John Cooper Wood.

June 1926

J. Andrews, Delt. & Zinco.

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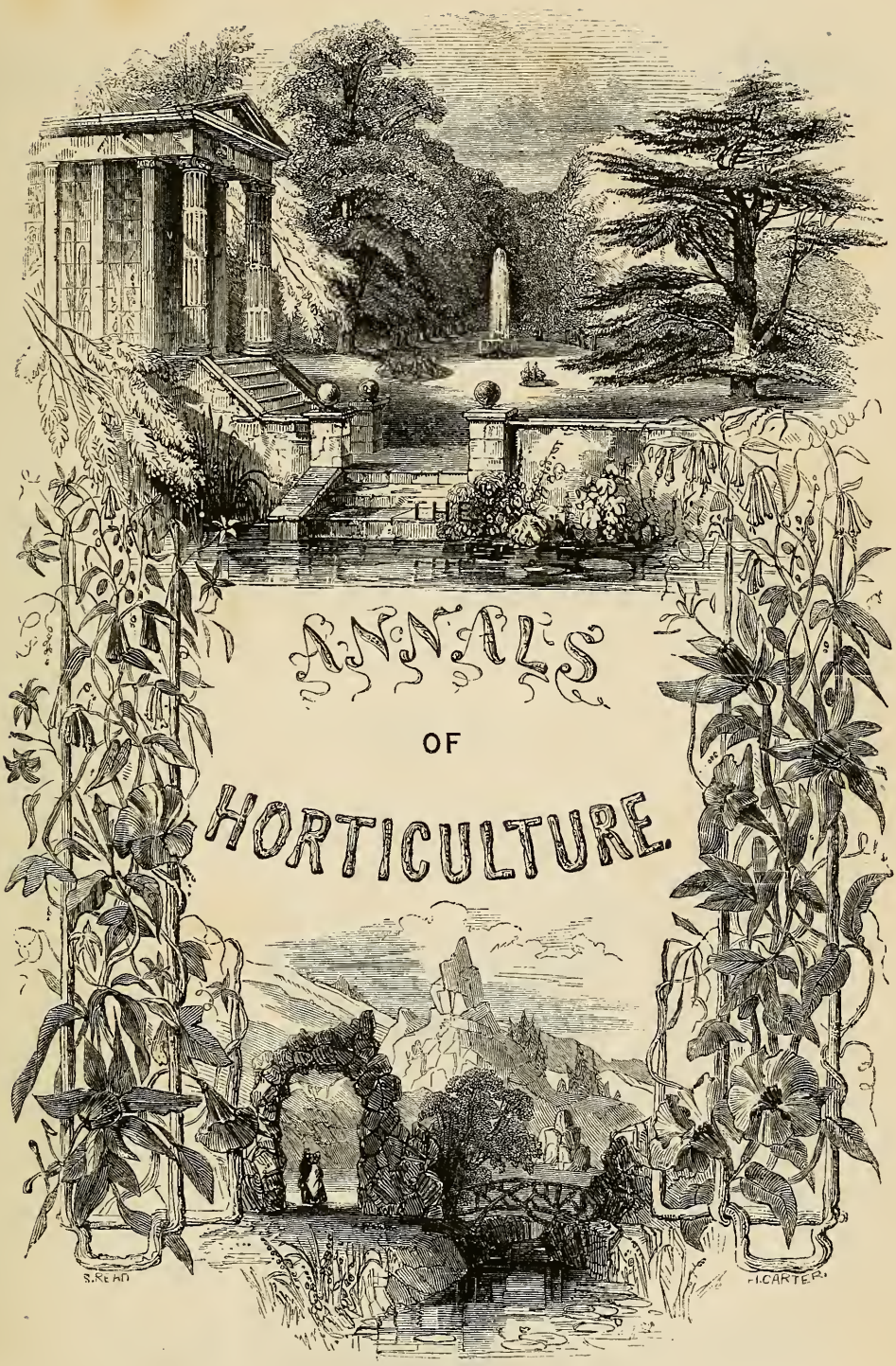

ANNALS OF HORTICULTURE.

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THE

ANNALS OF HORTICULTURE;

AND

Year-Book of Information

ON

PRACTICAL GARDENING,

FOR 1849.

LONDON:
CHARLES COX, KING WILLIAM STREET, STRAND.
1849.

TO

THE RIGHT HONOURABLE

THE EARL OF AUCKLAND

KNIGHT GRAND CROSS OF THE ORDER OF THE BATH

VICE-PRESIDENT OF THE HORTICULTURAL SOCIETY OF LONDON

&c. &c. &c.

THE PROMOTER OF HORTICULTURE IN BRITISH INDIA

AND ITS FRIEND AND PATRON AT HOME

This Volume

IS WITH HIS LORDSHIP'S PERMISSION

RESPECTFULLY DEDICATED

BY HIS LORDSHIP'S

MOST OBLIGED AND DEVOTED SERVANT

THE EDITOR.

PREFACE.

THERE are very few pursuits influenced by so many circumstances as Gardening; and we can imagine nothing more interesting to a lover of that healthful and delightful study than a collection of all the facts and figures that relate to it.

The raising of new varieties of Flowers, Fruits, and Vegetables, the importation of Foreign Plants, the scientific discoveries, the improvements in Culture, the results of experiments, &c.—are all matters of the deepest interest to the Amateur and the Professional Gardener, and indeed to all who take pleasure in, or who would keep pace with the advancement of Horticulture.

A faithful record of all these subjects, and indeed of all subjects of practical utility connected with Gardening, has been the object of this Publication; so that the "Annals of Horticulture" literally form a comprehensive History of Modern Gardening, embodying every improvement in the Science to the present day.

ILLUSTRATIONS.

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ERRATUM.

Page 294, second column, for *Anthemis* read *Anthyllis*.

THE FIG:

ITS NATURE AND CULTURE UNDER GLASS AND IN THE OPEN AIR.

The Fig is one of those singular kinds of frnit that are totally useless unripe, and however near they may come to perfection, any thing short makes them worthless. When thoroughly ripe they are very delicious,—when but a little short of it, they are mawkish, sickly, and even rank. It would appear that the last few days of solar heat changes the entire character of the fig, and if the fruit be gathered before this change, they are unfit to eat, and, unlike almost every other of Pomona's gifts, they will do for nothing but the pigs; they are of no use in tarts, they cannot be made into wine, and so far as we have been able to discover they are good for nothing. Strictly speaking, they require protection to bring them forward, although they will fairly ripen in a hot summer, on the open wall in a southern aspect, and we have even known them, in very favourable seasons, to ripen on standards. They are something like the vine for bearing frost, and bringing fruit, and the season that will ripen the black Hamburgh grape, will unquestionably perfect the fig. Of the different modes of growing the fig, we shall speak in the proper place. They are often grown in a house adapted exclusively to them; the back walls of a vinery, if the grapes are not allowed to cover the glass entirely, is a very good situation for a tree planted out. They may be grown in pots in any part of a grape-house. They do well in front of a stove—we mean outside—for the wall being always warm helps them on a good deal, and being near the ground they have the advantage of the reflected sun's rays. On a south wall they will require but little covering, and that is from the frost, when they once start; any thing short of a southern aspect lessens the chance of their doing well; and as to standards, although we have gathered them, or rather picked up a few fallen fruit under the trees, the great bulk have remained on and with no very ready prospect of coming to perfection. Under these circumstances, we will give a few directions to those who wish to cultivate the fig, premising, that first, the sorts must be well chosen, well potted or planted, well protected, and well attended, to give us any chance of success. We will treat of them under the several heads, dividing the subject into—

I.—The sorts to be chosen.
II.—The soil they grow in.
III.—Their treatment on walls.
IV.—Their treatment in pots.
V.—Their treatment planted under glass.

It will be seen that there is no more difficulty in growing figs than in growing grapes; that the same general principles govern the one as govern the other. That is to say, the plant that has too many fruit to swell and ripen will not

do it well, so that the fruit must be apportioned to the capacity of the plant; the roots must be in good soil, and they must be watched and attended to throughout all their stages of growth, like so many bunches of grapes, and be no more neglected than a favourite vine. There are early and late figs, as well as early and late grapes, and according to our intended object of getting very early figs, or very ripe ones, so must we choose our sorts and cultivate them. It is well known that a goodly supply was kept up at Covent Garden, by Hill, of Hammersmith, who grew them on the common walls of a kitchen garden; while others, with to all appearance a better chance, were unable to produce a single ripe specimen. Situation and soil may therefore have more to do with it than we give them credit for, and it is only by trying the best known methods that we can hope to succeed, and even then may have more trouble than we anticipate.

THE CHOICE OF SORTS.

The principal sorts recognised by Miller, Lindley, Loudon, and others, who have written on the subject, are as follows :—

Brown Ischia, Black Genoa, Small Early White, Large Genoa White. These, like some of our earliest grapes, have a better chance of ripening than any others, therefore they are chosen in preference to any other for out of door culture. There are many others that will do well under glass, and the choice may be made from the following :—*Malta, Murray Brown Naples. Green Ischia, Black Ischia, Small Brown Ischia, Yellow Ischia, Small Brown Italian, Small Black Italian, Common Blue or Purple, Long Brown Naples.* Any or all of these are good for the fig house, and nearly all are fit for potting. Loudon thus enumerates and describes the various kinds of fig adopted in English gardens, but this list is collected from other authors.

1. *Brown Chestnut-coloured Ischia.* One of the largest that we have : it is of a brown or chestnut-colour on the outside, and purple within. The grains are large, and the pulp sweet and high flavoured. It ripens in August, and if planted against a hot wall, two crops may be obtained annually.

2. *Black Genoa.* This is a long fruit, of a dark purple colour, the inside being of a bright red and the flesh very high flavoured; it ripens at the latter end of August.

3. *Small White Early.* The skin of this fruit is of a pale yellow, when ripe; the flesh is white and sweet; it is ripe about the latter end of August or the beginning of September.

4. *Large White Genoa.* This is a large fruit; the skin is thin and yellow when ripe, and red within; it is a good fruit, and is ripe about the latter end of August. This and the preceding will bear two crops annually.

5. *Black Ischia.* This is a middle-sized fruit; the skin is almost black when ripe, and the inside of a deep red; the flesh is high flavoured, and the trees good bearers.

6 & 7. *Brown and Black Small Italian.* These are cultivated in pots. The fruit is small, round, and very delicious. Forsyth gathered from one plant, in a twenty-four pot, two dozen of figs at one gathering.

8. *Malta.* This is a small brown fig; the skin of a pale brown, the inside of the same colour: the flesh is sweet and high flavoured; it is ripe in August and September.

9. *Murray Brown Naples.* This is a pretty large fruit, of a light brown colour, and the inside nearly of the same colour; the flesh is well flavoured, and it ripens about the middle of September.

10. *Green Ischia.* This is an oblong fruit, with a green skin, but being thin, is stained through of a brownish cast by the pulp when full ripe. The inside is purple, and the flesh high flavoured; it is ripe about the middle of September.

11. *Madonna, Brunswick* or *Hanover.* This is a large pyramidal fruit; the skin brown, the flesh a lighter brown, coarse, and has but little flavour; it ripens about the middle of September.

12. *Common Blue or Purple.* This is a large oblong fruit; ripens in August and a good bearer.

13. *Long Brown Naples.* The skin of this fruit is a dark brown when ripe, the flesh inclining to red; it has large grains and a good flavour, and ripens about the beginning of October.

14. *Small Brown Ischia.* This is a small pyramidal fruit; the skin of a light brown, the flesh of a purple cast and a high flavour; it ripens in October.

15. *Yellow Ischia.* This is a large fruit; the skin yellow, the flesh purple and well flavoured; it ripens in October.

16. *Gentile.* This is of a middle size; roundish fruit, the skin yellow, and the flesh inclining to the same colour; it has large grains and a good flavour; ripens very late, and the trees are but indifferent bearers.

It is quite clear, then, that from these descriptions, the very authority that quotes them as sorts for English gardens should have excluded both the Madonna, which he admits as "coarse and of little flavour," and the Gentile, which "ripens very late and the trees but indifferent bearers." The best for out-of-door culture are unquestionably the first four we mentioned, Brown Ischia, Black Genoa, Small Early White, and Large Genoa White. When you have obtained these and are doing well

with them, and, moreover, wish to increase your varieties, you may look among the others. For culture in pots you may, in addition to these, adopt the Small Black and Brown Italian, and for the regular fig-house and general in-door culture you may add the Black Ischia, Green Ischia, Small Brown Ischia, and Yellow Ischia. Many authors recommend others, but the distinctions are not for the better, and we have no notion of increasing the varities by adding worse.

We now proceed to the soil or compost. If good hazel loam from rotted turves, originally cut about three inches thick, could always be procured, not a single addition could be made with advantage. The quantity of decayed vegetable is at least one-third, or near half, and if the loam be not too adhesive, make no change or mixture whatever; if, howerer, it is too adhesive or marley, or would hold wet when squeezed together, there must be an addition of sand, in such quantity as will effectually make it porous, and as much decayed dung, that is thoroughly rotted into mould, as will compensate for the quantity of sand introduced; but in most cases turves cut from a pasture, laid together and rotted, form the very best soil in which to grow the fig, and, though it is no part of our subject to touch on other fruit, we may add, most other fruit trees, whether in the house, in the open air, on walls, or as standards. Other mixtures are resorted to and recommended, because rotted turves are not always to be had, and we then have to supply, as nearly as we can, a substitute for vegetable mould and for the dung which is in the top spit of all pastures. It has to be remembered, too, that the soil of the top spit of a pasture, which is the favourite store heap of loam in all gardens, is not so rich in vegetable mould by a great deal as turves cut three inches thick, or under, because the ordinary soil under the roots is three times as thick, however lightly it may be dug, and, consequently there is only as much decayed turf in three loads as there should be in one, and the rest has to be made up. In making, therefore, the borders for figs, dig out about eighteen inches, put two or three inches of brick rubbish at bottom, sloping from the wall to the front, which must for any tree be well drained, and if the soil has a good appearance, that is to say, if it is good loam, mix a little leaf mould, or, for want of that, rotten dung with it, and return it so altered to its place. If, on the contrary, it is cold, black, or sour, discard it altogether, and substitute peat, loam from rotted turves, or loam, dung, and leaf mould, and, if necessary, sand, well mixed, and on that border, which should be a south wall border, plant the trees, which should be one or two years old; plant no deeper than the collar of the root, and tread well in. You may then regulate your border, but never use it for any crop that will keep off the sun from the roots. Crowding a fruit border is highly injurious to any fruit that is growing on it, for the roots require the genial warmth of the sun as much as the branches.

We are taught by some writers to grow figs as standards, but where they succeed in one place they fail in twenty, that is to say, they fail to produce fruit in perfection; they will bear, and sometimes nearly ripen their fruit, but rarely bring them to their full flavour. Espaliers are no better than standards. The fruit is never so good as on a wall, and it is a waste of room to grow them without that, except as a mere curiosity. Having planted your trees on the wall, or rather close to it, nail the lowest branches horizontally, and the others down as low as will give them only room, and thus bring down the two sides as if arms of the tree, leaving the upper part or centre to be furnished by new wood. Thus far we have placed the fig in its proper soil and situation.

If, contrary to our advice, some are to be grown as espaliers and standards, all we can recommend is, that they be planted in a sheltered situation as near a south wall as they can be, and that stakes be driven into the ground to make standards fast, while the espaliers should be at once fixed on them, in the same fashion as they would be on a wall. A standard should be dwarf, the more so the greater chance of ripening the fruit, and the espaliers ought not to be more than six feet high. In the pruning of the fig as standards or espaliers, there is little else to do but to see that the branches are not in each other's way, not to cut back the wood of the present or past year, but to cut out whole branches that are too close, and cut them clean back to their parent stem, cutting out old wood always in preference to young, and, therefore, when it is necessary to take out a branch, cut that which has the least strong healthy young wood. The only chance for standards is to keep the heads open, that the sun and air may have free passage to all the branches. When it is necessary to thin the young wood, do not shorten any of it, but take out the weakest and thinnest close home to its base. The great fault of all pruning that we have observed, or nearly so, among out-of-door figs, has been the habit of shortening the young bearing wood, whereas this should be retained. There is only one exception, which is, that as the fig will struggle to yield two crops a-year, the spring shoots of wood yield a crop towards the autumn, and, if permitted, bear them just large enough to be totally useless, and to spoil the branches or shoots from bearing the

next year ; therefore the object is to advance the wood of midsummer shoots, which will bear the first crop in the early part of the next year, and to prevent the advancement of the spring shoots by way of encouraging the others. Therefore, when the spring shoots have pretty nearly attained their growth, they are broken off back to two or three eyes, which immediately push and ripen their wood by the autumn, and this wood gives you the spring crop, which will ripen ; whereas, had the spring shoots been allowed to perfect their growth, they would have been full of fruit that would have fallen at the first frost not a third grown. In warmer climates, both the spring and midsummer shoots produce their crops and perfect them.

RAISING AND PROPAGATING THE FIG.

Figs are raised from seed, and propagated by all the usual means of the most hardy plants, grafting, budding, layering, suckers, and cuttings ; the two latter modes are by far the best. From seed there is a chance of new varieties, but the fig from its nature is hardly susceptible of much improvement, and the period required is much longer than by any of the other methods of obtaining young plants. They may be sown in a common hot-bed in the early spring, and planted out at the foot of a south wall in June, where, with due attention to the watering required in so warm a situation, they will grow rather fast until the cold weather cuts off their leaves and puts them to rest for the winter. While young they are more easily affected by frost than when advanced ; a little loose litter, such as broken straw or peas-haulm, will protect them through the winter, and before they start in the spring, they should be all taken up, their long shoots pruned closer, and be replanted where they are to fruit, which may be on the same wall, at proper distances, or as espaliers or even as standards, if the determination be to grow standards at all. There is nothing obtained by grafting but the change of one sort of fruit to another. It may be available where there are already some of the worthless sorts in a good situation, because, by grafting better upon the strong old wood of an established tree, the formation of a new head is the work of a very short time. The grafting employed for this may be any of the most easy. The cutting of an angular gutter or groove down the stock on the side, so as to go through the bark, and then cutting two sides of the graft in a form to fit in the hollow, so that the bark of the graft and the bark of the stock meet at the edges, is perhaps the best, because, in grafting old stocks, the wood to be worked is always so much larger than the wood worked into it ; otherwise, when there are healthy branches that may be cut back only so far as to make the graft and the stock of the same size, a common splice will do as well as any other mode of joining ; but it must always be borne in mind, that the more stock there is, the more danger there is of its growing, and, if neglected, it will soon conquer and outgrow the graft. In this, however, as in all kinds of grafting, there are two or three conditions to attend to, and the rest may be managed any how. These conditions are, first, that the wood should be cut clean and square so as to fit close ; second, that one edge of the bark of the graft should exactly meet one edge of the bark of the stock ; third, that the juices of the wood should not have time to dry before the graft is fixed and tied ; fourth, that the external air should be excluded from the place of union until the parts are united. The relative size of the graft and the stock, the mode of joining, and all other points, are matters of little or no consequence ; some will cut a slit down the stock and pare the inside out almost like the inside of a common clothes-peg, and then cut the graft wedge fashion to fit it; others will cut the graft in that manner, and cut the stock into the form of the wedge ; others, again, will merely cut two long slopes, as if they were about to splice a broken stick ; but it matters not how it is done so that the above conditions are attended to, and the season chosen is the proper one, which in all cases should be when the stock and graft are upon the eve of growing. The lesser operation of budding is performed with little difficulty. The incipient bud, with a small portion of the bark attached, is inserted beneath the bark of the stock, which is slit down and crossed for the purpose of lifting it the easier from its wood, that the bark of the bud may be placed next the wood, and the bark of the stock lapped over it and tied down. There is no particular object attained by budding, unless it be that where the sort wanted is scarce, every bud will form a plant, whereas, in a general way, half-a-dozen buds may be obtained from a piece that would only make one graft ; yet the grafted plant will be sooner in bearing by a good deal, inasmuch as all the eyes will push at once and almost form a head the first season. The propagation by suckers is a self-operation. The roots of the fig, like those of many roses, currant-trees, gooseberry-bushes, and other shrubby-growing subjects, wander and throw up suckers in profusion ; and there is scarcely anything more detrimental to a tree or shrub than neglecting the removal of such suckers, always excepting when we desire to propagate by such means,

and even then they should be removed before they grow too large. Suckers should be taken off with roots attached at the fall of the leaf, and be planted at once where they are to fruit, or in nursery-beds, to grow into strength. If they are wanted for training they should be cut down to three or four eyes; if for standards they must not lose their leaders. But perhaps the layering is the most ready means of propagating strong plants. The branches for this purpose should be not the most vigorous; on the contrary, the short-jointed wood is the best. The branches have only to be pegged down two inches under the surface, and the end bent upwards rather suddenly, for the roots will protrude very rapidly from the joint where the bend is most sudden, and there is no occasion to cut a notch; but if it be determined to notch the place by way of directing where the root shall come, let the notch be just below a joint, but on the upper side of the branch. You will have to be careful that the joint be not broken off by the pegging down. If the operation be performed any time before the spring growth commences, the layer will be rooted enough to take off at the fall of the leaf, when it may be treated as suckers and seedlings are treated. Perhaps, however, the best plants are from cuttings; these should be taken from good short-jointed bearing wood, that is, ripened wood of one season; cuttings about a foot long, taken off at the heel, with a shield of the old wood at the base, may be put in pots, with the heel close to the drainage, and placed in slight bottom heat in early spring; see that they are regularly watered, and have air as soon as they grow. The cuttings may be taken off in the autumn, and plunged into the ground up to their tops, but they must be covered with litter or they will lose their tops. They are none the worse for either cuttings or grafts for their separation from the tree, but if there be the convenience for giving bottom heat, they will grow early in the spring and make good progress before they need be planted out or placed in the open air. These plants may be kept in their pots till the autumn, when they must be planted out or repotted in larger pots to use for forcing or growing under glass.

TRAINING AND PRUNING ON WALLS.

The fig, like many other subjects for wall culture, will grow best when trained fan-fashion; but the blunder which too many make in fan-training is neglecting to begin low enough, as if the fan were to be half open instead of quite open. The lowest limbs ought to be horizontal, and within four or six inches of the ground; there is no difficulty in filling the walls upwards; the branches immediately above the lower ones should be brought down to only a reasonable distance from the lowest, and all other branches be placed at regular distances, so that the wall, as far as the branches will reach, shall fairly cover it; as newer shoots come upwards, let them also be brought to their proper distances, so that in time the wall will be fairly covered. The horizontal growth should be encouraged, and the tree will in a very few years cover ten or fifteen feet on each side of the stem, and it is not desirable to encourage tall growth under any circumstances. The spring shoots will bear fruit in autumn if allowed to grow, but except where they are wanted to fill up the wall, and the ends of the branches extending sideways, all these spring shoots should be broken back to three or four eyes—not broken off, but broken down. Midsummer shoots, as they are called, will come from the eyes below the break, and these shoots will bear the crop in the following spring. Of course the tree looks untidy while the ends of the branches are hanging about, but if they were cut off instead of bent down, they would bleed and weaken the branch; in the autumn they are pulled or cut off, the shoots from the unbroken part being properly tacked to the wall. In the spring these shoots will bear the crop that will ripen. The new shoots of the spring will go on as before, and would, if not disturbed, bear a crop that could not ripen, but by breaking them again as soon as they have nearly done their growth, the midsummer shoots come from the three or four eyes left undisturbed, and again produce the wood for the next year's spring crop. Many gardeners pull off a good deal of the foliage, that the sun may get at the fruit. This may be carried to an extreme very easily as in the vine; but as every leaf a tree loses without the branch belonging to it, weakens it in some respects, the system is bad. Take care that the branches are not too close together; and to prevent this, the precaution of lessening the number must be taken in the early growth of the spring, for just as the bud pushes off a branch not wanted, it should be rubbed off. You have therefore to consider, when the tree first pushes, first, that every spring shoot shortened back produces three or four midsummer shoots to bear fruit the spring following, and therefore that you ought not to allow one more spring shoot than is necessary to grow at all; by rubbing off the buds, all the vigour of the tree goes to the few you allow to grow, and the chances are that you will require no thinning of the foliage; a leaf over a fruit is not too much shade, but if branches be allowed to

grow too thick, it may be much too shady to allow of solar heat at all.

TREATMENT OF FIGS IN POTS.

This of course is in cases where there is the means of protection, if not of absolute forcing. We have already provided for the striking of cuttings and raising of plants in pots, the next consideration is, how to fruit them. The grape is not unlike the fig in the treatment it requires, therefore we may be safe in placing the pots in a vinery ; but they will, like the vine, do in the common greenhouse, and all other houses for forcing. The plants must be checked in a very different way to those out of doors; the sorts we have mentioned already as the best for out-of-door culture are also the best for pots under protection, except that the Small Black and Brown Italian may be added. It will be taken into the account, that if the potted plants are kept in a vinery, they will yield two crops a-year, and therefore that there must be no shortening or breaking the spring shoots ; let them go on to bearing, because they will, if well managed, go on continually bearing and ripening one lot of fruit while another is only swelling, so that it will be found quite possible, and even probable, that three crops may be had in a year. The soil for pots should be the same as for the open ground ; in thirty-two sized pots they may be made to bear ; and, if the fruit be not so large as those in the ground, they will be quite equal, if not superior in flavour to any other. As, however, we want no knife pruning, or, at least, no more than we can help, there must be some watchfulness at each separate start of growth, because, if we allow a dozen branches to grow where there should be only half the number, the plant will require that which is an enemy to bearing, amputation with the knife ; rub the buds off before they attain any growth of consequence ; it is the only way to keep the plant within bounds. When the wood gets old, let young shoots come, and remove a whole branch to the very stem, by which means we keep up a succession of young wood, and get rid of the old ; for, let it be perfectly understood, that any system of shortening, to keep a fig-tree in order, is bad, that is, detrimental to the bearing. "I prune my figs every year very carefully, and I never get any fruit," said a gardener to us one day, and his wall-fruit trees generally were excellent and effective. "Let them alone very carefully," said we, "and you will see a difference." He did as he was told, and then he had two crops, one of which ripened, and the other did not ; from this time, however, he adopted the plan before laid down for figs on a wall, and he succeeded. We have known a market gardener to cover his autumn formed fruit all the winter, except mild days, and to save them by that means ; but when he built a small house against the wall, and enclosed one tree, he could ripen all the fruit, and grow little fig trees in pots in the size thirty-two, and produce a dozen and a half of ripe fruit at once on a single little plant. It is to be inferred, that the warmer the temperature of a house, the earlier will the fruit ripen ; but it is possible to over-heat a fig house at a time when it will cause all the fruit to fall off ; let the fig, however, share the fate of a vine or a cherry, and there is no danger. It is necessary to pot the fig up to the size thirty-two ; but, if it is in a good bearing state the second season, and unless you want to increase the size of the plants, let size twenty-four be the maximum. At the end of the summer, when the fruit is gathered, say September, the plants should be turned out of the pots, the matted roots be removed with a sharp knife, and, from the thirty-two, increase the pot to a twenty-four, putting fresh soil round the ball, and pressing it down close between the ball and the pot ; place the plant any where out of the weather and out of the way. If necessary to check the exuberance of the plant, keep it in the same pot another year, but remember that there be no shortening of young wood; cut small branches clean out if you will, and it is a good plan to do so when there are any, but it is far better to be looking out in time, and to rub off the buds instead of allowing weakly branches or shoots to grow. In pot culture a good deal of water is required, for the roots cannot travel after it, and especially when pots are small in proportion to the plant ; when the fruit is swelling, the watering is a most important object, and liquid manure may advantageously be applied if the pots are full of roots, and this is far better than enlarging the pots, except at the proper seasons. The largest pots that should ever be used for figs are sixteens; these are as large as can be lifted about easily, and are quite sufficient for growing the best fruit ; these pots should be placed in the grapery, stove, cherry, peach, or greenhouse, rather in the shade than otherwise, and there according to the climate, or rather the temperature kept up, so will the fruit advance, and it will not be at all uncommon to find the fruit in two or three different stages, but there will be abundance of it, with only the ordinary care and means that we have described. Fig houses are seldom erected, partly because, so far as temperature is concerned, the fig wants no other than the vine ; it will force, or come natural, or be merely aided a little ; in cold or heat it is equally healthy, although not equally prolific ; it is not worth while to bestow a house upon the

subject ; but everybody who has glass, from a greenhouse up to a stove, ought to grow a plant or two of the fig in pots, if they do nothing else with it.

TREATMENT OF THE FIG UNDER GLASS.

The fig planted against the wall of a house requires the same soil as elsewhere, and the house, or rather the roof of it, will be all the better adapted for it if there be a vine trained along the rafters, so as to partially, though not wholly, shade the tree from the burning sun. The sorts may be chosen from those we have mentioned, the descriptions will decide which are best adapted for the purpose ; the planting, training, pruning, and general treatment must be founded on the rules already laid down ; the forcing should be begun gently in January, February, March, or April, and the heat gradually increased as the growth advances ; but if the vines on the roof be forced, there needs no difference on account of the fig, the border in which the fig is placed being under glass, and consequently deprived of the usual supply of rain which would be its portion out of doors, must be regularly supplied. If the fires are begun in January, the fruit will be ready to gather in June or July, according to the sort ; and this does not prevent a continuance of the growth and of the bearing ; but we cannot help considering the culture of the fig on walls under glass a loss of room, and not worth the trouble. We recommend, most particularly, pot culture under glass, because you can regulate the seasons, the crops, and the quantity, by taking them into heat sooner or later, and in more or less quantity ; all not in use may be standing out under a south wall, but constantly watered and looked to as well as if they were in the house.

GENERAL OBSERVATIONS.

The fig is perhaps understood as little as any fruit under culture in this country, and, in general, as little cared for; certainly three-fourths of the figs produced at the deserts of the rich, or the markets of great cities, are of very inferior flavour to those imported; they have, for the most part, a rankish, earthy, and unpleasant twang ; the best are but mawkish and insipid. This entirely arises from imperfect ripening; and the same fruit, if well ripened, would be very different. They are as precarious as melons, and vary from insipidity to extreme richness; but the former so greatly predominate in number over the latter, as to be the rule instead of the exception. At the various horticultural shows, where we are to presume the gardener produces his best, they are very often poor, though we have discovered here and there a few samples that remind one of what the fig must be in its own country and climate; but, inasmuch as we can produce the grape, the pine, and the orange, as fine as they can be in their own land, there is no obstacle to our producing the fig in equal luxuriance and quality for flavour and ripeness. To accomplish this, pot culture is the safest, and the half dozen sorts we have recommended are the best ; vary the houses, the temperature, and the subjects which share the room in the houses how you like, you will soon find that the fig tree is as obedient as the vine, and will yield to proper treatment, at all seasons, plenty of good fruit, which may be produced, by a little trouble, at as many different periods as the grape, and in quite as great perfection. Our illustration is from Loudon's *Arboretum Britan.*

THE RANUNCULUS.

We have often thought it a great pity that this most splendid flower should become comparatively neglected ever since all the humble florists of Bethnal-green, Hackney-road, Mile-end, and other localities of the metropolis were deprived of their little gardens—for those were the classes who most indulged in the culture of the flower—and whose deprivation of their gardens to make way for brick and mortar dwellings was a real loss to floriculture. But it is very remarkable that a flower which is so superb in its perfection, and which presents us with so many varieties that have nearly attained that state, should not gain ground among those gentlemen who take some pains with their villa gardens, and grow with care many of our florist flowers. It is true that many cultivators have, as they call it, tried to grow them, but find they degenerate with the management they have received. But some great point has been overlooked in, we had nearly said, ninety-nine gardens out of a hundred round London, and that one point is fatal to all the delicate florist flowers of which the auricula, the ranunculus, the double anemone, and some others we could mention are the most remarkable. That oversight is want of draining. Stagnant water is death ; it is to the ranunculus plague, pestilence, and famine. It is as possible to transmute lead into silver as it is to grow the ranunculus long together in undrained ground. By this we mean ground which has stagnant water in it. We do not deny that there are gravelly soils which carry off the water and form a natural drainage, but there are also hundreds of gardens on gravelly soils which do not. There are those who smile at our endeavours to persuade them that the ranunculus, which is so greedy for water, and requires so much, should fail in undrained ground, because it is undrained, and set up their judgment against ours ; but, with great submission to their

knowledge, or fancied knowledge, we know from actual experience that they are wrong and we are right. But one of these gentlemen, who knows so much, and is fond of even writing the quantity he does know, assures us, on actual experience, that he has followed our directions, well drained his bed, used the best loam from rotted turves, and done every thing we have at various times said should be done, and yet he failed as much as he did in other parts of his garden. It is worth noticing how easily a man may deceive himself. We examined his bed ; we found a foot-and-a-half of excellent loam, and at the bottom of this a foot of brick rubbish, the natural soil being a stiff loam very retentive and as close as clay ; and he maintained that there could not be a better drainage, because the excess of water would run down into the brick rubbish. The only mistake he made was, that when it had run there it stopped there. He had forgotten a very essential point, and we said so. He defied us to suggest better drainage ; it was as good and on the same principle as the drainage of a flower pot ; but our worthy friend forgot the hole in the bottom. He had sides and bottom that could hold water like a leaden cistern, but there was no outlet; so that there was, for the whole season, the accumulation of his watering as well as of the rains ; and his well drained bed, as he called it, was always full of stagnant water. Here was, and here is, the grand secret: drainage is getting rid of the water ; all pretences that fail of this are useless. Had this gentleman made a drain from the bottom of his bed to run the water off, he had been right enough ; but brick rubbish is no better than any other rubbish if the water is to lay in it. We attribute the failure of many things in many gardens to the stagnant water in the soil, and all make-shifts, all partial draining is not so effective as draining the whole garden. If a man grows florist flowers—there are pounds' worth of plants go into a small compass—his crops, as it were, are beyond price. He is unable to estimate the cost of his stock, because the plants have been bought at so many different periods. Pansies have been tried and failed, pinks have been tried and failed ; twenty other kinds of flowers have been tried, but by degrees have got worse and worse. It has all been attributed to the air and situation, when it should have been laid to the want of proper drainage. But it may be said, "Mr. This grows them without draining his garden, and Mr. That has never drained his ; it cannot be that." We say it can be, and is that. Mr. This and Mr. That possess only two out of the hundreds of gardens in which they have been grown ; and they occupy gardens which have good natural drainage, and that alone accounts for their growing successfully flowers which other people cannot grow. The ranunculus must be left alone unless the ground is effectually drained ; the soil should be clear loam with vegetable mould ; and when dung is used it must be clean cow-dung, rotted into mould; new cow-dung, though strongly recommended by one grower, who has made however but a poor job of it, brings the fly and the maggot. Let our friends around London, as well as elsewhere, grow them again with fair means, and this most beautiful flower will once more progress. Lightbody, of Falkirk, and Reid, of Dunfermline, have always been successful; they have superb varieties which nobody has equalled, and a lesson out of their book will do great service.

THE GENUS BURTONIA.

A LARGE proportion of the finer hard-wooded greenhouse plants belong to the group of Papilionaceous plants ; that is to say, those which have butterfly-shaped flowers, similar in structure to those of the pea, the bean, the lupine, and many other familiar flowers and plants. This race of plants is invaluable to the cultivator, the great majority of the plants being objects of the greatest beauty under a proper course of culture. The greatest objection that arises is, that the colour prevailing among them is yellow—a common colour—varied indeed through many shades, but still having the xanthic tinge conspicuous. To this general rule, the genus Burtonia presents some exceptions, the flowers of several of its species being of a purple colour, and moreover very handsome. Hence, they are most desirable plants in a collection, however limited its extent may be.

Till recently, but one purple-flowered species of Burtonia existed in our gardens ; two others have however been recently added. They are all plants of high merit, and though perhaps too similar in general appearance to be all admitted to a very limited collection, yet in none should one or other of them be omitted ; and where there is space for them, we should recommend them all to be obtained.

The yellow-flowered species of Burtonia introduced to this country in a living state are the following :—

Burtonia scabra, Brown.—This has pubescent branches, scabrous leaves, formed of three linear-subulate leaflets, and yellow flowers. It is a shrub growing to a foot-and-a-half high. Introduced in 1803.

Burtonia sessilifolia, De Candolle.—This has hairy branches, smooth leaves of three linear-subulate sessile leaflets, and yellow flowers. A shrub growing about the same size as the last. Introduced in 1824.

Burtonia minor, De Candolle.—This has

hairy branches, smooth leaves of three leaflets as in the others, and yellow flowers. A shrub growing from six inches to a foot high. Introduced in 1812.

Three purple-flowered species have at the present time been introduced ; and it is these to which we would especially direct attention ; they are as follows :—

Burtonia conferta, De Candolle.—A small bushy, heath-like shrub, growing from one to

Burtonia villosa.

two feet high, with smooth branches, and smooth crowded simple linear-subulate leaves; the flowers are purple or violet coloured, very pretty. Introduced in 1830.

Burtonia pulchella, Meisner.—A small graceful shrub, growing from one to two feet high, with smooth slender branches, and smooth sessile trifoliate leaves, the leaflets of which are narrow-linear and obtuse, with revolute margins ; the flowers are rich purple, produced copiously along the upper part of the shoots. Introduced in 1846.

Burtonia villosa, Meisner.—A small heath-like shrub, about the size of the others, with hairy branches, and hairy trifoliate sessile leaves, consisting of linear obtuse leaflets, having revolute margins ; the flowers are rich purple, but paler than those of *Burtonia pulchella*, while at the base of the vexillum is a conspicuous yellow spot ; they are produced copiously from the axils of the upper leaves. Introduced in or about 1846.

The merit of introducing the two last mentioned species, lies, we believe, with Messrs. Lucombe, Pince, & Co., of Exeter, who received the seeds of them from Mr. Drummond. All the species are natives of New Holland, and all bloom in the spring and early summer months.

PROPAGATION.

These plants are propagated by means of cuttings of the young shoots taken when about two inches long, and planted in sand, covered by bell glasses, and set where there is a gentle warmth. The process is this :—The young cuttings are taken off by a sharp knife at the required length ; they are then trimmed, all the lower leaves for about a third of their length being cut clean off by a sharp small-bladed knife ; the base of the cutting is then cut across horizontally on a level with the point of attachment of the *lower* side of the leaf to the stem. They are then ready for planting, but the pots should have previously been prepared in readiness, which is done thus :—A pot of a greater diameter than the bell glass to be used is selected and cleaned if necessary ; a large piece of broken pot is laid over the hole in its bottom, and on this as much broken potsherds as will make the pot one-third full ; next follows a thin stratum of the fine fibre of turfy peat to keep the soil from falling down among the potsherds. The pot is next filled up to within an inch of the rim with sandy peat soil, pressed down close and equally all over ; a layer of about an inch of pure white sand pressed quite firm, completes the preparation. The materials should be in the intermediate state, between wet and dry, rather inclining to dryness that the particles may be pressed close without adhering. When the pot is filled up in this way, the surface being quite level, the bell glass should be put on and gently pressed, so as to leave the mark of its edge on the sand ; the cuttings are to be arranged within this mark. A piece of blunt pointed stick is used as a dibble to plant them with ; this should taper very much, the point being about twice the thickness of the base of the cuttings, and cut square across. This is inserted in the sand, and slightly turned, so as to come out clean, leaving a hole open, the

bottom of which is to be just deep enough to allow the end of the cutting to rest on it, while it is buried not more than about a third of its length. The base of the cutting resting on the bottom of the hole thus made, the little dibble is pressed into the sand, just clear of the former hole, at two or three points; this presses the sand firmly against the cutting, which thus becomes fixed. All the cuttings are thus planted, and then the whole receive a gentle watering from a pot having a *very fine* rose attached to its spout. As soon as the cuttings and sand have dried a little, the bell glass is put over, and the pot set in its allotted place. A very mild tan-bed is an excellent place, and any place where there is a mild degree of heat is preferable. The bell glasses have to be wiped dry every day, the cuttings shaded when there is bright sunshine, and watered gently from time to time *before* the sand gets dry. When the cuttings begin to grow the glasses should be tilted aside for a few days, and then removed entirely, the plants being now fit for potting separately.

Seeds produce the best and most vigorous plants, and whenever they can be had, they should be preferred before cuttings; they require to be sown in well-drained pots in a compost of peat and loam, made rather sandy by the admixture of the pure white sand. The seeds should be covered about their own thickness with fine soil; and the pots may be set, as before, under the influence of a gentle heat. The soil must be kept moderately moist. When the young seedlings have grown fairly up, and formed a pair or so of leaves besides the seed lobes, they may be potted singly in the same way in the cuttings.

GENERAL CULTURE.

The young plants, both cuttings and seedlings, may at first be potted singly into the small pots called thumbs; these are prepared by placing a piece of crock at bottom as large as will lie flat, and then about three-fourths of an inch of broken crocks of the size of peas, followed by a few sprigs of moss to separate the drainage from the soil. The plants should be potted rather high; that is to say, they should not be planted lower in the soil than they have been previously; the roots must be laid easily among the soil, which ought to be gently pressed, but not too much consolidated. They require after potting a close frame and a little warmth, which latter should however be very trifling—about 60° in the soil, and 45° in the atmosphere. Watering must on no account be neglected, for this would ruin the plants; the soil ought to be kept just moderately and thoroughly moist; wet soppy soil is decidedly injurious, dry parched soil is death. Nothing but vigilant attention can avoid falling into these extremes. The soil should consist of a mixture of very sandy loam, and good fibry peat, the turfy parts of each; these should be mixed in equal quantities, and about an eighth part of silver sand should be added, and the whole well blended. Similar soil, though rather less sandy, may be used at the successive pottings, which should take place as often as the previous pots become fairly filled with roots,—between the months of February and October. From October to February exclusive, it is seldom desirable to re-pot shy-growing plants of any kind. The fresh pots must not be too large; thus, from a thumb-pot the shift may be to one just over three inches in diameter; this again to be exchanged for a six-inch pot; then a nine-inch; then a twelve inch, and so on, if still larger sizes are required. In every case, the pots must be well drained, the drainage being increased in proportion to the size of the pots.

Reverting to the young plants: when they are fairly started for growth after being "potted off," as the first potting is termed, they must have air given to them, at first gradually, until they are enabled to bear full exposure to our climate in the same degree as the older plants do. From this time, a cold frame is an excellent situation for them during summer weather, and in winter they must be kept in a light airy greenhouse. In the former situation they are best covered by the sashes during the middle portion of the day in hot weather, a shade being thrown over the glasses, and these tilted up alternately back and front, so as to admit of a circulation of air. The frame should also be elevated clear of the surface which it covers, so that a current of air may constantly play about the plants at all times. Drought and scorching sun are the principal enemies to fight against in summer. In the winter, on the other hand, the greatest apprehension is to be excited by the fear of over-watering—the opposite extreme. The various re-pottings should take place when the roots begin to thicken around the soil in the old pots.

We have not yet mentioned pruning, not however that it is unimportant in the formation of a handsome plant; on the contrary, it is impossible to form one of the thick bushy objects which are now only looked on as handsome specimens, without following up pruning almost incessantly; but it is pruning of a peculiar sort. The branches must not be allowed to grow at random, and then cut back severely to prevent the plant from getting lanky. The young shoots must, *from the very first*, be continually nipped as soon as they have grown about two inches long; this

causes them to push out other shoots which would otherwise have been dormant, and so the multiplicity of branches necessary to form a stocky bushy plant are produced in an incredibly short space of time from the little single sprig which formed the cutting. The principle of this matter, is to pick out the heart—no more—just as soon as the shoot has reached the assigned limits, the actual length allowed being of course regulated by circumstances, but while the plants in process of formation, the shoots should seldom be left longer than two inches. Plants so treated need no support in the form of stakes or trellises, but form a compact even head, almost in contact with the soil.

A STROLL THROUGH THE GARDEN,

BY A TUTOR AND HIS PUPIL, IN THE MONTH OF JANUARY.

Now, my young friend, as you are anxious to know something about horticulture, and the weather is very fine, we will take a walk and see what is going on in the kitchen garden; for that is the most useful part of the establishment, because it provides us with all the vegetables you see at table from time to time. Now bring out your little book, to take notes of those facts which it is desirable to impress on the mind.

When you inquired, the other day, the meaning of gardening, I told you it was the art of cultivating in one place, and in great perfection, a variety of those vegetable productions which nature brings forth at very distant places and of an inferior quality. I explained to you then that the wild cabbage, the wild plum, and nearly all other subjects that grow naturally and unassisted by art, were scarcely eatable, while some, by the difference of treatment alone, and others, by improvement of the breed, become the excellent fruits and vegetables that you see every day on the dinner table and in the dessert.

As an instance of the difference of treatment improving a production, you remember the wild celery I got for you in the lane the other day. It was strong, and bitter, and green all the way down to the root, but it was like the green part of the celery you see every day. I will not say that this breed has not been improved for size and solidity; but, if a plant of the wild celery were taken up young, brought into the garden and grown as you will presently see our celery is grown for table, it would have a considerable quantity of white and comparatively mild eatable stem to it. This is caused by drawing earth to the stems as fast as they grow up, and thus keeping them from the influence of the light and free air, which would turn all our best celery green. Another instance of this may be observed in the common weed called dandelion, which grows rank and green by the road-sides, yet is picked and used for salads in its wild state; but, if treated in the same way as endive or lettuce, and tied up to blanch, it would scarcely be known for the same plant, so much does the flavour and texture improve. I might tell you of many things that are improved by the means used in producing them; but the greater part of our garden vegetables and fruits are improved by sowing seeds and marking the best, to save seed from every year; and as each season some one may be found better than the rest, to save the seed from for the next year, there have been great improvements made from time to time, until we have produced many things so different from the original or wild subject, as would scarcely be known. Yet there is a great disposition to degenerate; and if we sow the pips of apples, or the stones of peaches or cherries, nine out of ten, or perhaps ninety-nine out of a hundred, would produce only wild and useless fruits. The apple-pips would bring crabs, and the peach-stones a sort of wild almond, while the cherry-stones, for the most part, would produce the wild cherry-tree. But there may be, and generally are, some exceptions; and it is from these that new varieties are and have been produced.

But we have arrived at the garden. I shall take you to the man who is digging yonder, because I want to explain to you the nature of all the principal operations, and that is almost the first that is performed on a piece of new ground. Observe, he has just dug a trench or gutter, you see, a foot wide all along one end of the piece he is going to turn up, and is wheeling away the last of the soil he has dug out, to the piece of ground just beyond the space he is about to dig. He does this for a purpose which I shall explain presently. When he returns, he will leave his barrow there, as he has done with it for the present. Now you observe he puts his spade in the ground about six or eight inches backward from the trench or gutter he has made, and thrusts it into the ground with his foot; then he bends the handle backward, which loosens the earth that is on his spade. Observe, he then puts his left hand as close down as he can to the blade, lifts up the lump of soil, and, by a jerk of the spade, throws the earth bottom side upwards into the gutter he first made. Now observe, he takes another spadeful further on and does the same, and so

keeps on the whole length, by which he has partly filled up the first gutter he made, and has made another further back. And if you notice properly, you will see that when the soil does not break into pieces and crumble by itself, he chops and knocks it about with his spade, to break it, and he also lays the top as true as he can as he goes along. As we have seen him dig several rows, we will go and see what the man is at with his rake yonder, and come back to see the fruits of this digging; and as we go along, I will explain what the digging is for, and what effect it has, for this is one of the greatest contrasts that gardening forms when compared with nature in her uncultivated state. Ground, in a state of nature, is so hard that, unless it is after heavy rains, seeds cannot send their roots into it; hence, millions of seeds that fall upon the earth are wasted, and those which do grow are very much stunted for want of nourishment. Now, the digging not only softens the earth and lets the air into it, which encourages the roots of plants to shoot vigorously into it, but it renders the soil so porous that the rains sink down into it and afford the most effective nourishment that can be given; so that generally the more the soil is dug and stirred about, the better, and the deeper it is dug, the better; for although the soil, the depth that a spade reaches, may be very good, and below that depth may be very poor and bad, even the stirring of that for another spade deep would be beneficial now and then. Sometimes the ground is good the full depth of two spades, and in such a case as this the bottom spadeful or spades' depth, having been idle a long time, and also having received all nourishment that has washed down with the rains, will be much stronger for cultivation, and should be put at the top, and the top spit at the bottom, by means of double digging or trenching, which, if I mistake not, we shall see going on to-morrow.

We have now to observe this man who is drawing his rake and pushing it backwards and forwards on a piece of dug ground, and every now and then he turns the back of his rake next the ground to break the lumps, so that the surface may be quite level. I see he is about to sow that piece with various kinds of seed. You see he has marked out a piece about four feet wide; that is for onions, not the main crop, because it is too early. Just notice how thinly he scatters the seed on that piece, what a little he seems to have used: the truth is, that if he could do it, he would sow all of the seeds four inches apart, because that is as near as the onions could grow to their full size; but as he cannot, he sows them as thinly as he can, to make sure that there are no larger vacant spaces, and will wait till they are up and then take away those that are not wanted, so as to leave them at a proper distance. Now observe, he takes the rake again and moves it all over the surface, so that the teeth make little furrows, into which the seeds fall and get covered by the continuance of the operation, for as he makes new marks or furrows with the teeth of the rake, which he moves in all directions, he turns up the old ones, so that the seeds get covered with soil. Now he uses that heavy iron roller to press the soil down upon the seeds and keep in the moisture. Now, you observe, he has changed his implement from a rake to a hoe, and has taken up a garden-line, which is wound round a sort of iron swivel on a spindle, and one end of it fastened to a simple iron spike. He is now going to make what are called drills, that is, small furrows, at equal distances, in which to sow peas. Observe, he thrusts the spike which has one end of the line to it, fast into the ground, just two feet six inches from his onion-bed at the further side of the piece. As he comes across the ground, the line unwinds, and now giving it two or three turns round the spindle, so that it should not loosen, he stretches the line as tight as possible, and thrusts the spindle into the ground the same distance from his onion-bed at this end. You must now take notice that the line is so tight along the surface of the ground, that if it be pulled or pushed on one side, it springs back into its place again: for instance, he is drawing the hoe all along one side of it to make a sort of gutter or furrow with the corner of it, and although he presses the cord on one side every now and then, it recovers its place again directly. Now this furrow, which is about two inches deep from the surface, has a sort of bank by the side of it, formed of the soil that has been drawn out of it. Observe, too, that he moves the line forward exactly two feet six inches at each end, to make another such furrow, and he will continue to do so all through the rest of that piece of ground that he has raked after digging; he will then sprinkle peas along the bottom of the furrows, an inch apart, and with the back of his rake he will draw down a part of the little bank, so as to bury the seed an inch deep, and press it on the seed a little. Both peas and onions will then be left until they are fairly above ground. Let us now turn back to the digging, for by this time the man must be getting pretty well through his job. You see he has now come to the end of the piece, and there is a vacant trench all across his work. Now observe, he is filling up the last trench or furrow with the earth he dug out of the first, and wheeled in the barrow to this end, so that the whole piece is level; and the soil

being loosened so as not to lay so close, stands considerably higher than the part which is not dug. Now all this piece is ready to sow or plant, as the case may be. We will take another walk to-morrow, and see what will be done with it; but it will take no harm if it remain uncropped for a considerable time; but as it is usual to leave the work rough, just as it turns up in lumps, when it is to be empty some time, it will most likely be cropped to-morrow or next day. The reason why ground is left rough when it is not to be filled directly, is because the weather shall penetrate it better. If a frost comes on while the earth is purposely laid rough, it freezes the lumps, and when it thaws they are completely rotten, as it were, and pulverize almost without touching. Nothing is more beneficial to the earth than seasonable frosts, and the more they penetrate the soil the better the effect. We will go round the other side of the garden homeward, to see what they have in those beds. These are all young cabbage plants, ready for planting out; they were sown at the end of the summer, and as soon as they were large enough were pricked out in their beds six inches apart, as you see them; they have now gained strength enough to be planted anywhere for the completion of their growth. Under these glasses there are cauliflower plants, which will be planted out as soon as the chief of the cold weather has gone. You see the glasses are taken off this mild weather, but at night they will all be closed up, and if there be any signs of frost the glass will be even covered with mats. Those hand glasses that are tilted up on one side with bricks, cover over cauliflower plants that are forwarder than those in frames; they have been planted out these two months, and being covered with those glasses they have not been checked by frost or cold winds. If you notice, there are three under each glass; these are tilted as you see them, in mild weather; and when very fine, and the sun out, the glasses are taken off. There is plenty of room to put the glasses between the patches. In windy weather the glasses are tilted on the side opposite the wind, so that they get air without being dried or checked by the wind. That large heap of smoking dung is to make a hot-bed with. We shall see in a day or two what that is intended for. Here is a large piece of ground that has been laying in ridges some time; this is done that the frost may get through it more completely than it can when it is only left rough. It is not always necessary; but if you notice, you will see that the ground is very stiff and clay-like compared with the other part of the garden. It has been only lately taken in, and was only grass-land two months ago. We will now return: we have seen enough for one day. Recollect that in gardening nothing is done without an object, and I shall endeavour to make you understand what the object is for every operation we see performed.

As the weather is frosty this morning, we shall find every thing that is at all tender closely covered up; and this sudden change shows the necessity of covering up at night even when the temperature is mild, for we cannot calculate on the continuance of warmth, even for an hour, after sunset. There is no digging or sowing going on, for the ground is quite hard, but I see the gardener is about to make his dung-bed. You observe that the wooden frame which is to go on the top, lays on the ground; he has placed it there that he may mark out the size he wants to make the pile of dung on which it is to stand. Take notice now that he is measuring a space just one foot all round larger than the frame itself, and he drives a stake down at each corner, leaving as much out of ground as the height of the dung is to be; now he takes the frame out of his way, and from the large heap he shakes out the hot dung evenly over the square place confined within the stakes. He will continue this until he has piled up the dung four feet high, patting it down with the fork which he uses, but not treading on it or compressing it too much. As it will take him some time to finish his job, and the process is only a continuance of what we have just seen, we will move onwards, for it is too cold to stand about. The heap of dung from which he is taking all he uses, is not as it comes from the stable, for the heat is always irregular, but it has been shaken out, just as he does it for the hot-bed, four or five times; and where it has been very hot, and therefore become dry, it has been wetted; and when the heap has been lying together a few days, it has all been shaken out again and sprinkled with water every foot of thickness, that the whole body may be damped or rather kept damp. After four or five turnings over and occasional waterings, the heat becomes alike all over, and it is in the state you see it. This frost is not severe enough to kill the brocoli, for that plant will bear a good deal. You see a good deal of it may be cut for use, as the sprouting sort is showing flower buds. These savoys also are not easily affected; they are said to be better and more mild and tender after a good hard frost than they are before it or without it. Observe, there are several different crops of this useful winter green, some well hearted and quite hard; some smaller, that are hearted but not hard, and the most backward are only turning in their centre leaves and beginning to heart. This border, covered with litter, contains radishes and cabbage

lettuce, both up and doing well; but had they been left uncovered last night, they would have perished; the litter must not be removed while the frost lasts. Yonder, I see, is a man pumping water on the wall through a fine rose, which is something like the rose on the spout of a waterpot, only that the holes in those garden engines are made of various sizes, that the water may be forced through in small streams, as fine as dew, or coarse, like rain. The rose he is using has very small holes. The object in this operation is not easily guessed; but if you notice the part of the wall that he has left, it is completely coated with ice, and as the water, fine as were the particles, was forced from the engine, it filled all the crevices, so that all the insects that may be lodged in and about the wall are frozen in solid ice; and it will be few, if any, that will escape with life—insects and eggs will be destroyed. If the man sent the water in larger streams, it would not freeze so quickly. Frost is a great destroyer of animal vitality, as well as of vegetable life; and although everybody is not aware of the good done by watering a wall, it should never be neglected if the opportunity of a sharpish day-frost offers itself. Let us now turn back, and see how the hot-bed progresses. I see he has completed it, and placed the wooden frame on the top, and the glasses upon that. The dung, you see, projects a foot all round the frame; the only object of this is the additional body of dung for the sake of the heat being greater and lasting longer than it would with a less quantity. Since we left, he has made another bed half the height of the other or rather more; this is intended for asparagus. He has already put three inches thickness of soil upon the dung inside the frame; upon this he will place, side by side, as thick or rather as close together as he can pack them, the roots of three year old asparagus, or older if they can be got strong and healthy; these he will cover up with soil three inches thick above the crowns. The reason for not building up the dung so high as the other bed, is that the heat is not wanted so great, nor is it required so long as that for cucumbers or melons, which the larger bed is intended for. A great body of dung will sometimes heat very much more than it ought, notwithstanding all the precaution we can take; therefore it is necessary to watch narrowly the first few days. The wooden stake you see thrust into the side of the dung, reaches to the middle, and by pulling it out and feeling the end, you may always tell the heat of the centre. If it is found too hot, and likely to burn, it must be taken partly to pieces, shook out again, and remade; but if the previous management of the dung has been right, there will be no trouble. The gardener has tilted up the glass behind, to let the steam out of the large bed, but the lower one is closed up. The steam that goes through the mould will be sweet and wholesome; besides which, it will take some hours to heat through the mould which covers the dung. I wish you to remark the difference between the weather of to-day and yesterday—one, all sunshine and warmth, the other, cold, frosty, and cheerless. This shows that no unconditional directions can be given for any particular month, because here we have two consecutive days in January, one of them a summer's day, as it were, and the other hard winter. We will not lengthen our walk to-day: the house is the most comfortable place, for it has begun to snow.

As the snow has all thawed, and it is more than a week since we took a walk in the garden, we will take a stroll down some of the principal walks, though there is not much going on. Now observe this lump of earth, which before the frost, was as hard almost as a brick, you see I can crumble it with my stick; but it would not do to work upon it yet, for the feet would press it again together into hard lumps, which would perhaps remain so for months when dug up again; the thaw expands the water that is in all the pores of the earth, and that pushes all the particles away from each other, and completely breaks the texture; but whenever it is trampled on, it would be again compressed into its clay-like structure, and require enormous labour to chop it or knock it to pieces. You see the frost has even made the gravel walks rotten, but the heavy roller passing over this will set it to rights. I see the gardener has completed his asparagus bed, and has put three heaps of mould on the cucumber bed, one under the centre of each light. These heaps have been in two or three days, to make the warmth of the dung penetrate them. See, he is coming with some cucumber plants in pots: let us pay attention to his proceedings. You see the soil which he put in a heap like a cone, he now stirs round in the centre, by which he forms a sort of basin, throwing or rather pushing the soil over the edge to run down the side of the cone. Having made this basin or hollow, he now turns the plants out of the pots, and does not disturb the ball of earth that comes out of the pot whole, but places it in the centre of the hole and presses it down, so that the bottom of the ball of earth is only three inches from the dung; he now draws down enough of the soil to cover up the side of the ball to the surface, and having watered it, to settle the earth close to the ball: it is done. He will do the other two just the same. In a few days the roots of the plants will have

spread so much as to protrude through the sides of the heap of earth, when some more soil will be put round it, and by degrees the earth will be added, and the whole levelled, so as to be six inches thick all over the frame. But you naturally enough ask how he got the plants. Half a dozen barrow-loads of dung were put in a heap, flattened at top, and two or three inches of soil laid on, three cucumber seeds were placed in each of half a dozen pots, and these pots set upon the dung, with a hand-glass over them; they are very soon up; and some air was given by an opening in the top of the hand-glass. As soon as there are four rough leaves, the points or growing parts were nipped off, and they progressed in their temporary abode until brought as you saw them to-day. But we shall see more of them by-and-by. At present there is nothing more to observe on this side the garden. The frost has not hurt the brocoli, though it has touched it a little. The savoys, cabbage plants, Brussels sprouts, and Scotch kale, appear none the worse. The short sticks that have been stuck to the few rows of peas under the south wall seem to have protected them well; and now that the litter is removed, you see the only ill effect of covering the radishes and lettuces is, that they look a little paler green. This will be removed, in a very short time, in the full light, for it is the operation of light and air on vegetation that causes the natural colour of the plant; as I have already explained to you, with regard to celery, which is white as high up as you bury it in the soil, and this holds good with all plants; according as they are more or less covered up, they are paler or almost white. Cabbages and lettuces show it in the closeness of their hearts, for, if you notice, although not buried in the ground, still they are hidden from the light and air by the outer leaves, and the nearer the leaves are to the outside, the more green they are, while those that are quite exposed are perfectly green. This will explain to you why gardeners tie up cabbages and lettuces; for although good ones will always grow into good solid hearts, the gardener is anxious to produce pale hearts earlier than they would naturally grow, and therefore ties them tight round with a piece of matting, to exclude the light and air from the inner leaves of early growth. To-morrow, if the weather holds fine, we shall see them busy in the garden, for this dry day will make the ground work pleasantly, and it will be in excellent order for planting or sowing. I see you have been making notes, let me read them. They are short, but to the point: you cannot do better than continue them; you can enlarge upon them at your leisure.

"Gardening is the art of cultivating in one place and in great perfection, many different kinds of vegetables that grow naturally at distant places, but of inferior quality.

"Improved varieties are produced by sowing seeds, and always saving seeds from the best, by which, in the course of time, we get new and better varieties.

"The earth is dug to let the air and rain in and to loosen it, so that roots may easily penetrate it.

"The ground is left rough and sometimes in ridges, that the winter frost may break the lumps and pulverize it.

"Tender plants that would be damaged by frost, are covered in winter with frames and glasses or litter which protects them, and this is done every night, because a frost may come before morning; but they are uncovered on mild days.

"Frost destroys many insects; therefore, as walls may be covered with ice by sprinkling them with water forced through small holes by a garden engine, many insects that conceal themselves in the crevices can be destroyed whenever the weather is cold enough to freeze the water, because it embodies them in solid ice.

"Plants in the dark grow pale; by excluding light and air they become white. This is the cause of the hard hearts of cabbages and lettuces and the stems of celery being pale or white."

All these notes are very good, and you will have an opportunity of making others as we proceed. In the mean time you are to recollect we are in the month of January, which is sometimes frosty all the way through; and therefore, except as far as protecting crops that are tender, and the hot-beds, are concerned, it is an idle month; but when mild or changeable, as this is, there is abundant work. We shall perhaps have an opportunity of seeing to-morrow all the different operations that are proper for this month, as the gardener will naturally be anxious to make the most of the fine weather, and have all hands that he can spare at those jobs which cannot be done in frosty nor in very wet weather, for nothing does the ground so much harm as to tread upon it while it is wet and clammy, because it closes it up and squeezes out the air, and forms it into lumps. We will afterwards go to the flower and fruit gardens.

The drying wind of yesterday evening, and to all appearance of all last night, has done much towards getting the ground in good order for working; and as soon as we have done our in-door studies we will go into the garden, for it is sure to be a busy day there. The uncertainty of all the months after September and before May, but particularly of January, February, and March,

renders every fine day valuable, and every thing that can be done during frost and in very wet weather, should be left whenever the soil is fit for working. The men have been at work for hours, but we shall see what they have been doing as well as what they will then be performing. We are sure to be in time for any sowing that is to be done, because the gardener or foreman will never let that be done except while one or other of them is at hand, and, whenever they can, they do it themselves. * * * *

Well, now you are ready for the garden. Observe the piece of rough ground that I told you was left in ridges, that the frost might penetrate as far as possible, has been for the greater part levelled; you see the man throws down the top of the ridges into the bottoms of the furrows, and makes the surface tolerably even; he will presently take his large rake to smooth it a little, preparatory to sowing or planting in it; meanwhile, we will go on to the bed that the man is preparing at the other end. See how those pale radishes and lettuces have recovered their green colour, although they have had the light only yesterday and the forepart of to-day. Here is a man planting cabbages from the nursery bed that I showed you some days ago; he is planting them too thick to grow into full-sized cabbages, but he intends that every alternate plant shall be pulled up half-grown, to be eaten as greens, such as you see tied up in bunches at the shops and markets; they are nine inches apart in the rows, and the rows are eighteen inches from each other. Observe, there is another man "earthing up," as it is called, all that large piece of brocoli, Brussels sprouts, late savoys, and early cabbages; that is, he is drawing the earth up to the stems and stirring the surface of the soil between the rows; if you notice particularly, you will see that he forms a kind of bank all along the rows, and brings the soil three or four inches up the stems. This always greatly refreshes all sorts of crops of the cabbage tribe, besides refreshing them and enabling them to strike fresh roots into the soil higher up their stems; observe how much cleaner and better the crop looks after earthing; and stirring the surface always does a great deal of good, because the rain runs the soil together and closes it against the air; stirring it admits the air and allows the rain to penetrate more easily. Now we have arrived at the work I spoke of when we were too distant to see it: The bed, you observe, is four feet wide; this width is chosen, that the man may be able to reach the centre from either side, to pull out weeds or thin the plants. Here he is sowing several different things, a few of each, because they *may* fail if a very hard frost should come and last some days. Beans (the broad sort) you see are sown very thick, not more than an inch apart; these are only wanted to grow for planting out in rows. Suppose the winter set in very hard, this small patch, which is not more than four feet square, could be easily covered to protect them. Had he sowed them at once in thin rows, six inches from seed to seed, and two feet from row to row, they would have been much more difficult to protect, because of the great space they would cover. He has also a patch of turnips and carrots, and lettuce. He has made up his mind to protect this whole bed, just as he protected the bed of radishes and lettuces, which we noticed. There is a man on the right there earthing up celery. The soil forms a complete bank, and the higher it is, the longer will be the white part of the plant. We will just walk across to the place where the hot-bed is, and which is called, in large establishments, where it is separated from the garden, the forcing ground, but here there is no separation. There appears to be a quantity of dung spread over a large space of ground; that, covers a number of pots which are put over plants of sea kale, and the gardener is trying an experiment with the rhubarb, that is worth notice. Under close cover and in the dark, the rhubarb plant grows blanched like celery or kale, and the flavour is not nearly so strong; but he has two or three wooden frames made, some eighteen inches long and some two feet nine inches long, like a square pipe: here they are. You see they are formed of four pieces of nine-inch wide board, and are open at each end; one end is put on the ground to cover the plant, the other is open to the sky, but they are surrounded with hot stable dung, and a flat bit of glass is put on the top. In the daytime, the dung is taken from the top of the glass to let in the light, and the glass is removed altogether occasionally to let in the air. This will be found to give colour, and add to the flavour. Observe these flower-pots on the ground, they have roots of mint in them; the gardener will put them in the hot-beds one after another, and so have a supply of green mint next month, and a succession till that out of doors comes forward. The cucumbers have grown considerably in this short time, but there is no appearance of asparagus yet. The ground that was ridged and is now levelled, is partly planted with the remains of the winter greens out of the nursery bed, all of which are cleared, except the cabbage and cauliflower; and I see he is planting a few rows of potatoes. We have now seen the principal operations that can be performed with advantage in January; and our next visit shall be to the

flower garden and conservatory, for you will perhaps be better pleased, though not more usefully instructed, among the flowers than among the vegetables. In the mean time, the only thing worth making a note of, is the fact that plants may be hastened by sowing them in a small space, where you may protect them easily, and where they will grow until the weather is open enough for them to be planted out. I have known potatoes to be treated in this way, but it is only of use when time has been lost and the ground is not ready so soon as it ought to be. In that case, I have known the potatoes to be set in a comparatively small space, and there be retained until the ground was ready; but this is not a desirable plan, they are easily damaged in planting out.

THE FLOWER GARDEN.

This morning, you see, has brought with it a tolerably hard frost: this shows the necessity of seizing every moment that is favourable. Nobody could expect that so warm an evening would be succeeded by a sharp frost in the night. Had the gardener neglected to cover up any of his tender crops, on the supposition that there would be no frost, he would have had the mortification to see his hopes blighted, and he might have done so, without wishing to save himself trouble. The temptation is, that if the night could be insured, the plants do so much better uncovered than covered; but it is never safe; there is no certainty. The flower garden, you observe, is in neater order than the kitchen garden: all the beds are uniform. Here we have one main path, six feet wide, and a four-feet border of each side, right down the centre, side paths just twelve feet from each wall, and the whole intermediate space is divided into beds of four feet wide, with paths of two feet between them. The white frost hangs on all the plants that are uncovered, so that you can see very little difference in the appearance of the beds, except that one lot of plants is larger in stature than another; many of the beds are vacant to all appearance. Those which have irises, hyacinths, crocuses, narcissuses, ranunculuses, anemones, and many other of the bulbous and tuberous rooted plants, have nothing to indicate that they are occupied, except that the gardener's label with a number to it, and his book in which all the particulars are registered, tell him what each bed contains. Those beds which are covered with peas haulm, contain pinks and pansies; of course they are all valuable ones, or they would not be covered, because the common sort are not tender. They will all bear a good deal of frost, but although severe frosts may not kill, they frequently check plants a good deal; and you remember I told you what is the effect of frost upon the earth, and how the thawing expands the frozen water in the soil, and makes it spongy. The effect on a smooth surface is still more easily seen: it opens all the pores upwards, and creates innumerable little hillocks and fissures, doing considerable violence to any very fine fibres of plants that do not extend their roots downwards; very small subjects, such as young pinks, and the still more brittle subjects, young pansies, are frequently turned fairly out of the ground, and lie on the surface with the roots exposed, much of the fine thready portion of the roots being broken off and remaining in the soil. We shall notice this after the present frost goes, in some of the beds of small common things. The litter which you see thrown over them, is not so much to keep the plants from freezing as to prevent the frost from getting into the soil. While I lift the haulm up at this place, press your finger on the earth, and tell me whether it is hard or soft; well, so long as they can keep it soft, the plants can take no harm, and if the cold lasts for weeks, the part that is covered will not be so hard frozen as the ground that is open. You see you may press the soil that has not been covered as hard as you please, but you can make no impression. Here is a row of common garden frames, merely placed on a paved or hard ground, and all full of potted plants. Here are auriculas, just like so many very small cabbages; all of them have small hearts, these contain the truss of bloom that will rise in March and be fully developed in April. In the adjoining frame we have pansies, in small pots; these, you observe, are plunged in sand up to the rims of the pots; if they were not, a very slight frost that reached the side of the pots would go through them, and as the most tender fibres of the plant are close to the side, they would be frozen and damaged, by this the quantity of nourishment would be diminished very materially, and the plant receive a check; but, plunged as they are to the rims, no ordinary frost can reach them, and an extra covering over the frames would very much neutralize the effects of a severe one. The pinks and pansies that are thus saved in pots are to turn out in beds early in the spring, without disturbing their fibres; or to put into large pots, to grow and bloom in them, so that they may be out of the way of frost, and therefore earlier than those out of doors. Here is a frame full of verbenas, kept through the winter in the smallest pots, that they may take less room. Petunias, hydrangeas, geranium cuttings, calceolarias, cinerarias, and various other plants for bedding out, occupy the succeeding frames, until we come to the carnations and picotees, which, as you see, are set out two in each pot. These

plants are generally bought in pairs and bloomed in pairs, the balls of earth being usually turned out of these into large pots at the proper season. Observe the earth in all potted plants in frames ; it is nearly dry ; the plants are for the most part comparatively at rest; all the gardener cares for is to keep them alive, he wants no winter growth. I do not see any one at work in the open ground ; in fact, there is nothing to do. The beds covered with litter must not be uncovered, but remain as they are during the continuance of this frost. Here are two beds arched over with hoops and matted close, these are the best beds of tulips and hyacinths ; the careful grower of these flowers will not allow the surface of the soil to be frosted even before the bulbs have shot through it. The ground is not so hard but that digging might be done; the spade would easily break through the crust of frozen surface, but the flower garden is not like the kitchen garden ; the planting of hardy things is pretty well all done in autumn, and there is very little to do until the bedding-out time, and the dressing of the borders and shrubbery clumps, in spring. The winter business is chiefly confined to the protection of the young plants and cuttings for this spring dressing ; the collecting of different soils and manures, and jobs under cover, such as breaking up potsherds, or as they are called by gardeners, crocks, to use for placing at the bottom of pots before we put in the soil, to make a loose bottom for water to go through, and to prevent the soil from filling up the drainage holes. I see, here is the gardener in his working shed ; he is examining the dahlia tubers, anemones, ranunculuses, and various seeds. If he finds any of the choice dahlia tubers rotting, or shrivelling up much, he will put them in pots directly and set them growing, for even a rotting tuber will frequently send forth a shoot or two, which may be taken off and struck before the decay destroys the tuber altogether. Although we do not see any of the men about, they are doing something, you may be sure ; perhaps pruning in the orchard or the shrubbery. Since we left the other side of the garden two men have begun digging, and throwing out the soil on each side the beds they are at work upon ; they will merely throw out the soil a foot in depth, remove half of it altogether, to replace with fresh loam and leaf mould ; these beds are for the best ranunculuses, which are not planted till February, and bloom in June. They are considered too delicate to risk the severity of the winter, and besides, they are generally valuable. The autumn planted beds are generally confined to the sorts which stand the winter well, and a few of those which are so plentiful as to be of no consequence if lost ; the best and most scarce are saved till spring. The same may be observed with regard to anemones ; the single and common sort are not only more plentiful but they are more hardy ; they are planted in the autumn, and sometimes left in the ground undisturbed for two or three seasons, and some of them are generally above ground, for the young offsets do not die down like the old ones, or at least do not die down at the same time, and there is nearly always some in bloom. Those beds covered with the white frost are single anemones. Every here and there you actually find a flower, although they are pretty nearly as white as the leaves. The double sort, however, are more tender, more susceptible of damage from wet, and therefore often suffer if planted in autumn, when succeeded by a wet winter.

THE GREENHOUSE.

The greenhouse, you see, has mats hung along the front. It is a great protection for the plants in the coolest part of the house; and, unless the heat is applied directly next the front wall, this will always be at the lower front shelves ; even then it is the first place that cools after heating, for heat always ascends. It is hardly right to open the doors, so we will go on this time, and choose a day for that when the mats are off. The principal point in the management of the greenhouse is to give all the air you can ; never to light a fire if you can keep out the frost without it, unless it is to dry the house, when you open some of the windows to let out the damp. You see pretty nearly half these flower beds all over the place are filled with something. Here are wallflowers, double and single ; Brompton, Queen's and other biennial stocks; rockets, Canterbury bells, sweetwilliams, polyanthuses, primroses, holyhocks, various kinds of lupins, and such like. These beds which are so crowded are the different varieties of violets ; now observe while I remove this litter, here are beds of the same sorts quite in a growing state and actually some of them blooming; now this slight covering will make a complete double season; they will yield flowers and be pretty nearly done blooming before the others that are unprotected, begin. However, there are some violets in yonder frames, which I forgot to show. It is from them that the gardener brings in the violets for the drawing room every morning.

THE SHRUBBERY AND CONSERVATORY.

This gate is the only way to approach from the flower garden. Here every thing looks as white as things are elsewhere, even the larger shrubs are covered. Here you find the men working. It is too late to choose for

making alterations, because the weather is so uncertain; but when a thing has only just been resolved upon, or has been omitted, the first opportunity must be taken to carry it into effect. The clump they are now forming is to conceal that bit of new fencing, and they will be able to remove two or three tall hollies, a common laurel or two, a few large rhododendrons, and some little fancy shrubs for the part that faces the windows, will complete it.

Let us now turn into the Conservatory, and go through it into the house, for I begin to feel cold. Here you find quite a different climate. The glass, I see, stands at 42°, that is just 10° warmer than the freezing point; water will freeze at 32°; the glass out of doors stood at 27°; there is therefore out of doors five degrees of frost. In the conservatory every things looks neat and clean. Here are camellias, throwing out a strong bloom here and there, to enliven the collection; hyacinths in flower, narcissuses and crocuses, snowdrops and early tulips in full bloom, which have been all brought forward by means of a common hot-bed. The rhododendrons seem all but bursting their blooms, and the pots of violet and mignonette at our feet assist in yielding the delightful perfume with which the place is filled. There is plenty of bloom to form a complete garden now, but what will it be when the camellias and rhododendrons are in perfection? This, remember, requires to be swept very frequently, for the leaves fall off the trees and shrubs, and watering the plants occasions a great deal of dirt, for the portion of moisture that runs through is always stained, and unless the place was washed frequently, it would soon be unsightly. To-morrow we will look into the fruit garden, and see if anything is going forward there.

THE ORCHARD AND FRUIT GARDEN.

Well, the hard weather continues, and there is no more working at the ground out of doors, but some of the heavy pruning may be going on in the old orchard, for the trees there had got into a very bad state. Standard trees yield their fruit somehow or other, even when neglected. The produce may be worse and worse every year, the fruit deteriorated, and people may begin to talk about their trees being worn out, whereas to the neglected growth alone may the evil, nine times out of ten, be fairly attributed. I can hear the saw going. I am glad they are at work at a most important subject, that I may the more easily explain to you the operation and object of pruning on a large scale.

Fruit trees in a wild state grow naturally, and yield their fruit in season, such as it is. There is nobody to find fault if the crop is short, the tree ugly, or the fruit small; the whole appear as worthless, at least comparatively so, and, in a general way, the tree is reconciled to its station, and the station to the tree; but the fruit that we cultivate is removed far from its natural state. The tree wants more nourishment and greater care than nature bestows, unaided, and the farther any variety of fruit is removed from its wild or natural state, the more care does it require. If the tree is allowed to run wild, and make more wood than is compatible with the root which supplies it, and the fruit which wants that supply, the produce will suffer and degenerate in quantity and quality. If the branches are allowed to grow very thick and close, the sun and air will not penetrate the interior of the tree, and the greater portion of the fruit will have no benefit of either. But here we are; let us observe the gardener. He has just put his ladder against a fine old apple-tree, which, as you observe, has branches crossing each other in all directions, and its entire head crowded with thin shoots; two or three large branches bend down so awkwardly near the ground, that he will saw them off close to the trunk, or at least within a few inches. Look at the quantity of wood there is lying under the tree he has pruned. Observe, there are main branches left spreading out all round, smaller branches growing out sideways from these, and, in fact, a handsome but open head; thousands of pimping little branches, which, like so much brushwood, choked up the head, have been cut clean away; all the branches left on are healthy, and the smaller shoots from these are only those thick enough and strong enough to bear; the remainder, which took away the nourishment the fruit should have, or which, if bearing, had not strength enough to bring their fruit to perfection, have been cleared out. There may not be so many apples next year, but there will be more pecks of apples, because they will be of a full size, instead of a miserably stunted and blighted crop. There are many people who will tell you that if a tree bears too much fruit, the wind will thin it; or, if not, the superfluous quantity will fall of itself, and that nature will, by her own efforts, correct the evil. If I allow for a moment that nature wonderfully interferes to adjust the balance in all her works, I must remind you that the argument fails, when, by the aid of art, we pervert the natural order of things, and produce that which is very different. Nature may adjust all the affairs of a crab, but not of a Ribstone pippin; Nature may govern a wild plum by means that would fail in the affairs of a great Goliah, or a Coe's Golden Drop. Rest assured, my young friend, that it is wisely ordained that when man is permitted, by the exercise of his ingenuity, and the skill with which he has been blest, to

bring that which is naturally worthless to an artificial state of great value, he can only enjoy the fruits of his talent by constant watchfulness, and the supply of the artificial means necessary to keep up the artificial state. Nature is always asserting her right, and claiming her dues. Graft a splendid fruit on a natural stock; leave the affair to itself. Nature will help the stock to destroy the graft, and will prevail; but it is graciously permitted that, by destroying and continuing to destroy all growth from the stock, you have your improved fruit. This fact should be impressed upon the mind very strongly; the more we improve a thing, the further we can remove it from its nature or wild parent, the more necessary is it to be vigilant in the application of artificial means to retain the improved character. Observe how the removal of those three lower branches of the apple-tree has improved its appearance; now he is sawing a large branch that crosses two others; a third, that forks out awkwardly, and fills up great part of the interior of the head, will be all that he will remove of the large branches; he will then shorten some of the most spreading, cut all the thin twiggy shoots from the inside, and the tree which was last summer impervious to sun and air, will be light and handsome, and bear clean and well-grown fruit. If every body who had an old orchard would but look to this particular duty, and remember that standard fruit-trees require as much pruning as wall fruit-trees, they would soon find in their improved crops abundant encouragement to continue their system of standard pruning. All the trees on the wall, you see, are neatly pruned and nailed; the branches lay scarcely two inches from each other, for the great art of the gardener in the management of wall fruit-trees is to cover as much of the wall as he can with the bearing branches, which are selected from the young branches of last year's growth. The strawberries are as white as anything else, and there is nothing more worth looking at but the stove, or hot-house.

THE STOVE, OR HOT-HOUSE.

Here we have the glass standing at 70°. Observe the immense difference of climate. Comfortable as it feels, as a contrast to the cold we have left, it is very overpowering. This is like many other hot-houses, or stoves, where the owners do not pretend to keep a regular collection of plants, a few striking objects being all they care about; they may be called family hot-houses. Here, you observe there is a branch of grape-vine up each rafter, and a shoot of young wood growing up by the side of it. The one branch that is full of grapes now, was, last year, just such a shoot as is now rapidly growing by the side of the bearing branch. This is an excellent plan; because, as soon as the young shoot has done growing, it will be pulled outside the house to rest; instead of being always in the heat of the hot-house, it will have the benefit of the autumnal cold nights, and thus be got ready for its next year's duty. Those objects which appear like golden butterflies, waving about, are the flowers of a plant called *Oncidium Papilio*, the most remarkable, and, perhaps, the most elegant of all the orchidaceous tribe. Observe, they are on very long wiry stems, which move about with the slightest puff of wind, and give the flowers all the appearance of the real insect. There are many very gorgeous subjects among the orchidaceous plants already introduced. The Cattleyas, Oncidiums, and Stanhopeas, are all beautiful in their way, but these plants are not generally cultivated in small hot-houses, for a house a hundred feet long would hardly contain a collection. The Oncidium Papilio happens to be abundant and cheap, but in regard to the real properties of a flower, it is the very best of all the orchideous tribe. That little and extremely brilliant scarlet flower is the *Euphorbia jacquiniæflora*, prized not less for its abundant bloom than for its bright galaxy of little stars. You cannot grow too many of these two plants; they are of the greatest value in the formation of a bouquet, though few will waste upon a posy one of these magnificent floral butterflies. Those grand lily-like flowers of different colours, some scarlet, others striped, with three or four funnel-shaped blossoms to a plant, are Amaryllis. If we wished for a grand display in the conservatory, these would be removed there, but there is no object in setting it off just now, and these things will not last so well after a change of climate. Those plants sunk in the tan-bed are pine-apples, and that thistle-like head coming up in the centre is the fruit; further on, there is one nearly the full size; yonder is one turning colour, and there are several half grown. There are no pains taken here to bring these things out of season; as they happen to come, they come; nothing is done to hasten or retard them, for the house is used for every thing. But we have been in this warm climate long enough; put your handkerchief round your neck and run in doors, for the sudden changes from heat to cold are very trying to the constitution, both of men and plants. It is these changes that ruin the health of so many gardeners. I will tell you more about the orchidaceous plants when we get in-doors. * * * * The chief of these beautiful plants, called Orchideæ, grow upon trees, clinging to the branches in a most extraordinary manner, not exactly like the ivy,

which begins at bottom, and climbs its way up, nor like the mistletoe, which springs from its seed, deposited by accident, or otherwise, upon the bark, into which it roots as firmly as the oak does in the soil. These hang in tufts, by means of their roots. The endless variety of these plants, in habit, structure, and bloom, so different, may be said to almost infest the trees of a tropical forest, where their splendid flowers, in hanging racemes of extraordinary length, canopied with the gigantic trees on which they are merely fixed, are quite beyond description; for there is in the orchidaceous tribe of plants, notwithstanding their fantastic forms, a gorgeous display of colours seen to the greater advantage from the subdued and shaded light in which they are displayed; and, strange as it may appear, they may be found of all sizes, from a little larger than a common moss, to specimens of enormous size, with spikes or racemes of flowers adorning stems from fifteen to twenty feet long. Some day, I will take you to Kew Gardens, where is to be seen a most noble collection, hundreds of the plants being brought over on the very pieces of wood which they occupied, the collector having sawed off the branch beyond the plant, and then sawed off the piece on which it grew. I see you have made some notes, though nothing very particular strikes me as worthy of it in our last two days' ramble. Well, these things are as well recollected, and if you had any doubt of being able to do this, you did well to make notes.

"There is no dependence from September to May on a night without frost, therefore cover, whether or not.

"Whenever there is out-of-door work to do in these months, never miss doing it.

"Cabbage plants, and all their tribe, are earthed up their stems, to enable them to strike new roots higher up, if so disposed." (Exactly so; if they have abundant without, they will not strike.)

"Seeds sown in a small patch close together, can be easily covered against frost, until they can be safely planted out; but if they were sown in their places, they would occupy too much ground to cover at all.

"Sea kale covered up dark, grows and blanches at the same time, which makes it good to eat, and mild. Rhubarb, if blanched, is weakened in flavour, therefore should have light and air.

"Freezing and thawing may check a plant that it will not kill, for small plants are often turned up on the surface, and the fine fibres torn away.

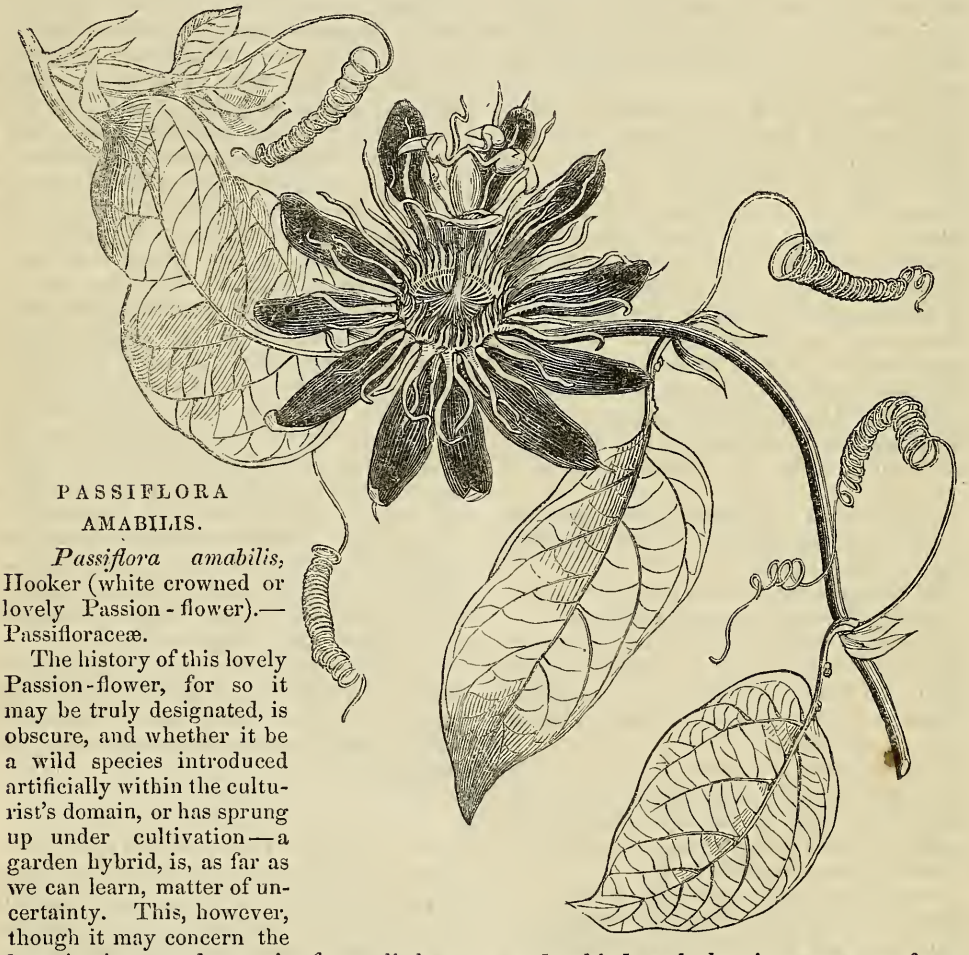
"Heat always ascends. This must be important in the plan for warming a hothouse, or greenhouse.

"The more the nature of a plant is changed, the more necessary is it to keep up all the artificial treatment which its changed nature requires, to prevent its losing the quality which the change has given it.

"A fruit-tree should not be left to its own growth. A standard fruit-tree wants as much attention and pruning as a wall fruit-tree." (So far, so good. Pay equal attention to all matters as we go on, and you will soon know all that is necessary about Horticulture.)

The lessons you have had on gardening from only walking two or three times through the place while the men were at work will be of the greatest use to you when you begin to try the use of the implements. I can tell you here, as well as in the garden, the work that is required in each month; nevertheless, we shall come to some things that I may wish you to see done. I have already observed that the winter months are uncertain, therefore, those who can avoid it, ought never to delay any kind of ground work or alteration till after Christmas; October and November are the months for planting, making box edgings, and all alterations. The soil must be thrown into the ranunculus and anemone beds early in February, and the tubers planted about the middle of the month, in drills six inches apart, and the roots six inches from each other. They should be gently pressed in the ground, and covered an inch and a half. All the plants in pots must be still covered at night. Auriculas should be top dressed with rich earth, taking out a little of the top soil, and filling up the pot with rotted cow-dung and poultry dung, mixed with a little sand. Roses should be pruned at different times, not all at once; cut out all the weak shoots, and shorten all the strong ones to two or three eyes; cut out all that cross each other. The dahlia roots may be potted this month and next, and placed in the hot-bed or stove. Give all covered plants air every opportunity, both in the frames and in the greenhouse. All the beds that are covered against frost in the evening should be uncovered every opportunity. A few of all sorts of annuals for planting out may be sown then in a hot-bed, and the next month more may be sown in a similar way. If the weather be open and mild, the work in these two months is a good deal alike. In the kitchen garden the cropping begins in earnest. The gardener sows some onions, radishes, lettuces, and peas towards the end of February or the beginning of March. He will also plant out the beans that were sown thickly, as soon as they have their first pair of rough leaves, and at the same time he may sow some in drills; both the planting and sowing are done six inches apart in the rows, and the

rows are two feet apart. He will also plant a few potatoes, small tubers, and whole are better than cut pieces ; these should be a foot apart and the rows two feet apart ; they should be planted six inches deep. Earthing up the crops, especially celery, must not be forgotten on fine dry days. A few carrots, turnips, cabbages, leeks, cauliflowers, savoys, Brussels sprouts ; and, if the weather is good, in March towards the end, full crops may be got in. All these things you may retain in your memory, or if you fear that, make your notes. All these two months the gardener is looking well to his hot-beds, cutting in due season rhubarb, sea kale, asparagus, and cucumbers. The greenhouse is beginning to look showy, the camellias are coming into full bloom, many of the Botany Bay plants are about to flower, and many subjects that will be of great use in furnishing the conservatory, which will by-and-by be worth a visit. The hot-house will also be worthy of attention ; at present it is merely bringing some of the ordinary plants a little forwarder than they would be, if left out of doors. These things, however, we shall see more about in our future strolls.



PASSIFLORA AMABILIS.

Passiflora amabilis, Hooker (white crowned or lovely Passion-flower).—Passifloraceæ.

The history of this lovely Passion-flower, for so it may be truly designated, is obscure, and whether it be a wild species introduced artificially within the culturist's domain, or has sprung up under cultivation—a garden hybrid, is, as far as we can learn, matter of uncertainty. This, however, though it may concern the botanist in some degree, is of very little moment to the cultivator, to whom, though we cannot present an interesting chapter on its history and introduction, we venture to recommend the subject of our notice as deserving a place in every select collection of stove plants.

We say stove plants, because the only experience had of its growth in this country seems to have been under the condition of a tender kind, and the circumstances of a tropical climate. It is here that a knowledge of the nature of its origin acquires most practical importance ; for whilst, if its origin were well understood, its proper place in our artificial climates might at once be assigned with tolerable certainty, ignorance of this matter may render it necessary to institute experiments in order to acquire this knowledge ; and experiment instituted in the case of new plants is

not always consonant with that immediate success in cultivation, which in the case of new and very beautiful plants it is generally a primary object to secure.

The species is cultivated in the Royal garden at Kew, where it had been received from Mr. M'Koy, of Liege, in Belgium. "It is very unlike any species yet figured or described, as far as we can learn, and it may possibly be a hybrid, one of whose parents may be *Passiflora alata*, judging from the peculiar colour of the sepals and petals, while the involucre more resembles that of *P. quadrangularis*, but the slender terete stem is at variance with both." Thus writes Sir W. Hooker in the *Botanical Magazine*, and our engraving is prepared from a beautiful coloured drawing published in that excellent work. At Kew the plant has been grown in the stove.

The whole habit of this plant is graceful, and besides this its flowers are pre-eminently beautiful; their colours are red and white, the contrast between which is striking. It is, of course, like the rest of its family, a climber, though of much less vigorous growth than many others; in fact, its growth is in all respects moderate. The stem is slender and rounded, or, as it is expressed in botanical language, terete; the leaves are borne alternately on the stem, to which they are attached by short stalks which bear glands on their surface; in form they are acutely egg-shaped, that is, ovate, and sharply-pointed, and the margin is quite entire. At the base of the leaf-stalk is situated a pair of small leaves, which are called stipules; they are of a narrowly ovate figure and also quite entire on the margin. From the axils of the leaves both tendrils and blossoms are produced, the flowers being usually, if not always, solitary. On the flower-stalk, which is longer than the leaf-stalk, and just below the calyx, is an involucre of three broad bluntish ovate membranous leaves which support the blossoms. Of the latter, the calyx and corolla, that is, the sepals and petals, are alike or nearly so, the chief difference being that the segments of the calyx have each on their back just at the tip a small hooked mucro; the sepals and petals, of which there are five each, form as it were one series of oblong obtuse rays, measuring from the centre about an inch and a half. In cases where the calyx and corolla are thus conformable, it is usual to call the conjoined parts the perianth; and in this case the perianth measures about three inches in diameter; its colour is a bright clear red. Within this is the crown, or the filamentous crown as it is called, consisting of a ray of thread-like bodies, or filaments, familiar to every one in the common passion-flower from their variegation of blue and white; in this kind the filaments are white, and are shorter than the perianth, which thus forms an entire background to them. The most beautiful effect results from this simple and complete contrast of red and white in the flower. The filaments just alluded to, are arranged in the flower in four series. The blossoms are produced in May.

This species may be grown either in a pot, or planted out against a pillar or to cover a trellis. If the former, however, the pot should be large, or the roots will not acquire nourishment enough to result in the development of a profusion of vigorous blossoms. It will, no doubt, attain its greatest perfection planted out into good soil, in a hot-house, where its branches could be trained around a pillar, or under the roof, or over any trellis, freely exposed to the light. The soil most proper for it would be a compost of equal parts turfy loam and peat, mixed with a small proportion of quarter-inch broken bones, about half a peck to a bushel of soil; sand may be added as requisite, according to the texture of the staple soil; the mass should be made porous enough to allow the water to pass freely away. The situation in which such plants best display themselves, are on wires or trellises under the roof, to which the main stems should be secured, the lateral branches being suffered to hang dependent or in festoons without any formal constraint. In such cases it is necessary to have recourse to an annual pruning to reduce the plant to an orderly condition, and this pruning should be carried out in the winter season, when a condition of rest should be induced by a reduction of the heat and moisture applied. With the increase of the light as the winter breaks away, more heat and moisture may be again supplied, and this will induce renewed vigorous growth, the prelude to a healthy crop of blossoms.

All these plants may be increased by cuttings of the half-ripened shoots planted in sand, and placed in a close moist atmosphere, and where there is some warmth afforded to the soil.

INTRODUCTION TO BOTANY.*

Dr. Lindley's several works on Botany are among the best which are to be met with in the English Language. This arises from two causes in combination, or, in other words, from a keen perception and knowledge of the subject on the part of the author, added to an off-hand and understandable enunciation. In consequence of this, we get a clear expression

* An Introduction to Botany. By John Lindley. Ph. D. F.R.S. Professor of Botany in University College, London, &c. Fourth Edition. London: Longman & Co.

of the facts and opinions recorded, clothed in the ordinary phraseology of the science. The "Introduction to Botany" under notice is one of the author's larger works, and professes to treat of the structure and physiology of plants; two branches of the subject perfectly distinct from Systematic Botany, which refers to classification only. The present, which is the fourth edition, has received large accessions of new matter, so that the work, originally and through the former editions forming one moderately thick volume, has now grown into two. We shall run through these volumes, and cull here and there a passage, so as to give a general idea of the nature and merit of the work.

In the introductory matter, while comparing the past and present state of the science, the learned author tells us that, "It now comprehends a knowledge not only of the names and uses of plants, but of their external and internal organization, their anatomy and physiological phenomena: it involves the consideration of the plan upon which those multitudes of vegetable forms that clothe the earth have been created, of the combinations out of which so many various organs have emanated, of the laws that regulate the dispersion and location of species, and of the influence exercised by climate upon their development; and, lastly, from botany, as now understood in its most extensive signification, is inseparable, the knowledge of the various ways in which the laws of vegetable life are applicable to the augmentation of the luxuries and comforts, or to the diminution of the wants and miseries of mankind. It is by no means, as some suppose, a science for the idle philosopher in his closet, nor is it merely an amusing accomplishment, as others appear to think; on the contrary, its field is in the midst of meadows and gardens and forests, on the sides of mountains, and in the depth of mines—wherever vegetation still flourishes, or wherever it attests by its remains the existence of a former world. It is the science which converts the useless or noxious weed into the nutritious vegetable; which changes a bare volcanic rock into a green and fertile island; and which enables the man of science, by the power it gives him of judging how far the productions of one climate are susceptible of cultivation in another, to guide the colonist in his enterprises, and to save him from all those errors and losses into which all such persons unacquainted with botany are liable to fall. This science, finally, it is, which teaches the physician how to discover in every region the medicines that are best adapted for the maladies prevalent in it; and which, by furnishing him with a certain clue to the knowledge of the tribes in which particular properties are or are not to be found, renders him as much at ease, alone and seemingly without resources, in a land of unknown herbs, as if he were in the midst of a magazine of drugs in some civilized country."—Pp. v. vi.

Nor is this claiming too much importance for the science, which bears closely upon the comforts and concerns of every-day life, although, to a mere cursory observer, the connexion may not be at once apparent. The author continues—"The principles of such a science must necessarily be complicated, and, in certain branches, which have only for a short time occupied the attention of observers, or which depend upon obscure and ill-understood evidence, are less clearly defined than could be wished. To explain those principles, to adduce evidence by which their truth is supposed to be proved, or the reasoning upon which they are based, in cases where direct proof is unattainable; to show the causes of errors now exploded, the insufficiency of the arguments by which doubtful theories are still defended, and, in fine, to draw a line between what is certain and what is doubtful, are some of the objects of this publication. * * * Another and not less important purpose has been to demonstrate, by a series of well connected proofs, that in no department of natural history are the simplicity and harmony that pervade the universe more strikingly manifest than in the vegetable kingdom, where the most varied forms are produced by the combination of a very small number of distinct organs, and the most important phenomena are distinctly explained by a few simple laws of life and structure."—P. vii.

This latter allusion is to the much opposed and misrepresented doctrine of Morphology, which is fully upheld by all, or nearly all, the botanists of repute at the present time. Microscopical investigation has been chiefly instrumental in leading to this general recognition of the doctrine, the opposition to which, moreover, in cases where it was really offered from honest convictions of its error, must have originated in a misconception of the entire nature of the question, produced perhaps by a loose or imperfect enunciation of its import.

We come now to the body of the work, the first section of which is devoted to the definition of a plant, as distinguished from the animal kingdom on the one hand, and the mineral kingdom on the other. There might appear to be little difficulty in defining the animal and vegetable kingdoms of organized nature, but in truth it is not so. None of those external and apparent characters which a novice would at once fix upon, are found sufficient to separate them; and the distinc-

tion between them is, in fact, a matter upon which the most learned naturalists are not only at variance with each other, but often altogether at fault. The difficulty lies on the confines of the subject; not in discriminating the characters which refer the oak and the elephant to their respective stations, but in separating the lower orders, as they are called, of each kingdom. To make this understood, it may be well just to mention, that, according to what appear to be the most correct notions on this matter, plants and animals may be regarded as two great sections of organic life, which at the lower extremity, that is, in the most simple forms of each, approach each other so closely as to coalesce, but at the higher extremity, that is, the more compound or perfectly developed forms of each, are widely separate, the divergence gradually increasing from the lowest to the highest forms. It is this coalescing point which baffles the attempts at definition ; and as a consequence of the uncertainty or obscurity hanging over the subject, there are some organized bodies which are sometimes and by some observers claimed as animals, and at other times and by others considered as vegetables. This amounts to the statement, that it is a matter of extreme difficulty to point out the distinguishing differences between animals and plants ; and so in truth it is, viewing the question in the abstract. The author's definition runs thus :—"A plant is a cellular body, possessing vitality, living by absorption through its outer surface, and secreting starch," the latter being perhaps the most tangible character. Besides this, we have an account of the definitions offered by various other botanists, as Jungius, Boerhaave, Ludwig, Linnæus, Mirbel, Link, De Candolle, Richard, Endlicher, Jussieu, D. P. Gardner, and the visionary philosophist Oken, the latter of whom says,—"The plant is an organic body, chained to the earth ; it is only developed out of water, and in the dark in the earth ; is associated with metal and carbon ; is a magnetic needle attracted out of earth into air towards light," a statement which, it is well observed, is tinctured with all that mysticism which renders the writings of this author so repulsive to sober minds.

The remaining matter is divided into three books, of which the first is devoted to *organography*, or the structure of plants, which is treated at length; the remainder of the first volume and a portion of the second being thus occupied. This branch of the subject comprehends what relates to the various forms of tissue, or elementary matter, of which plants are constructed, or to the external appearances assumed by the various combinations of these elementary organs. The term tissue is applied to the material which forms the structure of plants, and of this there are many kinds, the bulk of all the soft parts being what is called cellular tissue, which forms, in some of its various conditions, the soft part of the substance of all vegetables. This is permeated by layers and combinations of different forms of vascular and woody tissue, the first consisting of vessels for the transmission of fluids and air, and the latter consisting of fibrous matter serving to solidify and strengthen the entire structure. The terms applied to the elementary organs are,—1. Cellular tissue, or *parenchym;* 2. Pitted tissue, or *bothrenchym* ; 3. Woody tissue, or *pleurenchym;* 4. Vascular tissue, or *trachenchym;* 5. Laticiferous tissue, or *cinenchym.* These elementary matters are constructed of what are called organic mucus, membrane, and elementary fibre; and indeed, there is no doubt that all the forms of tissue enumerated above, are in reality modifications of one common type, namely the simple cell.

It is a mysterious fact that all plants should be compounded out of a simple vegetable cell; and yet, really, this is near the truth, divesting the subject of its technicalities. At the least, this is the light which science seems to shed upon the subject. The cell forms within itself the nucleus of another or other cells, which advance to maturity and become independent only to undergo the same process of multiplication ; and thus an increase of size is effected. This is carried on under the impulse of the vital force of the plant. So of the different kinds of plants; the simplest are mere cells or vesicles, or threads of vesicles, and the most complex are also vesicles connected together in indefinite numbers, yet arranged upon a definite plan, which gives individuality to the connected mass.

The cellular tissue which is thus regarded as the type of all the other forms, consists of little bladders or vesicles of various figures adhering together in masses ; it is transparent and for the most part colourless. Some idea of its nature may be gained by cutting a very thin slice—not thicker than tissue paper—across the pith of any plant, and this if viewed by a magnifying glass will be seen to have a honeycombed appearance, which, in fact, represents a cross section of the cells. It is generally transparent and colourless, or at most only slightly tinged with green. The brilliant colours of vegetable matter—the white, blue, yellow, and scarlet hues of the corolla, and the green of the bark and leaves—are not owing to any difference in the colour of the cells themselves, but to colouring matter of different kinds which they contain. When growth or extension of the plant is going on, it takes place, as already intimated, by the little blad-

ders or cells producing others under the influence of the vital principle, and exterior stimulating influences. It is the knowledge of this general principle which so strongly supports the doctrine (or, as some say, dogma) of Morphology. The existing cells develope other cells, and thus the plant is extended, but the nature of these cells as regards the external characters they assume may be varied according to the conditions under which they are developed, always providing that there is in plants an individuality which restrains the variations within certain limits. This kind of tissue, the cellular, is found in two essentially different states, membranous and fibrous.

Woody tissue is that which forms the bulk of the ligneous part of plants; it consists of slender tough membranous tubes, tapering towards each end, and lying in compact bundles. Vascular tissue, is that of which what are called the vessels of plants are composed, the principal kinds of which are spiral vessels—membranous tubes with conical extremities, occupied internally by a spiral fibre —and ducts, which are thought to be modifications of spiral vessels. Laticiferous tissue consists of branched anastomosing tubes, or "milk vessels." Pitted tissue is a modification of cellular tissue.

Within the tissue of plants certain particles are found, of which one of the most important is starch. To this substance peculiar interest attaches, in studying the structure and characteristics of plants, inasmuch as it is the absence or presence of starch which best distinguishes between animals and plants, as already mentioned. We shall therefore quote some part of the account given of this secretion:—

"This substance is so common that no plant is destitute of it, and many, like the potato, have the cells of their tubers or other parts of the stem filled full of its granules. The rhizome of Equisetum is so crowded with them, that when the cells are wounded, the starch grains are discharged with some force, apparently by the contraction of the membrane, so that the grains appear as if in voluntary motion as long as the emptying the tissue continues to take place. These particles are perfectly white, semi-transparent, generally irregularly-oblong, sometimes compound, and marked with oblique concentric circles; they are extremely variable in size, some being as fine as the smallest molecular matter in pollen, that is, not more than $\frac{1}{25000}$th of an inch in diameter, others being as much as $\frac{1}{1000}$th or $\frac{1}{750}$th. * * * Starch grains of the smallest size have a distinct motion of rotation when suspended in water, and this motion looks as if spontaneous; for of several floating near each other in the same medium, a part will be in active motion while others remain inactive. Starch when dry is tolerably hard, and falls to powder when rubbed between the fingers; when moist it is rather gelatinous; when dried from solution it at first forms a trembling jelly, and afterwards becomes vitreous, brittle, and as clear as water (even in lichens); when perfectly clean and fresh from the plant, starch gradually dissolves in water (or only disperses? for the so-called solution cannot pass through a cellular membrane); in the plant it is usually protected from solution by an incrusting wax, albumen,* mucus, or any such substance outside. Starch is easily (partially) soluble in boiling water, acids and alkalies; insoluble in alcohol, ether, volatile or fat oils; it is stained blue by iodine, even in dilute solutions (and the iodide of starch is not more soluble in water than ordinary starch, but it is insoluble in acids). It appears to be changed through intermediate matter; as for instance, Lichen starch into Amyloid; through the material discovered by Henry in the mace, into membrane, vegetable jelly, and perhaps also into gum. The chemical composition of starch is now placed beyond doubt by the distinguished chemists Berzelius and Liebig, and is given thus—C 12, H 20, O 10."—P. 114.

"Starch is the most common of all vegetable productions. I know of no plant that does not in some season or other, at least at the time when vegetation is at rest, secrete starch in more or less abundance; often only in single grains in the cells, but often also swelling the cells from the large quantity of it. The grains of starch adhere to the cell walls, for the most part accidentally by means of mucus. The supposed hilum by which the grains of starch have been said to be held to the sides of the cells, is one of Turpin's innumerable careless representations, and is entirely without foundation. The largest starch-grain does not appear to be more than 0·05 of a line in the longest part. Starch can generally be separated from the cellular tissue by bruising and washing with water; often, however, it cannot, as, for example, when it occurs united to mucus, as in Hedychium. Starch seems to be purest in Maranta arundinacea. It is not too much to say that for two-thirds of mankind, starch is the most important if not exclusive source of nourishment. It is certain that starch occurs in all plants, but not always in such a state as to suffice and become fit for food; it often cannot be separated from other disagreeable substances, as in the horse-chestnut. Certain parts of plants secrete it more than others, viz., the albumen of the seeds (Grasses), the cotyledons of the embryo (Le-

* Used in the sense of Chemists, not of Vegetable Physiologists.

guminous plants), pith (Cycads and Palms*), bulbs (Lilyworts†), tubers, rhizomes and roots of several different orders.‡ In less abundance it is found throughout the winter in the bark and sap of trees; hence the possibility of making bread from the bark of trees in polar countries."—P. 121.

"Under the influence of vital force, starch changes into gum and sugar. Sugar makes its appearance as a transparent fluid, which seems as clear as water, and is not rendered turbid by alcohol, but is coloured brown by tincture of iodine, according to the greater or less degree of dilution of that agent.

"Gum appears as a yellowish, more consistent, less transparent fluid, which with tincture of iodine coagulates into a pale yellow colour. When vegetation has advanced to that point that gum is the latest immediate product, there appear in it a great many minute molecules, which are generally so small as to resemble dark points; at that time the fluid becomes of a darker yellow upon the application of iodine; but the molecules, if they are large enough to show their colour, become dark-brown yellow. It is this mass, so transparent that it can hardly be seen until it is coloured, in which in all cases organization commences, and from which the youngest structure is constituted. It may be called vegetable jelly, and is probably nearly the same as Pecten, the base of Gum Tragacanth and many other kinds of vegetable mucus. It is this jelly which by a further chemical alteration becomes the membrane of cells, and is afterwards the material by which they are thickened.

"'Vegetable mucilage of the chemist in part (Bassorine; Salep) is a horny or cartilaginous substance when dry; when moist, it swells up in a gelatinous manner, and becomes gradually diffused throughout cold water. It is transparent and soluble in hot and cold (?) water; in caustic alkali is perhaps converted into an acid. It is not affected by alcohol, ether, fatty or essential oils, and is not coloured by iodine. On one side it passes by various modifications into cellulose (ex. gr. the cell walls of fucoids), and amyloid (ex. gr. some kinds of horny albumen); on the other into amylum (ex. gr. the mucilage of the orchis tubers), and often further into gum and dextrine. Probably Pectine and its compounds are closely related here. (*Henfrey.*)'"—P. 130.

The matters thus far treated are elementary. Their combination into the external organs of plants is the next step. In this way is produced the cuticle or skin; the stomates or pores; hairs, scarf, glands, and prickles; and also roots, stems, leaves, flowers, and fruit. From the minute description of the stem, we shall select the account given of leaf-buds, which besides having considerable interest, is also suitable to our limits:—

"Leaf-buds (*gemmæ*, Linn.), being the rudiments of young branches, are of great importance in considering the general structure of a plant. They consist of scales imbricated over each other, the outermost being the hardest and thickest, and surrounding a minute cellular axis or growing point, which is in direct communication with the woody and cellular tissue of the stem. In other words, they may be said to be growing points, covered with rudimentary leaves, for the purpose of protection, and to consist of a highly excitable mass of cellular substance, originating in or connected with the pith or cellular portion of the branch, and having a special power of extension in length. Under ordinary circumstances the growing point clothes itself with leaves as it advances, and then it becomes a branch; but sometimes it simply hardens as it grows, producing no leaves, but forming a sharp conical projection, called a spine, as in the Gleditschia, the sloe, &c. When formed it does not, however, consist of cellular tissue alone; on the contrary, it has the same general internal structure as the perfect branches themselves.

"The spine must not be confounded with the prickle or aculeus already described, from which it differs in having a considerable quantity of woody tissue in its structure, and in being as much in communication with the central parts of a stem as branches themselves; while prickles are merely superficial concretions of hardened cellular tissue. Spines occasionally, as in the Whitethorn, bear leaves; in domesticated plants they often entirely disappear, as in the Apple and Pear, the wild varieties of which are spiny, and the cultivated ones spineless. They occasionally branch, as in the Gleditschia, thus showing that the power of subdivision is a vital quality inherent in the growing point itself.

"The spadix of the arum, the receptacle of nelumbium, all the forms of placenta, and even some styles and stigmata, are modifications of the growing point of the bud, and consequently are analogous to unhardened spines.

"Linnæus called the bud *Hybernaculum*, because it serves for the winter protection of the young and tender parts; and distinguished it into the *gemma*, or leaf-bud of the stem, and the *bulb*, or leaf-bud of the root.

"The leaf-bud has been compared by Du Petit Thouars, and some other botanists, to

* Sago from Cycas revoluta; Sagus Rumphii, farinifera, &c.

† Lilium camtchaticum, used as food in Greenland.

‡ Potato from Solanum tuberosum; Cassava from Jatropha Manihot; Tarro from Arum esculentum, &c.

the embryo, and has even been denominated a fixed embryo. This comparison must not however be understood to indicate any identity between these two parts in structure, but merely an analogous function, both being formed for the purpose of reproduction ; in origin and structure they are entirely different. The leaf-bud consists of both vascular and cellular tissue, the embryo of cellular tissue only : the leaf-bud is produced without fertilisation ; to the embryo this is essential : finally, the leaf-bud perpetuates the individual as well as the species ; the embryo continues the species and not the individual.

" The usual or normal situation of leaf-buds is in the axil of leaves ; and all departure from this position is either irregular or accidental. Botanists give them the name of regular when they are placed in their normal station, and they call all others latent or adventitious. The latter have been found in almost every part of plants ; the roots, the internodes, the petiole, the leaf, the flower itself, have all been remarked producing them.

" On the leaf they usually proceed from the margin, as in Malaxis paludosa, where they form minute granulations, first determined to be buds by Henslow, or as in Bryophyllum calycinum, and Tellima grandiflora ; but they have been seen by Turpin proceeding from the surface of the leaf of Ornithogalum.

" M. Naudin, in the *Annales des Sciences Nat.*, vol. xiv. p. 14, describes some small plants of Drosera anglica, which were produced on a leaf, on the upper side. They sprang from the cellular tissue, between the midrib and lateral veins near the edge, and were stationed about a line and a half apart. They were from five to six lines in length, and had, it would seem, a stem with alternate leaves, notwithstanding that the Drosera in its natural state is stemless, and only provided with root leaves. Nothing could be observed on the under side of the parent leaf, except a black spot below one of the two stems ; there were no roots. The stems issued from the naked cellular tissue, and had no connexion with the vessels of the leaf. This is undoubtedly an universal rule ; buds, whether normal, latent, or adventitious, being invariably formed by exciting the peculiar vitality of true cells, and not of tubular forms of tissue ; a very important physiological truth.

" We are unacquainted with the cause of the formation of leaf-buds ; all we know is, that they proceed exclusively from cellular tissue ; and if produced on the axis, from the mouths of medullary rays, it would seem as if certain unknown forces were occasionally so exerted upon a vesicle of cellular tissue, as to stimulate it into a preternatural degree of activity, the result of which is the production of vessels and the formation of a centre, having the power of lengthening. Any cellular matter, which is not of a perishable nature, may be compelled to form buds by a skilful application of heat, moisture, and light. Hence, any firm fleshy parts of plants may be employed for propagation, especially fragments of the root, a part which usually possesses an unusually high degree of vitality. A case of the artificial compulsory formation of buds by the scales of a Hyacinth bulb, is mentioned in my *Elements of Botany*, p. 41.

" There is indeed an opinion, which I believe was that of Mr. Knight, that the sap itself can at any time generate buds without any previously formed rudiment ; and that buds depend not upon a specific alteration of the arrangement of the cellular system, called into action by particular circumstances, but upon a state of the sap favourable to their creation. In proof of this it has been said, that if a bud of the Prunus pseudo-cerasus, or Chinese cherry, be inserted upon a cherry stock, it will grow freely, and after a time will emit small roots from just above its union with the stock ; at the time when these little roots are formed, let the shoot be cut back to within a short distance of the stock, and the little roots will then, in consequence of the great impulsion of sap into them, become branches emitting leaves.

" The leaf-buds of the deciduous trees of cold climates are covered by scales, which are also called *tegmenta*, or sometimes *perulæ ;* these afford protection against cold and external accidents, and vary much in texture, thickness, and other characters. Thus in the beech, the scales are thin, smooth, and dry ; in many willows they are covered with a thick down ; in Populus balsamifera they exude a tenacious viscid juice. In herbaceous plants and trees of climates in which vegetation is not exposed to severe cold, the leaf-buds have no dead scales ; which is also, but very rarely, the case in some northern shrubs, as Rhamnus Frangula.

" The scales of the bud, however dissimilar in their ordinary appearance they may be to leaves, are nevertheless in reality leaves in an imperfectly formed state. They are the last leaves of the season, developed at a period when the current of vegetation is stopping, and when the vital powers have become almost torpid. That such is their nature is sufficiently shown by that gradual transition from scales to perfect leaves, which occurs in such plants as Viburnum prunifolium, Magnolia acuminata, Liriodendron tulipifera, and Æsculus pavia : in the latter, the transition is perhaps most satisfactorily manifested. In this plant the scales on the outside are short, hard, dry, and brown ; those next them are longer, greenish, and delicate ; within these

others become dilated, are slightly coloured pink, and occasionally bear a few imperfect leaflets at their apex; in succession are developed leaves of the ordinary character, except that their petiole is dilated and membranous, like the inner scales of the bud; and finally, leaves perfect in all their parts complete the series of transitions.

"Among the varieties of root is sometimes classed what botanists call a *bulb*, a scaly body formed at or beneath the surface of the ground, emitting roots from its base, and producing a stem from its centre. Linnæus considered it the leaf-bud of a root; but in this he was partly mistaken, roots being essentially characterized by the absence of buds. He was, however, perfectly correct in identifying it with a leaf-bud, from which it differs in nothing more than in being deciduous, and consisting of scales much more fleshy than in ordinary leaf-buds. In some plants, such as the Tiger Lily, the leaf-buds in their usual position in the axils of leaves acquire a fleshy consistence, and are spontaneously cast off by the stem in the state of true bulbs.

"A bulb has the power of propagating itself by developing in the axils of its scales new bulbs, or what gardeners call cloves (*nucleus* and *adnascens* of the older botanists, *adnatum* of Richard), which grow at the expense of their parent bulb, and eventually destroy it; in this respect it behaves exactly like a leaf-bud after it has lengthened into a branch. Every true bulb is therefore necessarily formed of imbricated scales, and a solid bulb has no existence. The bulibi soldi, as they have been called, of the crocus, the colchicum, and others, are, as we shall hereafter find (see Cormus), a kind of subterranean stem; they are distinct from the bulb, in consisting, not of imbricated scales, but of a solid fleshy mass, itself emitting buds. It has been supposed, indeed, that corms might be buds, the scales of which had become consolidated; but the hypothesis leads to this inadmissible conclusion, that, as the corm or solid bulb of a crocus is essentially the same, except in size and situation, as the stem of a palm, the stem of a palm must be a bulb also, which is absurd. In truth, the bulb is analogous to the bud that is seated upon the corm, and not to the corm itself; a bulb being an enlarged succulent bud without a stem, the corm a subterranean stem with buds on its surface."—P. 175.

The stems of Exogenous plants are described in a very detailed manner; after which we come to some remarks as to the age of timber, a subject on which many curious notions are extant. In matters of this kind, theory is apt to run riot; and so it would appear she has done in this case. Even the number of zones shown in a cross section of the wood, does not always indicate the truth, although much nearer than any computations based on measurement.

Among much interesting matter relating to the structure of leaves, is an account of that of those "curiosities of vegetation," the pitcher plants. The leaf of a plant usually consists of two distinguishable parts, the lamina or blade, and the petiole or stalk. The "pitchers," as they are called, which are borne by the plant just alluded to, are regarded as modifications of the petioles of the leaves. We may perhaps be tempted to quote this passage at some future time.

The following is an excellent definition of a flower, according to the ideas of modern botanists. Popular notions, however, ascribe a much more restricted interpretation to the term flower; and in this respect approach somewhat closely to the views held by the ancients. The passages are selected so as to give a connected description of the different parts; in the work itself a much ampler account is given:—

"The flower is a terminal bud, enclosing the organ of reproduction by seed. By the ancients the term flower was restricted to what is now called the corolla, but Linnæus wisely extended its application to the union of all the organs which contribute to the process of fecundation. The flower therefore, as now understood, comprehends the *calyx*, the *corolla*, the *stamens*, and the *pistil*, of which the two last only are indispensable. The calyx and corolla may be wanting, and a flower will nevertheless exist; but if neither stamens nor pistil nor their rudiments are to be found, no assemblage of leaves, whatever may be their form or colour, or how much soever they may resemble the calyx and corolla, can constitute a flower.

"We usually consider the flower to consist of a certain number of whorls, or of parts originating round a common centre, from the same plane; but Adolphe Brongniart has correctly pointed out the fact, that what we call whorls in a flower, are in many cases not so, strictly speaking, but only a series of parts in close approximation, and at different heights upon the short branch that forms the axis. This is particularly obvious in a cistus, where of the five sepals, two are lower and exterior, and three higher and within the first. The manner also in which the petals overlap each other, evidently points to a similar cause, although the fact of those pieces being inserted at different heights, may not be apparent."—P. 315.

"The *calyx* is the external integument of the flower, consisting of several verticillate leaves, either united by their margins or dis-

tinct, usually of a green colour, and of a ruder and less delicate texture than the corolla. Authors have long disputed about the definition of a calyx, and the limits which really exist between it and the corolla; the above, which is copied from Link, seems to be the only one that can be considered accurate. In reality, in many cases, they pass so insensibly into each other, as in Calycanthus and Nymphæa, that no one can say where the calyx ends, and the corolla begins, although it is evident that both are present. Linnæus, indeed, thought that it was possible to distinguish them by their position with regard to the stamens, asserting that the divisions of the calyx are opposite those organs, and of the corolla alternate with them; but if this distinction were admitted, the corolla of the primrose would be an inner calyx, which is manifestly an absurdity. Jussieu defines a calyx by its being continuous with the peduncle, which the corolla never is, but there are plenty of true calyxes, of all papaveraccous and cruciferous plants for instance, in which the calyx is deciduous, and not more continuous with the peduncle than the corolla itself. The only just mode of distinguishing the calyx, seems to me to be, to consider it in all cases the external verticillate series of the integuments of the flower, within the bracts, whether it be half coloured, deciduous, and of many pieces, as in Crucifers; membranous and wholly coloured as in Mirabilis; green and campanulate or tubular as in Laurus and Lythrum. Upon this principle, wherever there is only one series of floral integuments, that series is the calyx. A calyx, therefore, can exist without a corolla; but a corolla cannot exist without a calyx, either perfect or rudimentary. The term *perianth* is sometimes given as synonymous with calyx; but this is an error. The word perianth signifies the calyx and corolla combined, and is therefore strictly a collective term. It should only be employed to designate a calyx and corolla the limits of which are undefined, so that they cannot be satisfactorily distinguished from each other, as in most monocotyledonous plants, the tulip and orchis for example."—P. 327.

"That envelope of the flower which forms a second whorl within the calyx, and between it and the stamens, is called the *corolla*. Its divisions always, without exception, alternate with those of the calyx, and are called petals. Like sepals, (the divisions of the calyx,) they are either united by their margins, or distinct; but unlike the calyx, they are rarely green, being for the most part either white, or of some colour such as red, blue, or yellow, or of any of the hues produced by their intermixture. The corolla is generally also larger than the calyx. * * * When the petals of a corolla are all distinct, then the corolla is said to be polypetalous, but if they cohere at all by their contiguous margins, so as to form a tube, it then becomes what is called monopetalous. * * * A petal consists of the following parts;—the limb or *lamina*, and the *unguis* or claw. The claw is the narrow part at the base, which takes the place of the footstalk of the leaf, of which it is a modification; the limb is the dilated part supported upon the claw, and is a modification of the blade of a leaf. In many petals there is no claw, as in Rosa; in many it is very long, as in Dianthus."—Pp. 330, 333, 334.

"Next the petals in the inside are seated the organs called *stamens*—the *apices* of old botanists. These constitute the andræceum or male apparatus of the flower, like the calyx and corolla are modifications of leaves, and consist of the filament, the anther, and the pollen, of which the two latter are essential: the first is not essential; that is to say, a stamen may exist without a filament, but it cannot exist without an anther and pollen. All bodies therefore which resemble stamens, or which occupy their place, but which are destitute of anthers, are either petals or appendages of the petals, or abortive stamens."—P. 338.

"The last organ to enumerate in the flower is that which constitutes the female system, or gynæceum of Röper, and which is usually called the *pistil*. In all cases it occupies the centre of the flower, terminating the axis of growth of the peduncle; and is consequently the part around which every other organ, without exception, is arranged in hermaphrodite structures. It is distinguished into three parts, the ovary, the style, and the stigma. The ovary, called germen by Linnæus, is a hollow case placed at the base of the pistil, enclosing the ovules, and always containing one or more cells or cavities. It is the part which ultimately becomes the fruit. * * * The style is that elongation of the ovary which supports the stigma. It is frequently absent, and then the stigma is sessile; it is not more essential to a pistil, than a stalk to a leaf, or the claw to a petal, or the filament to a stamen. * * * The stigma is the upper extremity of the style, without epidermis; in consequence of which it has, almost uniformly, either a humid or papillose surface."—Pp. 363, 364, 367.

We must pass by, with mere mention, much that is interesting in reference to the fruit and seed, and also a critical and somewhat lengthy account of the compound organs of flowerless plants, in order to make room for the following admirable sketch of a plant in a state of vital action. The author frequently presses the recognition of the "vital power,"

which influences all the phenomena connected with the growth of plants, in opposition to the views of those who recognise no such principle at work in the vegetable structure, but account for all the changes which take place by the rules of abstract science. A living plant, however, is no such machine as this doctrine would seek to make it; and this is forcibly set forth in the following paragraphs:—

"I. If we place a seed, (that of an apple for instance,) in earth at the temperature of 32° Fahrenheit, it will remain inactive till it finally decays. But if it is placed in moist earth some degrees above 32°, and screened from the action of light, its integument gradually imbibes moisture, and swells; the tissue is softened and acquires the capability of stretching; the water is decomposed, and a part of its oxygen combining with the carbon of the seed, forms carbonic acid, which is expelled; nutritious food for the young parts is prepared by the conversion of starch into sugar; and the vital action of the embryo commences. It lengthens downwards by the radicle, and upwards by the cotyledons; the former penetrating the soil, the latter elevating themselves above it, acquiring a green colour by the decomposition of the carbonic acid they absorb from the earth and atmosphere, and unfolding in the form of two opposite roundish leaves. This is the first state of vegetation; the young plant consists of little more than cellular tissue; only an imperfect development of vascular and fibrous tissue being discoverable in the form of a sort of cylinder, lying just in the centre. The part within the cylinder at its upper end, is now the pith, without it the bark, while the cylinder itself is the preparation for the medullary sheath, and consists of vertical tubes passing through and separated by cellular tissue.

"The young root is now lengthening at its point, and absorbing from the earth its nutriment, which passes up to the summit of the plant by the cellular substance, and is in part impelled into the cotyledons, where it is aërated and evaporated, but chiefly urged upwards against the growing point, or plumule.

"II. Forced onwards by the current of sap which is continually impelled upwards from the root, the plumule next ascends in the form of a little twig, at the same time sending downwards, in the centre of the radicle, the earliest portion of wood that is deposited, and compelling the root to emit little ramifications; and simultaneously the process of lignification is going on in all the tissue, by the deposit of a peculiar secretion in layers within the cells and tubes.

"Previously to the elongation of the plumule, its point has acquired the rudimentary state of a leaf; this latter continues to develope as the plumule elongates, until when the first internode of the latter ceases to lengthen, the leaf has actually arrived at its complete formation. When fully grown, it repeats in a much more perfect manner, the functions previously performed by the cotyledons; it aërates the sap that it receives, and returns the superfluous portion of it downwards through the bark to the root; tubular tissue at the same time appears between the medullary sheath and the bark, thus forming the first ligneous stratum, a part of which is incorporated with the bark, the remainder forming wood.

"During these operations, while the plumule is ascending, its leaf forming and acting, and the woody matter created by it descending, the cellular tissue of the stem is forming and expanding horizontally, to make room for the new matter forced into it; so that development is going on simultaneously both in a horizontal and perpendicular direction. This process may not inaptly be compared to that of weaving, the warp being the perpendicular, and the weft the horizontal formation. In order to enable the leaf to perform its functions of aëration completely, it is traversed by veins, originating in the medullary sheath; and has delicate pores (*stomates*), which communicate with a highly complex pneumatic system, extending to almost every part of the plant.

"Simultaneously with the appearance of woody matter, the emission of young roots, and their increase by addition to the cellular substance of their points, take place. They thus are made to bear something like a definite proportion to the leaves they have to support, and with which they must of necessity be in direct communication.

"After the production of its first leaf by the plumule, others successively appear in a spiral direction around the axis, at its growing point, all constructed alike, connected with the stem or axis in the same manner, and performing precisely the same functions as have just been described. At last the axis ceases to lengthen; the old leaves gradually fall off; the new leaves, instead of expanding after their formation, retain their rudimentary condition, harden and fold over one another, so as to be a protection to the delicate point of growth, or in other words, become the scales of a bud. We have now a shoot with a woody axis, and a distinct pith and bark, and of a more or less conical figure. At the axil of every leaf a new growing point had been generated during the growth of the axis, so that the shoot when deprived of its leaves is covered from end to end with little, symmetrically arranged, projecting bodies, which are the buds.

"The cause of the figure of the perfect shoot being conical, is, that as the wood originates in the base of the leaves, the lower end of the shoot, which has the greatest number of strata, because it has the greatest number of leaves above it, will be the thickest; and the upper end, which has had the fewest leaves to distend it by their deposit, will have the least diameter. Thus that part of the stem which has two leaves above it, will have wood formed by two successive deposits; that which has nine leaves above it, will have wood formed by nine successive deposits; and so on: while the growing point, as it can have no deposit of matter from above, will have no wood, the extremity being merely covered by the rudiments of leaves hereafter to be developed.

"If at this time a cross section be examined, it will be found that the interior is no longer imperfectly divided into two portions, namely pith and skin, as it was when first examined in the same way, but that it has two internal perfect concentric lines, the outer indicating a separation of the bark from the wood, and the inner a separation of the wood from the pith; the latter too, which in the first observation was fleshy, and saturated with humidity, is become distinctly cellular, and altogether, or nearly, dry.

"III.—With the spring of the second year, and the return of warm weather, vegetation recommences.

"The uppermost and perhaps some other buds, which were formed the previous year, gradually unfold, and pump up sap from the stock remaining in store about them; the place of the sap so removed is instantly supplied by that which is next it, an impulse is thus given to the fluids from the summit to the roots; fresh extension and fresh fibrils are given to the roots. New sap is absorbed from the earth, and sent upwards through the wood of last year; and the phenomenon called the flow of the sap is fully completed, to continue with greater or less velocity till the return of winter. The growing point lengthens upwards, forming leaves and buds in the same way as the parent shoot: a horizontal increase of the whole of the cellular system of the stem takes place, and each bud sends down organizable matter within the bark, and above the wood of the shoot from which it sprung; thus forming on the one hand a new layer of wood, and on the other a fresh deposit of liber.

"In order to facilitate this last operation, the old bark and wood are separated in the spring by the exudation from both of them of the glutinous slimy substance called cambium, which appears to be expressly intended in the first instance to facilitate the development of the subcortical tubular tissue; and in the second place, to assist in generating the cellular tissue, by which the horizontal dilatation of the axis is caused, and which maintains a communication between the bark and the centre of the stem. This communication has by the second year become sufficiently developed to be readily discovered, and is effected by the medullary rays spoken of in the last book. It will be remembered that there was a time when that which is now bark constituted a homogeneous body with the pith; and that it was after the leaves began to come into action, that the separation which now exists between the bark and pith took place.

"At the time when the latter were indissolubly united, they both consisted of cellular tissue, with a few spiral vessels upon the line indicative of future separation. When a deposit of wood was formed from above, between them, they were not wholly divided the one from the other, but the deposit was effected in such a way as to leave a communication by means of cellular tissue between the bark and the pith; and as this formation or medullary ray is at all times coetaneous with that of the wood, the communication so effected between the pith and bark is quite as perfect at the end of any number of years as it was at the beginning of the first; and so it continues to the end of the growth of the plant.

"The sap which is drawn from the earth into circulation by the unfolding leaves is exposed, as in the previous year, to the effect of air and light; is then returned through the petiole to the stem, and sent downwards through the bark, to be from it either conveyed to the root, or distributed horizontally by the medullary rays to the centre of the stem.

"At the end of the year the same phenomena occur as took place the first season: wood is gradually deposited by slower degrees, whence the last portion is denser than the first, and gives rise to the appearance called the annual zones: the new shoot or shoots are prepared for winter, and are again elongated cones, and the original stem has acquired an increase in diameter proportioned to the quantity of new shoots which it produced; new shoots being to it now, what young leaves were to it before.

"IV.—The third year all that took place the year before is repeated; more roots appear, sap is again absorbed by the unfolding leaves, and its loss is made good by new fluids introduced by the roots and transmitted through the alburnum or wood of the year before; new wood and liber are formed from matter sent downwards by the buds; cambium is exuded: the horizontal development of cellular tissue is repeated, but more extensively; wood towards the end of the year is formed more slowly, and has a more compact character; and another ring appears, indicative of this year's increase.

"In precisely the same manner as in the

second and third years of its existence, will the plant continue to vegetate till the period of its decay, each successive year being a repetition of the phenomena of that which preceded it.

"V. After a certain number of years the tree arrives at the age of puberty; the period at which this occurs is very uncertain, depending in some measure upon adventitious circumstances, but more upon the idiosyncrasy or peculiar constitution of the individual. About the time when this alteration of habit is induced, by the influence of which the sap or blood of the plant is to be partially diverted from its former courses into channels in which its force is to be applied to the production of new individuals, rather than to the extension of itself; about this time it will be remarked, that certain of the young branches do not lengthen, as had been hitherto the wont of others, but assume a short stunted appearance, probably not growing two inches in the time which had been previously sufficient to produce twenty inches of increase. Of these little stunted branches, called spurs, the terminal bud acquires a swollen appearance, and, at length, instead of giving birth to a new shoot, produces from its bosom a cluster of twigs in the form of pedicles, each terminated by a bud, the leaves of which are modified for the purposes of reproduction, grow firmly to each other, assume peculiar forms and colours, and form a flower, which had been wrapped and protected from injury during the previous winter by several layers of imperfect leaves, now brought forth as bracts. Sap is impelled into the calyx through the pedicle by gentle degrees, is taken up by it, and exposed by the surface of its tube and segments to air and light; but having very imperfect means of returning, all that cannot be consumed by the calyx is forced onwards into the circulation of the petals, stamens, and pistil. The petals unfold themselves of a dazzling white, tinged with pink, and expose the stamens; at the same time the disc changes into a saccharine substance, which is supposed to nourish the stamens and pistil, and give them energy to perform their functions.

"At a fitting time the stigmatic surface of the pistil being ready to receive the pollen, the latter is cast upon it from the anthers, which have remained near for that particular purpose. When the pollen touches the stigma, the grains adhere by means of its viscid surface, emitting a delicate membraneous tube, which pierces into the stigmatic tissue, lengthens there, and conveys the matter contained in the pollen towards the ovules, which the tube finally enters by means of their foramina.

"This has no sooner occurred than the petals and stamens fade and fall away: their ephemeral but important functions being accomplished. The sap, which is afterwards impelled through the peduncle, can only be disposed of to the calyx and ovary, where it lodges: these two swell and form a young fruit, which continues to grow as long as any new matter of growth is supplied from the parent plant. At this time the surface of the fruit performs the functions of leaves in exposing the juice to light and air; at a subsequent period it ceases to decompose carbonic acid, gains oxygen, loses its green colour, assumes the rich ruddy glow of maturity; and the peduncle, no longer a passage for fluids, dries up and becomes unequal to supporting the fruit, which at last falls to the earth. Here, if not destroyed by animals, it lies and decays; in the succeeding spring its seeds are stimulated into life, strike root in the mass of decayed matter which surrounds them, and spring forth as new plants to undergo all the vicissitudes of their parent.

"Such are the progressive phenomena in the vegetation, not only of the apple, but of all trees which are natives of northern climates, and of a large part of the herbage of the same countries, modified of course by peculiarities of structure and constitution, as in annual and herbaceous plants, and in those the leaves of which are opposite and not alternate; but all the more essential circumstances of their growth are the same as those of the apple-tree.

"If we reflect upon these phenomena, our minds can scarcely fail to be deeply impressed with admiration at the perfect simplicity, and, at the same time, faultless skill with which all the machinery is contrived, upon which vegetable life depends. A few forms of tissue, interwoven horizontally and perpendicularly, constitute a stem; the development by the first shoot that the seed produces, of buds which grow upon the same plan as the first shoot itself, and a constant repetition of the same formation, cause an increase in the length and breadth of the plant; an expansion of the bark into a leaf, within which ramify veins proceeding from the seat of nutritive matter in the new shoot, with a provision of air-passages in its substance, and of pores on its surface, enables the crude fluid sent from the root to be elaborated and digested until it becomes the peculiar secretion of the species; the contraction of a branch and its leaves forms a flower; the disintegration of the internal tissue of a petal forms pollen; the folding inwards of a leaf is sufficient to constitute a pistil; and, finally, the gorging of the pistil with fluid, which it cannot part with, causes the production of a fruit."—Vol. ii. p. 139.

With this extract we must conclude our notice. The second book treats fully of the physiology or vital action of the various organs, elementary and compound; and in the third are explained and illustrated the terms used in descriptive botany. The volumes are exceedingly well got up, the embellishments consisting of numerous wood engravings dispersed through the text, and six beautiful plates of microscopical figures. The merit of the work is sufficiently evidenced by the sale of three editions; and certainly this fourth edition, which is considerably extended so as to become almost a new work, deserves an equal share of patronage to that which has been accorded to those which have preceded it. If we were disposed to find any fault, it would be that the author has given us, in great measure, the views of others, rather than a detail of his own; though, in such a science as botany, and in a work professing to be a reflex of the present state of the science, it was perhaps hardly possible that it should be otherwise.

SKETCH OF THE NEW PLANTS OF 1848.

The influx of new plants to our gardens from foreign climes, appears not to be stayed; for during the past year there has been no lack of novelty; indeed, several important additions have been made to the plants already in cultivation. The various introductions have all, from time to time, been duly recorded in the previous volume of the *Annals of Horticulture*, and it is not our purpose here to repeat their descriptions; but we propose in this place to give a useful summary of the most remarkable of the subjects which have either been introduced to this country or to public notice, during the year 1848. We shall take the genera in alphabetical order:—

Acacia.—Of five species which our list records three are useful additions to collections of green-house plants. These are *A. argyrophylla* (Hooker), *A. ixiophylla* (Bentham), and *A. leptoneura*, (Bentham). The former has the phyllodia greyish and silky, and of an obovate oblong figure; in the other two they are narrow. The flowers of all three are borne in globular heads, and are of a deep yellow colour.

Achimenes.—This favourite genus has been greatly augmented within the few years it has attracted notice in gardens. The best which have been added this year are *A. atrosanguinea* (Lindley), with long tubular scarlet blossoms; *A. candida* (Lindley), with small white flowers, and *A. Kleii* (Skinner), which has rosy-coloured flowers, and the habit of longiflora. Hybrids are becoming frequent in this genus: a very large and beautiful variety of *A. longiflora*, distinguished as *grandiflora*, has we presume been thus originated; its blossoms are certainly very large. *A. misera* (Lindley) is a weed; and *A. ocellata* (Hooker), is too leafy.

Agalmyla staminea, *Blume*, is a fine stove epiphytal climber; the blossoms are of a very rich vermilion colour, but there is a little coarseness in habit. Nevertheless, it is a useful plant.

Allamanda Schottii, *Pohl*, is a magnificent plant, its large yellow blossoms being very attractive; its habit is more compact and shrubby than the common kind.

Alloplectus concolor, *Hooker*, one of the half-shrubby gesneraceous plants, bears freely its shaggy bright-red blossoms, and is a second-rate plant.

Banksia Solandri, *R. Brown*, is a fine proteaceous shrub of New Holland, with scarlet blossoms.

Bejaria.—This genus of ericaceous shrubs is not at all familiar in a cultivated state. The species are, however, well deserving of attention, in consequence of their evergreen foliage, neat habit, and showy blossoms. The present year has introduced us to two, *B. æstuans* (Mutis), and *B. coarctata* (Humboldt), both with purplish flowers, the exact tint of which we cannot learn, that are of the class alluded to; the flowers are large and showy.

Bouvardia Cavanillesii, *De Candolle*, is a greenhouse shrub "about as ornamental as a fuchsia," and bearing scarlet tubular flowers.

Burtonia.—Hard-wooded New Holland shrubs. There are two new purple-flowered kinds, either one of which should be added to every select collection of greenhouse plants; they are *B. pulchella* (Meisner), and *B. villosa*, (Meisner). Perhaps the first is the preferable one.

Calceolaria cuneiformis, *Ruiz and Pavon*, is a small yellow-flowered shrub, which may perhaps be useful as a summer plant out of doors.

Cantua.—A genus of polemoniaceous shrubs of distinct habit and appearance. *C. dependens* (Persoon), has the blossoms carmine, and is of sub-trailing habit; *C. pyrifolia* (Jussieu), bears pale yellow blossoms in largish bunches; the former is the preferable kind.

Chirita Moonii, *Gardner*, is a very handsome stove sub-shrub, with dark blue or purple gesneraceous flowers of a large size.

Clematis indivisa, var. lobata is very ornamental; it is a New Zealand plant, with

large white blossoms, which are very freely produced.

Clerodendron.—We have two additions to record, both desirable stove plants. *C. capitatum* (Schumacher), a very strong grower with immense heads of creamy white flowers, and *C. scandens* (Beauvois), a climber, with white flowers tinged with pink.

Cymbidium eburneum, *Lindley*, is a beautiful tropical orchid, with large ivory-white flowers, stained on the lip with yellow.

Dipladenia urophylla, *Hooker*. This is a bushy shrub, apparently not at all climbing in habit. It is rather pretty, the racemes of somewhat bell-shaped salmon-coloured blossoms hanging down gracefully among the leaves, which are however rather large; it is a stove plant.

Echinocactus chloropthalmus, *Hooker*. Remarkable among the dwarf cacti for its purple blossoms and green stigma, from which latter its specific name is derived—green-eyed.

Episcia bicolor, *Hooker*. Dwarf with quite the habit of gloxinia, the foliage is broad and ample, and the numerous purple-and-white flowers spring from among the leaves; very pretty.

Fuchsia spectabilis, *Hooker*, is a very fine species, perhaps the handsomest of all the known kinds. It is a very strong grower, and both leaves and flowers are large, but there is a richness about them; the flowers are crimson. Our only doubt is about the habit of the plant.

Gesnera libanensis, *Morren*, is a dwarf herbaceous stove plant, bearing a remarkable profusion of rich scarlet flowers, with comparatively unobtrusive foliage; very pretty.

Hoya bella, *Hooker*. One of the loveliest of plants; dwarf, spreading, rather drooping in habit, small in stature, with umbels of pure white blossoms with a purple crown—small absolutely, but large in comparison with the other parts, the whole plant being small. Its habit adapts it for growing in suspended baskets in stoves.

Impatiens repens, *Moon*, a yellow flowered balsam, of spreading and diffusely branching habit; has very small leaves, and a profusion of flowers, which renders it worth a place where stove plants are accommodated.

Leuchtenbergia principis, *Hooker*, is a remarkable cactus, with the mammillæ prolonged like the leaves of some aloe; the flowers are yellow. It should form one of a collection of these curious plants.

Metternichia princeps, *Mikan*, is a solanaceous shrub of the larger class, which bears profuse beautiful trumpet-shaped white flowers, something like those of the *Datura arborea*; it requires a stove.

Mitraria coccinea, *Cavanilles*, is a distinct and somewhat handsome sub-climbing shrub, the blossoms of which are scarlet, tubular, and much bellied on one side; they hang on long slender stalks; the plant is probably sufficiently hardy to succeed against a sheltered wall.

Nemophila maculata, *Bentham*, is an annual, resembling in habit and appearance the *N. insignis*, but the flowers are white, with a good-sized blotch on the tip of each division of the corolla; when true, it is very pretty, but it is liable to sport and degenerate.

Nepenthes lævis, *Lindley*, is a smooth pitcher-plant, with narrow shiny leaves, bearing pitchers from two to four inches long, contracted towards the mouth, the brim being without ribs. An interesting addition to this singular race of stove plants.

Passiflora amabilis, *Hooker*, is, we should think, one of the prettiest of passion-flowers. The leaves are whole, that is, not lobed, and the flowers are scarlet-red, the filamentous crown being white; the effect of this contrast is admirable; it is a stove plant.

Plumbago Larpentæ, *Lindley*, does not prove so good as was anticipated; its habit is good, and so is its colour—a bright blue, but the flowers are flimsy, and soon fade, and, moreover, do not fall, but wither on the plant. From its habit and colour, it may be useful to breed from.

Primula Stuartii, *Wallich*, is a fine yellow-flowered primrose, quite hardy, and very desirable for the border; it prefers a north aspected peat border.

Rhododendron.—Some important additions have been made to this genus, in the case of some epiphytal kinds, natives of Borneo. One of these, at least, *R. Brookeanum* (Low), is introduced; it is an evergreen shrub, epiphytal, and bearing golden-yellow or coppery-red blossoms. *R. gracile* (Low), has the flowers fiery red; *R. longiflorum* (Lindley), crimson; and *R. verticillatum* (Low), reddish crimsom. These have all the same habit. *R. barbatum* (Wallich), is a beautiful and very distinct Nepal species, with rosy-red flowers nearly round and flat. *R. nilagiricum* (Zenker), also a Nepal kind, has delicate rose-coloured flowers, with a pale centre.

Siphocampylus manettiæflorus, *Hooker*, is a dwarf compact plant, with small obovate leaves and numerous little tubes of scarlet and yellow, giving it a very ornamental appearance. It is a stove plant.

Thibaudia microphylla, *Lindley*, is another evergreen ericaceous shrub, remarkable for its neat foliage and scarlet or purple flowers. It is a fine greenhouse shrub.

Vanda suavis, *Lindley*, has very fragrant as well as ornamental blossoms; they are white, with reddish-brown and violet mark-

ings and variegations. It is a Java species, and is epiphytal.

Vriesia speciosa, *Hooker*, is a bromeliaceous shrub, with narrow leaves banded with black markings, and bears its white flowers on a scape, which is furnished with large imbricated rich scarlet bracts; it flowers too in winter.

Zauschneria californica, *Presl*, is a very free growing hardy perennial, having a very diffuse and branched habit, and bearing a great profusion of scarlet flowers, which greatly resemble those of some fuchsia.

These all are desirable plants for cultivation, either on account of their beauty or curiosity, or from some other feature of interest which they possess.

FLORICULTURE OF THE PAST YEAR.*

BY GEORGE GLENNY.

There has been a considerable advance in the progress of some flowers, while others have remained stationary, if not altogether receded: that is to say, been neglected. Suppose we take them all *seriatim*, and begin at the Rose. We may be told that the novelties of the year are by no means numerous; but if it were shown that there had not been a single new variety, we should nevertheless say it had greatly advanced, inasmuch as, if nothing good has been added, many bad ones have been rejected; the properties are better understood; the points which add value to them are more highly appreciated, and there cannot be a better preparation for a permanent advance. But there are new ones to let out, and others under proof: that is to say, possessed by the dealers, who will grow them a season, with a view of proving their qualities. The summer Roses: that is to say, the numerous varieties which flower in June, or thereabouts, and give us their flowers for a month, are no longer valued; so many magnificent flowers which equal and surpass the best of the summer varieties may be now selected from the perpetuals and continuous bloomers, that nobody of taste cares to encumber the ground with the sorts which flower but one month in the year. Dealers are obliged to keep them all, because they are asked for; but the best of the rose nurserymen discourage the sale of the summer varieties altogether, and if any one were to order a hundred, and leave it to the choice of the vender, he would select such as bloom three-fourths of the summer. Of course, there are exceptions. Those who provide themselves with a stock of everything, would, perhaps, let the most conspicuous varieties go, without considering the one great object, a prolongation of the bloom. Again, there are persons who, in laying themselves out for an exhibition three or four times a-year, would procure all the best formed flowers, and summer roses will afford them great help in June; for even the old cabbage would be desirable in a collection of fifty in June, and many others would be important additions. At the Hammersmith Nursery, they reject nearly all the flimsy-petalled kinds, and acknowledge thickness of petal to be a most important *desideratum*. This example must be followed; but some of the catalogues are very faulty in this particular, and contain many varieties which, as described, would tempt, and as surely disappoint, those unacquainted with the qualities of the things they order. The Rose, which formerly occupied the undivided attention of a few leading men, now becomes a most important portion of the stock in all respectable nurseries. At the late Mr. Girling's, Stowmarket, this queen of flowers was grown in high perfection, and immensely long walks, neatly formed, and graced on each side with a double row, the front dwarf or half standards, and the back whole standards, took up more than two thousand of the finest sorts; these now pass into other hands. It is, however, very curious to see most of those who have adopted the Rose as a leading article, differing so much in their estimate of the best; but certain it is that most of them, after we mention about fifty, which all appear to like, have a different set of favourites. A very excellent list has already appeared in the Horticultural Magazine. These were the adopted favourites at the Headenham Rosery. At the same time there was a catalogue with a very novel arrangement belonging to another nursery. We cannot too strongly impress on all who have gardens, to first secure all the distinct varieties of the China and hybrid China sort with good flowers, and make up with such others as are continuous in their bloom, or, at least, have two or three seasons of flowering; and it should be recollected, that a garden without a collection of roses, is a complete anomaly; it is a house without a chimney; it is a dining-table covered with plates and dishes, but nothing to eat. The Rose is the finest of all florists' flowers, with the richest qualities, the greatest contrasts, the most lasting beauty, and is withal the greatest favourite among all classes, even the most indifferent. The Tulip has moved a little in the country; but costly as it is to keep up a fine collection, and seldom as it is

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* 1848.

that the new ones come to any fine standard, the progress is slow; and this sluggishness arises, for the most part, from the indifferent judgment and worse taste of those who will write about them. It will hardly be believed, that, in a work of some pretence, but fortunately of no circulation, we have lists of flowers recommended that no honest florist could conscientiously pass off to the most uninformed Tyro; but if, unfortunately, the list should fall into the hands of an ignorant beginner, and he should procure those recommended, he would become disgusted with the flowers altogether, and come to the well-founded conclusion, that if they were good, the tulip was unworthy of his notice. The best varieties that have turned up lately are, the Queen of the North, a byblomen, that has been out two seasons, and begins to be understood ; it is deeper than we like, something of the shape of Ceres belleforme, but beautifully pure in the white and distinctly marked in the purple : Dickson's Bijou, a rose that has been out about the same time, is also very distinct and a good shape, and proves all that we said of it; and a rose which has been conspicuous this season—Rose Magnificent—is not less remarkable for its brilliance of colour, than for the dulness of the pretended representation of it; and it is only justice to this striking rose to say, that had we not seen the name attached to the portrait of the flower, it is impossible that we should have guessed that it was meant for the Rose Magnificent. This flower is in several persons' hands; Alexander has the breeders; Macefield has some of the flowers, as, indeed, have several of the growers at Hoxton; but, in all its states, it is among the best of the roses. In the country there is great talk of new things, but their very best has so frequently disappointed us, that we wait to see them before we can say much in their favour. The proportions of the tulip are at last definitively settled as we settled them in 1832, the proportion of shape to be from a third to half of a hollow ball; and we have given these proportions to show that less than the third would be too shallow, while more than the half would be too deep, but that all the shades between would be perfection. We have been congratulated by some of the oldest and most respectable growers for thus settling the question. It was endeavoured to be shown by diagrams and specious arguments that the third was wrong, and most disingenuously the same circle was used for the third as was used for the half, by which the third was made to look smaller than the half, whereas we have shown that the same flower which forms a fine half, may be expanded wider until it forms a third, and every grade of the expansion is equally beautiful, for what it loses in depth it gains in size, and down to one third it is all that we can desire. Nay, a flower that will not expand to the third without quartering (or dividing between the leaves,) is comparatively worthless; and we have now the acknowledged authority of every grower in the kingdom whose opinion is worth recording, that the question is settled. Such being the case, we leave all those who claim to have had any thing to do from first to last with settling the form at any portion of a circle, no matter what, to prove where and when they first wrote it, or be satisfied that they are set down as pretenders. We are not going to raise the question again under any circumstances. We wrote the properties of flowers before we even communicated with a single individual, and we never, directly or indirectly, had a hint from any body. This is all we shall now say about the authorship of the properties of flowers, so falsely claimed by persons who had no other means of knowing. The extraordinary notions which it was at first considered we had formed, and which in the Pansy, the Geranium, the Verbena, the Cineraria, the Tulip, the Petunia, the Rose, and indeed many others, were disputed until we succeeded in convincing the best florists that they were correct, were then claimed by writers who had either never put pen to paper on the subject, or had written to the contrary. The Cineraria has arrived at a close approximation to the model. Ivery's Beauty of Peckham has its petals so close as to form a circle, the very thing which a few years ago was called impossible; and there are some others coming pretty close up. This flower is distinctly advancing; some of the best of three years ago will now have to give place to better, and the colours are as novel and distinct as their forms are beautiful. The Petunia, though improving, is not a general favourite. It is a difficult thing to exhibit; a single flower is hardly enough to show, and a plant is too weedy, nor are there enough distinct varieties to make a stand of single flowers attractive; but after all, it should be remembered that its value arises from its habit as much as its flowers; dwarfness is a great point, abundance of bloom, thickness of corolla, roundness of flower, brightness of colour. Too many are the reverse of all this: they are straggling, weedy, untidy looking things, and only tolerable while small. They have greatly improved in the form and texture of their flowers, and if some attention be paid now to the most dwarf varieties they will be greatly increased in value. The late Mr. Girling did more than any body else in his time towards improving this flower, and there are some novelties in the Danecroft Nursery at the present time not yet distributed to the public.

The Carnation and Picotee have been gradually improving, especially the latter. The feature most advanced is the smoothness of edge. Some of the favourite varieties were deeply serrated ; these must now be discarded, for there are many as good in other respects and quite smooth. The only check to a more general competition at shows is the great facility for showing collected blooms, and beating gentlemen with other people's flowers. It is a sad pity, but there is no denying the fact, that unfair showing has driven many enthusiastic exhibitors from the field; they have retired because they stand no chance against collected blooms, and they have honourable notions that preclude them from adopting so mean a course. Cases of this kind have been brought under our notice, but we hope the slightest reference to the subject will put on their guard those who have been acting unfairly, and prevent the necessity of further notice. The Dahlia has not been proved this season at all. The old metropolitan test of six blooms has been found inconvenient for the raisers of flowers, though very useful to the public. At the only London show of any consequence, the managers only required three flowers of those varieties which were grown in abundance, by way of proving ; and we need hardly say, that to cut three blooms from twenty or thirty plants is so easy that even the most uncertain will yield that number. The change has been unfortunate for the very persons who caused the alteration. The public considered six flowers a tolerable security for the average certainty of a flower, but the best growers and the best judges think three blooms no evidence at all, because three are as easily cut as one from thirty uncertain plants, and they naturally doubt the quality of even the best. Some growers showed many blooms as well as the three required ; but this opened the eyes of the public still more to the probable uncertainty and worthlessness of all those belonging to the same persons not so supported. For instance, one grower shows five or six varieties, three blooms of each, but of one of these he shows a dozen flowers besides ; the conclusion naturally drawn is, that the one so fully exhibited is at least a constant flower, with all its deficiencies, and that all the others are uncertain. The Dahlia trade will suffer for this. The description of the flowers in our Almanac may be some kind of guide to the buyer, but the alteration of the test from six flowers to three has taken from the public the best security they ever had. Added to this, the growers, or rather some of them, have formed themselves into a society which is to support their productions by certificates of their excellence, and these granted by themselves to one another's flowers. The public do not like this, and indeed many respectable growers set their faces against any society in which the dealers decide upon their own productions. Strictly speaking, there is no advance in the show Dahlias, but the fancy class has several useful additions. There is a second Princess Radziwill in the Beauty of Hastings, the only doubt of its value arises from its small size ; but the same opinion was given of Unique, which was exhibited little larger than a fine Ranunculus the first time, and Princess Radziwill was shown no larger at first than the Beauty of Hastings ; if this should prove large enough it will be a trimmer, at least we should not have hesitated to pronounce it such had we seen six blooms instead of three, which is certainly not test sufficient to depend on. Fearless is a slate-coloured lilac, quite new in colour, and rather striking, a good average flower, with some claims to a place in even a small stand. Queen of the East is really and truly another edition of the Marchioness of Cornwallis, with additions and improvements, and therefore deserving a place; we shall give a description of a few about which some noise has been made, to be relied on as accurate, so far as the three flowers exhibited will enable any body to estimate their claims.

The Pansy may now be weeded of many sorts that have nearly the worst faults, small centres almost all occupied with the eye and the rays, which break into the margin. A flower of this description looks heavy as compared with those which have a good field of white or yellow clear all round the extreme points of the rays. We do hope that judges will begin to exercise a sound discretion and throw out such heavy looking varieties as we have seen of late. A run petal in a pink is fatal to a stand; nobody tries to save it; and the same penalty should be imposed for an eye when its rays break through the field of yellow or white into the margin ; there are plenty without this fault. It is the fashion just now to cry up Hollyhocks as show flowers, and truly, to look at those of Mr. Baron's rearing, they were deserving of the distinction. Mr. Bircham, of Headenham Rosery, Bungay, puts forth a list which, according to the description, must be some of Mr. Baron's best. For the properties we refer our readers to the volume called "The Properties of Flowers and Plants," where they will observe the features that are most esteemed. Mr. Chater, of Saffron Walden, also advertises a number of Mr. Baron's best sorts, and it must be conceded that he has far outshone all who had pretended to raise them. We wish we could see the Ranunculus and the Auricula cultivated with the spirit formerly evinced, when a thousand little gardens, now no more, occupied Bethnal-green, Mile-end, and indeed all the suburbs now covered with

densely crowded houses; but those who could and did grow both well were driven from their plots of ground, and, comparatively, both flowers are neglected, although the Auricula is the most delicate, and the Ranunculus the most perfect, of all our pets. Floriculture has suffered more from evicted tenants of gardens being forced to discontinue growing, than any body not well acquainted with the gardens of Bethnal-green could imagine; thousands of growers have no longer a rod of ground to cultivate, and to growers of that class we owe many of our most beautiful varieties of florists' flowers. Those who grow flowers now must get further from London, and they comprise a higher if not better class than the humble mechanics and artisans whose industry and perseverance accomplished so much in the earlier days of floriculture. The Geranium is of later adoption as a florist's flower. Its properties were little understood until the publication of the particulars a few years since; brilliancy of colour was the only point looked after; shape was altogether lost sight of, and the notion of the bloom being round was not thought of; but now that the properties of flowers are in every body's hands, other works go elaborately into the subject, giving the same points over again, as if they had never been mentioned; but inasmuch as none of them contradict the original, we shall leave the question of dates to speak for themselves. We are not quite sure that the world is any wiser for these repetitions, but that is not our business. We shall give a list of useful new varieties which may guide those who do not judge for themselves, but they are not all we require for a good Geranium as yet. The Pink growers are very much divided in opinion as to the merits of two new ones that have made considerable noise—Turner's X Y Z, and Read's Jenny Lind. We could settle the merits of these two candidates in a few words, but as both are good enough to demand a place in every exhibitor's collection, no grower of any pretensions will fail to obtain both; they are not alike, and both will, if well grown, help a stand. These things would be all better understood if there were social meetings of the persons interested, where the flowers could be seen and talked of; and we are not sorry that such meetings are contemplated, for there is as much pleasure in talking of flowers as there is in growing them, or nearly so; besides which, we can enjoy the conversation in the evening as much as we enjoy the culture by daylight. The great nurseries of the science were the numerous societies of humble but enthusiastic amateurs who congregated to club small sums for prizes once a-year; but, from the cause already mentioned, these are for the most part discontinued. An attempt has been made to get up a society for conversational purposes, under the pretence of promoting floriculture by judging flowers and *deciding as to their merits*, but a more inconsiderate thing was never attempted, nor one that more completely defeats itself. We have repeatedly said that amateurs have no confidence in such affairs, unless *judges are appointed and their names advertised*. Say, for instance, a dozen raisers and dealers meet to give one another's flowers certificates of merit; what is the value of such a character to a flower? We are careful not to say anything offensive, but which of the raisers and dealers have not put forth, strongly recommended and highly described flowers, that have turned out worthless? Nay, which of them have not done it repeatedly? However, as the "London Floricultural Society" have taken upon themselves to give one another certificates, it is our duty to report matters as they stand; therefore we give the following as the entire business of the year, and the proceedings of all the meetings.

April 18.—Mr. Cuthill, in the chair. First-class certificate for *Cineraria Satellite* to Mr. Atlee.

May 9.—Mr. Bright in the chair. One to Messrs. Bragg & Bright for Pansy *D'Israeli*.

June 13.—Mr. George Smith in the chair. One to Mr. Black* for Pelargonium, *Gipsy's Bride;* one to Mr. Black for ditto, *Constance;* one to Mr. Black for ditto, *Fireball;* one to Messrs. Bragg & Bright for Pansy, *Hero*.

July 11.—Dr. Bushell in the chair. One to Mr. Black for Pelargonium, *Ondine;* one to Mr. Gaines for ditto, *Meleager;* one to Mr. Gaines for ditto, *Virgil;* one to Messrs. Bragg & Bright for Pansy, *Colossus;* one to Mr. G. Smith for Verbena, *Beauty of Hornsey;* one to Mr. G. Smith for ditto, *Advancer;* one to Mr. G. Smith for ditto, *Napier*.

August 8.—Mr. James Dickson in the chair. One to Mr. Stein for Dahlia, *Nymph;* one to Mr. Hunt for ditto, *Gen. Cavaignac*.

August 22.—Mr. Kendall in the chair. One to Dr. Bushell for a Dahlia, *The Duchess*.

September 5.—Dr. Bushell in the chair. One to Messrs. Bragg & Bright for Dahlia, *Othello;* one to Messrs. Bragg & Bright for ditto, *Gen. Vyse;* one to Messrs. Bragg & Bright for ditto, *Horatio;* one to Mr. Keynes for ditto, *Rainbow;* one to Mr. Keynes for ditto, *Sunbeam;* one to Mr. Long for ditto, *Earl Clarendon;* one to Mr. G. Smith for Fuchsia, *Lord Nelson;* one to Mr. Back for Petunia, *Minerva*.

September 18.—Mr. James Dickson in the chair. One to Mr. Barker for Verbena, *Junius;* one to Mr. Barker for ditto, *Miss Thur-*

* Mr. Black is gardener to E. Forster, Esq., of Clewer, whose flowers are let out by Messrs. Bragg & Bright.

rold; one to Mr. Barker for ditto, *Cardinal;* one to Mr. G. Smith for ditto, *Ariel;* one to Mr. G. Smith for Dahlia, *La Reine;* one to Mr. Dodds for ditto, *Miss Blackmore.*

October 3.—Dr. Bushell in the chair. One to Mr. Barker for Verbena, *Lord of the Isles;* one to Mr. Barker for ditto, *Bride;* one to Mr. Barker for ditto, *Duchess of Northumberland;* one to Mr. G. Smith for ditto, *Psyche;* one to Mr. G. Smith for ditto, *Queen of the French;* one to Mr. Cook for Dahlia, *Flora.*

November 14.—Dr. Bushell in the chair. One to Mr. Kinghorn for Pelargonium, *Ceres Unique.*

December 12.—Dr. Bushell in the chair. One to Mr. Kendall for a Cineraria, *Queen of the Isles.*

These are the mere facts of the case. We have no dislike to such societies, but they must be above suspicion of ignorance, or favouritism, or design, to have any weight with the public. We shall only say, most unequivocally, that if we had been judges, very few of the whole number would have been passed as improvements on what we already possess, or been distinguished by any certificate. The public, especially the amateur buyers, may do as they like about which they place their faith in, but we are quite convinced that it will not tell in favour of a flower to say it had a first-class certificate at a society of dealers. The idea of a dozen interested persons raising the value of one another's productions, by a scheme of this kind, is not very likely to prevail in their favour, but we will not offer a contradiction to any one decision, though, as an authority, we say the proceedings are calculated to deceive those who put trust in the certificates. A society of amateurs is forming, which bids fair at present to lead to great results. Amateurs are the persons interested in the proper estimation of a flower, and are very likely to put a complete check upon the issue of worthless varieties, by establishing a disinterested test. The enrolling of all amateurs in a society from which there is nobody to get the pickings, and to which the subscription is merely nominal, is a work now in progress. They will meet at four different sides of the town, to accommodate the members all round; and they will elect a board of judges not interested in any result except in common with the public. These judges will be able to decide that a flower deserves a certificate, and produce it to the meeting; but unless the body of members, all of whom are amateurs, decide, *as well as the judges,* that the subjects are worthy of a certificate, no certificate will issue. But the meeting cannot issue a certificate, or grant one, unless the judges first approve: so that while they can prevent the issue of a certificate, the members can do so likewise; and thus there is a complete check to those unfair distinctions which, *if the public had any faith,* would drive them into the purchase of *bad* things at *good* prices. As, however, we shall for the present year be the organ of "the United Florists of Great Britain, Ireland, and the British Colonies," we shall be able to do much more than we have done; and if we be not all that a large class of florists may wish, we shall communicate all the facts they can want. There has been one good movement made by the Royal Botanic Society—the growers of American plants have been invited to exhibit in the Regent's Park Garden; it is wise on the part of the Society, who are like the children of this world, "wise in their generation." This is no original idea; on the contrary, Mr. Waterer has for years raised a show by himself, on a piece of ground hired or rented by himself, and has taken hundreds of pounds in money as well as orders. The appropriation of such patronage, if they will admit us on the same terms, is wise on their part; if they exclude the public, or any body willing to pay Mr. Waterer's price, the loss to the public, and to those who take orders, will be great; and beyond this, any public exhibition of flowers, no matter what, induces a few who never grew them before, to begin their cultivation, and the floral world and the floricultural nurseries are gainers. The Horticultural Society could have done this years ago, but the difficulty has been in the arrangement: if they let the public in as Mr. Waterer did, they lowered the value of the Fellowship of the Society, the privileges of Fellows being chiefly their right of discriminating between those proper or improper to be let in; and if they confined the right of seeing the exhibition to the Fellows, and those who had orders, it would do harm; so they perhaps very properly left such extra exhibitions to individual enterprise. It has yet to be ascertained how the plan will work, but it rather reminds one of the country societies which, in their attempts to grasp at too much, have entirely lost caste and deteriorated their standing. We are quite prepared to admit that the Royal Botanic Society has, on the whole, done well, and been a formidable rival to the Chiswick Gardens; but it cannot be denied that their success has been in the precise ratio of their departure from their originally proposed objects.

If the fact of having obtained particular notice and distinction at the principal exhibitions had any reference whatever to the merits of the subjects, we should have given a list of the prizes awarded during the year; but as four-fifths of the subjects that have obtained prizes will never be heard of after the first sale is forced by means of the prizes or certificates

awarded, it would be only giving currency and influence to the awards to notice them at all. Perhaps the shows in a whole year never gave so much cause for dissatisfaction as those for 1848; this will give rise to new societies and the abandonment of old ones, and this will never be cured without a demonstration of sound judgment on the part of societies by the employment of acknowledged judges. The shows of plants are lotteries, and, until plants are grown naturally, will continue so; those who can mechanically grow a geranium, or a rose, or any other plant with the most shoots, and place wooden or other supporters with the greatest dexterity, supersede all good plant growing, give bunglers the preference, and place bad ill-habited plants over those that will grow well without any mechanical aid. Upon the whole, there is a good deal to undo, as well as much to do, to bring up floriculture to the place it held in 1846, and even that was almost a reaction. The only subject upon which we can really congratulate our floral friends, is the fact that the continental florists have not only adopted our standard for florists' flowers, but they have greatly added to our very best varieties of many different species, and that unless we make great haste to bring up our arrears, they will surpass us in most of those subjects which, (as the late Mr. Loudon said,) have been elevated to the rank of florists' flowers. In closing our remarks on the last year's doings, we have to acknowledge the omission of many occurrences which we could only notice hastily, and we have done this rather than incur the charge of ill-nature; something has been done, much remains to be done, and not a little requires to be undone. We shall watch carefully not only everything but everybody through 1849, and notice all important matters month by month.

NEW FLOWERS AND PLANTS.

Asclepias Douglasii, *Hooker* (Douglas's Asclepias).—Asclepiadaceæ § Asclepiadeæveræ.—An erect growing herbaceous perennial, growing a foot or a foot and a half high, generally unbranched. The stems are stout, round, and woolly, furnished with opposite or ternately whorled leaves, a span long, and of an oblong or ovate-lanceolate form; they are downy above and woolly beneath. The flowers grow in umbels, which spring from between the petioles of the opposite leaves; they are numerous, of a reddish purple colour, tinged with green. It is not a very attractive plant; although the asclepiases, which are not very commonly cultivated, have a singular structure, worth attentive examination. Native of North America, on the west side of the Rocky Mountains. Introduced in 1846 by Mr. Burke to the Royal Garden at Kew. Flowers in July. *Culture.*—Hardy; good loamy soil; propagated by division of the plant.

Dipladenia urophylla, *Hooker* (taper-point-leaved Dipladenia). — Apocynaceæ § Wrighteæ.—A handsome bushy shrub, much branched, and smooth in every part. The branches are round, and swollen at the joints; they are furnished with opposite leaves, between ovate and oblong, obtuse at the base, and lengthened out at the apex into a long narrow point. From the axils of these, grow the flowers on slender drooping racemes, bearing apparently each four or five flowers; the corolla is large and handsome, with a tawny-yellow tube, narrow and cylindrical at the base, and narrowly-campanulate above; the limb consisting of five large rotundate, oblique, deeply separated, salmon coloured divisions; the face of the flower is about two inches across, of which one is occupied by the yellowish throat. Native of the Organ Mountains of Brazil. Introduced in 1847. Flowers in summer and autumn. *Culture.*—Requires a stove; turfy peat, and loam; propagated by cuttings planted in sand, and placed in a gentle bottom heat.

Vriesia glaucophylla, *Hooker* (glaucous-leaved Vriesia). — Bromeliaceæ. — Rather a pretty plant, though not strikingly coloured. A stemless perennial plant, with an aloe-like appearance, the leaves narrow, recurved, a foot and a half long, tapering to the point, and at the base closely arranged around a somewhat swollen base; they are firm in texture, and of a bluish tinge, produced by a sub-farinose covering. The flower scape, from the centre of the plant, reaches a foot or more in height, and is divided at the top into four or five branches or spikes of a span long, covered with distichous keeled rigid bracts, of an ovate-lanceolate form, and very acute; some of the lower bracts are red, the rest green, tinged with yellow and red. That portion of the blossoms protruded beyond these bracts, consists of three convolute purple petals, almost white at the apex; these project about an inch beyond the bract, and reach perfection in succession, not more than one blossom on a spike being perfect at one time. Beyond the petals are protruded the six stamens, bearing dark purple anthers. Native of Santa Martha, New Grenada. Introduced in 1847. Flowers in August. *Culture.*—Requires a stove; light turfy peat soil; propagated by dividing the plant.

Dendrobium Farmerii, *Paxton* (Mr. Farmer's Dendrobe).—Orchidaceæ § Malaxeæ-Dendrobidæ.—A very beautiful epiphytal species, having the habit of *D. densiflorum*. The stems are angular, club-shaped, thickened upwards, bearing towards the summit three or four oblong acute leaves. The flowers are borne in long lateral drooping racemes, each supporting many flowers; they are large and very handsome; the sepals spreading, ovate obtuse, of a rich and very delicate tinge of rose colour; the petals are larger, of a very delicate straw colour, ciliated, the lip broad, almost squared, clawed, and ciliated, of a pale straw colour, with a deep yellow blotch an inch in diameter. Native of the East Indies, having been received from Dr. McClelland of the Calcutta Botanic Garden, as *D. densiflorum*, from which it very strikingly differs. Introduced in 1847. Flowers in March. *Culture.*—Requires a hot moist stove; turfy peat soil, mixed with chopped sphagnum moss; propagated by division of the plant.

Chironia glutinosa, *Paxton* (glutinous Chironia).—Gentianaceæ § Gentianeæ.—A very handsome evergreen suffruticose plant, with a smooth stem, and numerous, somewhat succulent, spreading branches. The leaves are opposite, of an ovate-lanceolate form, three to five-veined. The flowers are numerous on the young shoots, and are large, being two inches or upwards in diameter, and of a bright red colour tinged with lilac; the limb of the corolla is five-parted and widely spreading. Supposed to have been raised from Australian seeds in the Hull Botanic Garden, but its history is obscure. Introduced probably about 1844. Flowers for several months in summer. *Culture.*—Requires a greenhouse; peat, loam, and leaf-mould, with abundance of drainage; propagated easily by cuttings planted in sand, with a little bottom heat.

Acacia salicina, *Lindley* (Willow Wattle or Acacia).—Fabaceæ § Mimoseæ-Acacieæ.—This is a very handsome conservatory shrub, of large growth, soon attaining twelve or fifteen feet high. The branches are slender, and drooping like those of the weeping willow, and the foliage has the same narrow lance-shaped form. The whole plant is glaucous, being slightly covered with bloom; the branches are angular; the leaves (phyllodia) are linear or oblong-lanceolate, obtuse, one-nerved, and sprinkled on the under side with numerous reddish minute drops of resin. The flowers grow in short racemes of from three to five heads, and are of a pale yellow colour. When planted out in a conservatory, this species is almost always in blossom. Native of New Holland. It is one of the plants found by Sir T. Mitchell, during his surveying expeditions, and was found by him in woods, near the Lachlan River. Introduced in 1844 (?) Flowers throughout the year, most copiously in spring. *Culture.*—Requires a greenhouse; turfy loam, and peat; propagated by seeds, or by cuttings which root slowly in sand, under bell-glasses.

Uropedium Lindenii, *Lindley* (Mr. Linden's Uropedium).—Orchidaceæ § Cypripedeæ.—A very singular and magnificent plant, with exactly the habit of *Cypripedium insigne*. It is a perennial, with thick shining fleshy persistent leaves, a foot long, blunt and unequally two-toothed at the point. The flowers are borne singly on downy stalks something shorter than the leaves, and are very remarkable in consequence of the tail-like length of the petals; the upper sepal is ovate-lanceolate, four inches long, the lower ones united into one of the same form but rather wider, all being of a pale yellow colour streaked with orange; the petals are linear-lanceolate, extended into a long narrow tail, and about eight or nine inches long, purple-orange at the base; the lip is of the same form, but broader, and is, like the sepals, shaggy at the base. The flowers measure from fifteen to twenty inches in their greatest diameter. Native of Colombia, growing on the ground in the woods of the Savannah, in that elevated part of the Cordillera which overlooks the vast forests at the bottom of the Lake of Maracaybo; altitude 8500 feet. Introduced in 1848, and dispersed at an auction sale. Flowers in —— ? *Culture.*—Requires a stove; turfy peat soil; propagated by division of the plant.

Picrorhiza Kurroa, *Royle* (Kurroa Picrorhiza).—Scrophulariaceæ § Rhinanthideæ.—An herbaceous perennial, having thick fleshy roots, which are intensely bitter, and used in the native medicine of India. The plant attains a height of about six inches, the stems being ascending. The leaves are obovate, tapering to the base, serrated on the margin, and nearly or quite smooth. The flowers are deep blue, and sessile in dense spikes, but not remarkable for showiness. Native of Northern India. Introduced in 1846. Flowers in July and August. This plant was called *Veronica Lindleyana* by Wallich. *Culture.*—Hardy, requiring only protection against wet in winter; rich light soil; propagated readily by division of the plant.

Tradescantia glauca, *Lindley* (glaucous Spiderwort).—Commelynaceæ.—A pretty little stove herbaceous plant, smooth, glaucous and ascending. The leaves are oblong, acuminate, and remarkable from the peculiarity of clasping the stem by their base. The flowers are small, somewhat umbellate, the principal rays being very long, and the partial ones very

short; the sepals are purple at the point, green at the base, and covered with glandular hairs; the petals small and concave, white, occasionally stained. Native probably of Guatemala. Introduced in 1848. It was raised in Sir P. Egerton's orchid house, on the stump of an epidendrum. Flowers in October. *Culture.*—Requires a cool stove or warm greenhouse; turfy peat and loam; propagated by cuttings.

Rhododendron ledifolium (Azalea indica) *var. setosum* (bearded Indian Azalea).—Ericaceæ § Rhododendreæ.—A handsome and vigorous growing variety, with dark brown and very hairy branches, furnished with ovate lanceolate acuminate leaves, hairy, especially on the margin and on the under surface; the leaves are persistent through the winter. The flowers are very large (represented as being four inches across), of a light rosy purple colour, deeper towards the margin and paler towards the centre; the petal-like lobes or segments of the corolla are large, broad, and undulated, the upper one being studded in the centre with red tubercles which appear like spots; the stamens and pistil are deeply-coloured purple. A Belgian garden variety raised from the Phœnician variety of the Indian Azalea, crossed with the common white variety. Raised in 1846, by Mr. L. Bailleul, nurseryman of Ghent. Flowers in the spring months. This variety is also called *barbata* in the Belgian gardens. *Culture.*—Requires a cool greenhouse; turfy peat and sand; propagated by budding, grafting, or inarching on stocks of the free growing varieties of Indian Azalea, or Rhododendron ponticum.

Tropæolum oxalianthum, *Morren* (oxalis-flowered Indian Cress).—Tropæolaceæ § Tropæoleæ.—A pretty tuberous-rooted perennial species in the way of *T. brachyceras* and *T. tenellum.* It has slender cylindrical twining stems, proceeding from the crown of the tuber, and bearing small peltate five-lobed leaves on slender twisted petioles about three inches long; the lobes or segments of the leaves are lanceolate entire, and wedge-shaped at the base. The flowers are also borne on slender stalks from the axils of the leaves, and are small, of a clear yellow colour, the two upper petals being streaked with bright orange-red; the calyx is about half as long as the petals, green, divided into five oval dilated lobes, and terminating behind in a conical obtuse spur; the petals are oval, wedge-shaped at the base, the lateral ones undulated on the margins. Native of Chili. Introduced to Belgium in 1847, by Mr. Bauman, of Ghent. Flowers in the early part of the summer. *Culture.*—Requires a greenhouse; sandy loam and leaf mould; propagated by cuttings of the young shoots planted in sand, and placed in a gentle heat.

Epidendrum funiferum, *Morren* (thread-petalled Epidendrum).—Orchidaceæ § Epidendreæ-Læliadæ.—A handsome and very distinct epiphytal species, having a round slender erect stem of from eighteen inches to two feet high, on which are situated the alternate oblong-lanceolate, acuminate, striated leaves; these envelope the stem by their base in the manner of a sheath, and are also much incurved at the apex. The flowers are borne in numerous short drooping racemes issuing from along the upper part of the stem; they are small, of a rich orange colour, with a white centre; the sepals are entire, ovate acuminate, spreading, and tinged with light green and purple at the back; the petals are remarkable for their thread-like form; they are as long as the sepals, and adhere to the sides of the two lateral ones as far as the middle, but separate nearer to the base with the full expansion of the flower, and ultimately become contorted, like a corkscrew; the lip is longer than the sepals, three-parted, joined to the column, and of a white colour at the base; the side lobes are serrated, the intermediate one ligulate and notched in the middle. Native of the island of St. Catherine's. Introduced to Belgium about 1847. Flowers —— ? *Culture.*—Requires a moist stove; should be grown in pots among turfy peat soil, potsherds, and sphagnum; propagated by division of the plant.

Statice imbricata, *Gerard* (imbricated Statice). — Plumbaginaceæ § Staticeæ. — A handsome perennial with the habit of *S. sinuata.* The flowering stem, springing from a tuft of leaves at the base of the plant, grows about two feet high, and is winged with a broad leafy dark green sinuated margin throughout; it terminates in a corymbose head of flowering branches, each branch having also a corymbose ramification. The leaves, forming a rovulate tuft, are pinnatifid, the upper portion being entire, and forming a large and distinct lobe of a sub-triangular or acuminate form, and the lower portion consisting of a series of entire oblong-reniform oblique and slightly sinuated lobes, which gradually become smaller towards the naked leaf-stalk; the margins of the old leaves are red and ciliated, the young ones being also red and of a velvety texture, contributing greatly to the beauty of the entire plant. The flowers growing from the apices of the numerous ramifications of the stem, consist of a rich blue persistent cup-shaped crenated calyx, surrounding the small cream-coloured fugitive petals, the chief beauty of the plant—which is very considerable—residing in the persistent blue calyx. Native of the island of Teneriffe, where it was originally found by P. B. Webb, Esq. near the town of Buena Vista. Introduced to the continental gardens in 1846, and thence to those of this

country. Flowers in the summer months. *Culture.*—Requires a greenhouse or dry frame secure from frost, in winter; sandy loam and peat; propagated by seeds, by division of the plant, and also by means of portions of the thick roots, excited by gentle bottom heat.

Dipladenia nobilis, *var. rosea* (rose coloured variety of Dipladenia nobilis).—Apocynaceæ § Wrighteæ.—A handsome stove climber, differing from *D. nobilis*, in having more tubular shaped blossoms, with the limb more fully expanded, and in the colour of the interior of the throat being of a deep rose colour. The leaves are opposite, and oblong lanceolate, and the flowers borne in a racemose arrangement at the ends of the branches; they are of a rich deep rosy pink colour, and about two inches in diameter. Native of the island of St. Catherine's. Introduced in 1847, by Mr. A. Verschaffelt, of Ghent. Flowers in summer. *Culture.*—Requires a stove; sandy loam and peat; propagated by cuttings planted in sand under bell glasses.

Rhododendron ledifolium (Azalea indica), *var. lacteolum striatum* (white-striped-flowered Indian Azalea).—Ericaceæ § Rhododendreæ.—A showy variety of vigorous habit, with dark brownish coloured branches, bearing oblong roundish pointed leaves of a deep green colour, covered with small red hairs, particularly at the margins and on the under side. The flowers grow at the ends of the branches, several together; they are about two inches and a half in diameter, with rounded petal-like lobes, milky white, streaked with crimson; the form is tolerably good, but the variety not better than some of those raised in English gardens. A Belgian garden hybrid, obtained between the common white and a red flowered variety. Raised in 1846, by Mr. J. Van Geert, of Ghent. Flowers in spring. *Culture.*—Requires a cool greenhouse; turfy peat and sand; propagated by budding, grafting, or inarching on the stocks of vigorous growing varieties of Indian Azalea, or on those of Rhododendron ponticum.

Cattleya amethystina, *Morren* (amethyst-lipped Cattleya).—Orchidaceæ § Epidendreæ-Læliadæ.—A charming epiphyte, having considerable resemblance to the *C. intermedia* of English botanists. It has a short, thick, round stem, with a furrow on one side, supporting two lance-shaped, smooth, thick, fleshy leaves, which are dark green on the upper surface. The flowers, growing from three to five in a short terminal raceme, which issues from a pale coloured spathe, are large, and generally of a light pink or pale flesh colour, strikingly contrasting with the sombre hue of the leaves; the sepals and petals are lanceolate, somewhat pointed at the tips, spreading, pellucid, with a full streak of pale yellow down the middle, and faintly tinged with light green at the base and points; the lip is three-lobed, the side lobes which envelope the column are entire, thick, fleshy, and of a light pink, the centre lobe—the striking feature of the flower—being of a rich violet colour, and, in general form, somewhat heartshaped, undulated, and regularly dentated at the margins, with a narrow band down the centre, fading off to white at the tip. Native of S. America; St. Catherines. Introduced in 1848 to Belgian gardens, by Mr. A. Verschaffelt, of Ghent. Flowers in May. *Culture.*—Requires a moist stove; turfy peat soil; propagated by division of the plant.

Cattleya elegans, *Morren* (elegant Cattleya).—Orchidaceæ § Epidendreæ-Læliadæ.—A handsome and magnificent epiphytal species in the way of *C. superba*, from which it is chiefly distinguished by the absence of rugose veins and callosities in the labellum. It grows with a straight, short, club shaped stem, which bears two ovate-lanceolate, somewhat pointed leaves. The flowers, which are produced on a short few-flowered raceme, are large and of a bright rosy pink colour, which merges into a soft pale yellow towards the base of the petals, there terminating in light green; the sepals are narrow, oblong-lanceolate and pointed; the petals are also oblong, nearly three times broader than the sepals, undulated, and somewhat acute; the lip, or labellum, is three lobed, furrowed and undulated, the two side lobes being white, with a faint rosy tinge on the outside, convolute, oval, terminating in obtuse angles and overlapping each other so as to envelope the column in a tubular manner; the intermediate lobe is of a dark purple colour (which is partially continued on the interior of the side lobes), large, considerably lengthened, undulated, and nearly square. Native of the island of St. Catherine's. Introduced to the Belgian Gardens by Mr. A. Verschaffelt, of Ghent. Flowers ——— ? *Culture.*—Requires a moist stove, and but a sparing supply of water during the time of forming its flowers; turfy peat soil; propagated by division of the plant.

Pentstemon ovatum, *var. atro-cœruleum* (dark-blue variety of Pentstemon ovatum).—Scrophulariaceæ § Antirrhinideæ-Cheloneæ.—A very showy perennial plant of graceful upright habit, clothed with short viscous pubescence, and growing from three to four feet high. The leaves are smooth, ovate-cordate, amplexicaul, and finely dentated at the margins, the lower ones having longish petioles. The flowers form a loose many-flowered leafy panicle at the top of the stem; they grow on axillary peduncles nearly in the manner of a corymb, from six to eight together, and are tubular, the tube being about half an inch in

length, and separating into a five-lobed limb of about half an inch in diameter ; the colour, as the name implies, is a fine dark blue, deepening near the extremities, and merging into a bluish green towards the calyx ; the throat is of a yellowish tinge. A very desirable species for the open border, or even a rockery. Native of the mountains of Columbia. Introduced to the Belgian Gardens in 1846. Flowers in June and July. *Culture.*—Nearly hardy ; requiring shelter in wet or severe winters, when it may be kept in pots in a greenhouse or dry airy frame ; rich loamy soil ; propagated by seeds, or by division.

Epidendrum sulphureum, *Morren* (sulphur-flowered Epidendrum).—Orchidaceæ § Epidendreæ-Læliadæ. — A pretty species, with oval conic pseudo-bulbs, from which short unilateral stems issue, having entire, smooth, linear lanceolate, attenuated, obtuse leaves, furrowed down the middle, keeled underneath, and partially two-lobed at the points. The flowers are numerous, and produced in short racemes, usually from eight to ten in number, and forming a graceful panicle, the stem of which springs from the axils of the leaves ; the petals and sepals are of equal size, and of an ovate-lanceolate form, the sepals being slightly spathulate, and of a uniform sulphurous colour ; the labellum is three-lobed, the two side ones red, three-angled, and pointed ; the intermediate one broad, oval, crenated, and beautifully lined with rose colour, which terminates at the column in red streaks. Native of Guatemala. Introduced in 1847. Flowers in the summer. *Culture.*—Requires a moist stove ; turfy peat soil; propagated by division of the plant.

Barkeria melanocaulon, *Richard and Galeotti* (dark-stemmed Barkeria).—Orchidaceæ § Epidendreæ-Læliadæ. — A graceful little plant with small round fleshy roots, and growing up with a straight round stem of a dark brownish colour at the base, and bearing small distichous, ovate lanceolate alternate leaves, commonly four in number, attenuated at both extremities, and recurved at the points. Immediately above the leaves are a number of bracts, usually three ; they are straight, lanceolate, and clasping the stem at their base, the undermost being considerably longer and broader than those above it. The flowers are borne on a pendant raceme from the apex of the stem ; they are from twelve to fourteen in number, an inch and a half broad, about half an inch apart, and of a rosy lilac colour ; the petals are oval, attenuated at the points, and about thrice as broad as the sepals, which are linear-lanceolate ; the lip is two-lobed, sinuated at the margins, and having a double, obtuse, or roundish notch in the middle, the column being of a purplish colour, which merges into green at the base. Native of Mexico. Introduced to the Belgian Gardens in 1848. Flowers in June. *Culture.*—Requires a stove; turfy peat soil ; propagated by division of the plant.

Brassia coryandra, *Morren* (helmet-columned Brassia).—Orchidaceæ § Vandeæ-Brassidæ.—A distinct and interesting epiphytal species. The pseudo bulbs are conical, compressed, and each bear one lanceolate pointed leaf, which is shorter than the flower-stems. The flowers are produced in pendant racemes, and are beautifully variegated with green and white ; the sepals are very long—three to four inches—linear and acuminate, the upper one smooth, straight, and turned down ; the petals are divaricated, linear-lanceolate, shorter than the inferior sepals, which are the longest ; the colour of both sepals and petals is pale green spotted with brown near the base ; the lip, which is white spotted with green over its lower half, and having a yellow crested plate at the base of the column, is elongate-panduriform, about half as long as the petals, lengthened out into an acuminate point, which is reflexed. Native of Brazil. Introduced to the Belgian Gardens in 1848, by Mr. A. Verschaffelt, of Ghent. Flowers in June. *Culture.*—Requires a moist stove ; turfy peat soil ; propagated by division of the plant.

Dossinia marmorata, *Morren* (marbled leaved Dossinia).—Orchidaceæ § Neotteæ-Physuridæ.—This is one of that group of dwarf creeping stemmed orchidaceous herbs, whose greatest interest lies in the appearance of the foliage, which looks like a velvet surface overlaid with lustrous metallic veins. Some species of the genera Anæctochilus and Physurus, having these characters, are not unfrequently met with in English gardens. The present species is of very recent introduction. It has a sub-repent habit, the stems being fleshy and assuming an erect position at the apex. The beauty of the plant consists in the colour and marking of the leaves, which are seated rather close together at the base of the upright part of the stem. When in bloom the plant rises with an erect rose-coloured stem about a foot in height, the flowers being arranged as a lengthened raceme-like spike on the upper part, the apex being recurved. The leaves are ovate, attenuated towards both extremities, having a velvety surface, rich dark green with a mahogany coloured stain, clouded with yellowish green, and netted over with clear yellow lines, resembling the veins in marble ; these lines do, in fact, mark the reticulated veins of the leaves. The under surface is similarly marked, but less velvety, and of a paler colour. The flowers are small, and not attractive ; the sepal

and petals are white tinged with rose-colour, and the lip is white, lengthened out, nearly square at the apex, where its margins are smooth. Native of Java and Borneo. Introduced in 1847, by Mr. Low, of the Clapton nursery. Flowers in May. It is the *Cheirostylis marmorata* (Van Houtte). The genus is dedicated by Professor Morren, of Ghent, to the memory of M. P. E. Dossin, a botanist of Liege. *Culture.*—Requires a stove, and to be for the most part covered with a bell-glass; sphagnum moss, potsherds, and sand, with a little very spongy turfy peat; propagated by division of the plant or roots.

CURTIS'S BOTANICAL MAGAZINE.*

We are happy to bear testimony to the permanence of the improvements, formerly noticed as having been effected in the production and publication of this work, during the last three or four years. In books of this kind, much value attaches of course to the faithfulness of the delineations, and in this respect the father of the botanical periodical literature of England was always trustworthy; but since the work has been in the present hands, there has been a very marked change in what is technically called the "getting up," and the change has been decidedly for the better. Under the very able superintendence of Sir W. Hooker, too, the botanical fame of the Magazine, has continued to increase rather than otherwise, which was indeed to be anticipated, inasmuch as not only the new plants of the national Botanic Gardens of Kew adorn its pages, but others also from the chief plant establishments of the country, both public and private. Our own pages are often indebted to the beautiful drawings of this work, for the materials from which our wood engravings are prepared; though of course the latter give but a very imperfect idea of the beauty of the originals, which have not only the advantage of greater size, but the very important one of colour in addition.

Some notion of the interest which attaches to this work may be gained from the following memoranda of new subjects, of which admirable figures and descriptions have been published in it, within the last year:—

"*Solandra lævis* (smooth-leaved). — A stove shrub, with long white trumpet-shaped flowers.

"*Hypocyrta glabra* (shining-leaved).—A stove sub-shrubby plant, with numerous tubular bellied scarlet flowers from the axils of the leaves.

"*Hoya cinnamomifolia* (cinnamon-leaved).—A climbing plant, requiring stove heat, and bearing green and purple blossoms.

"*Gesnera pardina* (leopard-spotted).—Not very showy, being rather too leafy. A stove sub-shrub, with red spotted flowers.

"*Orothamnus Zeyheri* (Mr. Zeyher's).—A proteaceous Cape shrub, with a head of fine rose-coloured bracts; greenhouse.

"*Achimenes ocellata* (eyeletted).—A tuberous-rooted stove herb, with large foliage, and scarlet spotted flowers; not very showy.

"*Sida integerrima* (entire-leaved.) — A stove shrub or small tree, with large heart-shaped leaves and yellow blossoms.

"*Strobilanthes lactatus* (milky-leaved).—A pretty stove dwarf sub-shrub, with handsome leaves, having a milky mark down the centre; the flowers are bluish-white.

"*Alloplectus concolor* (whole-coloured).—A stove sub-shrub, with bright red ventricose tubular flowers from the axils of the leaves; the flowers are shaggy with hairs.

"*Echinocactus chloropthalmus* (green-eyed).—A pretty dwarf cactus of nearly globular shape, with large purple flowers, having the peculiarity of a green-coloured stigma; greenhouse.

"*Fuchsia spectabilis* (showy).—The queen of Fuchsias, vigorous in habit, with rich crimson flowers; greenhouse.

"*Jatropha podagrica* (gouty-stalked).—A stove plant with curious gouty stems; it has a corymb of scarlet flowers.

"*Vriesia speciosa* (showy).—A beautiful stove plant, with a pine-apple-like habit, and a scape of crimson bracts.

"*Acacia argyrophylla* (silver leaved).—A nice greenhouse shrub from the Swan River, with silky leaf-like phyllodia, and yellow blossoms in globular heads.

"*Episcia bicolor* (two-coloured). — A pretty dwarf herb, requiring stove heat; the flowers are purple and white; of the gesneriaceous class.

"*Leuchtenbergia principis* (noble). — A remarkable cactus, with mammillæ like aloe leaves; the flowers are yellow; requires a dry warm greenhouse.

"*Sonerila stricta* (upright).—An annual stove plant of slender habit, with rose-coloured flowers of no great beauty.

"*Siphocampylus manettiæflorus* (manettia-flowered).—A beautiful dwarf suffruticose stove plant, with neat foliage, and numerous scarlet-and-yellow tubular flowers.

"*Hoya bella* (beautiful).—The most lovely of all the Hoyas, and with the habit of a small Æschynanth; the flowers resemble an

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* Curtis's Botanical Magazine, comprising the plants of the Royal Garden of Kew, &c. By Sir W. J. Hooker, K.H., D.C.L., Oxon, &c. &c London: Reeve, Benham & Reeve.

amethyst set in frosted silver; it requires a stove.

"*Hibiscus ferox* (stinging). — A coarse plant, but requiring stove heat; the leaves are stinging, and the flowers inconspicuous.

"*Passiflora amabilis* (white-crowned).—One of the most lovely of all the passion-flowers; blossoms scarlet with a white filamentous crown; it should have moderate stove heat.

"*Dipladenia urophylla* (taper-point-leaved). — A handsome stove bush, with copious foliage and deep salmon-coloured flowers, which hang gracefully from among the branches.

"*Vriesia glaucophylla* (glaucous-leaved). —A pine-apple like stove herb, bearing a branched spike of purple flowers issuing from amongst a double row of green bracts."

These, it should be explained, are in addition to more than double the number of species previously described by other botanists, but only now cultivated in English gardens—the "new plants" of the gardens not being always new to botanists of experience.

We are glad to perceive by an announcement recently made, that the volume for 1849 is to be still further improved. In accordance with a wish very generally expressed, the publishers have determined to exchange the folding plate usually contained in each Number, (except in very rare instances,) for one of ordinary size, and in lieu thereof to give instructions after the description of each plant, on its history, culture, treatment, &c. This information, now intended to be introduced for the first time, has long been a desideratum, and will be supplied by Mr. John Smith, the Curator of the Royal Gardens of Kew. This feature will greatly add to the utility of the work; and will, we hope, gain for it increased patronage.

CONTEMPORARY WRITINGS, AND ORIGINAL NOTES.

Fumigating Greenhouses.—This practice, sometimes necessary for the destruction of injurious insects, has the disadvantage of leaving behind, for a day or two, the unpleasant odour of the tobacco. In the *Gardener's Journal*, Mr. Tillery, of Welbeck, mentions a remedy, thus:—"I find burning Cascarilla bark is the best 'deodorant,' for it neutralizes the tobacco smell, so as to make the odour not disagreeable to the most fastidious." The plants are to be syringed as soon as the tobacco-smoke is nearly dissipated, and then the bark is to be burned in one or two places, till the house—kept close for some time—is full of the perfume.

The Ivy.—This plant is not so much employed as it deserves for an ornament to the garden. As a screen, its rapid growth makes it invaluable where large buildings or walls unfit for fruit trees require to be covered; and it is equally suitable to be adopted as an embellishment among shrubs, particularly when the majority are deciduous. The dead stump of a tree covered with ivy is a beautiful object, standing among the lighter beauties of the shrubbery, its massive and dark green foliage growing handsomer, as those which remain assume the pallid hue of death. The plant has a deep solemnity of look, and an appearance of antiquity. The kind called Irish Ivy is the best and quickest growing kind, the foliage being much finer than the common ivy. An ivy fence or screen may be easily formed by nailing together a few rough pieces of wood, over and around which the ivy will twist and enwrap itself, and when it reaches the top, will hang out in waving masses, covered on every side with its umbellate heads of starry greenish blossom.

Carrots in old Garden Ground.—It is well known that there is often a difficulty in inducing carrots to reach perfection in a garden which has been long under a course of cropping. Mr. McIntosh, gardener at Dalkeith, writing to the *Cottage Gardener*, observes:—The culture of carrots is an object of some considerable interest to cottagers, in many of whose gardens they do not often succeed. The following simple plan has been for years practised in the garden of the Earl of Morton, at Dalmahoy, which, for many years prior to its adoption, had ceased to produce carrots. The seeds are sown in the usual manner, and at the usual time; and immediately after, a quantity of Scotch kale (German greens), or savoys, are planted promiscuously over the bed, about five or six feet apart. These are allowed to grow through the summer, and carrots of a large size and free from disease is the result. Such is the fact,—what is the cause?

Lime and Sand Floors.—The plan here explained may be advantageously employed in various garden structures:—Take good washed sand, free from all earth, and the ashes of lime, as taken from the lime-kiln, in the following proportions, namely, two thirds sand, and one third lime ashes. Mix them well together, and let them remain in a body for three days; then temper the mortar, and form the floor with it three inches thick. Let this remain so formed three days, when it will bear treading by men, whose shoes must be without nails. After it is well and equally trodden, beat it with a flat wooden mallet every day for two weeks, until it is become hard, then use a little water on the surface,

and smooth it with a trowel ; after this, keep the floor free of dirt and dust, sweeping it well with a brush until it is quite hard and solid. Floors carefully laid down in this way have been known to last for forty years, at the cost, per square yard, of five pence for labour, and eight pence for materials—thirteen pence.

Anacharis Alsinastrum.—In the *Annals of Horticulture* for 1848 (p. 139,) this plant was described, and was mentioned as having been in 1847 found apparently wild in this country. The existence of some doubts as to this point was also mentioned. During the summer of 1848 it appears, however, to have been met with in some other places, which appear to remove any suspicion of its being truly indigenous to this country. Dr. Mitchell found it in the month of September in great quantities in the river Leen, near Nottingham ; and Dr. Johnstone of Berwick also found it in a truly wild locality in the bed of the Whittadder. It also appears that this plant was found, by Dr. Johnstone, in a pond at Dunse Castle, so long ago as 1842, but being not then in flower or fruit, was laid by, and its name undetermined. The total submersion of the plant accounts for its having been so long overlooked by British botanists.

Tarring Iron Work.—This plan, which is extensively followed at Trentham, the residence of the Duke of Sutherland, is found to answer much better than painting. Out-door iron work, such as rails and fencing, is referred to. The material used is, one-third of Stockholm tar mixed with two-thirds of gas tar. This is laid on boiling hot, and in dry warm weather, when the iron is quite dry. It is laid on with a brush, and spread as thinly as possible. The fire should be kept close to the work, in order that it may be used boiling hot, as it can then be spread much thinner; under which circumstances it dries quicker and presents a harder and smoother surface. The cost of applying this to common iron ox-hurdles is found to be three-eighths of a penny per square yard; and it is computed to last nine years.

Poppy Seeds as Food.—Mr. Forsyth, in the *Gardener's Chronicle*, recommends the use of the seeds of the white poppy (Papaver somniferum) as an article of food. The seeds are stated to be wholesome and nutritious, agreeable to the taste, much resembling that of the kernel of a walnut. The quantity of seed yielded per acre, is considerably above that obtained from ordinary bread corn, being upon rich land above one ton, and in poor soils about eleven hundred weight. The seed for an acre of this crop could be had for something less than a shilling. The plant is less likely to become diseased than almost any other crop. The culture of this poppy must not be looked on as anything new or speculative, or impracticable. Thousands of acres are now and have for ages past been devoted to its culture to supply the deadly drug, opium. But the seeds are wholesome, and the oil expressed from them is similar in purity and salubrity to the best olive oil. The oil and the seeds are articles of commerce.

Destroying Snails.—In the *Florist*, M. Braconnot describes some experiments which he instituted to discover a ready means of destroying snails, from which it may be useful to quote the substance. He ascertained that lime-water diluted with three times its bulk of water, was sufficient for their destruction. Water scarcely rendered alkaline by the addition of potash, killed them still more quickly. Of all the poisons which he tried, none exerted so powerful and deleterious an effect upon the snails as the alkalies. If a drop of caustic ammonia, or of caustic potash, be added to a quart of rain water, an alkaline solution will be formed of such little strength, that it scarcely affects delicate test paper, and causes no impression on the organs of taste. If snails are placed in this solution they soon die, though, if placed in rain water alone, they escape out of the vessel. He therefore concludes that a weak solution of caustic potash, or soda, or what would be still more economical, the refuse lyes which have served for the washing of linen, diluted with water to which a small quantity of quick lime has been added, will prove a better remedy than lime alone in the state of powder, which soon, under the action of air, becomes converted into a carbonate, and loses its poisonous influence on the snails.

Deodar Cedars.—The leading shoot of this beautiful Cedar tree invariably curves downwards, though the stem may be quite upright ; at least, this is the case with young plants. This shoot should never be tied up straight, under the idea that by leaving it in the drooping position the stem will become crooked. To tie them up will be to kill them, or render them unhealthy. As the tree grows, they right themselves, and the stem forms straight enough.

Erica Watsoni.—This, which appears to be a wild hybrid heath, was found, in 1847, in the neighbourhood of Carclew. It seems to be exactly intermediate between Erica ciliaris —the handsomest of our wild heaths—and E. tetralix. It seems, however, to range with E. Mackayana as a variety of E. tetralix, rather than under E. ciliaris. Mr. Watson found the same form some years since, and it was then named after him by Mr. Bentham, who thought it a variety of E. ciliaris.

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THE CULTURE OF THE ORANGE TREE.

BY GEORGE GLENNY, F.H.S.

THERE is good reason for believing that this fruit would be as easily and as plentifully grown in this country as any other subject under glass, and that the leading cause of its failure in nine places out of ten, is ignorance and ill-treatment. When we say "failure," we do not mean that the tree dies, because there are plenty of living evidences, but that neither fruit nor flowers are had with any certainty or in any quantity, from thousands of trees that nevertheless have leaves and exist. There have been empirics who have written on the orange tree as on many other subjects, and nobody can form an idea of the mischief which such people do. Where the soil is composed of some proportions of wholesome loam, and dung, and vegetable mould, we can understand a little difference in the proportions used; but where a man can sit down and recommend all sorts of filthy nostrums, we can wish he had been flogged at the cart's tail before such stuff had been printed. We have, in the treatment of the auricula, had occasion to reprobate similar unwholesome composts, as freely directed to be used, and especially when the instructions emanated from persons who had been reputed successful in the culture. Mr. Ayres, who has written upon the subject, gives the following compost:—

Ten parts strong turf loam.
Seven parts pigeon's dung.
Seven parts garbage from the dog-kennel or butcher's yard.
Seven parts of sheep-dung.
Seven parts of good rotten horse-dung.
Ten parts of old vegetable mould.

We hear a good deal of assimilating the soil of plants to that in which they flourish in their natural habitat, but tell us in what part of the world the natural soil would be composed of garbage from dog-kennels or butchers' yards. We believe that the above mess might be mixed together, and be suffered so completely to decompose, that in time there would be but little if any mischief; just as the most violent poisons might be exposed to the air until their virulent qualities had departed; but there is nothing very nice or very natural in scraping together so much mischief and so much uncertainty, to be kept until it has grown harmless by natural decay. Miller, who was a sound, practical man, and seems in all he has done to have been actuated by common sense, says the best compost is,—

Two-thirds fresh earth, from a good pasture.
One-third of neat's dung.

There is nothing revolting or unnatural in this compost, which Miller directs should be laid together a year, and turned to rot the turf; but in all the composts we have recommended, we have considered the loam from rotted turves the staple, and, whatever may be said to the contrary, nobody can succeed so well without this as with it. The soil which is the result of turves cut as if for laying down as grass, or somewhat thicker, is rich in all the essentials to healthy vegetation. There is in itself, when properly rotted, a third of vegetable mould, the most useful and safe of all manures, and there is generally in pastures that have been fed off, enough animal manure to form it altogether into a rich compost, in which almost anything will grow well. But Miller contemplates the top spit of the loam of a pasture, which will consequently be so much the poorer than the turves alone would be, that the third of neat's dung will be necessary. A glance at a few other composts recommended by different writers may not be lost, in well studying the effect of soil on the health of the trees. In Italy we are told they are grown in the natural soil, which is strong soil, and for this purpose richly manured. So also at Genoa and Florence. At Naples, the soil is a good deal of it of volcanic origin, yet they thrive well. The French gardeners, as we are told by Mr. Loudon, on the authority of Bosc, seem to fancy that the appetite of the orange tree is like that of a pig, and that they thrive in proportion to the filthy nature of the soil they are in. To a soil that is already composed of a third of clay, a third of sand, and a third of vegetable matter, in other words, perhaps a compost not very different to the loam of rotted turves, they add an equal bulk of half-rotted cow-dung. The first soil is supposed to have been three years rotting. This cow-dung is to be mixed, and the next year it is to be turned over twice. Thus is a fourth year occupied in preparing compost, and the fifth year it is to be mixed again with one half its bulk of rotten horse-dung, and be turned over two or three times, and the winter before using, it is to be again mixed with,

One-twelfth rotten sheep-dung.
One-twentieth of pigeon's dung.
One-twentieth of dried night soil.

Is not this six years' preparation enough to deter anybody from growing orange trees? that is to say, if there be any truth, or a man believes it all to be necessary? It is quite ridiculous to so clog the most simple and easily-managed operations with such unnecessary trouble, even if it were free from mischief; and we very much doubt if it be, as Mr. Loudon affirms, the practice of the French gardeners. We do not dispute that there may be such empirics in France as well as in England, but we do not join in the libel upon the good sense of a whole class of men, when perhaps the folly is confined to one or two whose fingers have itched for writing, and who want to be thought different from everybody else, or, what is very probably the case with all these quacks, want to make the difficulties as great as possible, that there may be the more merit awarded to the writers for their success amidst such difficulties. Strange to say, the composts recommended by different people vary so much, that nobody who studied them could fancy they were for the same plant. We are told in the *Encyclopædia of Gardening*, that M'Phail and Abercrombie, who appear to have written on the subject, recommend the following:—

Three-eighths four-year-old cow-dung.
One-eighth sheep-dung.
One-fourth vegetable mould from the leaves of trees.
One-sixth fine rich loam.
One-twelfth road grit.

In this compost there are three-fourths manure to one-fourth of soil such as it is, and the loam may also be charged with manure. It is neither reasonable nor practicable to keep plants in soil like this; that is to say, they could not be kept in health. Mean, as we are told, recommends,

Leaf-mould, one-half.
Decomposed cow-dung, one-fourth.
Mellow loam, one-fourth.

with a small quantity of road grit added to the compost. We hate anything so indefinite as "small quantities," because it must depend on a man's notion; a small quantity may mean a peck or a bushel; it means everything, it means nothing. But without going to these trifles, here is a compost of three parts manure, vegetable and animal together, and an addition of a small quantity is to be made that will alter the relative quantities, inasmuch as sand is the opposite of dung or vegetable manure. If there be a bushel of compost as above, a peck of sand added would make the manure three-fifths instead of three-fourths. But apart from all this, there is too much animal and vegetable manure for the health of any tree to be permanent in it, and we doubt if they ever tried it. We believe that many people who write have found that a little of some particular thing has improved their growth of a plant, and they have jumped at the conclusion that if a little made a little improvement, a good deal would make a great improvement, and so written what they have never tried. Henderson, as we are informed, recommends,

Light brown mould (loam ?), one part.
Peat (such as heaths grow in), one part.
Clean sand, two parts.
Rotten hot-bed dung, one part.
Leaf mould, one part.

Here we have a compost consisting of two-thirds soil, and one-third manure, probably not differing very materially from Miller's. But need we wonder that a healthy orange tree is a scarcity, when so many whims and fancies sprang up among the gardeners of old, and when the Horticultural Society of London gives place to communications recommending garbage from dog-kennels, and other exciting and unnatural stuff, as the soil for them to grow in? Few men used to grow orange trees in better health than Ronalds, of Brentford, and hundreds of ill-used trees, in all sorts of tubs, boxes, pots and contrivances, nevertheless exhibited all the signs of rude health, plenty of good coloured foliage, abundance of bloom and fruit. There was nothing poisonous in the soil, nothing detrimental to the growth. In our experience, (and we had many of his plants, some of all sizes,) we followed Miller as nearly as may be; at least we began all our composts with one staple article, rotted turves cut rather thicker than they would be laid down, and when this can be got from a good loamy pasture, there is nothing to be so well depended on. This, with one part of well-rotted dung from an old melon bed to every two of the loam, will grow almost every thing well; but the orange tree, or the camellia, or myrtle, will flourish in it better than in any other compost that can be tried. It is true that when the fruit is swelling, the tree is the better for an occasional watering with liquid manure, but it must be more carefully administered than many are in the habit of doing it, and if overdone there is more mischief done in a short time, than can be undone in a season or two, and the best way when a soil has been overcharged with any particular manure, is to re-pot the plant as soon as it is discovered. There should never be less than two waterings with plain water to one of liquid manure, and even then the manure should not be too strong. We therefore recommend the soil to be as nearly as may be composed of rotted turves, two parts, rotted dung from a melon bed, one part; or if the loam be poor instead of charged with vegetable matter, let there be half loam, one-fourth leaf or vegetable mould, and one-fourth dung. It may be that the loam is of too stiff a nature; if so, a little sand, no more than sufficient to open it and make it divide easily, should be mixed with the loam before you measure it; but as the sole object of the sand is to prevent the loam from being too adhesive, let there be no more used than will accomplish that object. We prefer, however, above all things, the loam of rotted turves two-thirds, and dung one-third, well mixed together, and broken through a coarse sieve. So much for the soil.

THE CHOICE OF PLANTS.

The object in view must determine the choice of plants; if it be to grow and enjoy the fruit, some of the most beautiful of the tribe are not edible, or rather are fit only for marmalade, being very bitter. The Maltese or blood orange is as rich as a sweetmeat, the peeling being as fine as the juice. It is also an abundant bearer; but there are several other varieties of the sweet orange that are worth cultivating in this country for the sake of their fruit. If, on the other hand, the trees are wanted for their appearance only, and the fruit are to be allowed to hang till they drop, the bitter kinds are far better. They tempt nobody to pluck them for eating, and many of them have curious, interesting, or very handsome foliage; gold and silver striped, myrtle leaved, willow leaved, plain and striped, tricolor striped, and many others, showy as plants, but valueless as to their fruit. We recommend the sorts that can be eaten, and have no particular fancy for botanical curiosities. A striped holly is much handsomer than a striped orange. It is a tribe of trees that we above all others like to cultivate, and we should confine ourselves to the really useful varieties. The lemon and lime would have a place with us, and perhaps the citron, but certainly none of the shaddock tribe, for they are but mawkish, flat things, and in perfection are not to be compared even to a bad orange. The plants then should be chosen at a nursery, well-established but not too large, in good health, but not rapidly growing. Choose plants with healthy foliage, short joints, stocky and bushy habit, good spreading heads free from weakly spindly shoots, and the grafting place or budding place clean, healthy and neat. Turn out the balls without damage as soon as you get them home, and if the roots be at all grown to the sides, shift them.

CHOICE OF POTS, BOXES, OR TUBS.

Ordinary sized plants in pots, and doing well, are in our estimation better than those in boxes or small tubs; but when plants have been shifted time after time until they are in peck pots, they may be removed to tubs or boxes, because they become unwieldy, and it is only in wooden vessels that we can conveniently make provision for lifting about with poles. Tubs are better than boxes, because the roots spread all round alike, and there is the same quantity of soil on all sides, whereas

in a square this is unequal; the roots are, next the flat sides, growing too hard before the corners can be filled up with them. There should be hooks of iron fastened to the sides, so that by putting two poles under them two men can remove very heavy trees without difficulty. The inside of whatever it may be, box or tub, should be pitched all over well. Plants are aided by pitch rather than injured, and the roots naturally cling to it wherever it may be found. The bottoms of carnation sticks are frequently pitched to prevent them from rotting; one of these could not be pulled up at the end of the season without dragging the plant out with it, for the roots will have matted round it, while one that was merely charred before use, would leave the pot without disturbing a fibre. Tubs or boxes should have a number of small holes in the lowest part of the bottom, otherwise water would lodge, and this is always detrimental. The bottoms of tubs are often highest in the middle, where the holes are, but if the sides are lowest, a dozen gimlet-holes should be made round, otherwise the wet would lie, and rot the tub as well as the roots.

SHIFTING THE PLANTS.

If you find, on turning out the balls, that the roots are matted, and the ball hard, it will be necessary to soak it a while in water; and if the soil appears too clogged, it may be desirable to wash it out from the roots; in that case you will be obliged to reduce the plant, otherwise it will receive a check and flag, perhaps, so that the washing of the roots must be avoided if the soil looks at all congenial. If the plants are in boxes, such as they are imported in from France, Italy, and Belgium, remove them into pots whether they require a shift or not, for we object altogether to the square boxes: they are very well in exporting, they pack close, and the confinement to the plants for the time is no object; but when growing, the plants should be clear of each other; the most distant branches should not touch; there should not only be room to grow, but the air and light should be admitted freely, which cannot be the case if they are at all close. One-half the plants of every description localised in England, are damaged by the disposition to crowd as many as possible into a small compass. In shifting them from the square boxes to round pots, the roots should not be disturbed when it can be avoided. Of course there is no objection to rubbing off any of the soil that can be removed without disturbing the fibres, both from the corners and the surface; but if the roots have grown into the corners of the box, the round pot must be large enough to take in the square without any violence. They must be gently watered to settle the new soil to the roots; and as we have before observed, if the ball is hard and dry, the soaking is necessary, for the hard dry ball would never be penetrated by ordinary watering, for it would run through the new soil, and leave the centre as dry as ever; for the purpose of preventing this afterwards, it may be necessary to run a sharp iron rod through the ball from the surface in several places. The plants should then be placed in the greenhouse, each having plenty of room, and the temperature ought never to be less than 40°. These will soon grow, and as their heads progress, the pots will fill with roots. Like all other fruiting plants, the potted plants can be brought into bearing much sooner than those planted out in the conservatory, and both flowers and fruit will be produced annually until they arrive at a size fit to plant out. The shifting is best done in the spring, and they should be watered all over the leaves with a syringe, as well as the soil in the pot. It has been the practice with some to shift orange-trees but once in two years; but while they are of a manageable size, once a-year is better. Keep them in the greenhouse all the year; the placing them out of doors in summer subjects them to continual checks, sometimes for want of water, the sun and wind drying them much faster than most people imagine. In shifting them the second year, as the pots are larger, they require more attention. The drainage must be secured by crocks, charcoal, or coal-ashes, or a mixture of them, all over the bottom, one-fourth of the height of the inside, until it is three inches thick, beyond which it is not necessary to go, however large the tub or pot. If the roots appear rotten and unhealthy, they must be pruned in a little, and in some cases the same sized pot will do instead of a larger; but if the roots are healthy they need not be disturbed. In this way, giving fresh pots every spring, they will soon be too large for pots at all, and then we must obtain half-tubs. The same kind of drainage will do; they must still be as distant from each other, in proportion, as when younger; no two trees ought to be near enough to let the closest of their leaves touch, and when large there ought to be six or eight inches clear between the heads, and a foot or more would be better. The changes from pots to tubs, and from small tubs to larger ones, should go on, by right, as long as you intend the tree to grow larger, the compost the same, watering well attended to, and all the summer, or from March to September, the syringing over the leaves should be persevered in once a-day. Many omit this while the flowers are in perfection; but we recommend a finer rose, so that instead

of ducking them, the moisture should fall almost as fine as dew.

PRUNING.

The flowers and fruit are produced on the young wood of the current season in a general way, although there will occasionally be a few bunches come on two-year-old wood. The pruning, therefore, should be done with two or three objects; first, to keep the branches from being too numerous, and thereby making the foliage too thick, so as to exclude air and light to a great part of the head; secondly, to check those branches which grow too vigorously for the rest of the tree; thirdly, to remove old and bare wood, and make way for the young. In pruning to keep the head thin and open, the weakest branches should be removed altogether, and this should be done in February or March, before the spring growth; no fruit-tree requires more care in this particular. All fruit is the better for light and air; half our orchard-trees are literally spoiled for want of the knife and saw; the sun rarely penetrates the interior; whatever fruit there may be in the middle, or towards the middle of a tree, is smaller and coarse flavoured; whereas if the heads were kept thinner of branches they would be as fine as those outside. With the orange-tree this is the more requisite, because, being an evergreen, it is always alike. The tree has not even the benefit which even a badly managed deciduous tree has at the fall of the leaf. All the little spindly wood that has come weakly, should be taken close off. Some of the branches may be advantageously cut off or shortened, due regard being had to the shape of the head. All the shoots below the head should be taken off while young; and in a general way, a shortened branch sends out young wood and flower, unless it be shortened too much; when the growth of the young wood may be too vigorous to bloom, and so spoil the appearance. The pruning to keep the tree from growing to an ill shape, through some branches taking to rapid growth to the detriment of others, requires but little judgment; but it is well that even these should be shortened no more than necessary. If it can be spared altogether, cut it off close to the stock. With regard to the removal of old and barren wood, it must be done with care. A succession of young branches must be nursed before it is taken away altogether; sometimes it is necessary to remove it only a portion of the way; as when healthy shoots are running out from it, in which case it should only be cut back to the first healthy shoot. But there is another kind of pruning applicable to old trees, which it is difficult to shift; for as the nourishment is more limited, the tree must have less to do. Sharpish pruning is then necessary. Every season will bring with it a fresh necessity for the free use of the knife. We are told that in France they actually cut back the heads so much, about every seventh or eighth season, that the tree is three years recovering itself; we prefer continual care and watchfulness, that the tree may not be made unsightly; and when the plant will no longer grow well and cannot have an increased quantity of soil, there is no remedy but a violent one; violent pruning of both head and root, and a move into a smaller tub to undergo its shifts again. This should be done in the spring, before it begins to grow, but the operation may be protracted a long while by timely sharp pruning and the application of top dressing and liquid manure, when the tub is filled with roots, and begins to feel a lack of its ordinary nourishment. It is not the orange alone that is in danger of ill health, when the pot or tub gets full of roots. The nourishment being very limited, must be increased by extreme vigilance in watering, by the occasional use of liquid manure, and by top dressing, which is in its operation very like it, because the ordinary water carries it down, and it may as well be deposited in the water at once.

ORANGES AS WALL-FRUIT.

Orange trees may be grown on a south wall, but should be glassed in winter and covered against frost; or they may be planted in a border against the wall of a grapery, where the rafters only are used for the vines; or in a pinery. The branches then must be trained carefully, the branches spread out well, and the young wood on which fruit are set must be supported, because they will not be so robust as when on standards, and the fruit will be heavier. The training and pruning bears the same relation to standards as that of pear-trees; the saving of bearing branches, the removal of old barren ones, the neat and uniform disposal of those that are to remain, so that they be not in each other's way, and fastening the young wood with its fruit, so as to derive support without being in any way cramped. The borders should be well drained; the soil as directed for pots; the trees planted with the collar close to the surface. When planted against a south wall, the plants should be dwarf, and the nearer they are trained to the ground, the better. The glass should fit against sloping supports, and there should be partitions for each tree; the wall should be coped, to prevent the wet running down the surface; about two, or if narrow, three lights to a tree. The partitions being to prevent the draught or current of air that would run from end to end, perhaps every third support might

be a partition. If this wall be used at the back as a depository for hot stable dung during the winter months, it would be found

sufficient for all the purposes, whether the trees be used for their flowers only or for flowers and fruit. It is quite certain that the bloom is now an article of commerce, and at particular seasons brings much more than the value of an orange, so that where the cost is nothing but the glass and the use of the dung, such a contrivance would pay well even in a commercial view. It is the custom in France to thin the flowers, and leave on only a moderate quantity to bring fruit; but there the flowers are used as preserves or for distillation; here they are only valued as cut flowers for bouquets; and although we have seen them made French fashion, with wires through the single pips of flowers, the bouquets thus formed are little better than bunches of artificial flowers. It is a contemptible fashion, and such as the higher classes will discard, changing the fashion to half a dozen sprigs, or may-be a single sprig, instead of a mass patched up for an hour and hung on wires, like so many children's playthings. Here, therefore, it would be the bunches of bloom to thin, instead of the individual flowers in a bunch; and this might be done sometimes to advantage, for the bunches are occasionally very numerous. Air may be given in mild weather, but not when the temperature out of doors is below 40°, and never in windy weather. Not more than one fruit should be allowed to swell on a bunch; they should be thinned when they are about the size of a green gooseberry, to two, and directly it is seen which of them takes the lead, or promises to be the most handsome, the worst should be taken away. These trees will rarely require water; the roots will seek for themselves the moisture required, but the syringing once a-day will be beneficial, and they may be shaded during the mid-day sun, in the early months, by transparent cloth. In June there will be no artificial heat required, so the dung may be removed, and it must be remembered that in the hard winter the glasses must be thickly matted, notwithstanding the heat imparted by the dung. Of course other contrivances may be used for warming walls, and it is scarcely worth entering the field as the champion of any one sort of heating, now there are so many answering the same purpose. We have had oranges on a south wall without any artificial heat, but they required great attention in covering up, whenever there was an inclination to cold, and always double-matting at night, in the winter months. The trees grow vigorously when their roots are in the open ground, and the border has been made for them. About two feet deep of the proper soil is required, and below that there should be a bottom of brick rubbish a foot thick.

AS STANDARDS IN A CONSERVATORY.

There is scarcely a subject in the British gardens so well adapted for a conservatory, as an orange tree; and when they have been grown to the full size we have described, in the largest tubs, they should, if practicable, be turned out, but not unless there be ample room for the development of their natural unrestrained branches; and be it remembered, they form noble objects, worthy of a house to themselves; for they are, when at maturity, or approaching it, always beautiful; they will exhibit fruit ripe and unripe, and bloom at the same time, and if the place be suited to them, be continually yielding fruit in perfection; and when we consider the general appearance of one of these trees in perfection, we think almost every thing might give place. An orange tree in the centre of a conservatory, is an ornament worthy of the very best associates, and forms a beautiful object among the noble flowers of the Camellia japonica, the Hoveas, Azaleas, Rhododendrons, and other gay subjects. The only care required, is the occasional cutting of an ill-growing branch, the removal of barren wood, and the cutting out of any light thin spindly shoots, that now and then will come in the heart of the tree.

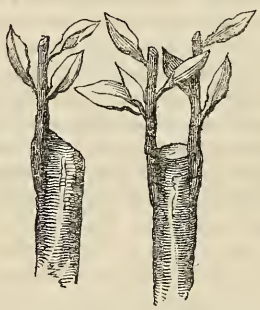
RAISING FROM SEED, AND INARCHING.

The objects to be attained in raising this tribe from seed are, first, to procure new varieties; secondly, to provide stocks for grafting, budding, and inarching the known varieties upon. Choose the ripest fruits, and the best sorts; make up a hot-bed as if for cucumbers or melons, in the spring of the year, and sow the seeds in compost such as we have recommended for plants, in a wide-mouthed pot, the seeds an inch or so apart. When they have come up and expanded their second pair of leaves, pot them singly, in pots size forty-eight of any of the potteries, and replace them in the hot-bed; give an occasional watering, and proper air by tilting the glass a little behind. If the bed declines in heat, take away the outside linings, and renew them with hot stable dung; as soon as the pots fill with roots, shift into others, size thirty-two, and during all the time, the plants must be shaded from the mid-day sun, but they must not be darkened. As the plants get

nearer the glass and require room, the bed will have again declined enough to allow of the pots being sunk, and in July the glasses themselves may be raised a little. If the pots again fill with roots, which they may by August, remove them into the greenhouse, giving them plenty of room on the shelves, and treat them as established plants. If they are for stocks, you will continue to grow them until they are the size you wish them to be for use. If for new varieties, the sooner they are inarched on other strong stocks, the sooner they will bloom and bear; for this purpose, they must be taken to the stocks that they are to be tried on, and their pots so adjusted by props or otherwise, that they may be level with the portion of stock to which they are to be united. A clean cut on the side of the stock, clear through the bark, must be made on the side next the plant, and the portion to be united must be cut nearly half through, perfectly flat, so as to fit against the stock, where it must be tied so that the bark of the stock on one side the cut, and the bark of the branch, may come in contact, No matter how much of the cut on the stock shows, so that the bark of the plant engrafted is in contact with the bark on one side of the cut, which in a large stock is always wider than the cut of the branch, and unless it be a large stock, it might as well be on its own plant. When this has been tied a few weeks, it will have united, and that part of the stock which is above the union may be cut down, and the plant below the union may be secured. The engrafted portion now becomes the plant, and the increased vigour of a well-established stock will bring the flower and fruit two or three years sooner than if its own original root had to maintain it. But it will naturally occur to the grower, that to try many seedlings would be involving great expense, occupy great room, and be very troublesome. On this account, it is the practice only to select such seedlings as indicate novelty; probably in hundreds of seedlings, not half a dozen would be thought worth the trouble. The habit of the young plant may be different to ordinary stocks; the foliage, or some other peculiarity, or its likeness to some approved sort, may determine the raiser to try, but otherwise they are all allowed to grow, to be used as stocks for others. Those therefore in the habit of raising seedlings, have soon a number of stocks for the second year to work approved varieties on, and in three or four years, with good attention, large enough to try seedlings upon.

PROPAGATING BY GRAFTING.

Grafting by inarching we have already described in the raising of new varieties from seed; it is also applicable to propagating approved sorts, and enables us to use a much larger branch, or a branch with fruit on it. Other modes of grafting are done with detached scions, and may be varied much. Grafting is simply uniting, in a join perfectly fitting every way, a piece of one tree on a portion of another tree. The stocks, which are two seasons old before they are well adapted for the operation, are raised from seed or cuttings; the former are the better. The scions are best when they are the same size as the stock; this should for dwarf plants be cut down within two or three inches of the surface, a sloping cut should be made, and the scion should be also cut in a slope to fit; these require only to be bound together with bass matting, or coarse worsted, and covered with grafting wax, or grafting clay, the former made with bees-wax and resin, equal parts, and sufficient tallow to make it melt at a temperature that will allow of its application in a melted state, without scalding the wood, and to harden in the ordinary atmosphere, even in summer; the other is made with well-beaten clay, mixed with neat's dung, fresh, which, when well kneaded together, makes a pliable composition coat, which will not crack when dry. This covering is to keep off the external air. The operation is performed in the spring, before they begin growing, and it is very soon discovered whether the grafts have taken or not. Two-year-old wood is the best to use for scions, and the place of contact with the stock may be any age. Standard plants are usually grafted at the height the stems are to be, after the manner of the rose. It is a common practice abroad to put on two grafts, one on each side a strong stock; our opinion, grounded on experience, is against more than one; their plan leaves a flat top, on which the wet lodges, and often rots the centre, whereas by sloping



the stock, and only inserting one graft, you have a much more sightly union, and the stock continues as sound as possible. The stocks for standards must not only be a given age, say five years or more, but the lateral branches must have been removed all up the stem the whole time, and only the top few branches

be allowed to grow every year, therefore there would be the under branches taken away, and all undergrowth completely stopped. The graft having taken, the management of the head is very simple ; the first year, cut down to two eyes, or three at the most ; the second, shorten all the branches to two eyes ; the third, remove those which are useless, or in the way of the others, and only shorten where there is not sufficient wood to fill out. The pruning then may go on as before directed for established plants, for such they are. Among the various modes of grafting for dwarf plants or standards, we like the saddle graft, the cleft graft ; in short, so that a piece of two-year-old wood with one or more buds on it, be cut so as to fit a stock of two years or more of age, it will unite and make a plant, and the plan to be adopted may be varied to suit the several kinds of scions or buds that can be most easily procured.

RAISING BY CUTTINGS.

There are various modes adopted. Wood of two years old requires a cold frame, and the result is not certain. Wood of one year old, that has done growing, requires bottom heat. The former is adopted after sharp pruning in the spring, to give all the wood a chance of striking ; the latter is adopted as a matter of business. Plant in the same soil they are grown in, cover with a bell glass, water and plunge them in tan or a hot-bed not too powerful. Wipe the glasses every morning, shade from the burning sun, and when struck, pot into forty-eights, thirty-twos, and twenty-fours successively, as the plants advance and fill their previous ones with roots. No difference is required between the treatment of seedling plants and struck cuttings. While young they must be shaded ; in all other respects they should be the same. The cuttings of more matured wood that have been put into a cold frame will in three or four months have struck or died or callused. If the latter, they may be put in separate small pots, be submitted to bottom heat, with a bell glass over them, and they will soon push roots, when they must be treated like established plants, and be changed as soon as the pots are filled with roots.

GENERAL REMARKS.

The Orange tree has been set down among neglected plants, and many in this country which still exist have perhaps never had a change of soil for many years. Constant top-dressing, perhaps, keeps them alive though not in health, and they drag on a miserable existence, yielding neither flowers nor fruit, except almost by accident, and becoming unsightly and valueless. It would be invidious to mention names, but we have recently paid visits to an establishment in which the gardener takes no heed of the orange, lemon, citron, and lime trees, and literally does nothing but remove them into the orangery (as a dark, miserable room, with a brick wall for the back, and plastered ceiling for the top, and half a dozen arched windows to the ground, is called) in the fall of the year ; and putting them out on the lawn in the summer, lets them take their chance ; the consequence is, they live and that is all. On remonstrating with him upon their condition, all he could say was, they were too old to be trifled with, and " he was afraid to tackle them." It was clear that he did not understand them. He had read what this man said and the other had said, and found them contradicting each other on the very soil they grew them in, and therefore there was no chance of knowing what to do ; they had not been shifted since he had been there, and that was five years, and he did not see any difference in them from what they were when he came. But this is not an isolated instance, it is the case with many establishments, and likely to continue so, unless the employers rouse their gardeners to a sense of the fact, that the whims of the new school do not compensate for the neglect of duties that were performed by the old. The decayed state of the Physic Gardens at Chelsea, and the Royal Gardens at Kew, until we routed the authorities up a little, was only a sample of hundreds of private establishments in which the proper duties of the gardener were neglected for some whimsical tomfoolery that did no good to the employer or the employed. Nothing will sooner make a good show in some establishments we could mention, than a complete reformation in the condition of the orange tribe. We say by them as we said by Kew Gardens and Chelsea,—have them in proper condition, or do away with them.

MONTHLY TREATMENT.

JANUARY.—All the orange and lemon tribe should now be housed, and if the temperature out of doors be forty, or upwards, they may have all the air that can be given ; but if below that, they should be closed, and the house kept up to forty degrees, (which is the minimum heat to be kept up,) either by matting the house, or if necessary by the aid of a little fire in the flue. They should not be kept wet during the winter season, for whether mild or otherwise they will not be doing much in the way of growth. A strange notion entertained by some of the old writers cannot be too soon got rid of, though there are too many books always being made up from old writings by people

who never, perhaps, grew the plants they pretend to write about, to get rid of such foolish instruction altogether; and so, because somebody once wrote a foolish thing, we are constantly served up with it, generation after generation, without the exercise of common sense. The notion we speak of is that of having dark orangeries, as if the tree flourished better in an unnatural state. The orange tree requires as much light as any subject in cultivation, yet we were told, up to a late period, that the north wall of an orange house may be opaque; and practically, this tribe have been treated as if the light were an objection; many of the old orangeries have not even a glass roof. All this is a mistake. An orange tree will flourish nowhere so well as in the conservatory, which is glass to the ground, and all over alike light; the principal object during the winter months is to keep the temperature at, or above, forty degrees.

February.—Before the plants begin their summer growth, do what pruning is required. Shorten any branches that have grown out of form, and remove altogether such shoots as are in each other's way; then cut the heads, so that light and air and sun can find their way through the branches: nothing conduces more to the health and vigour of the tree than these judicious prunings. If any require shifting, now is the time to perform that operation, and in doing this, remove such fibres as are matted close together, or rotted, or dried up; and if the same tub or pot is to be used, some of the earth must be shook out of the roots, and the roots themselves be trimmed: but in this case the head must be considerably reduced also, as the roots after pruning would not keep up the nourishment required by the head, if left the original size; therefore shorten the principal branches, cut out any that can be spared, and so lessen the quantity as to compensate for the weakening of the root, which will soon grow again and re-establish the head. Where the ball is to be put into a larger tub, do not disturb it any more than you are obliged; merely remove any dead fibres, and take care to poke the compost down between the ball and the side of the tub, box, or pot, without hurting the fibres that are next the side. This may be done towards the end of the month, as well as all the pruning; but if the weather be very cold and unfavourable, the only thing that need be done is to take care of the temperature, make hot-beds, and sow seeds.

March.—Operations the same as last month, except that, whereas they *may* be performed in February, they *must* be performed in March; or rather, must not be delayed beyond it. The cuttings from the trees that are pruned should be used either for striking or grafting. Use good stocks not less than two years old; but the more advanced the stocks are, the more vigorously will the graft proceed. Any seedlings that, from the peculiarity of their foliage or habit, indicate superiority or novelty, may be grafted on healthy stocks of three or four years old, because the object is to try and get bloom and fruit before they would come naturally on their own bottoms. Grafted stocks should be placed in gentle heat, and the orangery generally must not be allowed to recede below forty. The surface of the soil in all the pots and tubs should be stirred as well as it can be without disturbing the fibres, and the loose soil may be removed and fresh compost put on. Seedlings that have come up may be potted off, one in a pot; and after being watered, to settle the earth about their roots, be replaced in the hot-bed, which, if declined in temperature to any extent, must be lined with fresh stable dung after the removal of the present spent lining, and the heat be kept up for some weeks. Put in cuttings to strike under a bell glass. Syringe all over the foliage every morning, but be careful to keep up the temperature.

April.—The grafting by inarching may be performed this month. It is only when you desire to make a forward plant that this is worth while. In this case, you select a vigorous branch of the plant from which you are going to propagate, and a healthy stock of proportionate strength, certainly not less than two years old; bring the stock and the plant into such proximity that they can be easily tied together, and then shave off the bark and a little of the wood, so as to make a flat place in the stock and a corresponding flat place on the branch to be inarched. Let these be fitted exactly, tied securely, but not too tight, and let them grow. There need not be any tongue made, as is usual with many hard-wooded plants. The two flat surfaces will soon unite, after which the branch is cut from the plant it originally belonged to, and the top growth of the stock should be also cut off. You have then a strong plant that will grow rapidly, and soon make a good tree or bush, as the case may be. If anything was omitted last month as to pruning and grafting, the error must be repaired, as well as you can repair it, by doing it now. The seedlings must be looked to; any in the seed pans or seed pots must be potted off, and those potted off and growing must be tended. If the pots are filled with roots, give them larger pots, for seedlings ought not to be checked. If the plants are getting too tall for the glass, sink the pots into the soil, or, as the heat has by this time declined, you may sink them down to the rim, if necessary, in the dung itself. When they grow still taller, the frame must be propped up all round with bricks, turves, or some other con-

trivance, to make room by raising the glasses. Cuttings may still be struck of such wood as may not be actually growing when selected.

May.—In a collection of orange, lemon, citron, and lime trees, kept always in a moderate temperature, there will mostly be found some blooms ; but this month there should be a general blossom on all of them, if they are properly attended to. Where there are evidently many more bunches of flowers than ought to be left to bring fruit, those which are the worst placed should be taken away in preference to those near the outer surface ; but unless the flowers are wanted, such as they, do no harm on the trees. It is all very well to protest against a tree bearing too much fruit, but the time to prevent that is when the fruit sets, for they do not generally set more than the trees will perfect, and the flowers are interesting on the trees. Nevertheless, a bunch of orange-blossom is so acceptable in a bouquet, that whether it be to carry out, or to decorate a vase in the drawing-room, it is quite a star. All we object to is picking individual blooms, under the impression that the tree is the better for it ; however, that is not the case, and you are just as likely to pick a bloom that would set, and leave those that would not, as you are to do the reverse. Not that we object to nipping out small weakly flowers from a bunch, if there is no other employment for a person, and perhaps if there be but two or three plants to look after, it may be done with advantage to their appearance, because those that are left would be more of a size; but we cannot look upon it as a necessary operation for the benefit of the tree. The trees now require more liberal watering, greater care as to temperature, which should be advanced a little, and well secured by closing, lighting fires, and hanging mats, because the trees are more tender while growing rapidly, which they are this month. In fine bright warm weather give plenty of air, and however much you may be recommended to turn orange trees out of doors, be not in any haste to do it. They may be required for ornament on the lawn, or by the house, and therefore are removed ; but let no one move them out of doors for their health, because they are always the better for being kept within their house, protected from high winds, syringed daily over all their foliage, closed when necessary against the external atmosphere, with the advantage of receiving all the air when the weather is favourable enough. Orange trees are great and noble ornaments out of doors, but for fruiting, flowering, growing healthy, and keeping in good condition, they have no business in the open air, exposed to wind and rain ; for although a gentle breeze and mild shower would be beneficial, heavy rain and high wind are downright injurious, and when once removed to the open air, they cannot have one without the other. The advantage under glass is, that they can be protected from what is injurious, and get all that is beneficial ; for the syringe is a good substitute for a mild shower, and there can always be air enough admitted when the weather is mild. During this flowering month the syringing must be applied with the finest rose, so that it falls on the plants as fine nearly as the dew itself. Shift seedlings that have filled their pots with roots to those of a size larger.

June.—Watering is of great importance to the trees this month, and the temperature in the night should not be less than fifty or fifty-five degrees ; and whenever it is up to seventy-five by sun-heat, pains should be taken to keep it at that, as near as may be, by shading with a transparent cloth, giving a free air all through the house, syringing the ground, and other cooling means. When the fruits have set, they may, perhaps, be four or five times as numerous as they should be ; in this case, thin them while very small to about double the quantity that should remain, and as these swell and show which are the best to leave, they may be reduced to the proper quantity. This is far better than thinning the blooms before the fruit sets. Look over the grafted stocks and the plants that were inarched, and examine whether the former have grown, and the latter have united. The grafted stocks should have all the growth of the stock removed, so as to throw the strength into the graft; and the inarched plants, if united, should have the grafted branch cut from the plant it belongs to, and the top and all the other growth of the stock cut away, that nothing but the inarched branch should grow. If any of the trees have strong growing shoots advancing more vigorously than the rest, cut them clean out if they can be spared, or materially shorten them if they are where stuff is wanted ; for if a branch which thus takes a lead be left unchecked, it will actually grow almost to the extinction of the other portions of the tree. With regard to watering, if any of the tubs or pots are found to retain the water too long on the surface, as if the drainage was not free, or it runs down the side and not through the ball, a small pointed but smooth iron rod should be thrust down in two or three places in the middle ball of earth in the latter case ; but the draining must be examined in the former case, and remedied at once, for no tree can by possibility be healthy long together with an imperfectly drained soil to grow in, and all the mischief may be done before the tree shows it. Look well, therefore, that none of the tubs

are imperfectly drained, and satisfy yourself that the water you give a plant moistens the whole ball.

JULY.—The gradual swelling of the fruit renders it very necessary to be liberal with the watering; not two days should pass in very hot weather without both watering and syringing the leaves. Air, and plenty of it, should be given all day. Syringing is best now in the evenings. The seedlings may be removed to cold frames, or even to the open air, if the place be sheltered, but the cold frame is the best, because they are more easily and securely protected against heavy falls of rain, and high winds, which do no good, and may do harm. If there be any fruit too close together, or rather too many on any of the trees, the superfluous ones should be removed. There will be at all times a disposition in some of the trees to grow and bloom, even while the fruit is on them. If we were very particular, we should remove the flower-buds as soon as they came, but we are far from disliking these little sports of nature, and this tribe is so pretty in all its stages, that except thinning the fruit to prevent injuring the tree, and cutting away too vigorous a branch to prevent it from robbing the rest, we should let bloom come, and not disturb a bud.

AUGUST.—Orange trees may be propagated by budding in the same manner as roses, plum-trees, cherry-trees, and the like. This is the season for it, and it is particularly applicable when there is a great stock wanted and but little to work from. The same piece that would be used as a graft, would make many buds; and when the buds are inserted and have united, there is a plant which, with new sorts, is saleable, although they are generally allowed to have a season's growth. Watering must be well attended to this month, and the houses so closed of a night as to prevent the temperature going down too low. Checks would be injurious to the fruit, prevent its swelling, and spoil its flavour; besides, heat will not hurt them now. The seedlings in the frames may, if intended for standard stocks, have some of their lower branches cut off close to the stem; if for trial of new sorts, they should not be touched with a knife until two years old, and then be pruned so as to lose as little wood as possible, as every inch is valuable with a new sort of fruit; each bud that is produced, being available for the propagation of the variety.

SEPTEMBER.—If you have been obliged to put any out of doors, return them to the house without loss of time, but the fruit will have been checked, and the tree all the worse for its exposure. Some of the nights even of our summers are too cold for an orange-tree and its fruit. Water must not be so liberally bestowed now as before. The house must be prepared for the resumption of fires, not only for the sake of keeping up the temperature, but to dry it. The floors should be kept dry and free from dried leaves, and the plants should be examined and cleaned, any dead shoots and broken parts cut out, any weak-growing branch cut away, and the whole placed in their proper winter positions, giving plenty of room between the plants, and so disposing them all that you can get at them easily. Seedlings must be put into their winter quarters; they will live in a cold frame, but they would do better in a greenhouse or pit that you could heat without difficulty when required; for even these should not be under forty degrees of heat at any period. The stocks budded last month must be examined, to see that they do not want for water, and are not too cold.

OCTOBER.—The treatment now resolves itself simply into the giving air in mild weather, keeping up the temperature in the night and in cold weather, keeping the plants clean, and giving them, at proper times, the water they require; but this last is not wanted often. Keep the house from getting damp, for that is injurious to all plants.

NOVEMBER.—The budded plants may be untied, to examine whether they have taken, and if they have, they need not be tied again, but be regularly released. The grafted plants and seedlings must be placed in the orangery or greenhouse, which for their sakes ought to be kept up to the proper heat.

DECEMBER.—The winter months require but little difference in the treatment, except as far as it regards the presence of bad or good, mild or hard weather. The general rule never to let the temperature be under forty degrees, suggests that fires, coverings, and other ordinary means, must be used to prevent the inconvenience arising from frost and cold; for, as we have before observed, an orange-tree will bear a good deal of ill usage before it is killed, but very little carelessness may do it much injury, and nothing more than sudden change from heat to cold; nor ought any water to be given in the winter while the soil is at all moist; but this must be made apparent to ordinary observers. A covering round the glass will always go a good way towards keeping up the temperature, but it may be taken for granted that there must very often be fires to keep up the degree of forty, even in the mild periods of winter.

A STROLL THROUGH THE GARDEN,

BY A TUTOR AND HIS PUPIL, IN THE MONTH OF FEBRUARY.

HERE we have a hard frost again, and the earth is as hard as a stone. If you are disposed for a walk in the garden we must clothe accordingly; not that we shall see much beyond the numerous modes of protecting things that are not under glass, but where there is no expense spared, there are very few shifts made, for all things necessary are provided. Nevertheless, we will, after looking about at home, go into neighbour Jones's garden: he has nothing proper, and accordingly has to make all sorts of shifts, and has all sorts of contrivances against hard weather, because in spring he is as gay as other people.

Now for the kitchen-garden. There are two men trenching the ground, although it is so hard on the surface that they are obliged to use a pick-axe. If you observe, the axe disturbs large lumps that are completely frozen through, and these large lumps are merely broken into somewhat smaller ones, and in this lumpy state they are thrown into the bottom of the trench; the soil below will bear digging in the ordinary way. Again, observe that instead of leaving it flat at the top it is left in ridges: the object of all this is, first, to get the frozen portions, which is the best possible preparatory state, to the bottom, and next, to leave as large a surface as possible exposed to the weather, so that this also may be frozen. That which is already frozen will thaw in the bottom, while the top may be freezing, and when all has been subject to the frost it will be in the finest condition for cropping. No doubt it is harder work to dig or trench in frosty weather, but the labour is as good for the body as the effect is for the earth. Yonder the men are wheeling barrow-loads of manure from the yard to the uncropped portions of the ground, while one man is spreading it equally over the surface, that it may be dug in regularly in every part of the ground. If this frost continues awhile they may use the pick-axe again, and so turn the lumps and manure undermost, but it will, if there be other work to do, lie there till either a thaw comes to tempt them to the job, or until they have nothing else to do of any importance. Observe, all the cabbages and other plants are completely whitened with frost, but these are so hardy that they will be none the worse for it unless it be very severe indeed; a few degrees of frost will not cause a leaf to be discoloured. It is the rapid changes that hurt plants, such, for instance, as we had last month, a few degrees of frost one day, and actual warm weather the next; for as freezing contracts the juices and thawing expands them again, when the change is sudden it ruptures the vessels and destroys the texture, and the younger the growth is the more susceptible it is of injury. The wheelbarrows seem very much in request: the gardener taking advantage of the slack time for out-of-door operations is doing everything in the moving way; first, because the walks are so hard that the barrows, however much loaded, make no impression on the ground, and secondly, because he has little else for the men to do. Observe, one is removing soil from one place to another; he takes it from the poultry-yard to the new-made hot-bed: another is removing pots of strawberries which, though small, are well-established plants, and strong enough for forcing; he is removing them from the frozen ground to the top shelf of a vinery, that they may be forced at the same time as the grapes and figs. In the shed the men are variously employed; one is cutting and painting wooden labels, another is breaking old pots, or rather potsherds, small, and with these two sieves he separates them into three sizes; those which will go through the smaller sieve form merely dust and small stuff not larger than peas; those which come through the large one go up to the size of nuts; and the larger, perhaps, some of them reach an inch. The two smaller sizes are for mixing with the soil in potting, and almost all gardeners have different ways of mixing soils for potted plants; you are not, however, to presume that all their different whims and fancies are necessary. We find certain conditions necessary to the success of plants, but it is in supplying these conditions that gardeners differ. How many modes are there of compounding a rich light compost! we can hardly number them, yet half a dozen gardeners will differ materially in their methods of forming the compost, while the plant is so indifferent as to thrive with one as much as another. I have, however, seen these broken potsherds, or crocks as they are called, mixed advantageously with the compost for Botany-bay plants; the dust is far better than sand, for while it lightens the soil and renders it pervious to the water, it absorbs moisture enough to supply the plant a much longer period than they would be sustained by a sandy compost. In this yard there are all the various soils which are used in gardening. That long heap is a pile, or rather was a pile, of turves cut thin from a pasture, which have lain and rotted, so that you see upon examination no remains of what they were, but a little fibrous texture; this is a valuable, indeed the most valuable soil. It consists of loam and decayed vegetable, which

rots into a kind of mould. I should use it as the base of every compost. The larger heap to the right-hand is a heap of turves only cut last autumn; you see by the stripes of grass growing on the outside the thickness the turves were cut. Many people take the top spit of a pasture; that is, instead of the turf with three inches of soil, they take eight or ten inches of soil; they both rot, but the thinly cut turves form a compost of two-thirds loam and one-third vegetable mould, the other is nine-tenths loam and one-tenth vegetable mould. The heap next to it is peat earth, that is, the top four or six inches or more of a common, and is a mass of woody fibre-like old roots of long-decayed plants; this fibre does not completely decay, but is a useful soil on that account. Many plants, especially the hard-wooded plants of the Cape, have remarkably fine fibres, and must have a light spongy kind of soil to penetrate; this is made by sifting this turfy peat, which is first chopped with a spade into small pieces, and then rubbed through a very coarse sieve; it is then mixed in certain proportions with richer earth, for this peat is the poorest soil we can get; like sand, it alters the texture of the soil, but adds nothing to its richness. Next to this is a heap of pure vegetable mould, that is to say, leaves swept up and rotted. This is the most fertilizing of all innoxious manures; however large the quantity administered it damages nothing. In that respect it is unlike the ordinary animal manures, because in too large a quantity they damage a plant. There is a heap of mould formed by the dung of an old cucumber bed, two or three years rotted; the other heaps next it are the same from last year's beds; this is the state in which alone dung should be used for potted plants; perfectly rotted into mould. Further on we have a heap of rotted cow-dung, and beyond that there are heaps of coarse and fine sand; and lastly, there is a hole into which all the waste of the garden is thrown, to form a dressing for general purposes. If a garden is kept up in anything like a good style, a waste piece as a store for soils is absolutely necessary.

The conservatory is beginning to look gay, the Camellias are opening their flowers every here and there, and like so many stars, lighting up the fine dark green background with spots of brilliant hues. The Acacias are showing their golden flowers and are becoming attractive. The Correa rosea has its million drops hanging like so many pearls all over its pyramidal surface; while others of the family, more brilliant though less abundant in their flowers, add to the variety. Here are many plants full of flower buds, all but bursting, and promising an early development of their beauties. These magnificent rhododendrons, azaleas, and roses, in fine bloom so long before their fellows that are planted in the bed, have been forced in yonder greenhouse, the temperature of which has been raised for the purpose of bringing forward all those flowers in the drawing-room as well as those before us. But while we are upon the subject we will step across. Here, you observe, is a common greenhouse with the usual stage of shelves one above another. If there were only greenhouse plants, there would be only just so much warmth given artificially as would merely keep out the frost; but here there is a continuous fire, or nearly so, to keep the heat up to fifty-five or sixty degrees. Observe, here are hyacinths just coming into flower, narcissus and other bulbous rooted plants all but in bloom. Here also are Siberian and Persian lilacs, the delicate Deutzia scabra, the Azalea indica, and Rhododendron catawbiensis, the hardy North America deciduous azaleas, and many other subjects, in all stages, from those just brought in from the cold frames to those all but ready to be removed to the conservatory. Indeed, they are quite ready, but the frost would damage them in this short transit.

The pinery is looking well; the distance is not far, so we will take that in our way. Here we have some ready to cut. Those which are earthed up so high have been grown after a plan recommended by Mr. Hamilton, an intelligent practical gardener, who, when suckers, as they are called, meaning the side shoots, come out, instead of breaking them off and striking them, that is, rooting them as young plants, earths up the stem and grows them on the old root, which sustains the suckers in full growth; and the growth is still more accelerated when the suckers or side shoots strike roots into the soil that is heaped up to them. These are as fine as the fruit on the old plants. Here is one that has two of these side shoots, and both with good large fruit on them. The fact is, that upon this plan the suckers never receive a check; the cutting of the fruit throws all the strength into the side shoots, and by earthing up to the base of the shoots they form roots of their own in the fresh mould, and thus obtain additional nourishment just as they want it to swell their fruit. It is the custom to keep these pineries as regular in the temperature as possible, but there must be a good deal of difference in their native climate, and there are people who fancy we should imitate the climate and all the other circumstances that attend the growth of plants in their native habitats—this is a mistake. The grapes and pines grown in our hot-houses are superior to those grown where they are indigenous, simply because they receive no check; whereas, in their native climate they are subject to occasional checks.

The greenhouse, used as such, has, notwithstanding the frost, no fire in the furnace. It has had a little during the night, to keep the frost out, but the lower the temperature can be kept, so as to avoid actual frost, the better for the health of the plants. Those dwarf buildings with glass covers are called frames. These contain plants that are nearly but not quite hardy ; the brick sides are warmer than wooden boxes would be, such as the cucumbers are growing in. The object of these pits is to preserve plants by keeping in the natural warmth of the earth. Some of these have plants which are completely hardy in the ground, but which, when potted, would be damaged if exposed, because the roots naturally reach the sides of the pot and would be frozen through ; whereas, in the ground, they go down into the earth and would not be reached. You see numerous beds and borders covered with straw; when the sun has been out awhile this will be taken off for an hour or two, but be carefully put on again ; It covers tender crops that would be damaged if not killed by the frost. Those shrubs which are matted round are nearly hardy, but would be injured were the frost severe, and they exposed, though ordinary frost would not hurt them much. But we must return to the house.

Nobody would believe it possible, if they did not witness it, that two following days could be so extremely different in temperature. Yesterday, everything was icebound. To-day all the eaves are dripping with wet ; all appearance of frost has gone. The air is comparatively warm, and the gardener is sowing his seeds again in some vacant places. He is covering sea-kale with pots and dung to force it early and keep up a supply, and rhubarb in the same way, or rather upon the same principle. The man a little beyond the cross walk, is sowing more peas, and planting more beans. Another is, as you see, planting out cabbages twice as thickly as necessary for hearting, but this is that one-half may be drawn before they are full grown, to eat as greens. He under the wall is sowing radishes and lettuces together to succeed forwarder crops. The green stuff almost like grass which the man is dividing from one large tuft into several smaller ones, is called chives ; they look like onions, and are a good substitute for them when these are scarce. And the youth who is planting bulbous roots in these holes, which he makes one inch deep, is planting shallots and garlic. The warm border at the foot of the fruit-tree wall is now being dug up just at the bottom, for the purpose of putting in these small potatoes ; they will be laid in the corner, and earth put upon them. These are sure to be an early, though not a prolific crop. Among the hot beds the gardener is sowing seeds in one, and of several sorts ; some are annual flower seeds, and I observe he has put in some cauliflowers ; this reminds me that yesterday all the cauliflowers under glasses were shut up close, now you see all the glasses are lifted clear off ; these will all be replaced at three or four o'clock, before the air gets too cold. Observe, the gardener is taking away the dung from the front of the cucumber bed ; this is for the purpose of replacing it with new hot dung. In the fruit garden the man is clearing the strawberries, forking up between them, dressing the surface with very rotten dung, digging between the gooseberry and currant trees, and burying dung over their roots. There are some of them not pruned yet, but he ought to do them this month. The bundles of twigs which you see half buried are grafts of choice apple and pear trees, ready to be grafted on stocks, to propagate the choice sorts of fruit trees from which they were obtained. These need not be used for several weeks, they will be just as good then as now, because their juices are dormant, and the parts at rest, but they might be used now directly if there were leisure.

In the flower-garden they seem to be busy. One man at the frame is stirring up the mould in the pots of auriculas, and throwing the loose earth out for the purpose of replacing it with very rich light compost mixed on purpose. He is doing it with rotten cow-dung, that is, cow-dung rotted into mould ; this is mixed with a little sand and it gives great strength to the plant. He leaves the carnations and picotees, the pansies and verbenas, and all other plants in the frame just as they were placed in the pots ; they want no attendance just now. Here the man is returning soil to the ranunculus bed, where he will plant some of the finest in about a week, say the 15th, and these will be in full bloom in June. In the shed there, the man is potting the large roots of dahlias, which will be put in the propagating house to push their shoots, and these will be cut off close to the bottom, and being struck in a small hot-bed, will become plants ready to plant out in May. If the weather continues fine, he will sow many of the annuals in the border, but there will not be much more done this month. The place may be kept clean, and on fine days he will earth up the celery, but very little else.

THE CROCUS.

The great variety of this gay and very welcome spring flower renders it comparatively easy to get hold of a few that, in some degree, approach the standard laid down ; and

if we examine them by the side of the many varieties which are the reverse of the standard, the most indifferent of us would be astonished at the superiority of one over the other. We

have seen more than fifty named sorts in one collection, some of them broad in the petal, and when half expanded, touching each other, and forming a cup; by the side of these we have seen others with very narrow, thin, and pointed petals, forming, when half expanded, a mean-looking star, poor and contemptible as a flower, and not worth a place in the meanest wilderness, while the others could be had. The culture of this flower is simple; it is very hardy, no degree of cold seems to have the slightest effect on it; and, although it grows finer in some soils than others, there is no kind but it will grow and flower in.

TO GROW FOR INCREASE.

Plant the finest bulbs that can be had, six inches apart every way, and four inches deep, a clear three inches of soil above the crown. They will do best in light sandy loam, and enriched by the addition of half its bulk of cow-dung, or the soil from cut turves, rotted; they require neither protection nor water. They will come up in February or March of most seasons, bloom abundantly, and seed freely. At the autumn of the year, when the grass has turned off yellow, the pods of seed may be gathered in considerable quantities. The bulbs are not to be disturbed until the leaves have quite decayed, when they may be dug up, and the largest and finest are marketable; the others may be replaced in the ground, or be got rid of, as the case may be; but for those who want increase, the longer they are planted, the more full-sized bulbs will be taken up. The question as to the depth of the bed has been variously answered by different writers; but if there be a foot of good soil, they require no more, so that there is nothing absolutely poisonous under it. In this little routine of planting in October, or even earlier, and taking up in August, or even later, consists all that can be done for the Crocus.

RAISING FROM SEEDS.

A bed, prepared with a barrowful of the loam of rotted turves, to half a barrowful of cow-dung, should be levelled and raked smooth on the surface in October. The seeds should be very thinly sown all over the bed, and carefully raked in so as to be covered; but it is still better to sift some of the compost through a fine sieve upon the seed, so as to cover it a good quarter of an inch. In the spring, if not before, this seed will come up, and all that is required then is to carefully remove all the weeds; this can only be safely done by hand, but if it be not done while the seedlings are young, the weeds will so completely rob the little plants of the required nourishment, that there will be no hope of their recovering the check; by early hand-weeding every thing is removed before it is large enough to do mischief. Vigilance must be continued all the year, so that no weeds be allowed for an unnecessary day to keep possession of the ground; and yet, with all the care and cleanliness that can be exercised, crop after crop of weeds will come up, and if they were allowed once to get ahead, their roots would tangle round the small bulbs, and drag them out of the ground. These, when they have died down, are to have half an inch of good soil, such as the bed is made of, covered over the surface, and again they will come up the second spring. At the end of this season they may be carefully taken up and planted in a fresh ground, composed of the same materials; or if there be only one bed that can be appropriated, dig it well, to turn bottom to top, and carefully replant all the bulbs, two inches deep, and three inches apart. If there should be any very severe frost, a little litter of any kind thrown over the bed is useful; not because the frost hurts the plants, but because the freezing and thawing of the soil often makes it rotten, and it actually displaces the bulbs, and at best leaves them among spongy, hollow, and disturbed soil, and often breaks the fibres of the bulb.

This third season they may be taken up and replanted in fresh ground as before; and this time they will be best in drills drawn three inches deep, and six inches from drill to drill; place the bulbs three or four inches apart, and when you cover in the earth, draw up the soil so as to ensure a good three inches of soil above the crowns. The greater part will bloom this fourth season, and the first thing to do will be to select the good ones that you mean to keep from such as you will despise. Mark every one that forms a nice round hollow cup, or something approaching to it, with broad petals to touch one another the whole length, round ended and thick, for these are all necessary to make one worth saving at all. Put labels to them, describing them, so that you cannot make a mistake in taking them up; and at taking up time, go to the marked ones first, and having secured them with their offsets and increase, take up the remainder all in one basket, or bag, for you have no interest in saving them separately; but as it may be that they do not all bloom, recollect that the unbloomed ones should be separately saved, to be grown till they do flower.

THE TWO CLASSES OF CROCUS.

For the purposes of the florist, it is sufficient to divide this flower into two very distinct classes. These are the spring-flowering crocus, and its hundreds of varieties, and the autumn blooming kinds, which are now becoming numerous. The management of both is as nearly alike as the two seasons admit of. They are taken up on the decay of the foliage and ripening of the seed, and it matters not how soon they are planted again, for they take no harm in the ground in a genial flower garden where there are borders. Alternate patches of autumn and spring flowering sorts greatly assist in the effect produced in their respective seasons. The rich purple of some of the autumn flowering kinds, when flowers are getting scarce and dwarf ones especially so, is valuable; and the spring flowering varieties, with their numerous colours, form the first and most brilliant features of the flower garden, and are of themselves "a host." Many gardeners edge their clumps and beds with close rows of these bright varieties; but it is by no means consistent with good general effect. By putting them in patches, and not too near to each other, the general effect is better. When they are alone, and if the quantity is apportioned a little to that of the things that are to accompany or surround them, the border may be kept in the best possible order, not all brilliance one week and all blank the next. The succession of flower may be kept up in borders with a very little trouble, because the earliest or spring flowers are for the most part perennials, and if the border were once planted, it need only be mended when any thing fails for two, three, or more seasons together; but if the room is so circumscribed as to require one thing removed to make room for another, the case is altered and the work increased. The crocus may have its little patches near the front, at such distances as to allow of other patches of bulbs in the same line, or a little farther back, according to the height. The early tulip, the snowdrop, the hyacinth, the various daffodils and narcissuses, the primrose and polyanthus, and various other subjects which bloom with or immediately succeed it, render it necessary to plant the crocus with a view to its contemporary or succeeding flowers; but there is one use that could be made, but that we have never seen made by any but ourselves. As subjects for the geometrical beds in those flower gardens which form a whole figure, they are without exception the most brilliant and the most independent of all the subjects we know of. They have, in the first place, a great diversity of colour; dark and light purple, white, and golden yellow. These colours are distinct, and as most of the Dutch or geometrical gardens have four different patterns or forms of beds, the whole figure might be occupied with the four colours. Many we have seen with six beds of a pattern, and four patterns. So that six might be occupied with white, six with light blue or lilac, six with dark blue or purple, and six with yellow. In so occupying beds of this kind, they must be planted at such distance as will allow of other subjects between. They ought to be in patches a foot distant every way; this would allow of the same diversity in hyacinths to follow the crocuses. The red L'ami de Cœur, and the dark purple L'ami de Cœur, form two excellent colours; a dwarf early white, and a dwarf early light blue, would complete the four sorts of beds, and give a feature totally different as the crocuses go off. However, our only business is with the crocus, which to be effective should be all one colour in a patch, and so also all one colour in a bed. There is then a boldness and decision about the work, no distance spoils the figure or the colours; but if you mix the colour in a patch or in a bed, there is nothing like distinctness of character to be seen when close, and at the least distance the variety is lost in a confused and undecided shade. We cannot help recommending the crocus for geometrical gardens, or as an early feature for all borders. We cannot too strongly impress upon the cultivator the propriety of keeping the colours distinct, and of choosing his sorts by the breadth and bluntness of the petals, that they may form a cup when expanded.

PRESERVING THE BULBS.

These must not be kept too warm nor too dry, for they are more apt to perish than a more juicy bulb. They are not formed of juicy layers like a tulip, onion, narcissus or hyacinth, but of a close dry substance, more like the composition of a bean, and as they do not exhibit the least difference when dried so as to kill them, but remain to all appearance the same, there is great danger in buying them late in the season, for with all the appearance of good ones they may be found past germinating, and so disappoint us. If therefore you lay them by, let it be in a cool dry place, and if you buy any after they are out of the ground, do it always before the end of November at the latest, but better in October. The Calendar of operations for this is very simple indeed, and the properties are as follow :—

1. It should be composed of six petals, three inner and three outer, but fitting so close as to form a cup the shape of half a hollow ball.

2. The petals should be broad enough, and blunt enough at the ends, to form an even edge all round the cup, and lap over each other so much, as to have no indentations where they join.

3. The petals should be thick, and smooth on the edges, without notch or serrature.

4. The colour should be dense, and all over the same, if the variety be a self; and the marking should be very distinct, if variegated.

5. It should be hardy enough to stand the frost, for those which are spoiled by the frosts which come after they flower are almost worthless, because they all bloom early, before the frosts are all gone, and therefore their only beauty would be destroyed unless they stood the cold well.

Lastly. They ought to bloom abundantly, the flowers succeeding each other, to lengthen the season of their bloom.

MONTHLY TREATMENT.

JANUARY.—The roots are now, or ought to be, in the ground, and require no care whatever, except merely keeping the beds, borders, and clumps in which they are planted clear of weeds; no degree of frost appears to have the slightest effect on these bulbs.

FEBRUARY.—If the season has been mild, most of the plants appear above ground; and in the beds in which choice seedlings are planted the surface of the ground may be stirred with advantage, first, for the sake of neatness, next, because it promotes the admission of air to the roots and facilitates free growth; weed the seedling-bed before the weeds grow large enough to hurt the seedlings.

MARCH.—In ordinary seasons the majority of sorts are in flower before this month is out; and among blooming seedlings, from which you intend to select the best, take advantage of the full sun-shine to examine them, for they expand in the warm rays, and you can see the shape. It is useless to attempt to discriminate, unless the sun be on them and the flowers fairly open; only such as have broad petals, and form a cup when opened, should be considered worth adding to the present varieties. Continue to weed the seedling-beds, both one and two years old.

APRIL.—A mere continuation of last month's attention and operation, especially weeding the young seedlings.

MAY.—The Crocus out of bloom sends forth its foliage at considerable length like long grass, and unless they have been planted in some kind of order, they now look untidy; but the practice of clipping this grass, although not of any great importance where they grow in large patches and open borders, is decidedly injurious to the growth of the bulbs, and checks the increase of size.

JUNE & JULY.—The foliage will be turning yellow, when they may be taken up. The seed-pods will be seen in the heart of the leaves, and should be gathered, if from good roots and worth the trouble; all the choice ones should be first taken up and kept in separate bags with their names, labels, numbers, and descriptions. After this, unbloomed seedlings should be taken up, and also kept separately, because you know not but that the most insignificant may prove the best. The great bulk may then be taken up and laid together according to the several distinctions, that you may be able to prevent any admixture of one sort or colour with another. All the seedlings that have bloomed and are not good enough to propagate or name, may be thrown together as mixtures, to be sold, thrown away, or given away. Mark with labels, to prevent disturbing them, all to be left in the ground.

AUGUST & SEPTEMBER.—While the bulbs are out of the ground, keep them dry and cool; damp will soon destroy them, and any excess of warmth, long together, will dry them, and destroy their vitality. As, however, you may begin planting from August, and keep on till November, there is no particular hurry; let it depend on your convenience, as vacancies occur. All the verbenas and tender plants in clumps require to be taken up in winter; the planting of Crocuses may bide the clearance of these less robust tenants. Sow seed.

OCTOBER & NOVEMBER—Finish planting with all industry; for, from the moment a root begins to spear, it loses strength out of ground. Plant all that you may want in pots,

and set in water or sand all that you mean to occupy the various devices and contrivances intended for conservatory and dwelling-house culture. Sow seed.

DECEMBER.—Here, if we have been commonly prudent, we have a month's rest, excepting if weeds grow on the beds, which must be kept clear. If through inadvertency any bulbs remain out of ground, lose not a moment in getting them in; and if any of the seed be not yet sown, give it a chance by sowing it directly; but you must not expect so good a bloom from the bulbs, nor so many plants from the seed, although in some instances, where they have been well preserved, both may give some return for the trouble. As a general rule, however, every bulb should be planted and every seed sown before the end of November; all beyond this is risking the health, strength, and sometimes vitality itself, of both the one and the other.

CHEMISTRY AND AGRICULTURE.

WE might as well have written Chemistry and Horticulture, for the application is much of the same character; and we are about to consider how far it is desirable for persons of limited means to try experiments. The establishment of the Royal Agricultural Society of England, and the Horticultural Society of London, was a great boon to farming and gardening; not because they set men of all conditions playing all sorts of tricks with chemical manures, for that involved a certain quantity of good, with an uncertain quantity of evil; but it was a boon, because men of capital, who could afford to lose crops, were led to try experiments and report the result, so that the poorer men who depended on their crops, and were sufferers when they had less than an average, could stand by while wealthy landholders did the experimental part of the business, and see the effect of novel practice before any risk was incurred by the less affluent lookers-on. It has, however, been the fashion among modern writers to condemn the "old jog-trot methods of our forefathers," and even to ridicule those who, as it was improperly called, obstinately continued in the old track, while so many new ones were pointed out. The science, or rather the business of farming and gardening, according to the old school, was reduced to something like a certainty, as far as particular requirements of the ground were provided, and those requirements were answered by an average result. A man with a farm or garden that proved sufficiently productive to obtain for him a general average profit, was in no degree blameable for waiting until some better, or cheaper, or more certain mode of producing the usual results was made manifest—not by reasoning, for the most specious reasoning will sometimes prove fallacious—not by any well-dressed theory, for theories often deceive even their authors—but by plain facts, which can deceive nobody; then, and then only, is the man of business, whose all is in his trade, warranted in adopting new methods instead of old ones. We repudiate altogether the notion that a man who has practised the acknowledged rules with the ordinary share of success, should step out of his way at the bidding of theorists; but we hail with pleasure the experiments of the wealthy, and the praiseworthy manner in which they publish their success or otherwise. It is only when the efficacy of novel practice has been *fairly and fully proved*, that the steady-going farmer, who has no money to spare, is called upon to entertain the change. But this does not affect improvements that are self-evident to all thinking men, and the change of system which relates to economy, and inattention to which bespeaks, or rather denotes, unpardonable idleness. If a man is not obliged to adopt a new chemical manure because somebody recommends it, he is culpable when he wastes that which he understands the value of; yet how many dung-yards do we see, even among wealthy, or comparatively wealthy, farmers, where the best juices of the manure are running to waste? The dung receives all the rain, which washes away the virtue of it, and a black ditch in the neighbourhood receives one-half the value of the muck. This is a very common picture, and those who, after the admonition of many writers repeated during many years, continue the waste, deserve all that has been said of them, for they exhibit the worst evidence of ignorance and obstinacy. Not so the prudent man, who awaits the success of his richer neighbour in agricultural experiments and costly speculations. Gentlemen farmers expect but little from their business profits; many esteem themselves fortunate if their farms bring them home the cost. They follow husbandry for amusement, and they, for the most part, like to speculate a little in novel applications, and novel practice. They can speculate on their sowing, because half a crop instead of a whole one does not ruin them. They can try guano in the place of stable dung, because, if they miss their mark, they have a right to do as they like with their own. If they are fortunate, and obtain an excellent crop, we hear of it in the newspapers, but if they fail, they do not publish their mistakes. It is, therefore, only from often repeated facts staring us in the face that we can draw a safe conclusion; we may read of one man doing wonders, and it may seem very specious, but he may have omitted some facts

that materially contributed to his success, and we may thus be deceived, if we are not careful to learn all. The men, then, who persevere in their old practice until they are convinced by repeated facts that they can improve, are, in the main, right; but there are faults besides that of wasting their dung, that no excuse can be made for, the neglected straggling nature of their hedges, in some cases overspreading an enormous quantity of land, frequently laying waste several yards in width the entire length; whereas the most inexperienced man must know that a good hedge, two feet thick in the thickest part, is enough and to spare. Ditches, foul and irregular, are a match for the barbarous hedges; these are faults which proclaim the most palpable ignorance, idleness, or obstinacy, or all three. We are no advocates for fast men; we have seen them running along the road to science at a great pace, and have to retrace their steps, while the loiterers, as they have been termed, have passed quietly along, and arrived sooner at the desired goal. Let industry and economy be apparent in the state of their hedges, farms, roads, and dung-yards; but there is no occasion to follow every theorist through untried roads, and begin a new line of business in farming, until it is proved better than the old.

THE FLOWERS AND FRUITS OF SCRIPTURE.

The olive is the emblem of peace and plenty, and has in all ages been held in peculiar estimation, as the bounteous gift of Heaven. In the sacred text two kinds of olive are referred to, one of which is distinguished as the "wild olive." The identity of the "oil-olive" tree with the *Olea europea* does not seem to be questioned; but some totally different plants have been suggested as the "wild olive" of the New Testament. One of these is the *Rhus cotinus*, which however can have no claim to be regarded as the plant referred to. With more appearance of truth a species of Elæagnus has been suggested, and this suggestion has gained some support from the trivial name of wild olive or Oleaster, which is applied to the Elæagnus family; moreover, a species of oleaster is common in Palestine, and bears some resemblance to the true olive in several particulars, such as in the form and appearance of the leaves, and in the shape of the fruit, also in yielding a kind of oil, which is expressed from its kernels. The *Elæagnus angustifolius* of botanists is the plant alluded to.

The "wild olive" is only mentioned by St. Paul in his letter to the Roman Christians, and is made the basis of a very beautiful figurative argument. Alluding to the extension of the Gospel to the Gentiles, and the rejection of the Jews as exclusive participators in its blessings, he writes to his Gentile converts: "If some of the branches be broken off, and thou, being a wild olive tree, wert graffed in among them, and with them partakest of the root and fatness of the olive tree; boast not against the branches."

There is of the olive tree, as of most others which are extensively cultivated for profit, the wild or original kind, which is also called *Olea Oleaster*, and certain varieties improved by cultivation, of which the best is that named *Olea sativa;* by those who regard these as forming but varieties of one species—*Olea europea*—the former is called *communis*, and the latter, *longifolia*. That the "wild olive" of St. Paul refers to the original kind, and the "natural branches" to the cultivated kind

The Olive.

or kinds, appears scarcely to admit of doubt, when the reference to the practice of grafting, which must have been known to the Romans, is taken into consideration; for the operation of grafting is well known to be restricted within narrow limits, those plants which are constitutionally allied only admitting of this

kind of union. Hence the Elæagnus, being of a widely different natural constitution, could not be grafted into the olive. The evidence which is adduced in apparent support of this latter practice, from the old authors, probably rests on a misunderstanding of the plants they intended, the identification of the plants of the ancients being one of the exercises of "the learned," and one which, from the obscurity which rests upon it, is very liable to error. It was the practice of the ancients to graft the wild upon the cultivated olive tree, with a view no doubt to increase their fertility, as it might assist to do; and this practice may therefore be held to prove that St. Paul does really refer to the "wild" state of the "olive" tree, in the text referred to.

It is to be presumed that this wild olive tree is that of which the dove sent forth from the ark by Noah, on the subsidence of the waters of the flood, brought back a leaf to the patriarch, and by which he "knew that the waters were abated from off the earth;" although, as we know that the vine was cultivated in the later days of Noah, it is possible that the olive also may have been by this time brought under that course of artificial management which would surely lead to its amelioration and improvement; and perhaps this latter view is strengthened by the familiarity of the patriarch with the "pluckt-off" leaf brought to him by the dove. The next mention we find of the olive, indeed, in the time of Moses, expressly mentions the "olive-yard" in connexion with the "vineyard," so that by this time, at least, the olive must have been under cultivation.

The laws given to the children of Israel seem to have expressly obligated the cultivation of the excellent olives of Palestine, which country they were destined to occupy. Being debarred from the use of animal fat, (Levit. vii. 23,) the olive seemed to be their chief resource, and pure olive oil was one of the offerings they were commanded to bring to the tabernacle, (Exod. xxvii. 20.) The tendency of such a restriction was directly to check their former nomade habits.

The olive (*Olea europæa*) is of slow growth, and forms in congenial climates a small evergreen tree of from twenty to thirty feet high, densely branched, and bearing stiff lance-shaped opposite leaves, of a dull green on the upper side and hoary beneath. The form of the leaves differs in the several varieties; the wild olive (*O. europæa communis*, the *O. Oleaster* of some) has oblong leaves shorter than those of the more valuable varieties (*O europæa longifolia*, the *O. sativa* of some; and *O. europæa latifolia*.) The flowers grow from the axils of the leaves in small panicles, and are small and of a whitish colour. These are followed by the fruit, of an oblong-spheroidal form, about the size of a sloe, and of a yellowish green colour, turning black when ripe, and consisting of a thick oleaginous flesh or pulp, enclosing a bony shell or drupe. The stems of old trees, which frequently rise two or three from the same root, appear like three or four pollard willows congregated together, and indeed the appearance of the olive tree, with its hoary leaves and greyish bark, much resembles that of the grey willow. This may appear contradictory to the expressions which are used in the authorized version of the Bible: "I am like a green olive tree," (Psalm lii. 8,) "A green olive tree, fair, and of goodly fruit," (Jer. xi. 16,) but in truth the difficulty vanishes when it is known that the word translated "green" does not so much refer to colour, as to a freshness and vigour of appearance, compared with the prosperity of a righteous man. The olive, moreover, is what is called an evergreen, so that there is much propriety in the expression. The wood is imported into this country from Leghorn; it is hard-grained and heavy, like box, but somewhat softer, of a yellowish colour, with dark grey coloured veins; it has an agreeable odour, is not liable to the attacks of insects, and is susceptible of a fine polish. The delicate closeness of the grain renders it fit for painter's palettes, and its exceeding beauty, in the colour and veining of the wood, shows how appropriate was its application in constructing the cherubim, and the carved work of the doors and door posts in the temple of Solomon. The roots have a very pretty knotted and curly character; they are said to be much esteemed on the continent for making embossed boxes, pressed into engraved metallic moulds.

The Mount of Olives, so frequently resorted to by our Saviour, as we learn from the New Testament narrative, seems to have derived its name from the olive trees which grew there. The place is yet fruitful in olives, and travellers are shown some which are said to have existed since the commencement of the Christian era. Some trees remarkable for their antiquity are certainly found on the mount, especially in the garden of Gethsemane. There seems to be historical evidence of the existence of some of these olives of Olivet since the time of the Eastern Empire. It is related that every olive tree found standing by the Mussulmans when they conquered Asia pays one *medina* to the treasury, whilst each of those planted subsequently is taxed half its produce. The trees in question, it would appear, are charged only one *medina* each. Lady Calcott mentions other olive trees which claim an equal date. On the mountain road between Tivoli and Palestrina, there was in

1820 an ancient olive, which, unless the documents were purposely falsified, stood as a boundary between two possessions even before the Christian era, and in the second century was looked on as very ancient.

The Turks being sensible of the worth of olives and olive oil, the tree continues to be extensively cultivated, and Palestine may still be called a land of olives. To this the longevity of the tree, and its character of springing up from the rootstock, may in some degree have contributed.

There must have been an enormous home consumption of olive oil in ancient Judea, from the substitution of vegetable oil for animal fat as an article of diet, and its employment also in the sacred ceremonies for burning in lamps, but yet the produce was so great as to leave a large surplus for exportation. Thus Solomon gave 20,000 baths of oil annually to the Tyrian cedar hewers in Lebanon, and, as it would seem, an equal quantity also to the king of Tyre. The Jews, moreover, traded with their oil to the great mart of Tyre; and even sent it to Egypt. (Ezek. xxvii. 17; Hosea xii. 1.) The branches of the olive tree were also used by the Jews at the feast of tabernacles.

Eliphaz the Temanite, speaking of the wicked man, says, (Job xv. 33,) he "shall cast off his flower as the olive." This seems to be the principal contingency to which the cultivator of olives is liable. If the blossoms are cast off there can be no fruit; and it has been mentioned by travellers that the blossoms of the olive are sometimes cut off by blasting north or north-east winds. Dr. Chandler, in his *Travels in Greece*, observes: "The crops had failed five years successively when we arrived; the cause assigned was a northerly wind, called Greco-Tramontane, which destroyed the flowers. The fruit is set in about a fortnight, when the apprehension from this unpropitious quarter ceases. The bloom in the following year was unhurt, and we had the pleasure of leaving the Athenians happy in the prospect of a plentiful harvest." This early blight, the crop was subject to in Judea.

Like the fig, the olive tree furnishes a successional crop. The first are mature about August, and the other in October or November. The first crop, consisting of fully ripe fruit, is allowed to drop from the trees on mats spread out beneath. The later crop is beaten from the trees with long rods, and caught in the same manner. Some nicety is required in getting the crops, for if the fruit are over ripe, the oil has an unguinous taste, and if they are unripe they impart to it an intolerable bitterness. We read in the Bible of the beating of olive trees (Deut. xxiv. 20,) and of the shaking of olive trees, (Isa. xvii. 6; xxiv. 13.) "When thou beatest thine olive tree, thou shall not go over the boughs again; it shall be for the stranger, for the fatherless, and the widow." "Two or three berries in the top of the utmost bough, four or five in the outmost fruitful branches thereof." "As the shaking of an olive tree, and as the gleaning grapes when the vintage is done." It seems, therefore, to have been the practice of the Jews, to beat down the bulk of the crop, leaving the residue for the poor; and a similar beating process is still practised in Italy. It has been suggested that the trees having been once beaten in taking the crop, were not allowed by the proprietors to be beaten by "gleaners," who had therefore to wait until the unripe fruit, of which most of those left behind consisted, attained sufficient maturity to fall when the trees were shaken.

There appears to have been three methods anciently in use of expressing the oil from the fruit. Probably the most ancient mode was to squeeze the fruit with the hand, and by this method, though it caused much waste, the purest oil was produced. The olives were trodden as grapes; thus the prophet Micah says, "Thou shalt tread the olives, but thou shalt not anoint thee with oil." (Mic. vi. 15.) It appears also from the prophet Joel, that an oil press was sometimes employed: "The fats shall overflow with wine and oil:" "the press is full; the fats overflow." (Joel ii. 24; iii. 13.) In France and Italy, where the best oil is produced, the oil is drawn from the fruit, by means of presses or mills, as soon as they are gathered. Care is taken that the mill-stones are set so far apart as not to crush the nuts of the olives. The pulp thus prepared is put in bags made of rushes, and moderately pressed, and thus the best or virgin oil is obtained. The mass is then broken, moistened with water, and returned to the press, out of which flows a mixture of oil and water which spontaneously separate; thus a second oil of good quality and fit for table is obtained. The mass is again broken, soaked, and fermented in large cisterns, and then pressed, and thus a third oil valuable to the soap-boiler and in other manufactures is obtained. The best oil comes from Leghorn.

Pickled olives are the unripe fruit steeped in water to which quick-lime or some alkaline substance has been added. They are afterwards soaked in pure water, and then bottled in salt and water, with or without an aromatic. They are supposed to excite appetite and promote digestion. In some parts of Provence, after the olives have been some time in the brine, they remove them, take out the kernel, and put a caper in its place; these they preserve in excellent oil, and thus prepared, they are said to strongly stimulate the appetite.

The olive was held in high estimation by the ancients. The Greeks dedicated it to Minerva, and employed it in crowning Jove, Apollo, and Hercules, as well as their emperors, philosophers, and orators. They had, moreover, a tradition, that the first branch of it was carried by a dove from Phœnicia to the temple of Jupiter in Epirus, where the priests received and planted it. By the Romans also it was higly honoured. (*Cyc. Bib. Lit.* ii. 278.)

The olive delights in schistous, calcareous steeps, not far removed from the sea. It is increased by suckers, large cuttings, and pieces of the root, which are best removed from the parent in spring and autumn. The plants bear at two years old, and in six years begin to repay the expenses of cultivation; after that period, in good years, the produce is the surest source of wealth to the cultivator, as the tree rivals the oak in longevity. The best sorts are also sometimes engrafted on stocks of inferior kinds. The *Olea Oleaster* already alluded to as the "wild olive," is described as bearing very small fruit of no value.

The Provence olive (*O. sativa*) is the most esteemed of the cultivated sorts; the Spanish (*O. sativa latifolia*) bears the largest fruit, but they have the strongest flavour.

THE BERBERIS OR MAHONIA AQUIFOLIUM.

Of all the handsome shrubs to plant for ornament, few if any can beat the Mahonias as a feature in their proper places, and for underwood we do not think there is an equal. It is, we were about to say, a beautiful evergreen, but the winter tints of the leaves forbid us, for they vary from rich crimson scarlet to deep red purple, and a mass of them forms one of the most showy objects in nature; the rainbow has scarcely more tints, and rarely brighter ones, while the general style and habit of the shrub are all that the most fastidious can wish. It is extremely hardy, and makes one of the finest covers imaginable. Planted as underwood they should be two feet apart; they soon close upon the surface and form an umbrageous canopy, under which game may run about from one end of the domain to the other, without being once seen. Hitherto it has been treated as a choice shrub, like the Rhododendron, Laurustinus, Aucuba japonica, and many others that find place in any garden of pretension; but from its seeding very freely and throwing up suckers in abundance, it has become very plentiful as well as in great demand. It bears a good deal of ill usage. It will grow in stiff, light, rich, poor, or ordinary ground; but, like a thousand other plants, it grows best where it is best used. It will do well wherever the laurel grows well, and the ordinary soil will be good enough in most cases. It is principally propagated by suckers, but raised from seeds in vast numbers. The seeds are saved, washed from their berries, and dried. The beds, four feet wide, should be trenched and dressed and properly levelled, when the seeds should be sown in the fall of the year, not too thickly but very evenly, and be raked in carefully. When up they must be hand-weeded to keep them clean, and this will have to be repeated several times. At the fall of the next year, say about September or October, they may be planted out in good soil eight or ten inches apart, in beds about four feet wide, where they have again only to be kept clear of weeds; but if this season passes, leave the planting till the next spring frosts are over: for unless they be well established before the frosts and thaws come on, their roots will be disturbed, and they would in such case have to be pressed into the ground again. If you wish for short bushy plants, pinch out the top shoot, but in general you may allow it to take its chance; some will grow every way, and the variety of foliage renders it a most desirable shrub in many places where more dainty plants will hardly grow. In this second bed they will do very well two years, when you may select the best and handsomest for a new plantation, double the distance apart. The remainder may be also removed with advantage to a plantation by themselves. The equal growth of the best and the similar equality of the worst, besides giving more room, give them a much better appearance than when mixed together, for when some are handsome and some stunted, the piece looks bad, but separate them, and even the stunted ones look well when no better are near them. But for underwood the whole may be planted indiscriminately, because it is not at all desirable to have the plants equal, and if they were so when put out, they would not remain so many weeks; twenty different circumstances would operate in favour of some and against others. To plant them the ground should be picked up with a pick-axe and loosened as far down as a spade would dig it, and this in some ground is preparation enough; in other cases, where there is but little wood in the way, the shrubs might be planted at equal distances, the ground being first trenched or bastard trenched according to the quality of the second spit or subsoil: if this be rich let it be regularly trenched, turning the bottom spit to the

top ; if, on the other hand, the lower or second spit be poor, or gravelly, or otherwise hungry, merely loosen it a spade deeper, but leave it in the bottom. Once watered in, or planted in tolerably moist weather with the ground nicely damp, it will need no other trouble. It will soon grow too close to encourage weeds, and completely overwhelm any that make their appearance. Treated as an ornamental shrub, you must place it near the front rank, as it will spread and not grow up much ; three feet is the extreme height for a good while, though we have no doubt that many would go higher. They will, however, generally be twice as wide as they are high, when they have plenty of room. There are many supposed varieties, but they are mere seedling varieties, though they are called species, and one bed of seedlings will give you all the leading sorts, if you choose to divide them according to their difference of foliage. They make a noble mixture with Laurustinus and other dwarf shrubby plants for the front of plantations, for the branches and their rich foliage reach the ground, whatever size they attain. In forming a clump by themselves they make a very pretty feature, and if planted with the tallest in the middle and the smallest on the sides, ends, and front, they are a green mound in spring, and turn gradually to yellow, brown, scarlet, crimson, and purple, as the winter advances. There is scarcely anything that affords so great a diversity of colour, for as the spring comes the leaves resume their green, and soon after their bright golden bloom appears, and lastly their purple berries. In fine, they are a valuable shrub, thoroughly ornamental, the best of all underwoods, the prettiest specimens to stand alone, and perhaps the most hardy. When the fruit is thoroughly ripe, they may be gathered, bruised and washed to get out the seeds, or they may be dried and rubbed out, but we prefer laying the berries together till they are a little dried, and then bruising them, and washing the seeds clean and thoroughly drying before putting away, but there is no better time to sow it than when they are ripe. They are now named Mahonia in the nurseries, but the public get familiar with the name by which plants are introduced, and do not so readily forget it. The Mahonia is now raised by hundreds of thousands, and the price of a thousand seedlings is very little more than used to be charged for a single plant. The Messrs. Waterers raise an immense quantity, and as the planters become acquainted with its value as underwood, the demand will be for some time quite equal to the supply. Nearly all the nurseries have them from seeds of their own saving, for it seeds abundantly ; but if a plant be taken up that has been planted three or four years, many suckers will be found strongly rooted and fit to plant out. When they are raised from these, they are planted out the same distance as two-year-old plants, and soon become strong plants, growing far more rapidly than seedlings ; but since the seed has become so plentiful, few take the trouble of growing from suckers, unless to propagate a particularly rich-leaved one, or a variety possessing some peculiarity. There is no plant so well adapted to enrich the heavy borders on the sides of carriage roads, or in front of a planted belt of trees. In fact, it may be used wherever shrubs are required.

FLORICULTURE OF THE MONTH.

BY GEORGE GLENNY.

JANUARY is by no means prolific, but although we cannot boast of its productions, it gives rise to many social meetings, where floricultural gossip is the leading topic, and much is communicated that interests the floral world, and changes take place which are not always expected. Mr. Turner, one of our best florists, has taken the nursery at Slough, the very head quarters of floriculture in the late Mr. Charles Brown's time, than whom a greater enthusiast never lived, and the place where Mr. Turner perhaps spent some of his most successful days. Mr. Cutter retires. Mr. Barnes, another of our best florists, is likely to be installed in the late Mr. Girling's nursery, which has been conducted by Mr. Barnes as foreman and manager for many years. These events are gratifying in some degree, as they are instances of rising fortunes, and we hope they will respectively improve their establishments. Both these gentlemen are conspicuous among the dahlia growers, and have several of the novelties of the season coming out. We have already seen three or four promising seedlings of Camellia japonica, but as they were early blooms, and others will be forthcoming, we reserve our decision. If the later flowers come well, we shall pronounce two of them acquisitions.

We notice in the *Midland Florist* that a sort of credit is claimed for the last show of dahlias, and we can hardly let it pass without repeating our conviction that it proved "a heavy blow and great discouragement." Nobody can contemplate without regret the fact, that perhaps so many as a hundred

seedling dahlias were exhibited, of which not twenty could have been exhibited under the tried and effective test which we established years ago, when everybody proving a new variety was obliged to exhibit six blooms. By allowing only three to be shown, scores of uncertain flowers that will perhaps scarcely ever produce a perfect specimen, were exhibited. Men never, if they can help it, try a flower likely to be a favourite with less than twenty or thirty plants, and if that number, carefully nursed as they always are, will not produce six perfect blooms on a given day, it cannot be worth the room it takes in a garden, to say nothing of the price paid for it. The effect was that instead of twenty or thirty being produced that would perhaps be certain, whatever their quality might be, there were a hundred, or perhaps a good many more, from which three could be cut out of the thirty plants, but which would not have been shown had six as heretofore been required. The alteration then produced a greater number of varieties, but not the slightest confidence can be placed in the flowers, nor the awards made upon them. The result has been unquestionable: the sale will be confined to the few individuals who would rather buy a dozen bad ones than miss a good one, instead of being distributed among the many who buy every thing in which they have confidence. We are therefore very far from thinking the result of the dahlia show of the last year glorious, nor can we view it in any light, but that of a sad retrograde movement, and unless we re-establish the dahlia show upon its old footing, the trade and the flower will decline as rapidly as ever it advanced. However, the dealers have seen the evil, and everybody who buys all that have been advertised as "first-rate varieties," "show flowers," and "splendid forms," will find that nine out of ten will prove useless, enough to damp the ardour and excite the disgust of the best disposed amateurs. In the sorts we have described, we are at a loss ourselves for that evidence which helps our judgment as to the certainty of a variety, and had we not had other opportunities of seeing a few of them sent to us individually, we should have hesitated to recommend any from what we saw at the exhibition. However, those who did not send us any pay the penalty in a diminished sale, for assuredly those who trust to us are by no means few.

A writer has recently started a new and silly crotchet about the properties of the pink, and affirms that the lacing ought to be on the extreme edge, and that there should be no white margin beyond it, and he asks why there should be a margin of white to a pink any more than to a picotee or a tulip. Dr. Horner, whom we do not always agree with, has given the writer a good set down, and answers his question by saying, simply because a pink is not a picotee nor yet a tulip; and confirms the properties as we have laid them down with a little more detail than we give, for we have only given fundamental principles, and so that these are complied with, we care not. The pink which is mentioned by Dr. Horner as a good specimen and approaching the standard, is the variety called X X. This pink we noticed as long ago as July twelvemonth, as a very fine rose-leaved flower, when there was but a single bloom exhibited, and that one only half open. We regard the white margin outside a pink as Dr. Horner does—as a leading feature, a leading property, and it is strange that there should be so much struggling among people of little or no weight to disturb those principles upon which all good florists are agreed; but we are vexed with journalists who give currency to articles tending to disturb those points on which, after much discussion, the best florists have met each other and agreed. We thank Dr. Horner for his defence of the properties of the pink.

One of the greatest enthusiasts of the present day in the tulip fancy, proposes to reduce his superb collection to a single bulb of each of the choice sorts, and sells off on bloom as near the twentieth of May as the state of the bloom will admit. Among the same things we esteem a few of Franklin's varieties highly; we once saw all his flowers in a bed which contained none but those of his own raising. Of the hundreds he had produced during a long floricultural life, there were ten or a dozen of a superior and novel character. At that period he required such an extravagant price, that we, with all our zeal, and no want of money, abstained from purchasing. The collection we speak of contains all his clean and best flowers purchased at his sale, and cultivated still with great care; but an advertisement will give more information than we can give here. Every tulip-grower knows the name of Mansfield from his spirited purchases at good sales, but like many others whose gardens are in the vicinity of London, he is very likely to get notice to quit to make way for bricks and mortar, and he reduces his collection to one of a sort in anticipation of removal. Right sorry are we that so many good metropolitan growers have year after year been driven as it were out of the fancy by the deprivation of their gardens, but we fear there will soon be scarcely a vestige left of gardening in the metropolis. Certain it is that the ground on which some of our finest flowers in early days were raised, is now covered with houses; even the site of the Walworth nursery is a square of houses.

The Royal Society for the encouragement of Horticulture and Floriculture in Great Britain and Ireland has had its initiatory meeting, and agreed to the Rules for its conduct, which may thus be summed up. The subscription is but one shilling per annum, which it is calculated, from the great number of admissions, will meet every possible expense. This is to open the door, as it were, to florists of all classes. The Society is divided into four branches, each branch to elect a Treasurer, Secretary, Committee, and three judges, and these are to form a general committee to meet once a quarter, while the branch committees are to meet once a month. All members may show without further expense as many novelties of their own raising as they please ; and, as the raiser of anything may become a member on the payment of the shilling subscription, nothing is excluded. The judges of all the branches may attend all, and if three be present they may award a certificate to any deserving subject, but it must be afterwards submitted to the meeting for approval, and if the majority of the meeting object, no certificate can issue. Here is a complete security against that unfortunate jobbing which has the very first season ruined the character of the London Florists' Society, and rendered its certificates ridiculous. The four branches are to meet at four different extremes of London, which may be ultimately fixed at Shoreditch, the Elephant and Castle, Oxford-street, and Knightsbridge (the exact places not settled); these meetings to take place the first, second, third, and fourth Tuesdays in the month, and as a fifth Tuesday comes four times in a year, these are selected for quarterly meetings of the whole four branches, the branch committees forming a general committee. Perhaps nothing in the history of floriculture ever bid fairer to cause a rapid advance, because so numerous a body will be an excellent check on that system of favouritism, which has so long been the bane of all societies and the destruction of all confidence. What with societies set up for the express purpose of recommending one another's flowers, and giving more certificates of merit among a dozen persons than could fairly be given among five hundred raisers of flowers, and publications devoted to the same objects, the public has been preyed upon to an enormous extent, and it was high time something was done to counteract the extensive deception practised upon the unwary by such means. It has long been the practice of journalists to admit anything that interested persons may have written, and those works which may be said to be conducted by very fair dealers and upright men have thereby been made the instruments of people altogether as unworthy of confidence as the conductors were the reverse. This journal has uniformly rejected everything tending to exalt a flower or plant, justly or unjustly, except the papers written by their own competent and authorized agents, and the public has shown a confidence in the decisions of the writers, which has increased year by year as those decisions have proved unerring. There is not a writer interested in flower, plant, fruit, or vegetable, except so far as they are calculated to gratify the public and advance the science ; and, although it is not our business to say a word against others, let any indifferent person examine the most independent, and observe the numerous papers written by nurserymen, florists, gardeners, and anonymously, in praise of different subjects brought under notice.

The rage for cut flowers is now said to have abated, and the demand to have considerably lessened. There is some truth in the lessened demand, but it is only the same diminution that has been witnessed in the sale of all luxuries. Trade has suffered considerably: business of all kinds has felt the effects of continental squabbles, and the love of flowers has not been indulged to the full extent, for want of means, or from a conviction on the minds of prudent persons that they must debar themselves of those enjoyments which are not necessary. But the lessened demand appears more formidable among the gardeners who provide the flowers, from two causes, unconnected with bad times. There are many more growers of flowers for the market than there were, and they often overstock it with common things. This is one cause. Another is that common things no longer please the refined tastes of the public. There is no glut of Camellia japonica, however large the supply, except at the height of the bloom, when many other choice things come in. Let those who supply the market furnish things of higher quality—Euphorbia jacquiniæflora, the most brilliant little scarlet flower that can be found ; orange and lemon flowers ; the most highly-scented Daphne indica odorata, whose perfume is matchless and flower neat and pretty ; Gardenias (or Cape Jasmines), delicate, and beyond measure sweet ; Ixora coccinea, grown weakly, with numerous heads, small, on purpose, which is showy and lasting ; the various and numerous heaths; and we could enumerate many more subjects, of which too many could hardly be found. Now, instead of these, we see the commonest subjects forced, at considerable expense, and wall flowers, pinks, lilies, and such like, subjects merely brought before their time. The number of persons engaged in supplying markets now is greatly increased, by the many gentlemen's gardeners

who send up flowers. Some of the sellers rely a good deal, and others entirely, upon the flowers sent up from the gentlemen's establishments all over the country, and, curious enough, many a wealthy family have to buy, at an exorbitant price, the flowers cut from their own plants. This is an interference with the trade of the florist, and, however delicately it may be wrapped up in language, a robbery of the employer. This evil would be checked by the gentry insisting on a regular supply of flowers from all their establishments, because there is not one, however meanly kept up, but could furnish a good many half-guinea nosegays and bouquets in the course of the season. Among the forced flowers worthy of taking any trouble with, we may mention roses of all sorts, and especially the smooth-barked kinds and small-flowered, because they force better and last longer after cutting than many others. Pinks are tolerable, but not to be compared with anything we have mentioned. Deutzia scabra will yield a pretty flower for a bouquet. Some of the azaleas are acceptable, as affording yellow varieties, especially Azalea sinensis, Azalea indica of some kinds, especially Danielsiana, which has a thick scarlet flower and lasts a long time ; alba and phœnicea are white and purple, but not lasting. However, these are passing remarks on a subject that we first set going many years ago, when ten guineas was the premium or prize for the best nosegay to present to the Queen, and a number of gardeners received the prize.

We did not attach much importance to a work we are about to complain of ; but we were sorry to see, in these enlightened times, the filthy nostrums of the old writers recommended for Auriculas. If these unsavoury materials were once pronounced necessary for the cultivation of any flower, by a competent authority, it would not fail to banish that flower from the gardens of gentlemen, and wherever the work in question goes, if it has influence enough to be believed, the readers will probably give up the culture as hopeless. We have endeavoured to convince amateur florists long ago, that there is nothing more necessary for the cultivation of the Auricula, the most beautiful of florists' flowers, than rich loam formed of rotted turves, well-decomposed cow-dung, and a top dressing in February of poultry dung rotted into mould, cow-dung equally decomposed, and sand. It is not many years since a gentleman of the highest spirit, who spent, we verily believe, hundreds of pounds to get together the finest plants and the finest varieties of Auriculas, and employed one of the old school of florists, or rather a florist who learned from old books, to superintend them. Great was the mortification of seeing his superb collection sacrificed to the nauseous compounds of the old books, and it sickened him of a fancy that no cost would have deterred him from following to the greatest extent. It is vexing, therefore, to see modern writers, who evidently gather all they *suppose they know* from books, continue to promulgate the most forbidding modes of culture, and journalists, seemingly as little acquainted with practice, admitting the objectionable advice.

The movement, at present but feeble, and that in the least important quarters, in behalf of "prize improvement funds," is chiefly promoted by prize winners, and, without doing the smallest service to horticulture, excites the cupidity of persons who would not take the trouble to show unfairly for moderate prizes, but who, when they are increased, think it worth every description of jugglery. Collecting flowers from anybody that will allow them to cut from their gardens, and deliberately showing them as their own growth, is as common as the rising and setting of the sun. It is not desirable to offer money or value prizes for seedlings. So long as the practice existed, it was ruinous to the fancy ; seedlings were seen and rewarded, year after year, and the lucky novelties never seen again. It has been wonderfully unsuccessful for many years; but within the last few, by the change of system, and the award of certificates of merit instead of money prizes, the incentive to raise seedlings has been greater ; and had it not been checked occasionally by the abuse of even this wholesome excitement, floriculture would have been advanced much more than it has been. There are more good flowers raised than ever, and the only thing to be regretted is, that by some means or other the award of certificates by partial judges, or prejudiced censors, has reached flowers that are good for nothing. These have been sold with an apparent good character, until certificates in papers, periodicals, and from societies, stand for little or nothing. It is the duty of all respectable dealers to stand up for the high tests for flowers—to maintain the admitted standards, —and though they may not experience the immediate good effects or temporary advantage, they will secure a permanent benefit in the confidence of the public, and the encouragement of young beginners. Those who can obtain certificates for half-a-dozen flowers in a few weeks, while it is notorious that some must be undeserved, may safely conclude that they are not seeking proper adjudication. It ought to set every honest dealer against such societies ; and as it was the ruin of the dahlia trade a few years ago, and it was but just recovering the shock, so it has been injurious in the present season, and its effects will be felt

until a proper test be again established to restore it.

It will be observed that some florists are writing industriously in public journals, and affecting to give rules for judging the flowers in which they deal; others are writing treatises for their culture, not with any novel ideas, but with previously-known treatises for their guide, and merely putting their names to it for the purpose of bringing themselves into notice. This would be laudable enough if there had been nothing of the kind done before; but under the circumstances, it is a very questionable proceeding, and it would have ten times the weight, and be more respectable, if they were really desirous of spreading the information, to quote the lessons from which they themselves learned their practice, and gave the original authors the credit; but this must in time find its level. We are obliged to read over again, in these questionable treatises, the very practice recommended in this very magazine; and gratifying as it may be to see this practice adopted and taught, it would have been still more so to have found the growers, in a fit of honourable fairness, quote the work itself, instead of giving out its lessons as their own. When all these treatises shall be published in a single volume, and dated at the time they first appeared, it will not raise the retailers of the same instructions, without even a mention of them, in the estimation of the thinking public. There are some florists' flowers that we hope to see again cultivated with spirit. The auricula and the polyanthus have been sadly neglected; and it was no small misfortune to the floral world when Mr. James Dickson, of Acre Lane, had his unrivalled stock of new as well as old favourite auriculas destroyed by the hailstorm. Some valuable novelties were altogether destroyed, and the varieties lost; but when we consider that a single garden light would be sufficient for a very fine collection, calculated to enable any person to exhibit successfully, it is much to be lamented that any amateur florist should be without them. As a stage flower they are universal favourites, and as a show flower the properties are well understood. Why then should it not be a popular favourite for public shows? The polyanthus is still more neglected in the metropolis; and the ranunculus is every way deserving the highest rank as a neat, brilliant, and much-varied flower, that has been brought to a high state of perfection. Lightbody of Falkirk, and Read of Brucefield, in Dunfermline, would supply any beginners with a good show collection for comparatively a small sum; and we would strongly recommend anybody who desired to begin, to make the best bargain they could with these two cultivators, for a hundred or two to commence with. The tulip fancy is worthy of every beginner's notice. A bed of these is the handsomest feature in a garden, and there is no difficulty in anybody attending a sale, or buying a bed whole, of such men as Lawrence of Hampton, Lightbody, Davidson of Peckham, or any other fancier; for they would almost give half to any beginner who bought the other half. But they must attend a sale of flowers in bloom, or get some one to attend for them, to buy a few of the stars that are not always to be had. We were in conversation with a nurseryman the other day, and admiring the progress the rose had made since florists had taken them up as a florist's flower; we excited his jealousy at once, for he would not admit it was a florist's flower. We were not sorry for his anxiety, but he could not alter the fact. The florist, however, is content with about eighty or a hundred varieties, whereas the nurseries in their catalogues enumerate from three to fifteen hundred. The florists have no wish to claim these; but the improvement of the rose is going on rapidly in the hands of the florists, and it will every year now get nearer perfection. Among the shrubs which are deservedly popular now, we notice two that were our favourites many years since, though then scarcely known. *Garrya elliptica* with its graceful catkins, and *Andromeda floribunda* with its beautiful racemes of delicate white flowers, both elegant evergreens, and now as plentiful as they are elegant. They are forced upon our notice just now because they are conspicuous at the earliest season, and ought to be in every shrubbery of only a dozen plants. A garden of a rod, in front of a suburban cottage, ought not to be without them. Perhaps January is the flattest month in the whole year, and affords least material for notice; but it is in such a season of comparative rest, that we are glad to secure an opportunity of a rambling sketch of what is coming, as well as things gone by, and giving a few desultory remarks upon the general state of the science and those who follow it. The rapid changes from heat to cold, and frost to thaw, have touched a good many tender shrubs, which would have borne far greater extremes with impunity, had they been more gradually approximated.

POLYGONUM VACCINIIFOLIUM.

Polygonum vacciniifolium, Wallich (vaccinium-leaved Polygonum).—Polygonaceæ.

The first notice of this plant appears to have been made by Dr. Wallich, in his splendid work, the *Plantæ Asiaticæ Rariores*. It was subsequently referred to by Dr. Royle, in his *Illustrations of Himalayan Botany*. The latter states that it grows on the Himalayan mountains over an extensive range, at from 7,000 to 13,000 feet of elevation.

It is found to be perfectly hardy in the climate of England; exceedingly well adapted for rockwork, which during the autumnal months it decorates with a profusion of its oblong heads of gay pink flowers.

The habit of the species is trailing, the stems having a sub-shrubby and permanent character. They are furnished with alternate neat-looking foliage, the resemblance of which to some of the small-leaved whortle-berries has suggested the specific name vacciniifolium; these leaves are oblong, terminated by a little hardened point, dark green on the upper surface, glaucous beneath, furnished with sheathing stipules, which in this genus, and where they have the same tubular character, are called ochrea; they are also bordered with very long bristles. The flowering branches rise to the height of three or four inches from the ground, each bearing from two to four narrow spikes, or close oblong heads of deep rose-coloured blossoms. These are produced profusely in autumn, and continue to retain their gay colours till affected by frost, which changes them to a brown hue.

It was raised in the garden of the Horticultural Society, from seeds sent from the northern parts of India, in April 1848, by Captain William Munro.

This pretty plant is perfectly hardy, growing freely in well-drained loamy soil, and, by its trailing habit, is well adapted for planting on rock-work. It is propagated readily by means of cuttings.

The engraving which accompanies these remarks, was prepared from a beautiful figure published by Dr. Royle. The cultivated plant appears, as yet, somewhat more slender.

NEW FLOWERS AND PLANTS.

ÆSCHYNANTHUS PAXTONI, *Lindley* (Paxton's Æschynanth).—Gesneraceæ § Cyrtandreæ.—A half-shrubby showy species allied to *Æ. ramosissimus*. The branches are somewhat trailing; the leaves large, oblong-lanceolate, convex, dark green, slightly marked on the under side with impressed dots. The flowers are dull red; the bracts are large; the sepals large, oblong-obtuse, and divided to the base; the tube of the corolla curved, widening upwards, with a flat four-lobed limb, the lobes nearly equal, the upper emarginate, the rest squared at the ends as if cut off. Probably a native of the Malay Archi-

pelago. Introduced about 1846? Flowers in the autumn. *Culture.*—Requires a stove; turfy peat, leaf-mould, and broken crocks; propagated by cuttings planted in light mossy soil.

Heterotrichum macrodon, *Planchon* (long-toothed Heterotrichum).—Melastomaceæ § Melastomeæ-Miconieæ.—A handsome but rather coarse shrub, growing from seven to nine feet high, but flowering readily when of much smaller size. The branches, as well as the petioles, peduncles, and calyx, are clothed with tawny hairs. The leaves are opposite, large, but unequal in size, cordate-ovate acuminate, saw-toothed on the margin, seven-nerved, velvety green above, paler beneath. The flowers grow in terminal cymes containing ten or twelve blossoms; they are white, tinged at the base with red. Native of South America. Introduced in 1847. Flowers in the autumn. It is the *Octomeris macrodon* (Naudin.) *Culture.*—Requires a stove; good light loamy soil; propagated readily by cuttings.

Passiflora cœrulea, *var. Neumannii* (Neumann's hybrid Passion-flower).—Passifloraceæ.—A very good variety of Passion-flower, in the way of, but superior to the old *P. cœrulea*, from which it has no doubt sprung. The plant is evergreen; the leaves five-seven-lobed; the flowers white, the filaments of the coronal ray blue at the apex and purple at the base. The divisions of the perinth are comparatively broader than in *cœrulea*. A garden variety, originated on the continent about 1847. Flowers in the summer. *Culture.*—Nearly or quite hardy; rich light loamy soil; propagated by cuttings, planted in sandy soil, and placed in a gentle heat.

Pentstemon Hartwegii, *var. Verplanckii* (Verplancke's hybrid Pentstemon).—Scrophulariaceæ § Antirrhinideæ-Cheloneæ.—The very handsome Pentstemon which is commonly known in gardens as *P. gentianoides*, is not the species properly so named. Mr. Bentham has consequently given the former the name of *P. Hartwegii*, after Mr. Hartweg, who sent it from Mexico. Of this plant there are numerous varieties, of which the most distinct and handsome are the following:—*coccineus*, scarlet; *albus* (*Ann. Hort.* iii. 525), white; *diaphanus* (*Ann. Hort.* ii. 37), transparent crimson; *miniatus* (*Ann. Hort.* iii. 165), vermilion; *M'Eweni* (*Ann. Hort.* iii. 465), light rose; and the subject of the present notice. This differs from the original form in its extremely vigorous habit, and in the form, size and colour of the flowers, which are large, of a beautiful rose colour, white in the throat, with the tube funnel-shaped, and the segments of the limb wider and more rounded than in any other variety, the limb being almost circular. A Belgian garden variety, raised by M. Verplancke of Ghent in 1847. Flowers throughout the summer. *Culture.*—Nearly or quite hardy, suitable for summer decoration; light rich loam; propagated readily by cuttings.

Pentstemon gentianoides, *G. Don* (gentian-like Pentstemon).—Scrophulariaceæ § Antirrhinideæ-Cheloneæ.—The true plant, the *Chelone gentianoides* of Humboldt, &c. is materially different from that cultivated under this name in European gardens. It is a larger growing plant, reaching four and five feet in height, the branches downy at top; the leaves lance-shaped, entire and glabrous; the flowers in a panicle of one, two, or three-flowered peduncles, violaceous; with a short tube and large throat, the lower lip beardless. Native of Mexico. Introduced about 1845, (1825, according to *Don's Miller's Dict.*) Flowers in the latter end of summer. *Culture.*—Hardy; rich loamy soil; propagated by cuttings.

Mirbelia Meisneri, *Hooker* (Meisner's Mirbelia).—Fabaceæ § Papilionaceæ-Mirbelieæ.—A very handsome evergreen bush, having a considerable resemblance to *M. dilatata*. It forms a much branched shrub, the branches being many-angled, and copiously leafy. The leaves usually grow three in a whorl; they are scarcely an inch long, wedge-fan-shaped, and of harsh rigid texture, much undulated, the apex three-cleft, the side lobes being toothed, and each segment tipped with a spine. The flowers are very copious, in leafy racemes; they are red-purple, deeper in the lower half of each petal, with a yellow spot at the base of the vexillum. Native of the Swan River settlements. Introduced in 1847. Flowers in May. It is the *M. dilatata* of Meisner, but not of R. Brown. *Culture.*—Requires a greenhouse; rough sandy peat; propagated by cuttings planted in sand, under bell glasses.

Echinacea intermedia, *Lindley* (intermediate Hedgehog-flower).—Asteraceæ § Tubuliflore-Rudbeckieæ.—A fine showy herbaceous perennial, of robust habit, growing about two feet high. The stem is hairy; the leaves scabrous, heart-shaped varying to ovate-acuminate, and of a dark green colour, the flowers, which grow terminally, are large, four or five inches in diameter, and of a bright reddish colour; the florets of the ray are spreading, those of the disc elevated. Probably a native of the cooler parts of Mexico; but this is not certainly known. Introduced probably about 1843. Flowers from August till October, or throughout the autumn season. *Culture.*—Quite hardy; good garden soil; propagated by division of the plant.

Dichorisandra ovata, *Martius* (ovate-leaved Dichorisandra).—Commelynaceæ.—An herbaceous perennial of a showy character, growing from three to four feet high, with acute lance-shaped, entire, shining leaves, bright green above, purple beneath, and clasping the stem at the base. The flowers grow in terminal erect racemes, and are of a rich deep blue colour; the perianth consisting of three ovate-obtuse sepals, and three larger obtuse entire petals, which are paler towards the base; the stamens, six in number and compactly arranged, are yellow. Native of Brazil. Introduced probably by way of the continental gardens about 1846. Flowers during the whole of the autumn months. *Culture.*—Requires a stove, and a moist temperature when growing; sandy peat, loam, and leaf-mould; propagated by cuttings of the ripened stems.

Chætogastra strigosa, *De Candolle* (strigose Chætogastra).—Melastomaceæ § Melastomeæ-Osbeckieæ. — A very handsome dwarf shrub, growing eight or ten inches high, with numerous tetragonal slender spreading branches, covered with adpressed bristles. The leaves are small, opposite, ovate-acute, three-nerved, and somewhat ciliated, attached by short petioles. The blossoms are numerous, and grow in few-flowered cymes; the calyx is tubular, hispid, with five short acute lobes; the petals, four or five in number, and of a broadly elliptic figure, are of a rosy purple, and each being as large as the leaves, the blossoms appear large on the plant, which is altogether of a small neat habit. Native of Guadaloupe, growing in beds of sphagnum on the top of the Sulphur Mountain, and of the mountains of Montserrat and Martinique. Introduced in 1847. Flowers in August. It bears a host of other names:—*Melastoma strigosa* (Linnæus); *M. ciliata* (Desroussaux); *Osbeckia ornata* (Swartz); *Rhexia chamæcistus* (Sieber); *R. inconstans* (Vahl); *R. ornata* (Richard); *R. strigosa* (Richard). *Culture.*—Requires a greenhouse; sandy peat and leaf-mould, perfectly drained; propagated by cuttings. The plants bloom when very young.

Tropæolum tricolor, *var. versicolor* (various-coloured tricolor Indian cress).—Tropæolaceæ § Tropæoleæ.—A graceful and distinct variety of *T. tricolor*. It grows with a round slender twining stem, bearing small peltate six-lobed leaves, the lobes or segments being oblong obovate obtuse and somewhat cuneiform at the base. The flowers are borne on slender thread-like pedunçles issuing from the stem immediately at the base of the leaf-stalk, and tinged with a rosy colour towards the upper extremity; they are rather more than an inch in length, highly coloured with red above, greenish beneath, and terminating behind in an obtuse spur, about twice the length of the leaf-lobes; the calyx is six-lobed, turbinate or arranged in the manner of a crown, the lobes ovate-acuminate, somewhat pointed, unguiculate, closely embracing the corolla at their apex, green at the points and bright red at the base; the petals are small, partially cordate, or notched at the margins, bright yellow, slightly striated with red towards the centre, and of a rose colour at the exterior under the lobes of the calyx. A garden variety. Raised by M. Bauman, of Ghent, in 1847. Flowers in the spring. *Culture.*—Requires a cool greenhouse; rich sandy loam and leaf mould; propagated by seeds or cuttings.

Tropæolum tricolor, *var. aurantiacum* (orange-coloured tricolor Indian cress).—Tropæolaceæ § Tropæoleæ.—A distinct and desirable variety of *Tropæolum tricolor*. It grows with a twining round thread-like stem, bearing small peltate palmate or five-lobed leaves on slender twining petioles, the lobes being oblong obovate obtuse and narrow or cuneiform at the base. The flowers, which are borne on pedicels somewhat similar to the petioles, are rather more than an inch in length, highly coloured with red, green, and yellow, and terminating behind in a longish obtuse spur, red on the upper surface, and green and yellow beneath and at the point; the calyx is five-lobed, turbinate, compressing the corolla at the points, the lobes ovate-acuminate, generally green, with a slight tinge of red and yellow at the base; the petals are small, roundish, slightly notched at the apex, bright yellow, and distinctly striated with red on the inner surface. A garden variety, raised by M. Bauman, of Ghent, in 1847. Flowers in the spring. *Culture.*—Requires a cool greenhouse; rich sandy loam and leaf-mould; propagated by seeds or cuttings.

Tropæolum tricolor, *var. grandiflorum* (large-flowered tricolor Indian cress).—Tropæolaceæ § Tropæoleæ.—A rich and distinct variety of *T. tricolor*, growing with a slender twining stem, and bearing small peltate palmate or five-lobed leaves, on twining thread-like foot-stalks, the lobes being oval or ovate-acuminate, entire, and about half an inch long. The flowers, which are borne on small thread-like twining red and green pedicels, are about an inch and a half in length, and of a bright glowing red colour, and terminate behind in a long pentagonal obtuse spur; the calyx is five-lobed, the lobes being entire, oval-acuminate and deeply tinged with violet towards the margin; the petals are small, entire, and of a bright yellow colour. A garden variety. Raised by M. Bauman of Ghent, in 1847. Flowers in spring. *Culture.*—Requires a

cool greenhouse ; rich sandy loam and leaf-mould ; propagated by seeds or cuttings.

Cereus Leeanus, *Hooker* (Lee's Cereus).—Cactaceæ § Cereidæ.—A very beautiful species. The plant grows erect, a foot or more in height, nearly cylindrical, slighly tapering upwards, deeply furrowed, with from twelve to fourteen ribs. The salient angles are studded at short intervals with clusters of needle-shaped spines, about twelve in each, straight, but of very irregular length. The flowers are produced at the top of the plant ; they are four or five in number, large and very handsome, the colour being a bright vermilion. As in all these plants, the scale-like petals pass gradually into the more highly developed petals. Native of Mexico. Introduced about 1846. Flowers in——? *Culture.*—Requires a warm greenhouse ; sandy loam and brick rubbish ; propagated by off-shoots from the plant put in as cuttings, or by seeds.

Torenia arracanensis, *Paxton* (Arracan Torenia).—Scrophulariaceæ § Antirrhinideæ-Gratioleæ.—A species in the way of *T. concolor.* A perennial with slender quadrangular climbing or straggling stems, serrated opposite cordate leaves, small axillary and terminal flowers, smaller than those of *T. concolor*, the tube and upper lip of corolla deep purple, the three-lobed lower lip blue. Native of Arracan. Introduced in 1846. Flowers through the summer. *Culture.*—Requires a stove, or intermediate house ; sandy loam and peat ; propagated by cuttings planted in sandy soil, and placed in bottom heat.

Hoya picta, *Siebold* (painted Hoya).—Asclepiadaceæ § Stapeliæ.—A very beautiful climbing plant, with exquisitely variegated foliage. The stems are round, and in the younger parts tinted with rose. The leaves, which are opposite, are ovate-lanceolate, attenuated, and acute at the point, the green colours, of which there are two or three tints, being confined to an irregular marginal band, the eighth of an inch or rather more in width. In the mature leaves, the central part of the leaves is of a golden colour ; in the young leaves this part is variously tinted with lemon colour, purple and rose, which is gradually discharged as the leaf gains age. The flowers are unknown. Native of Japan. Introduced to Europe in 1845, by Dr. Van Siebold. Flowers —— ? *Culture.*—Requires a warm greenhouse ; turfy loam and peat ; propagated by cuttings.

Hoya variegata, *Siebold* (variegated Hoya).—Asclepiadaceæ § Stapeliæ. — This beautiful climbing plant, which has not yet produced its blossoms in Europe, is after the style of *H. picta*, differing in the manner of variegation of the leaves. In both, the leaves are so beautiful, as to make the culture of the plants desirable, entirely independent of the production of flowers. Instead of being spotted and blotched with the gold colour as in *H. picta*, the leaves of the present plant are striped, blotched, and bordered with pure white. Native of Japan. Introduced to Europe in 1845, by Dr. Von Siebold. Flowers —— ? *Culture.*—Requires a warm greenhouse ; turfy loam and peat ; propagated by cuttings.

Brodiæa californica, *Lindley* (Californian Brodiæa).—Liliaceæ § Scilleæ.—A bulbous plant, with long fleshy channelled leaves, and producing a scape, bearing four or five blossoms at the top ; these have a subventricose tube, and divide into six oblong segments, longer than the tube ; the expanded blossom is two inches across ; the colour is pale blue, with a dark streak down the centre of each division of the perianth. Native of California, sparingly on the mountains and plains of the Sacramento. Introduced in 1848. Flowers from July to October. *Culture.*—Hardy ; strong sandy loam ; propagated readily by offsets.

Abronia umbellata, *Lamarck* (umbel-flowered Abronia).—Nyctaginaceæ.—A prostrate-growing perennial plant, with long rooting stems, covered as are the petioles and peduncles with glutinous hairs. The leaves are opposite, fleshy, ovate-obtuse, fringed with hairs, and stand up on erectish petioles two inches long. The flowers, which are exceedingly fragrant, especially in the evening, grow in close umbels, supported above the leaves by stout peduncles ; they have the appearance of a head of verbena blossoms ; the rosy-violet corolla consists of a long tube, and a flat five-lobed limb, the segments of which are deeply two-parted. Native of the sandy shores of Carmel Bay, near Monterey, in California. Introduced originally in 1823, subsequently in 1848. Flowers from June to October. It is the *Abronia californica* (Ræusch) ; and the *Tricratus admirabilis* (L'Heritier). *Culture.*—Not quite hardy ; succeeds under the treatment given to Verbenas ; light rich soil ; propagated by seeds or cuttings ; recommended to be treated as an annual.

Polygonum vaccinifolium, *Wallich* (vaccinium-leaved Polygonum). — Polygonaceæ.—A very pretty trailing species, with half shrubby permanent stems, furnished with neat oblong mucronulate, dark green leaves, glaucous beneath, bordered with bristles, and having sheathing stipules. The flowers grow in narrow oblong spikes, on little branches which rise three or four inches from the surface, and bear from two to four spikes ; they are deep rose-coloured, and very ornamental.

Native of the north of India; on the Himalayas to the height of from 7000 to 13,000 feet. Introduced in 1845. Flowers during the autumn. *Culture.*—Hardy; well-drained loamy soil; adapted for rock work; propagated readily by cuttings.

Dianella elegans, *Kunth and Bouche* (elegant Dianella).—Liliaceæ § Asparageæ.—A tufted caulescent perennial plant, bearing smooth broadly-linear leaves, a foot long, and six lines broad; scabrous on the margins and on the keel, and somewhat prickly towards the apex. The flowers grow in panicles, divided into two free or open branches, and are of a fine blue colour; the leaflets of the perigone (segments of the flowers) are all furnished with five nerves or veins. Native of Van Diemen's Land. Introduced to the Royal Botanic Garden of Berlin, in 1848. Flowers ——? *Culture.*—Requires a greenhouse; turfy peat and loam; propagated by seeds, or by division of the plant.

Cyclobothra monophylla, *Lindley* (one-leaved Cyclobothra).—Liliaceæ § Tulipeæ.—A small bulbous plant, producing a slender stem three or four inches high, bearing a single linear-lanceolate leaf, glaucous on the under side, and about three times its own length. The flower-scape bears from two to three flowers in a corymb; they have curved pedicels, and are smaller than is usual in the genus, about an inch across, and of a uniform bright yellow colour; the sepals are ovate and sharp pointed; the petals are of the same figure, but less pointed, and coarsely hairy. Native of California, sparingly on the Sacramento Mountains. Introduced in 1848 to the garden of the Horticultural Society, by Mr. Hartweg. Flowers in June. *Culture.*—Hardy; sandy peat and leaf mould; propagated by offsets. It should be placed undisturbed in an American border.

Swammerdamia antennaria, *De Candolle* (antennæ-seeded Swammerdamia).—Asteraceæ § Tubuliflorеæ-Helichryseæ.—A compact evergreen bush, apparently not attaining a very large size, having viscid angular shoots, and obovate apiculate, blunt, veinless leaves, deep green on the upper surface, but in the young state covered with a slight mealiness on the under side. The flower heads, in form resembling those of the groundsel, are small, and collected into little corymbose panicles terminating the short lateral shoots; they are white, and add but little to the beauty of the plant, which is confined to the foliage. Native of the sides of Mount Wellington, in Van Diemen's Land. Introduced in 1846. Flowers in June. *Culture.*—Hardy; common garden soil; propagated readily by cuttings.

Tradescantia Warszewicziana, *Kunth and Bouche*, (De Warszewicz's Spider-wort).—Commelynaceæ.—A handsome perennial plant, glabrous in every part, and having a straight short simple leafy stem. The leaves are fleshy, about ten inches long by two and a half broad, amplexicaul at the base, lanceolate, and sharply acuminate. The inflorescence is from one to two feet long, subterminal, simply branched, with many-flowered umbels; the spathe is armed with a long subulate point. The flowers are as large as those of *Alisma Plantago*, the sepals being bright lilac, and the petals rosy violet; the anthers yellow, broad, reniform, sinuated and emarginate at the summit; the stigma obtuse and entire. Native of Guatemala, whence it was sent by M. De Warszewicz to the Royal Berlin Botanic Garden. Introduced to Berlin in 1848. Flowers——? *Culture.*—Requires a cool stove; turfy peat and loam; propagated by cuttings, or division of the plant.

Miltonia Karwinskii, *Lindley* (Karwinski's Miltonia).—Orchidaceæ § Vandeæ-Brassidæ.—One of the most beautiful epiphytal plants in cultivation. The flowers are borne on a stout nearly upright stem, three feet long, covered for three-fourths of its length, at intervals of an inch and a half, with the beautiful blossoms, which are fully two inches and a half in diameter, and variegated with white, yellow, brown, and purple; the sepals and petals are bright yellow, barred and spotted with brown; the lip is white at the point, deep violet at the base, and white in the middle space; the column is nearly white and adorned by two serrated hatchet-shaped wings. Native of Oaxaca. Introduced in 1839. Flowers in August. It bears the names of *Cyrtochilum Karwinskii* (Lindley), and *Oncidium Karwinskii* (Lindley). *Culture.*—Requires a rather cool stove; fibry peat soil; propagated by division of the plant.

Limnanthes rosea, *Bentham* (rose-coloured Limnanthes).—Tropæolaceæ § Limnantheæ.—A rather pretty annual plant, of prostrate habit, and succulent texture. The leaves are variable in form, sometimes pinnate, at other times somewhat bipinnate, and sometimes without side-lobes; all the parts are linear. The flowers grow from the axils of the leaves, singly, on long stalks; they are of a pale dirty rose-colour, and consist of five petals, which are bordered at the base with long hairs, and are of an obcordate figure, giving the flower a resemblance in shape to that of a mallow. Native of swampy places in the Sacramento Valley, California. Introduced into the garden of the Horticultural Society, by Mr. Hartweg, in 1848. Flowers in the summer months, when sown in the spring. Mr. Hartweg called it *L. pulchella*. *Culture.*—Hardy; good garden soil; propagated by seeds.

CEREUS LEEANUS.

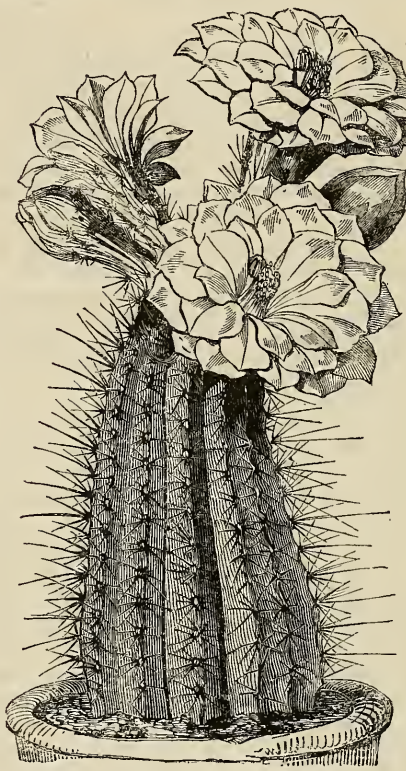
Cereus Leeanus, Hooker (Lee's Cereus).—Cactaceæ § Cereidæ.

The accompanying illustration of this plant has been adapted to our pages from a figure just published in the *Botanical Magazine*. We have recently directed attention (p. 47) to the improvements which have been from time to time effected in that work, and mentioned that a still further change was announced, namely, that of adding particulars explanatory of the culture of the plants figured. This has been commenced, and we cannot do better, with a view to inform our readers what the *Botanical Magazine* now is, than quote the entire description of the first plate of the new volume, which is the beautiful Cereus here represented, and which the coloured figure there given shows to be remarkably handsome. We shall omit the Latin character of the genus Cereus, and the Latin description of the species. The remainder runs thus :—

" Presented to the Royal Gardens by Mr. Lee, of the Hammersmith Nursery, who received it from France, as an unknown species, native of Mexico. If published, it would be no easy matter to recognise it from description alone. It is only by good figures, taken from perfect flowering specimens of the living plants, that we can hope to make known the distinguishing features of the individuals of this singular family. The present species is among the most beautiful, a free bloomer, and its blossoms are large and showy.

Description.—" Our plant is nearly a foot in height, about four inches broad, tapering upwards from a nearly cylindrical base, hence somewhat conical, the summit being the narrowest part : it is furrowed throughout its length rather deeply and acutely, forming elevated, rather sharp ridges or angles, which are studded at short intervals by small dense cushion-like tufts of wool, bearing the cluster (about twelve in a cluster) of sharp needle-shaped aculei, straight, very irregular in length, the outer series being the shortest, and gradually lengthening till the central, longer and shorter [? stouter] than the rest, is about an inch long. At and near the summit, four or five large handsome brick-red (inclining to blood-colour) flowers are produced. The tube (constituting the calyx) is green at the base, then yellowish orange, clothed with oblong fleshy scales (sepals), acute, tipped with green, and bearing at the point a tuft of aciculi or bristles. These scales pass rather suddenly into petals of an oblong-obovate-acute form, spreading and imbricated. Stamens numerous, rather longer than the tube. Style columnar. Stigma green, of many erect or connivent rays.—W. J. H.

" *Cultivation.*—The general practice with cultivators of Cacteæ, is to grow them in poor soil, composed of light loam, mixed with siftings of lime rubbish, and some sharp sand, giving them but little water, and keeping in a moderately warm and dry atmosphere. During the winter, this treatment, being in imitation of the natural climate of the plants, may be considered in a general way to be correct;



but other elements peculiar to climate are wanting, before we can be said to place the Cacteæ, or any other exotics, under the same influences by which they are supported in their native localities. It is quite true, that we are able to produce an artificial climate, so far as temperature, and the hygrometric state of the atmosphere are concerned ; but there are influences derived from proximity to the sea, of certain geological formations, and of the greater or less elevation of extensive plains in connexion with particular latitudes, which, with all our contrivance and appliances, we are unable to obtain to any extent. As Cacteæ inhabit many climates, growing in the hottest and most exposed arid places within the tropics, and ranging within 40° to 50° of latitude on either side of the equator, it is impossible to lay down any other rule for their cultivation in our gardens, than an approximate one.

" The modifications of this rule relate prin-

cipally to temperature. The *Cereus Leeanus*, being a native of the north of Mexico, needs only to be protected during the winter from severe frosts: it has been known to bear several degrees of frost without injury. As spring advances, it should receive some artificial heat and moisture, in order to get it into early growth, by which to ensure its flowering. Towards autumn, it will be benefited by full exposure to the sun, with plenty of free air, gradually decreasing the supply of water as the winter approaches.

"In respect to soil, we have found, other circumstances being favourable, that Cacteæ are not very particular, provided it is a soil not retentive of moisture.—J. S."

CALIFORNIA:

ITS CLIMATE, PRODUCTIONS, AND ADAPTABILITY FOR COLONIZATION.

The recent golden discoveries in California seem to have diverted towards that country a stream of immigration, which will no doubt materially conduce to people its habitable districts. Under these circumstances, it has been thought that a brief sketch of its geographical characteristics, of its climate, its vegetable productions, and of its capacities to meet the requirements and circumstances of new settlers, will not be entirely devoid of interest and utility. Such a sketch may be conveniently made under the heads thus pointed out.

Geographical Features.—California, situated on the shores of the Pacific Ocean, and forming part of the north-west coast of the American continent, is divided into two parts, called Upper and Lower California. The latter is a narrow peninsula, extending from 22° 45′, to about 32° north latitude, or from Cape St. Lucas to the northern extremity of the Gulf of California, by which it is divided from the main land. The former extends from about 32° to 42° north latitude, or from the northern extremity of the gulf northwards, in the direction of the Columbia river, in the Oregon territory. This district is bounded on the east by the Rocky Mountains, and extends from north to south about 700 miles, and from east to west, from 600 to 800 miles. But a small tract of this area is, however, habitable and fertile, and this consists of the strip of land between the coast range and the Sierra Nevada, or Great Snowy Mountains, extending 700 miles in length, and varying from 100 to 150 miles in breadth. The rest of the country, from the Sierra Nevada to the Rocky Mountains, is rugged and precipitous, with here and there a fertile and well-watered valley. It is called the Great Desert basin. In this tract there are some extensive salt lakes, and a large extent of land surface completely encrusted with a saline efflorescence, and dry and parched to extreme aridity. The high mountains bounding this part of California are crowned with perpetual snow.

The largest river in Upper California is the Colorado, or Red River, which, having its source in the Rocky Mountains, and following a course of about 1000 miles in length, disembogues into the Gulf of California at about 32° north latitude. The Green and the Grand rivers are its principal upper tributaries; the Gila is received just above its mouth; and the Sevier and Virgin rivers are also tributary. But little is really known of the country watered by these streams, although it is said to be generally precipitous, arid, and barren. Mary's River, a considerable stream, rises in latitude 42° north, and after a course of about 400 miles, is finally absorbed by the sands of the desert.

The fertile valley lying parallel to the Pacific, between the coast range and the Great Snowy Mountains, is well watered by the Sacramento and San Joaquin rivers, each having a course of from 300 to 400 miles, and both running into the Bay of San Francisco, the former flowing from the north and the latter from the south. The San Joaquin flows through the midst of the valley for about half its length, and then diverges towards the eastern mountains, where it has its source. The Buena Vista Lake, about 100 miles in length, and from ten to twenty wide, connected with the San Joaquin, is still further south, and receives, on its eastern side, about a dozen tributaries from the great range of the Snowy Mountains; the largest of these is the River Reyes; many of them flow through broad fertile valleys within the mountain range. Beyond this, and near the western side of the valley, is another smaller lake. The Stanislaus, the Tawalomes, and the Merced, are the principal tributaries of the San Joaquin, all on the eastern side. The higher plains in this direction afford good pasturage; and the whole of this region affords an inviting field for emigration. The mountain rivers afford water power to any amount. The Sacramento, which rises above 42° north latitude, is at all seasons navigable for craft of 100 tons burden to a distance of 100 miles from its mouth, and in the season of high water (January to July), much higher up. Some of its tributaries are the Rio de los Americanos, the Rio de la Plumas, or Feather River, the Mickelemes, and the Cosçumne,

the latter has its head near the foot of the Sierra Nevada.

The San Gabriel river waters the neighbourhood of La Ciudad de los Angeles, the city of angels, which is situated about 25 miles north of the Bay of San Pedro, into which the Gabriel runs. The Salinas River (on some maps laid down as the Rio San Buenaventura) empties into the Pacific near Monterey. The Bear River runs into the Great Salt Lake. This lake occurs between 40° and 42° north latitude, and is estimated at 100 miles in length, by 50 miles in breadth. The Utah lake, a body of fresh water, between 60 and 80 miles in circumference, empties itself into the Salt Lake. About 60 miles north of the Bay of San Francisco, is a lake called Laguna by the Californians; this is between 40 and 60 miles in length, and the valleys in its vicinity are fertile and beautiful. Near this lake is a mountain of pure sulphur. (*Bryant.*) In the Sierra Nevada there are several other salt lakes.

Lower California as a country is dry, mountainous, and sterile, but possesses some fine fertile valleys, as that of San Jose, 20 miles north of Cape St. Lucas, the northern extremity of the peninsula.

Climate.—The climate of Lower California is described as being exceedingly dry and hot. In some parts it does not rain every year, and in others, it is even said not at all! Only the southern portion receives the annual rains, which continue for a period of about two months, in September and October. Moreover, the heat is excessive; the thermometer reaching 100° or 110°, or higher; the minimum degree of heat is not stated.

Upper California has a cooler, and, in winter, a moister climate, although even here the climate is strictly seasonal, and varies considerably in different parts. The rainy season extends from November to February, and in the northern districts the fall is very abundant, decreasing towards the south. The summer, however, is very dry, no rain, or but few and slight showers falling at that season. The mountain tops are covered with snow for a portion of the year, but the lakes in the valleys to the southward do not appear to be frozen over. Even here the heat is very powerful, the thermometer ranging 80° and upwards. On the banks of the Rio Colorado, Dr. Coulter observed a temperature of 140° in the open air; but this was in a sandy desert. Exact and detailed observations of temperature seem to be wanting.

More recent information on the subject of climate is afforded by Mr. Hartweg,* who states that at Monterey the [average?] temperature of the summer months ranges from 62° to 65° Fahrenheit, and at the beginning of the winter season, when the rains set in, from 50° to 55° by day. The rainy days are succeeded by frosty mornings, but the cold is seldom so intense as to freeze water. By the beginning of November, El Toro, which lies east of Monterey, had been twice covered with snow, which soon disappeared again. According to Mr. Hartweg, the periodic rains, which set in with November, continue till the end of March, the heaviest fall occurring in January and February. The climate of a large portion of Upper California is therefore well suited to vegetable life, and must render the cultivable ground, which is very prolific, well adapted for agricultural pursuits.

Mr. Bryant† has supplied some additional particulars. In traversing the district between the Rocky Mountains and the Sierra Nevada, in the months of July and August, he has frequent occasion to record the congelation of water in the buckets: on one occasion the ice formed was a quarter of an inch in thickness. He nevertheless speaks of the mornings as being generally exceedingly pleasant, the atmosphere dry, elastic, and bracing. During the same month, the heat of the sun was found to be "excessive." On one occasion, a fall of rain in fifteen minutes reduced the temperature from 82° to 44°. In August, the temperature at 9 A.M. is stated on one occasion to be "intensely hot." He rarely found it so cold, in the settled portions of California, as to congeal water; but twice while here did he see ice, and snow on the ground not at all. The annual rains, which commence in November, are not continuous, as is generally supposed, but alternate with intervals of pleasant spring-like weather. From May to November, usually no rain falls, but there are exceptions; it sometimes rains in August. The thermometer rarely sinks below 50°, or rises above 80°. The climate of the coast of Upper California is said to yield to none in the world for salubrity.

Of the climate of particular districts, Mr. Bryant states some further particulars. About Nueva Helvetia, on the Sacramento, the sky is cloudless, with a delightful temperature. In the middle of the day the sun shines with power, but in the shade the heat is nowhere uncomfortable. San Francisco has a peculiar climate from its position. The mornings are usually calm, and pleasantly warm; after noon the wind blows strongly from the ocean, rendering the temperature cool enough for woollen clothing at midsummer; at sunset this wind dies away, and the nights are calm. In winter the temperature is agreeable, seldom falling

* Journal Hort. Soc. ii. 191.

† Journal of a Tour in California in 1846-7.

below 50°. At Santa Barbara, in the beginning of January, the temperature at night did not fall below 50°, and the average during the day was between 60° and 70°; the atmosphere clear and serene. About San Miguel, a mission situated on the upper waters of the Salinas Rio, the country bore evidence of long and extreme drought, which had prevailed for one or two years past. The day—a December one—was cold and disagreeable, and ice as thick as window glass was seen in a small branch of the Salinas.

Vegetable Productions.—The rocky peninsula of Lower California is but scantily furnished with vegetation. Some of its productions are, however, useful. One tree, called the mesquito tree, furnishes in its leaves food for cattle when there is no grass, which frequently happens in the dry season; of others, the bark is used for tanning. Figs, olives, dates, and vines, which have been introduced by the Spaniards, grow well in the hot, dry valleys; and on the more favourable spots, maize and the mandioca are cultivated. The surface, however, adapted for cultivation is very limited; the steep, rugged mountains, of which the peninsula chiefly consists, being almost entirely unavailable.

Upper California, having a more extended range of surface,—namely, from the sea-coast eastward to the Rocky Mountains,—possesses a much more interesting indigenous vegetation. Many beautiful hardy plants cultivated in English gardens have been formerly obtained from this part of California, and many others have recently rewarded the researches of the Horticultural Society's collector there.

Mr. Hartweg writes of verdant fields and a pine-covered range of mountains about Monterey. Several very valuable species of Pinus inhabit various parts of the country, (chiefly the coast range of mountains,) among which are *Pinus insignis*, a tree growing from 60 to 100 feet high, with a stem two to four feet in diameter; *Pinus Benthamiana*, 100 feet high, with a stem three to four feet in diameter; *Pinus Lambertiana*, of equal size; *Pinus macrocarpa*, 80 to 100 feet in height, the stem six to eight feet in circumference; *Abies Douglasii*, a magnificent timber tree; *Pinus Edgariana*; *Pinus Sabiniana* 60 feet high, with a stem six feet in circumference; and *Abies bracteata*, a remarkable tree, growing 50 feet high. A predominating tree near Monterey is the *Quercus californica*, an evergreen oak growing 30 feet high, with a globular head, and occurring principally in low dry situations. On the dry banks of rivulets the *Pavia californica*, or Californian horse-chestnut, is common; it grows 25 feet high, and is of a globular shape, producing fragrant white flowers tinged with pink, in great abundance on spikes a foot long. On the mountains of Santa Cruz the *Taxodium sempervirens*, red-wood, or bastard cedar, abounds, and grows to the enormous size of 200 feet in height, straight as an arrow, with a stem from six to eight feet in diameter: the timber is of a beautiful red colour, close-grained, and light but brittle; it is not, however, attacked by insects, nor does it warp. Here occurs the mountain oak, a species of *Castanea*, growing 50 feet high, of a pyramidal shape; its seeds are eaten by the Indians both raw and made into bread. At Carmel Bay occurs the *Cupressus macrocarpa*, attaining the height of 60 feet, with a stem nine feet in circumference, and spreading flat-topped branches like a cedar of Lebanon. These, except the *Quercus* and *Pavia*, are all valuable timber trees.

On the mountains of San Antonio, a range extending near the coast, in the neighbourhood of the Salinas River, and attaining a considerable elevation, there occurs abundantly an evergreen shrubby species of *Prunus*, called Islay, having a holly-like leaf, and bearing red fruit resembling the cherry-plum; the thin pulp which surrounds the proportionately large seed of this fruit is sweet and pleasantly tasted, and the kernel, roasted and made into a gruel, is a favourite dish among the Indians. The mountains of Santa Cruz yield an evergreen shrubby species of chestnut, whose nuts, produced in prickly clusters on the points of the young wood, and of the size and shape of beech-nuts, have an edible kernel resembling the filbert in flavour. The seeds of the *Pinus Llaveana* are collected and sold by the Indians. *(Hartweg.)* On the side of a mountain, near the Truckee lake, on the eastern side of the Sierra Nevada, Mr. Bryant found a most delicious raspberry, ripe and in full perfection (August); he thought its flavour fully equal or superior to any cultivated raspberry. The native fruits, however, do not appear numerous. The islands near the mouth of the Sacramento River furnish a small acid grape in abundance; and a fruit was met with, produced by a shrub four to six feet high, in appearance like a whortle-berry, and not unlike it in flavour; this was found on hills near the Great Salt Lake, and is used by the Indians. In the Bear Valley was seen a small tree, growing ten or twelve feet high, bearing reddish berries, called manzinata; the flavour is agreeably acid, something like that of the apple; these trees shed their bark annually, leaving a smooth surface. A small bitter cherry was also met with. In the valley of the Weber, and elsewhere, pulverised sunflower seeds were found to be used as food by the Indians; and in the Bear Valley were seen some large patches of wild peas. *(Bryant.)*

On the high grounds strawberries of excellent quality and larger than those of Europe are found, ripening in May and June.

Near the junction of the Feather River with the Sacramento, Mr. Bryant met with natives collecting the acorns of an evergreen oak (probably the *Castanea* found by Mr. Hartweg); the flour of these acorns, obtained by drying and pulverising them, is made into a kind of bread, and is with them the "staff of life," being the chief article of subsistence of the wild Indians of this part of California. The acorn of California from the evergreen oak is much larger, more oily, and less bitter, than that on the Atlantic side of the continent. In fruitful seasons, the Indians gather and lay up a supply of these acorns, sufficient for more than a year's consumption.

Bryant mentions a plant which he calls Canchalagua, regarded by the Californians as an antidote for all diseases. This is probably the *Erythræa Cachaulahuan*, a species of Gentianwort, known to possess famous stomachic qualities. According to Bryant's statement, it is particularly employed in cases of ague and fever; and for purifying the blood and regulating the system, he thinks it must become an important article of medicine. The fields of California are adorned by its pretty pink blossoms during May and June. A species of Collinsia, *C. tinctoria*, which has the seed-pods covered with glandular hairs which stain yellow, was found by Hartweg on the mountains near the Chuba, a tributary of the Feather River; and in the mountains between the Sacramento and its tributary the Feather River, he met with an umbelliferous plant, called Yerba de la Vivora, the leaves and stems of which are universally used with success against the bite of rattlesnakes. The bruised roots of a species of Zygadenus, called Amole, found near Monterey, are used as a substitute for soap (*Hartweg*); the root, or rather bulb, which is the saponaceous portion, resembles the onion (*Bryant*). Another variety of the Amole used as a substitute for soap, is eaten when washed, and has an agreeable sweetish taste. Mr. Bryant found wild flax in abundance in the neighbourhood of the Bear River; the fertile districts seem to afford a great variety of exceedingly nutricious grasses; the varieties are very numerous, and nearly all of them heavily seeded when ripe, and almost equal to corn as food for animals, which thrive and fatten upon them without other food. The horses, as well as cattle, subsist entirely on these indigenous grasses, at all seasons of the year; and the seeds are sometimes gathered by the Indians to make into bread. These grasses spring up as soon as the ground becomes moistened, and grow through the entire winter; some kinds are, however, evergreen and perennial. In the neighbourhood of Mary's River grows a small trumpet-shaped flower, the corolla of which is blue and scarlet, and a plant "with a flaming torch-like development of brilliant scarlet." (*Bryant*). The latter perhaps is a Castilleja.

Of the beautiful flora of all that part of this region which, watered by sufficient rains, supports a thriving vegetation, we have ample evidence in the many plants introduced thence to our gardens, and now carefully cultivated there among its highest ornaments. The greater number of the best of our hardy annual plants have been obtained from California; among them, the Nemophilas, the Collinsias, the Gilias, the Leptosiphons, the Eutocas, many lupins, and various others scarcely less familiar and beautiful. For many beautiful hardy bulbs of the genera Calochortus, Cyclobothra, Calliprora, and Brodiæa our gardens are also indebted to California. Besides these, various perennial plants have been obtained from the same source, and not a few trees and shrubs, including nearly or quite all the noble pines already referred to. Even within this last year or two a subject of peculiar interest, from its great beauty and perfect hardiness, the Zauschneria californica, bearing a profusion of scarlet blossoms like those of a fuchsia, has rewarded the researches of Mr. Hartweg in the neighbourhood of Santa Cruz.

Agricultural and Horticultural Capacities. Of all that tract of land watered by the Sacramento and San Joaquin rivers the fertility must be at least equal to that of any country in the world, and it is to this region, lying between the shores of the Pacific and the Snowy range of mountains, that the attention of settlers should be directed. Other spots farther eastward may be met with where all the conditions of fertility are present, but the tracts appear to be too small or too isolated to admit of their being peopled, at least as yet, by enterprising cultivators. In many parts of the fertile region just referred to, the higher table lands and mountain sides afford admirable salubrious pastoral tracts, which at once, in conjunction with the excellent and nutritive grasses natural to the soil, mark out the capabilities of California as a country adapted for the cattle-breeder.

The horned cattle of California are large, handsome, and very numerous. Horses and mules are correspondingly abundant. Travellers say that the sheep are abundant, and the mutton is described as being of excellent quality. Beef is so abundant and fine that game is but little hunted. The elk and other deer are very plentiful Hides and tallow have hitherto formed a large export. Swine

are in some respects neglected, though lard enters largely into Californian cookery.

For the purposes of the agriculturist the climate and soil of this region is well suited. Naturally fertile, and abundantly watered by navigable rivers, the germs of prosperity are surely present, though, like all other germs, they must be carefully tended, if they are to grow up to a mature and flourishing condition. The *peculiarities* of the climate must moreover be regarded. There is a dry season, and there is a rainy season. For field culture, the latter must be made the growing period, and the former that of ripening the crops. With such an abundant supply of water in the rivers, something might be done in the way of irrigation, but this must be a work of time.

Of what may be called farm crops, it appears that wheat, barley, maize, and *frijoles*, important articles of subsistence, are extensively cultivated and highly productive. The *frijoles* are a small kind of bean in universal use over what may be called Spanish America; they form a pleasant food, and are cooked in the ripe state, usually fried with lard. (*Forbes.*) Dr. Marsh, who resides at the foot of a mountain range, near the Bay of San Francisco and the San Joaquin, states that his lands produced an hundred-fold of wheat, without irrigation. The season for growing wheat commences as soon as the ground is sufficiently moistened by rain, and continues until March or April. The Pueblo valley, fifteen miles south of the Bay of San Francisco, well watered by the Rio Santa Clara, would alone, if properly cultivated, produce breadstuff to supply millions of population. Wild oats are abundant, even to the summits of the hills, the stalks growing from three to five feet high; and the grasses and clovers are very nutritious and fattening especially when in seed. Forbes, however, states that oats are not known. The wild oats alluded to are probably some heavy-seeded grass resembling the oat. Mustard grows spontaneously, so rank as to become a nuisance. The grains, with hemp, flax, and tobacco, may be grown in all the valleys without irrigation. (*Bryant.*) Summing up the capabilities of California as a corn-producing country, Forbes remarks, that Upper California ought to be, and one day must be, the granary of all South America. The sowing of maize, as of other grains, in Upper California, commences in November, or as near the commencement of the rains as possible. The harvest is in the months of July and August.

In the plain of the San Joaquin, and near the Bay of San Francisco, are several marshes covered with a tall kind of reed, called tule, which in the distance resembles immense fields of corn. These marshes appear to become nearly dry in summer, and would in all probability make fine rice plantations. If properly drained, which Mr. Bryant speaks of as being practicable, they would probably produce the sugar-cane. Mr. Bryant, however, thinks that rice, sugar, and cotton could not be generally cultivated to advantage.

The climate of California is admirably suited to the vine, already extensively cultivated, and which might be spread over the hill sides, wherever the surface could be thrown into terraces, of even inconsiderable width. The produce of the vine in California will undoubtedly, in a short time, form an important item in its exports and commerce —that is, if cultivation be not paralysed by "golden" dreams or realities. In the southern portion of the country, especially, the soil and climate are peculiarly adapted to the vine. The grapes, cultivated in the vineyards, are not indigenous, but acquire in the dry genial climate a remarkable excellence and delicacy of flavour. Whether the varieties originally introduced have undergone any improvement does not appear very evident; but the probability is that their excellence is rather owing to the climate, than to any cultural improvement. Large quantities of wine and aguardiente, or brandy distilled from the grape, are made, especially in the neighbourhood of Los Angeles. One vineyard in this neighbourhood covers forty acres, and contains from 4,000 to 5,000 vines, from which, though young, in 1846, 180 casks (sixteen gallons) of wine, and the same quantity of aguardiente were manufactured. The quantity produced in California, Bryant estimates at 1,600,000 gallons, which might by culture be increased indefinitely.

The prickly pear (Opuntia) which grows to a large size, is in many cases used for fences, and forms an impenetrable barrier. The stalks sometimes equal in thickness a man's body, and attain a height of fifteen feet. From the juicy blood-red fruit of the *Opuntia Tuna* a pleasant beverage called calinche is made. From the *Agave americana* a saccharine liquor called pulque is obtained.

Of the cultivated fruits, there are apples, pears, peaches, figs, oranges, grapes, olives and palms grown in different parts of the country; and of vegetables, pumpkins and other gourds, frijoles, potatoes, onions, and chillies, which latter are largely consumed in Californian cookery. The potato thrives well in California. (*Forbes.*)

The water-power of California is ample for any required mill purposes. Timber is not so convenient as is desirable, but nevertheless there is an abundance of it, which will gradu-

ally become more accessible, as the country becomes inhabited. The timber on the Sierra Nevada, among the most magnificent in the world, cannot be at present available. On the hills in several places near the coast, particularly at Santa Cruz and Bodega, there is a bulk of pine and fir, that will not for a long time be consumed. (*Bryant.*)

Animal Productions.—The wild animals of California include, besides a few peculiar to the country, many others which are found in the adjacent countries. American lions, (*Felis concolor,*) American tigers, (*F. onca,*) bears, wolves, jackals, polecats, foxes, mountain cats and field rats are mentioned as indigenous, as well as buffaloes, bisons, different kinds of deer and goats, hares and rabbits. Two of the most interesting of these indigenous quadrupeds are the elk or moose deer, which is very abundant, and the American Argali, (*Ovis Pygargus,*) which seems intermediate between the goat and sheep. The roe also abounds. On the rivers, lakes and bays both the otter and beaver are found, though less numerous now than formerly; the export of otter's skins has been very great.

The birds appear to be very abundant, and partake of an intermediate character between that of those of tropical and colder climates, in the former of which brightness and variety of plumage, and in the latter excellence of song, are characteristic. Among the more common birds are the white-headed eagle, black vulture, great and small falcon, goshawk, sparrow-hawk, large horned owl, raven, crow, magpie, jay, curlew, plover, oriole, cormorant, wood-pecker, goat-sucker, partridge, quail, wood-pigeon, goose, duck, water-hen, shag, pelican, heron, crane, snipe, razor-bill, humming-bird, bee-eater, gold-crested wren, &c. The tufted partridges collect in large flocks on the plains, and are excellent eating; a species of wild goose appears in myriads; and some species of sea birds are also very numerous.

Fish is extremely abundant, both in the rivers and along the coast. In the former the salmon are remarkably fine, and of excellent quality. Shellfish exist in considerable quantities; indeed the pearl-oyster is so plentiful on the coast of Lower California, that several attempts, apparently unsuccessful from inefficient arrangements, have been made to establish pearl-fisheries. Some kinds of snakes and lizards are also abundant in some localities; scorpions abound; and locusts breed in the sand-hills along the coast, and are sometimes carried inland by the strong north-west winds.

In the course of the preceding sketch, frequent reference has been made to the authority of Mr. Bryant. This gentleman was very actively mixed up with Californian affairs during the years 1846-7, and has since published the Journal of his route from the United States to that country, and of his residence therein,* forming two very interesting and instructive volumes of Mr. Bentley's Cabinet Library, which we can honestly recommend to every one who would become acquainted with that country.

THE GOLD OF CALIFORNIA.

We have been favoured by the following letter from Professor Tennant, on this part of our subject:—

"I comply with your request to give you an account of a sample of the native gold of California, which I have received, weighing one ounce.

"It was first carefully examined for any crystals of gold; but all I could find were an octahedron, having the edges replaced by six-sided planes, and a small group of cubes: the edges and angles of all partly destroyed by attrition, either during the process of washing, or the passage to this country. The remainder consists of flat or rounded fragments, varying in weight from a quarter of a grain to sixty grains. The specific gravity of a large fragment is 16.5. The quality, as a friend informs me, is 23 carats.

"The following substances have been mistaken for gold by the casual observer: viz. iron and copper pyrites, and mica; it, however, differs from them in its greater specific gravity and malleability, its inelasticity, its permanent colour under the action of the blow-pipe, and continued solidity in the nitric, muriatic, or sulphuric acids, *singly;* though it is soluble by a *mixture of the two former.*

"The following is an extract from a friend's letter, received yesterday from the United States, dated December 29th, 1848:—'Our accounts here say that, far from exaggeration in the stories we hear, there is not a thousandth part of the truthful reality told. Our whole country is delirious with the fever called 'auri sacra fames.' Many a Jason is preparing with followers to go in quest of the fleece. Literally thousands are precipitating themselves upon the Pacific shore on a Golden Crusade!' I have no wish to excite undue expectations: indeed, I should not be surprised if we were to receive the intelligence that all the richest deposits had become exhausted.

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* What I saw in California; being the Journal of a Tour by the emigrant route and south pass of the Rocky Mountains across the continent of North America, the Great Desert basin, and through California, in the years 1846, 1847. By Edwin Bryant late Alcalde of San Francisco. London: R. Bentley.

"The discerning emigrant to California might, however, be rewarded by finding diamonds, rubies, sapphires, topazes, beryls, tourmalines, &c. in addition to the ores of tin, platina, iridium, silver, &c. I am, &c.

"JAMES TENNANT.

"149, STRAND, *Jan. 25th*, 1849."

TROPÆOLUM OXALIANTHUM.

Tropæolum oxalianthum, Morren (oxalis-flowered Indian cress).—Tropæolaceæ § Tropæoleæ.

This pretty plant is one of a group nearly allied, if indeed the individuals are specifically distinct. It was named by Professor Morren, and we cannot better point out its differences from the allied forms already referred to, than by quoting the substance of the professor's published remarks. He states,—"It is in the way of *Tropæolum brachyceras* of Pœppig and Endlicher, in one respect; and agrees with *T. tenellum* in another; but it is nevertheless distinguished clearly enough from both. T. brachyceras has the peltate leaves divided into six or seven lobes. T. oxalianthum has never more than five segments. In this respect it approaches nearer to T. tenellum, which has also five or six, but in the latter species the lobes are obovate and mucronate, two features which are not observed in T. oxalianthum. The leaves, or the segments of the leaves, conform rather with those of T. brachyceras, which has also the spur conic, and as short again as the calyx. In T. tenellum, this organ is simply shorter than the calyx. In T. oxalianthum, the spur is the same length as the lobes of the calyx, a character which separates it entirely from the other two species. In T. oxalianthum, as in T. tenellum, and T. brachyceras, the petals are equal; but in the last-named, these organs are emarginate, the two upper ones cuneiform, and veined at the base; in T. tenellum, they are also cuneiform, but furnished with long claws, (unguiculate.) There is nothing similar to this in T. oxalianthum, neither the emarginate, nor unguiculate character." The differences set down, may be stated thus:—

T. brachyceras; leaves, six- seven-lobed; spur as short again as the calyx; petals equal, emarginate.

T. tenellum; leaves five- six-lobed; lobes obovate mucronate; spur shorter than the calyx; petals equal, unguiculate.

T. oxalianthum; leaves five-lobed; spur as long as the calyx; petals conformable, neither emarginate nor unguiculate.

It will thus be seen that the botanical differences between these three so-called species are but slight; and more than one of the three would not be required in any ordinary garden establishment.

The present species produces tubers, and is therefore perennial. From these tubers proceed the thread-like twining stem, which bears small peltate five-lobed leaves, having lanceolate entire segments, wedge-shaped at the base. The flowers are yellow, small; the calyx green, divided into five oval dilated recurved lobes, half the length of the petals, and terminating behind in a conical obtuse spur; the petals are oval, wedge-shaped at the base, and undulated on the margins, the two uppermost streaked with bright orange colour. Like the other species, this produces its blossom in the early part of the summer.

The native country of this plant is supposed to be Chili, as in the case of many of its congeners. It was cultivated during the season of 1848 by M. Bauman of Ghent. The name oxalianthum is applied in allusion to a certain analogy between its flowers and those of some species of Oxalis.

In respect to cultivation, this species entirely accords with the other smaller growing kinds. As to climate it requires a greenhouse, where the temperature is never allowed to fall to the freezing-point, and where neither a large proportion of moisture is present in the atmosphere, nor the atmosphere is allowed to stagnate; a dry airy warm greenhouse is therefore what affords it the most proper protection.

As to soil, it should have a sandy loam, lightened by the addition of decayed leaf mould, and enriched by the use of very rotten dung, both together forming about a third part of the whole bulk; the pots must be well drained, because the tubers require to be at once planted in the pots in which they are to bloom; a pot a foot in diameter will afford space enough for the pasturage of a very strong plant. As to watering, it must have moderate yet constant supplies while growing: as soon as the flowering is past, and the leaves begin to turn yellow, this moderate supply must however be very much lessened, so that, when quite ripened, the tubers may be in a perfectly dry state, in which they should remain until the growing season returns. Frequently the tubers will commence growing in the late autumnal months; in this case they must not be checked, but if they can be kept dormant until after the "shortest day," so much the better.

The training of the branches is a matter of taste, or often perhaps rather of want of taste. Whatever form of trellis or mode of training is adopted, it must be provided or commenced with the first growth of the plant, for it is impossible to shift the branches from one trellis to another, after they have made some progress, without fearfully mutilating them. Some think a shield-like trellis, with a flat or gently-curved face, displays the flowers to the best advantage. For our own part, we prefer the general effect of columnar trellises; for although they do not admit of bringing so many blossoms into one view, yet, if properly managed, they may be seen to advantage from any point, while the former will bear scrutiny from one point only.

These plants are propagated by cuttings or by seeds, and grow very freely under favourable conditions.

GARDENS UNDER GLASS.

This is becoming fashionable, and will become general, for it is clear that the mere protection of glass, without artificial heat of any kind, will enable us to grow many hard-wooded plants hitherto confined to the greenhouse or warm pits; and it is also obvious that hardy plants will be hastened in their bloom and preserved in their foliage by no greater protection than a well-built house with thick sheet-glass windows or sashes. There are a few rules to be observed in managing these gardens under glass, for this appears to be the proper name, where the only difference between the covered and the open portion of the garden is the glass which covers a part. A few rules may suffice. First, for instance, all the plants should be turned out in the bed or border, or the pot itself plunged, because frost cannot so well go down after roots as it can get through the sides of a pot; next, the greatest possible care must be taken that the windows and doors shut close and admit no draught; third, that the windows and doors be always shut at sun-set in winter time, so that the heat which has been absorbed all day shall be shut in all night: fourthly, that whenever the sun is warm, even in the depth of the winter, all the air that *can* be given *should* be given. It is impossible, indeed, to give a common greenhouse too much air in mild weather. If there are many top and bottom windows, open half of each, so that there is a thorough good air admitted. In dry weather especially, the house should be as open as possible for the sake of drying it. There are many plants that will succeed better under glass than in the open air, although they are hardy enough to stand exposure. The Daphnes, Rhododendrons, Azaleas (Indian and American), Andromedas, Camellias, many Heaths, Acacia, Arbutus procera, Deutzia scabra, all the Liliums, most of the early bulbs; but suppose it be planted out exactly the same as a bit of fancy garden out of doors, the plants under glass will be forwarder a good deal, so that this would create two distinct seasons if they were plant for plant alike. The hard-wooded Botany Bay plants will often stand a few degrees of frost, but under any circumstances, all the spring bulbs would be in bloom in February, instead of later; and we might walk out of the drawing-room into the garden, under glass, without the least difficulty, and see but the thickness of the glass between us and the most cheerless frost and snow, with the flowers blooming at our feet. The principal attention required is to the soil with which the beds and borders are filled, and the manner in which the drainage is carried out. There ought to be a clear run of water established, or rather the means of forming one,—two or three ordinary drains, with drain pipes at the bottom, and stones or bushes to cover them six inches; and these pipes should communicate with an outlet capable of draining away any moisture that may filter into these pipes from the beds and paths, so that however freely you may water the plants or saturate the beds they will be free of stagnant water. The soil should be loam from rotted turves one half, and good chopped peat earth the other half. That this may be well mixed, it ought to be placed in a heap and chopped down and thrown to another heap, and then chopped down again; but however it be done, mixed it must be, and well. The plants should be placed in the soil the same as if it were the open garden, a box edging or a board

edging, and smart gravel walks should characterise the ground work. The most effective way of planning the ground work, is a path of two feet six inches round a bed of six feet wide in the middle, and borders to occupy the space from the path to the walls, or rather the sides and ends, whatever they may be. There will be no great effect the first year without enormous expense, but the second you will have all the advantage of your own growth. If the balls of potted plants are very hard, it may be worth while to soak them and loosen all the fibres; for you may in vain try to wet a hard ball: the water will run away and soak away without penetrating the surface, and the plant will become discoloured, weakly, and perhaps defunct. The syringe should be used freely, with a fine rose on, and by pumping sharply all over and among the foliage, and especially of the creepers, you will keep the green-fly completely under. Confine your plants as much as you can to evergreens, for you want it cheerful in the winter. Roses, however, you must have, and they will occasionally drop their leaves; still there are some that must be had, and there is nothing more likely to give you a few fugitive flowers at Christmas. We have already said, water freely, but not often; a good sousing with the syringe-pump once a-week, is better than a garden-pot watering once a-day, and besides this it keeps the plants clean and healthy, and saves labour; the plants may be cut in pretty close for effect at first, but some may be easily withdrawn when they begin to crowd each other; unless, which is very desirable, you use your knife freely, and keep all things in a proper shape, and perfectly quiet.

ABRONIA UMBELLATA.

Abronia umbellata, Lamarck (umbel-flowered Abronia).—Nyctaginaceæ.

This plant has much the appearance of a Verbena, but its relationship is with the Marvel of Peru, to which it is nearly allied in botanical structure.

It is a perennial, with trailing stems, which creep along the surface of the ground, rooting as they go. It is clothed with glutinous hairs, both on the stems, on the margins of the leaves, and on the stalks of the leaves and blossoms. The stems are furnished with opposite leaves of ovate-obtuse form, and a somewhat fleshy texture; they are about an inch and a half in length, and attached to the stem by erect stalks, as long as, or longer than, themselves. The flowers grow at the axils, in close umbels, much like a head of Verbena blossoms, and stand on erect stalks, three or four inches long; the flowers consist of a long slender tube, with a flat five-cleft limb, the lobes of which are very regularly two-parted; they are of a rosy-violet colour, and agreeably sweet scented, especially in the evenings. The blossoms are individually about the size of those of a Verbena.

This species has been introduced to England by the Horticultural Society of London, through the instrumentality of their collector,

Mr. Hartweg. The seeds appear to have been received in January, 1848, and plants raised from them blossomed towards the end of the summer of that year. Mr. Hartweg met with it on the sands near the sea-shore, at Monterey, in California. It appears from Mr. Hartweg's published Journal, that two species were met with; the present, which he calls *Abronia rosea*, having pink flowers, and another mentioned, *Abronia mellifera*, with orange-coloured flowers; both are spoken of as spreading on the sands by the sea-shore, and delightfully scenting the air with their perfume towards evening. Mr. Hartweg gives the locality as Carmel Bay, an easy two hours' walk from Monterey.

Coming therefore from the very shores of the Pacific, in the latitude of Monterey, it cannot be expected to prove perfectly hardy in England. It is, however, sufficiently so to flourish in our climate during the summer months; and, in fact, should have treatment something similar to that given to Verbenas, with which it associates in appearance, as

well as in the purposes for which it is adapted, namely, the decoration of flower beds during summer. Whether the growth of the plant will make it suitable for bedding *en masse*, will require some experience of its habit to ascertain; it will be so if it can be made to produce its branches sufficiently numerous to cover the entire surface of the soil. Apart from this question, it is no doubt a very desirable plant, admitting either of culture in the flower-garden, or in pots.

The soil in which it has been found to thrive, is that of a light rich nature, and should contain a considerable proportion of sand. Naturally its branches lie upon the sandy beach of the ocean, where no moisture can lodge about the branches, and where the latter are exposed to an unimpeded circulation of air. Probably, therefore, it will not bear crowding.

In the garden of the Horticultural Society it has been found to be easy of increase, either by means of seeds or cuttings; and it is recommended to be grown as an annual. It flowers during the summer months, from June till October.

Besides Lamarck's name here adopted, this plant has received two others, which are these :—*Abronia californica* (Rœusch), and *Tricratus admirabilis* (L'Heritier). It was originally introduced to this country in 1823, but was soon lost.

NOTES ON FRUITS AND KITCHEN PLANTS PROVED IN THE GARDEN OF THE HORTICULTURAL SOCIETY IN 1848.

The following notes on new fruits and esculents, from the *Journal of the Horticultural Society*, are from the pen of Mr. Thompson, the superintendent of the fruit and kitchen garden departments in the Society's garden. They are highly valuable observations :—

1. The Queen Muscat Grape.—A plant of a vine under the above name was received last spring from Mr. Glendinning, Chiswick Nursery, Turnham Green. It was only a young plant raised from an eye in the previous season. It however fruited in an eight-inch pot. The size the bunch would attain from a well-established vine can therefore only be estimated comparatively with that of other sorts grown in a pot under similar circumstances, and accordingly it may be stated to be larger than that of the Royal Muscadine. The berries are also fully as large as those of the latter, but perfectly distinct, being oval. They are yellowish white, semi-transparent, so that the one seed which each berry contains can be seen through the skin. The flesh is firmer than that of the Sweetwater, but much more tender than that of the Muscat of Alexandria, rich and sugary. It is an early grape; and as far as can be judged of it, grown as above stated, it appears highly deserving of cultivation. For pot culture it has proved to be exceedingly well adapted.

2. Cardon Puvis.—This is a variety of cardoon remarkable for its almost entire and spineless leaves. In this season there were some sharp frosts in November, the temperature being sometimes 10°, and in one instance 14°, below the freezing-point. It appeared from these circumstances that the Cardon Puvis was more tender than the Cardon de Tours.

3. Largest Asiatic Cauliflower.—This is a good variety of cauliflower, seeds of which were this year, and formerly, received from Messrs. Schertzer, of Haarlem. It grows taller, and produces larger heads than the common, under the same circumstances.

4. Early Leyden Cauliflower.—Also received from Messrs. Schertzer, of Haarlem. This appeared identical with Legge's Walcheren Brocoli or Cauliflower, noticed* vol. i. p. 309. To this notice, and particularly to the excellent directions by the late Mr. Legge for the cultivation of the variety, I would beg to direct attention. A correction is required,—"For the purpose of *sowing* seed," read *saving* seed. It is difficult in very many cases to save brocoli seed correctly in this country, and to save it in any degree of perfection is often impossible. It is therefore satisfactory to know that this most useful variety, sometimes difficult to obtain under the name of Legge's Walcheren Brocoli or Cauliflower, may be procured under the name of the Early Leyden Cauliflower, from the Continent.

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* The heads are large, firm, white, like a very fine cauliflower, which in fact it closely resembles in appearance, except that the leaves are not so plain as those of the cauliflower. The difference in constitution must however be considerable, for it not only stands the winter cold, but likewise the summer drought much better than cauliflowers do; scarcely a head of the latter could be obtained in the dry hot summer of 1844, and at the same time a quarter of Walcheren Brocoli formed beautiful heads of uniform closeness. The following are notes respecting it from Mr. Legge [late gardener at Bishopsthorpe, by whom the seeds were presented to the Horticultural Society]:—"For the supply of a family, sow the third week in April, middle and end of May, the middle and end of June, and the middle and end of July. This attention will give a regular supply till the end of the year. I had a regular supply last year [1845] till January 21st. For the purpose of sowing seed I recommend to sow my Walcheren Brocoli at the time that the winter cauliflower is sown, say about the 25th or 27th of August, and winter the plants under hand glasses as Cauliflowers. Give them good soil, not too light, nor leave more than three or four under each glass, and let them be well attended to with respect to air." By timely sowings the Walcheren will afford a long and excellent supply equal in quality and appearance to Cauliflower.—*Journ. Hort. Soc.* i. 309.

5. Black Sicilian Cauliflower.—This, received from Messrs. Schertzer, of Haarlem, proved to be the Purple Cape Brocoli.

6. Haricot d'Espagne Hybride.—This is a hybrid variety of scarlet runner, presented to the Society by Messrs. Vilmorin, of Paris. The blossoms are very beautiful—bright scarlet and pure white. The pods did not remain quite so long fit for use as those of the old scarlet runner. It however deserves cultivation.

7. Shilling's New French Bean.—This seems a cross between the French bean and scarlet runner. The pods are large, and remain long tender.

8. Dwarf Crimson-seeded Bean.—*Fêve très-naine rouge.* Presented to the Society by Messrs. Vilmorin, of Paris. This proves to be a very dwarf prolific variety of broad bean. It does not exceed a foot in height. The pods are about three inches in length, roundish, generally well filled. The seeds are crimson, nearly the size of those of the Long-pod Bean. It is so very dwarf that it could be grown in rows twelve to fifteen inches apart. It might be very conveniently introduced in systems of intermediate cropping, as it would occasion but little shade. Its amount of produce, compared with that of taller kinds, has not been ascertained; but this point will be determined the first opportunity.

9. Onions.—On examining the varieties of those grown this season, it was ascertained that the French Red, and also the Blood-red Spanish, from Schertzer, of Haarlem, are the same as the Oignon Rouge Noir from Vilmorin, and are the Blood Onion well saved. The Yellow Spanish from Schertzer is the same as the Oignon d'Espagne from Vilmorin. The French White from Schertzer is of the colour of the Silver-skinned; but it is later, and it has the fault of being too thick at the neck.

10. The Large Rouen Leek.—*Poireau très-gros de Rouen.* Presented by M. Vilmorin, of Paris. This was grown alongside the London Flag and the Netherlands Leek; and under the same circumstances it proved larger and of a darker green than either. It can therefore be highly recommended for cultivation.

11. Barrott's New Crimson Beet.—Presented by Mr. Glendinning. This proves to be an excellent variety. It is less apt to fork than the Castelnaudary, from which it has probably been raised. Like those of the latter, its leaf-stalks have a yellow tinge. It is somewhat larger than the Castelnaudary. Flesh very dark crimson. The best variety known.

We may take this opportunity of remarking, that such lists as the above from the same source, if oftener afforded to us, would be always welcome. The subject is peculiarly fitted to the character and objects of the Society. New varieties of fruits and vegetables are so numerous, that an authoritative description of them and estimate of their value is of the highest importance to cultivators. The Society has formerly published excellent descriptive lists both of fruit and vegetables, and these would form a proper basis for such additional lists. No private individuals can effect such an object so well as a public body like the Horticultural Society.

STANDARD SHRUBS.

It is a very common thing for shrubs to grow what the nurserymen call "out of money," that is to say, grow too large to be saleable. In such cases, nine times out of ten, they can be converted into standards. Selecting the most straight stem, whether it grows upright or slanting, cut all the rest away quite close to the root or the selected stem. The plant must be dug up, and considering the quantity of the branches and foliage cut away, the root may bear trimming a little; and when replaced in the ground, should be planted on one side as compared with its former position, or at all events so placed that the stem of the standard should be upright. The next thing to attend to is the pruning of the head, to make it of as good a form as possible. Some kinds of shrubs will be the better for cutting in, especially the Portugal and other laurels, the ribes, lilacs, Chinese privet, rhododendron, laurustinus, and other free-growing subjects. In pruning, however, you have to make allowance for the season's growth, and cut so that this may be promoted in a right form. If, for instance, a vigorous branch pushes out of proportion, this must be cut considerably shorter than the other shoots of the head; for if it were merely shortened to the head, its new growth would again be pushed much further than those left untouched. It is a very common thing to form the Portugal laurel into standards, for the purpose of putting in tubs to take in the winter the places occupied by oranges in the summer, and they look very showy if they are of a handsome shape. But almost any shrubs may be grown from the first as standards, by planting them thick and promoting a tall growth; the lower shoots may be cut off at the end of the growing season, but not more than half way up, for there should be some branches to promote the growth of the stem. At the end of the second growing season, the plants will have advanced considerably, and any growth that has been made up the portion of stem that was first

trimmed must be cleared off, and it may be advisable to cut off the side branches a little higher up ; and if the heads touch one another, they may be replanted, giving them a little more room, but still keeping them what may be called close, as compared with the distances at which we should grow shrubs. After the third year's growth, they may be planted three feet apart every way ; and pruned for the growth of the head, cutting the lower branches up to the proper height, or as far as will only leave the head ; but the top or leading branch must not be stopped, until you have the stem as long as you require, by cutting up the side branches a little every year. When the stem is long enough, you may cut off the leader, and trim up four or five shoots to form the head, shortening them to four or five joints each. When the lateral shoots start, rub off any that are not wanted, or that will be in the way of others, and allow the rest to grow. The head will be handsome in one season. This will apply to any naturally shrubby plant. Even the Pyrus japonica, the least manageable of any, and the laurustinus, which is but little better, will make handsome standards.

VARIEGATED LEAVES.

Various are the speculations on the production of this curious feature in plants : some will pretend to find a cause in sickness; but we are not disposed to follow speculation. We may quite as sensibly attribute the notches and serratures of some foliage to blights in their parts, as attribute the colour or want of colour to ill-health. It is quite certain that trees will occasionally throw out branches with variegated leaves, and that cuttings or grafts from such parts will perpetuate the character. But there are hollies variegated in many different ways ; some have the white or yellow in the middle, some on the edges or margins ; and these are as constant as need be, thousands upon thousands of all the different varieties being propagated every year without their running away from their sorts. Camellias will sometimes throw out a branch with variegated or blotched leaves, but particularly Camellia reticulata. We have seen these variegated or blotched parts worked, and the plant continue blotched, nor does the plant indicate weakness or bad health, or give a less or poorer flower. These sports of nature may be caused by some known agency, but we have seen nothing written, and heard nothing said, that brought us to any rational conclusion except contrary to that which writers have attempted to prove. It would be quite as profitable to inquire into the different colours of flowers and their causes, the different shapes of fruit and the causes, the different nature of plants and the causes, as it is to waste time, and speculate on the causes of variegation in the colours of leaves. The great Giver of all good things has created plants and animals of endless variety of forms. Every day adds to the number of discovered plants, and nobody doubts their origin. They are different from those we already have, and excite admiration without setting us all wondering about what caused the difference. We hold variegated leaves to be as distinct in their nature as any other difference that may be discovered, but no tribe is more distinguished in this particular than the holly, and the variegated leaved sorts grow quite as vigorously as the same sorts plain. The seeds of the variegated kinds, however, bring only the common sort in a general way, the same as apple pips bring the crab stock ; any thing better are exceptions and not the rule. The best way to treat any desirable sport of nature is to graft or bud it directly. In this way some variegated subjects have been obtained, but the regularity and uniformity of the variegated geraniums, hollies, rhododendrons, and their vigorous and healthy growth, put all the speculations about sickness being the cause completely on one side.

NOTES ON THE DAHLIA.

A few hints to young exhibitors may be useful, and prevent their falling into errors of imitation. We see in the leading dahlia-growers' gardens an immense number of shades which completely destroy the beauty of the scene, but which are considered necessary for the production of first-rate flowers. Little wooden tables, just large enough to hold a pot, are placed by the side of the plant. These tables have holes in the middle, and a slit from one side to the centre, for the purpose of passing the stem of the promising bud to the centre, where it is fixed, as it were, by filling the slit and round the stem under the bud. Thus is formed a flat table, and the bud fixed in the centre, just enough above to allow of its full development. The cover to this bud should be flat on the edge, so that on being placed on the table no earwig can get under. This is, in truth, the greatest service that the cover renders ; but even this is at the cost of another advantage : the flower is deprived of the night air, which in August, and until the frosts set in a little, is most beneficial. We have seen covers like iron mousetraps, formed of closely woven wire, which keep out the vermin without excluding air ; and covers like flower-pots without a bottom, but a groove round, so that pieces of glass are dropped on to admit light without losing the benefit of air.

Perhaps the best improvement would be to substitute closely-woven wire for the glass, because this would admit light and air and still exclude the vermin, which in an hour would destroy a bloom; and closely-wove wire would also keep off the tarnishing heat of the sun. But there are several considerations lost sight of by some of the best, or at least, the most popular growers. By excluding the air and light, the colours of edged flowers are almost destroyed. This changes a blush white to a clear white, and may so far induce a change they require; but such flowers as Hudson's Princess Royal are so altered for the worse by the exclusion of light and air, that a flower that is absolutely beautiful in its natural colours, becomes an undefined and anything but pretty specimen under the present treatment. Yellows become paler, whites become purer, and all the brilliant colours lose a portion of their brightness. To young beginners, we would advise the constant and unremitting destruction of the earwig from the moment the plants are put out; it is worth all the trouble to be able to have the flowers more exposed. Flowers which have the air and light are brighter, and thrive a great deal better. It may be well, also, to cut some dahlias a little to their branches that are too crowded; but beyond this, all that is required is to pick off superfluous buds, and to stop the growing portions that are beyond the blooms selected for growth.

BOX EDGINGS.

Unless the figure of the edging is first formed with a hard bank of earth, perfectly true, of a like hardness, and level on the top, it is quite impossible to plant the box properly. The preparation of the box is important. All the plants should be of a size, and the tops cut off square. It may then be laid mathematically true half an inch above the edge of the level ground, and the soil should be drawn up against it, so that a thin covering of gravel shall bring it level with the soil inside. Now if the bank be not true and hard, and the top properly levelled, the pressing of the box against it would cause it to give way in some places and not in others, and so spoil the figure altogether.

ON PLANTING OUT POTTED PLANTS.

The common practice of putting out the Coniferæ, and many other plants usually kept potted in nursery stock, with the ball whole just as they turn out from the pots, has been often mischievous, and sometimes fatal. Indeed, soon or late potted plants put out with the balls entire, grow weakly, or completely choke themselves. The roots, as may be seen when confined in a small pot, turn round and round inside the pot, and having once taken this direction, the portions of root that are so turned round the collar of the plant swell very much, and so completely confine the collar that they prevent its enlarging, while the roots spread around and furnish their thicker bases with the nourishment sufficient for the growth of both themselves and the tree; and until the roots grow thick enough to pinch on the trunk and prevent its enlarging, all goes well; but so soon as that is confined by the still swelling but tangled and entwined root the tree becomes weakly, and at length fairly blows down, fractured at the collar, round which the roots have formed a confining ring, as obdurate as iron, and the trunk of a few inches diameter is seen to have been held by a collar of a fourth of the thickness. Avoid, therefore, all pot-bound plants if you can; but if you are obliged to use such, soak the ball in water, wash out the soil, disentangle the roots with as little fracture as possible, spread them out all round, as near the surface as you well can to be covered at all, and after treading in firmly, put stakes to them, that they may not be disturbed. All the expensive kinds of Coniferæ should be attended to especially, or they cannot succeed long together; and prefer those from the open ground to any that have been long in pots, for unless they are shifted often enough to prevent the roots from curling round and entangling themselves round the collar, they want all the care we have mentioned to make them succeed.

DEATH OF THE EARL OF AUCKLAND.*

The demise of this much revered nobleman has suddenly deprived the world of a good and great man, the Government of an enlightened statesman, the Horticultural Society of a noble vice-president, and ourselves of a most valued patron.

Of all the great and good men who have devoted their lives to the service of the state,

* On the 30th of December, while shooting at Lord Ashburton's, Lord Auckland was seized with a paralytic attack. Though four miles from the house when the attack came on, he was very speedily conveyed thither, and every remedy that human skill could suggest was immediately administered; but, unhappily, without effect.—*Times Newspaper, January* 1, 1849.

and have ministered to the improvement and happiness of their fellow men, there certainly is not one whose death has excited a deeper or more universal regret than that of the Earl of Auckland.

The leading journal * of this country (we believe, a political opponent of his lordship), in recording this unhappy event, most truly says :—" The impression left on the minds of those who enjoyed officially and privately the best means of appreciating his character, is that ' a more kind, more true, or more just man never existed than Lord Auckland ;' and there is every reason to believe that these are not the exaggerations of friendship, but *the award of an impartial judgment*. . . . Great good sense, general knowledge, moderation, refinement, a very gentle bearing towards his adversaries, and a very consistent support of his friends, made him greatly beloved. . . . Lord Auckland, though summoned unexpectedly, descends to the tomb, if not full of age, at least having acquired a competent share of honours ; and though no son inherits his higher dignity, yet a numerous and attached circle of friends may regard the degree of fame which he had acquired with just complacency, and may refer to his unspotted integrity with unqualified and honourable pride."

The late earl was no ordinary man. Whereever he resided, the arts and sciences, education of the people, and the moral and social comforts of the community, under his fostering care, invariably progressed.

It has been the fashion to complain of his lordship's gigantic policy in India, instead of the real cause of the only unfavourable result, " the government at home." However unpopular it may be to throw the blame on a powerful body instead of an individual, we are of the few who refuse to recognise any disaster in India as the result of the policy of Lord Auckland, who carried out in the most complete and masterly way the instructions of the home government, and appointed the ablest generals that he was supplied with to hold the advantages which he had obtained. Had he been supported by able instead of incompetent officers, the masterly stroke which placed a complete barrier against an insidious and powerful rival, whose approaches had long been anticipated, would have handed down his name without a cloud to sully its brightness ; but all great men are envied by those who admire what they cannot imitate, and the man who lays the trophies of successful battles at his sovereign's feet, might as justly be blamed if they were carried off again by stratagem as Lord Auckland for the disastrous consequences that arose out of the inexperience and incapacity of the best of the generals sent out to support a difficult and dangerous occupation of hostile people. In the botanical world we have indeed sustained a loss, for under his lordship's auspices it flourished no less in India than in England. He was vice-president of the Horticultural Society, patron of many scientific institutions, of great service to the government in whatever station he filled.

Dr. Lindley, who had many opportunities of knowing much of his lordship's encouragement to horticulture, says :—

" While others are recording the leading events of Lord Auckland's political life, and attempting to identify with his memory the fatal errors of the incompetent officers he was compelled to employ, let it be permitted to one who knew him well to put on record other points in the character of this great and lamented nobleman.

" Lord Auckland, although not a talker like some men, was wise and good in the truest sense of those terms. Although none speak of his private charity, many will miss it ; his whole life was a scene of kindness and consideration for those around and below him ; affectionate regard does not sufficiently express the feelings borne towards him by those who had the happiness to form his domestic circle : there his loss is irreparable. It is, however, as a true friend of science that he must be held to merit the gratitude of posterity.

"It was Lord Auckland who, while in India, took all learned societies under his protection, aided them in their objects, and held out to the young and rising men of his day the powerful hand of a mighty governor. It was he who brought forward and gave the means of distinction to Mr. Griffith, the first of Indian botanists, an early victim to scientific exertions. It was he who caused the capabilities of Assam to be investigated, and who also laid the foundation of those important tea plantations in the Himalaya, which seem destined at no distant day to win from the Celestial Empire the most valuable part of its commerce ; and when the armies of England penetrated into the wild country of the Affghans, it was he who provided the expedition with a scientific staff such as has not been attached to an army since the days of Napoleon in Egypt. Gardening was more especially Lord Auckland's favourite pursuit : wherever his power in India extended this art was protected, and advanced by the resources of his native country, which in its return was enriched with all that Indian establishments could furnish. It was at his lordship's instance, seconded by Mr. Robert Gordon, one of the then Secretaries of the India Board, that the East India Company laid the foundation of

* *Times.*

that important system of continually importing Indian seeds, to which we owe the numerous and invaluable Coniferous and other plants that have now become so common in England. No wonder that on departing from his Indian government Lord Auckland should have been followed by the deep regret of all, for a loss which they knew might not be easily repaired."

The following, from quite a different source, *The United Service Gazette*, shows how truly this excellent nobleman was beloved in every station it was his lot to fill:—

"The news of the death of the Earl of Auckland will, we are satisfied, be received with very great regret in India. The services which he rendered to his country at the head of the Admiralty were not to be compared to the great good which the deceased earl achieved as Viceroy in the East. Finding India in a state of tranquillity, Lord Auckland immediately applied his talents and the revenue at his disposal to the development of the resources of the country and the advancement of the arts of peace. Trade and commerce received an important impetus from the earliest measures of his government. He particularly addressed himself to the encouragement of the agriculture of the country. To the extension of medical knowledge he was likewise very friendly, carrying out with no niggardly hand the plans of his enlightened predecessor, Lord William Bentinck, and substituting the skill and humanity of the West for the empiricism and barbarity of the East. Education found in him a warm and liberal patron, and to the study of the natural sciences and mechanical arts he volunteered the most generous assistance. As the head of a large and highly intelligent society, of mixed professions and pursuits, Lord Auckland was remarked for his amenity and hospitalities; while in the dispensation of the enormous patronage attaching to his office of Governor-General he was just and discriminating. For the sole blot upon his administration—the military occupation of Affghanistan—his lordship could scarcely be considered responsible. It was a measure originating in the fears entertained by Lord Palmerston of the designs of Russia and the influence of Russian agents. The manner in which the expedition was equipped, and the facility with which its objects were carried out, spoke volumes in favour of the Earl of Auckland's foresight and good management; and if the climax of the enterprise was, after three years of the occupation of the country, disastrous in the extreme, it should be remembered that the Governor-General had employed the ablest officers in the company's service to watch the course of events, and study the temper of the people, and the best general officer in the royal service to command the troops the home authorities had vouchsafed him. . . . In the dispensation of charities Lord Auckland was as beneficent as he was judicious. The people of India recognised in him a wise and philanthropic ruler, and the circle by which he was surrounded, while it enjoyed the advantage of his society, yielded to his excellent example, and contributed to the general happiness. We repeat, Lord Auckland will be much regretted in India.

"As independent and impartial journalists, neither swayed by party nor biassed by favour, we lament his loss as that of a severe affliction to the navy, for in no First Lord, although he was a Whig, did we ever find so just, upright, able, and truly liberal a man in the discharge of all the duties that appertained to his high office. . . .

"Of his late administration we may say, in the words of a daily contemporary, that, week by week, 'we have traced the progress of his lordship in improving and developing the naval resources of the country; and, if we have not always given our unqualified approbation to the views and measures of Lord Auckland's board, we have, at least, given the noble earl credit for the most sincere intentions of carrying out what he believed to be the best adapted for the welfare and advancement of the service. His errors have been those of the head (and those very few), and not of the heart. He loved the navy, and always exhibited the most kindly feelings towards the officers of its respective departments; and, if there were any who did not look upon him as their friend, we are sure that there is not a single man in the military or civil service under the administration of the Admiralty who ever regarded the deceased noble lord as an enemy.'

"Lord Auckland was easily accessible, and, though his manners were often regarded as cold, they were only so in appearance, for he had a warm heart capable of the most generous impulses. He promised little, but he accomplished a great deal more, although cautious and prudent in most of his performances; his lordship's great aim was to select the man for the office, and not the place for the man.

"With his colleagues he was ever most open and straightforward, and he possessed the rare faculty, which he exercised with the greatest facility, of softening the asperities of professional discussion, and of reconciling differences of opinion where unanimity had not previously prevailed. He was as much beloved for his virtues as for his talents, and was as highly honoured and respected for his social good qualities as for his high and dignified official bearing."

VIOLETS,

THEIR CULTURE AND PROPERTIES.

THERE is scarcely any soil in which this pretty and fragrant flower will not grow; but it flourishes most in rich loam, or loam of a poorer sort with a mixture of leaf mould; but in every kind of garden mould the violet will grow and flower. Situation has more to do with the growth of the violet than soil; for although it will thrive on a sunny bank or bed, it will grow much faster and remain in bloom much longer in the shade. The chosen situations for the violet are the foot of shady banks, fences, or walls, round the stumps of trees, and in shady nooks. Of the sorts worth cultivating, we may mention as the chief—

Viola odorata, purple.
Viola odorata alba, white.
Viola odorata cœrulea, blue.
Viola odorata alba plena, double white.
Viola odorata cœrulea plena, double blue.
Viola odorata pallida plena, double pale blue.
Viola odorata purpurea, purple.
Viola odorata purpurea plena, double purple.

All these are indigenous to our own soil, and are sold under many different names. They are all hardy, in every sense of the word; for, besides being indifferent to the weather, they will bear a good deal of ill usage and neglect. They may be grown in several ways: in beds, borders, and clumps; in pots, in hot beds, and in conservatories.

IN BEDS.

Although by a visit to nurseries where these subjects are grown for stock they may be seen in beds in the most open part of the ground, it is far better to have the beds in some situation which is shaded in part by lofty trees or buildings, or high walls. The principal object of the violet is its flowers, and therefore whatever prolongs the period of flowering is an advantage; and this is the chief difference between an open situation, with all the sun upon them, and a shady spot in which they are free from it. In the sun the blooms all come forward together, and all are soon off; in the shade the plant is longer growing: as it progresses, blooms come forward; and though there are never so many out at one time, they may be gathered for weeks. Choose therefore for your beds a shady situation. Let them be dug one spit deep, and mix with the top spit a liberal dressing of leaf mould, or cow-dung, perfectly decomposed; level the surface, and between every four-foot wide bed let there be an eighteen-inch alley undisturbed. As soon as the plants have done growing, after they have flowered, take them up, and divide them into as many pieces as there are with roots to them, and plant these pieces out, six inches apart, all over the beds, watering them liberally as soon as they are planted. Here they will require no other attention than watering once or twice after planting, or more if the weather prove hot, until they have fairly taken root; they may then be left to themselves; they will grow, and spread, and bloom, and the second season they will completely cover the bed. This is perhaps the best way to grow them for their blooms, which may during the season of bloom be gathered daily in fine weather. Cold days, of course, throw them back, and perhaps very few flowers may be obtained for days together; but this protracts the whole bloom; the plant's growth is altogether delayed; it is not merely a delay of bloom, and three or four days' flowers coming in together; it is a complete check to the whole; and when the weather becomes warm again, the whole plant goes on again, somewhat the faster for the check, perhaps, but not so as to greatly hasten the decline of the flowering. When the plants

have spread so much as to fill the whole space of the bed, let them be forked up and divided. Let two or three inches of good cow-dung, well decomposed, be placed on the soil, and forked in, to mix it with nine inches of the other soil, clearing out all the roots and turning the bottom well up among the dung on the surface; replant the same as before, six inches apart all over the beds, using the strongest and best-rooted plants. The surplus may be planted into fresh beds, or in any waste places, according as they are wanted. But there is another way of growing them in beds, to keep them for years without replanting. As soon as the plants have grown, after blooming, take away all superfluous offsets, keeping each plant handsome and bushy, and well stir the surface of the earth between ; but the second season, when the growth would fill up the space completely, take away the offsets as fast as they come, and keep them to the size of the plant, at the second season. Let them not spread out, but as the runners appear beyond the bushy plant, pull them off. Let the earth be stirred between the plants, and a top dressing of cow-dung, well decomposed, or of a decayed hot-bed which has rotted to mould, full two inches thick, be spread all over the surface between the plants, and be washed in by the rains from time to time. The plants may go on thus for several years, in beds, and only require to be reduced within ordinary limits, after the blooming is all over. This does not apply to one sort only, but all the hardy sorts, double and single. Though it is thought the double varieties are not as hardy as the single, we have had them all flowering in the same bed, and often seen them equally healthy under all circumstances.

IN BORDERS.

The culture is the same in borders as in beds, except that in borders the violet only forms one of many subjects, and therefore the choice of place is the first thing to consider. First, the violet being a low creeping, or rather spreading thing, must be near the front if not joining it. Next, as it loves the shade, such parts of the border as are partially or wholly shaded by trees, shrubs, buildings, or other objects, should be particularly selected for the plant. There may indeed be shady nooks in which the plant might be allowed to spread over the surface altogether; but among other subjects it must be kept forward, on account of its dwarf habit. They are most effective in patches, not only on account of the increased odour, but also of their appearance; for the violet is insignificant when small, but in moderate-sized patches it is effective. They may be used with advantage as edgings to borders, in which case the border, for the width of one foot from the extreme edge, should be prepared with a good dressing, and dug up a foot or a spit deep; when levelled, a line should be drawn where the edge is to be, and the plants in their small state should be planted out three inches apart, or rather three inches from centre to centre of the plant,—of course there is not above an inch or an inch and a half of actual vacancy. In one season they join and spread ; and it is quite sufficient to keep them in bounds by cutting them back each season to an even edge, inside and out. This may be done by chopping them with the spade.

IN CLUMPS.

In small clumps of trees and shrubs there is sure to be a natural shade, and under these the violet is sure to thrive ; but there must be a sufficient depth of soil ; and if the clumps be planted in peat earth or bog, for the growth of American plants, remove it in the spots where the violets are to grow, to give them depth of proper loamy soil for their roots. Here they may be planted the same as in beds or borders; but it is not uncommon to let the violet cover a large space under trees and shrubs ; and few things look better, or do better, so that they have air and are not too much confined. They should be planted about six inches apart, all over the space to be covered, for they will soon spread and join each other. They must be well watered a few times, until their roots have taken hold well of the ground. It is a mistaken notion to plant large plants ; they will not root so well, nor spread so quickly, as small ones.

IN POTS.

The object of growing violets in pots is to be able to remove them where we please. Nurserymen, therefore, keep all the leading sorts in pots, for the convenience of sale, that buyers may take them away. Many persons treat the double varieties as only half hardy; but they forget that all things in pots are more exposed to mischief in the ordinary way, and therefore require corresponding treatment. For instance, in pots, the fibres of the roots, which are by far the most tender portion of the whole plant, are always close to the side of the pot, and frost penetrates through the side of the pot very rapidly ; so that one plant in the ground and another in a pot standing by it, are very differently circumstanced. A frost that would reach the fibres and destroy them through the side of the pot, would have no effect on the plant in the ground, because it would not reach the fibres. Keeping this therefore in mind, all plants in pots ought to be plunged up to their rims in tan, earth, sawdust, gravel, ashes, or some other medium that will protect the sides of the pots from the

influence of the frost. At the time of propagating these plants, which is after they have done blooming, let them be parted and planted out in nursery beds, six inches apart, and in a soil such as is recommended for plants in beds. By September these plants will have attained a reasonable size, and may be taken up singly, with the earth about their roots, and potted in wide-mouthed forty-eight sized pots. These pots may be plunged to their rims in the beds they were taken out of, as close together as the pots will pack, and taking care that they are packed solid with the earth between them. Let the width not exceed three feet, and across this let there be hoops, so placed, and crossed with a cord from one end to the other, three times, as to form a complete roof for mats. Let these be covered at night, and also against heavy falls of rain, or snow, or hail. Or if you have the convenience of common garden frames and lights, they are better than hoops and mats, because they protect without sacrificing the light, and the plant receives no serious check. The growth of these plants in pots is very steady, and from being protected against the cold winds and frosts that would keep them back, they are always forwarder than those entirely in the open ground. These potted plants may be taken out at any time for removal to any distance, or to the dwellinghouse, the greenhouse, or to plant in any particular place. For when they have been grown in pots they may be turned without breaking the balls of earth about them, and will not flag an hour if liberally watered, and perhaps not at all. The only thing that makes them flag is, when the roots have grown through the bottom of the pots, they break a good deal in removing, and if they lose roots they miss them directly. On this account they should be always sunk upon a hard bottom, if possible; and the most simple way of stowing them away, in September, if you have all the convenience, is to place the pots side by side on a stone floor, with the garden frame upon it, and completely fill the frame then with ashes, tan, sawdust, or whatever is to go between them ; fill up all the interstices completely; the roots will not be inclined to go through the bottom of the pot, and if they do they cannot strike into the ground. In November the plants will show bloom, and they may be taken wherever they are required.

IN HOT-BEDS.

The parting of the plants at the proper time and planting out in nursery beds to grow until September, is necessarily the same in preparing plants for hot-bed culture as for pot culture. In September, if you have any cucumber beds that have done work, undermine the dung all round a little, but not all at once, and fresh line them with hot stable dung. You do not require a great heat for violets. Upon the old compost in which the cucumbers have grown, being first however cleared of the old plants and weeds, put three inches of good loam from rotted turfs off a pasture, or, in the absence of this, clean loam and leaf mould, or loam and cow dung, the proportion of loam being two-thirds to one-third of the other. Let this be carefully levelled, and the plants taken up from the nursery bed are to be placed therein, six inches apart all over, and be watered over head with a fine rose waterpot, enough to reach the roots and settle the earth about them. The frame may be closed all but a tilt of an inch behind ; after the first day or two the frame may be tilted three inches behind, and lowered but not closed at night, for if closed the frame would be warmer than in the day time, which is contrary to nature, and therefore should be avoided. In the heat of the sun a mat should be thrown over the glass to keep off the burning rays, for they are not good for the plant, which cannot have too much air, and is impatient of the mid-day sun. They must frequently be refreshed with water to reach their roots, and when they do not require this their foliage should be sprinkled. You may soon gather violets from this bed, and continue to do so all through the winter by a succession of beds. The object of heat, though not by any means violent, is to be enabled to keep out frost, and to promote flowering at a season when the cold nights would operate as a positive check; but there are seasons when it is mild enough to gather violets all the winter in the open air.

IN CONSERVATORIES.

There is no place in which the violet is more welcome than in the conservatory, but they require too much air to be permanently healthy planted out in the borders, although in some places they do pretty well in the ordinary borders. But the conservatory should have nothing more than is absolutely unavoidable out of flower, and therefore the violet ought not to be planted out with any view of remaining. In September, look over the nursery beds and potted plants for such as show flower-buds, and carefully remove these into the shady parts of the border, where they will be least obtrusive and most effective. If there be any large plants in the ground, plant some round the stems so as to form a clump or tuft of violets at their feet; also fill up corners, and here and there form patches near the edges of the borders. They are specially a ground plant, and therefore do not look so well any where as at our

feet. They will soon flower, and when the flowering is over they should be removed, and others coming into bloom should be put in their places. In this culture the various sorts are all requisite, some because of their colours, others because of their seasons. Those in fact who pretend to grow violets should cultivate all the sweet varieties, for they will find that by following the directions we have given with all of them alike, they will never be without flowers of some kind or other. Besides, the various colours, with the difference of double and single, will at all times yield a pleasing variety, which in a conservatory is the main object, and all through the winter the violet is one of the most important though least imposing subjects.

RAISING FROM SEED.

There is no immediate object gained by raising the violet from seed, unless we propose to raise new varieties; in which case we should select single varieties with the largest flowers, and of different colours, and plant them together to save seed from. They require watching as the seed-pods swell, and should be gathered before they split, or the seed would be lost. Sow the seed in pans or boxes in February or March, and place them in a cold frame; or if the seed has been saved in large quantity, make up a four-foot bed of loam and dung, as if for a nursery bed, and sow the seed in March, sprinkling it very thinly over the whole space, and raking it in well, so as to cover it completely, but not deep. When they come up, the principal attention required is to keep them clear of weeds; and as they advance, if you have sown them too thickly, prepare another bed to remove the surplus into as soon as they are large enough to handle well for planting out. Then, first liberally watering the seed bed so that the soil may be completely softened, draw out the plants wherever they are too thick—for they ought not to be less than three inches apart—and plant out those you draw into the new bed three inches apart every way, water them in, and refresh them from time to time with water until they are fully established; they will then only require moisture in very dry weather, when the ground would be parched up without it. The seedlings sown in pans are to be kept clear of weeds until they, or some of them, have grown large enough to plant out: make up a bed for their reception, and first having watered the pans or boxes, so as to soften the soil, carefully take out the largest and the strongest to plant out three inches apart in the bed, and leave the weakest in the pans or boxes to grow stronger, and when they have grown strong enough, plant out the rest in the same way. All the seedlings after planting out must be kept very clear of weeds, and be occasionally watered until they come to flower. And now the cultivator is to be informed that there are several points to be noticed as to what constitutes a claim to be saved; first, he may watch for the time of blooming, not that the first flower of a seedling will settle this, because it might turn out totally different as to season the second year. However, any one that comes at a different season from all the others may be marked for trying again, to see whether this difference is accidental or permanent. Next, he may watch for a different colour, because as the seed was saved from white and blue of different shades, he may find some partaking of both, or striped; any remarkable difference in that particular may entitle a seedling to be saved. Then, again, he may look for any remarkably large flower, because that would entitle a flower to consideration; and independently of these, which are general features, we may now go to qualities which would make a florist value them, for he looks to perfection, and naturally asks himself what a violet ought to be to be as handsome as possible. We will here mention what would make them perfect if the points could be obtained.

The flowers should be round, with a perfect outline, and slightly cupped.

The petals should lie close at the edges, not showing the divisions, but lying close over each other.

The petals should be thick and smooth at the edges, and the flowers as large as a shilling, and highly fragrant.

The stems should be strong and straight, so as to stand out and keep the flowers above the foliage.

The plant should be dwarf, short jointed, and compact, the foliage bright and even, and flowers abundant, and equally distributed over the plant.

The double-flowering should be ranunculus formed, in preference to globular, and in all cases symmetrical.

We may be told, as in fifty other cases, that it is impossible to attain these qualities. We will not admit this, but if it were so, it would not alter our decision. If it were impossible to obtain all we have set down as necessary, it is quite certain we can get nearer than we have yet done; and the nearer we can approach perfection, the better a flower must be. For the fiftieth time we throw all the objections by, as we did those which were made to the tulip being a portion of a hollow ball, or the pansy, cineraria and petunia being a circle, (and the very men who contended against us then, have since adopted our notions as their own,)—we care nothing if

all the floricultural world objects; the objections are only the complaints of idlers and sloths, men who object to anything that gives trouble or requires perseverance. Let the florists once take up the sweet violet as they did the pansy, and see how soon there will be an approach to a circular cupped flower; see how soon they will find in a batch of seedlings some with thicker or smoother petals than others; and, once the improvement begun, it is very difficult to say where it will end. With these qualities pointed out to his attention, let the seedling raiser watch his bed and preserve anything from among them that exhibits the least improvement. Is there one among the whole with a thicker petal? put it aside. Is there one with the petals closer together than usual? save it. Is there a flower rounder? select it for that one point. In short, save any one that exhibits the slightest improvement upon any one point; make much of it; and having selected only such as show some favourable point, destroy the rest, and save the seed of the improved ones to produce another year still greater improvements, and as the new ones beat the old ones let them take the place of the old ones, and a few seasons will materially advance the flower.

GENERAL REMARKS.

The violet is such a universal favourite that it should always be sown in wildernesses, in large borders under the trees, by the sides of drives up to a mansion, at the edges of belts and plantations, and in all the otherwise neglected places about an estate. The air should be redolent of its sweets, it should occupy a space in all the shady nooks, for the drawing-room should be supplied each morning with abundance of its flowers, and no place where they will grow should be without them; once sown they require no more care in those waste places, because every plant that thrives will spread enormously, and if they be not burned up with the sun they are sure to flourish. How many fine estates abound in shady walks and drives, totally neglected as to flowers and other attributes of a garden, where one day to turn the soil here and there, and bestow a few plants or seeds of the violet would give a charm to many wealthy people wholly unknown. The general disposition to do no more than they are obliged to do, operates greatly against the preservation of those natural beauties which, however insignificant in themselves, yield a charm in combination with other features. A bed of violets near a mansion, surrounded by gorgeous exotics and fragrant aromatic plants, might indeed seem nothing, if not out of place; but in the retired shades of the richly wooded domain, with nothing but the humble daffodil for its companion, the violet asserts its empire and maintains its sway. Never then neglect the violet.

A STROLL THROUGH THE GARDEN,

BY A TUTOR AND HIS PUPIL, IN THE MONTH OF MARCH.

THE progress of vegetation in this month is so rapid, in a mild spring, that you will find, my young friend, much more pleasure in a ramble through the garden than you have experienced in January or February, or, indeed, in both combined. The blooms in the ground have become more varied and general, and those on the trees begin to make a striking feature in the scenery. But, under glass, there is an endless variety to gratify the lovers of flowers. The morning is promising, and we may calculate on a pleasant walk. We can take the flower garden this morning, and at any rate visit the houses, for they are of the most consequence just now.

Observe the lawn during the cold months: the coarse grass only grows, for the finer varieties make scarcely any advance. The consequence is, that the surface is uneven; large tufts, in different places, have made it uneven. Many persons neglect mowing till the spring is further advanced; but as soon as the grass becomes uneven it should be mowed, whether in winter or summer; for by neglecting it until the more hardy kinds of grass get too much the ascendancy, the places where you observe those tufts of higher growth would be of another colour when mowed, because only the stems would be seen. You will, therefore, very soon see the men set to work in mowing and rolling the whole of the lawn. The earth of the clumps and borders will also be turned up as soon as the herbaceous plants which die down in winter are all through the surface, and that will be before this month is out. Most of them, indeed, are through the ground now. It is necessary to delay the stirring of the ground in which bulbs and many herbaceous plants grow, until they are all fairly above the surface; for however careful you may be with labels to represent the spot where particular plants are, you cannot effectually fork over the beds and borders until you can go close to every thing; and operating, as it were, in the dark, half the roots might be damaged. We may expect, therefore, in a day or two, to see these places nicely turned up and raked smooth. The crocuses, early tulips, hepaticas, and daffodils, look gay; the hyacinths are showing their spikes of

buds, and primroses and polyanthuses are partially showing their gay trusses; and altogether the garden looks more interesting, though not more gorgeous, than at any other period of the year. The gardener at the unprotected tulip beds is stirring the earth between all the spikes of green, which are apt, as they come up, to push the earth up and leave it hollow and in cracks. By stirring and bruising the lumps, the air is let into the soil, and actual exposure of the bulb is avoided. There is nothing more essential to the health and vigour of tulips than laying the soil lightly, but nevertheless closely, about their bulbs, as soon as the green spike is fairly through the ground, and before they open to develope their leaves. The best bed, which has been under cover all the cold nights and frosty days, was ready some time ago, but the beds that have been fully exposed to the weather, are only just ready for the operation. Many of the auriculas are showing their bloom pips in the heart of the plants, and some are actually rising. Observe how carefully the man waters them, without letting any wet get to the heart or hollow, for it would lie there, and perhaps freeze; in either case damaging the pips, which are of the most delicate nature, for the entire beauty of the flower depends on a surface powder as fine as the down on a butterfly's wing, and as easily displaced. Nothing can injure it more than washing it violently, or allowing it to soak in water; that is the reason the man waters all round the plant without touching it. See how dry the carnations and picotees look; they have had no water for a fortnight, and perhaps may not have any for a week more. Nothing conduces more to health and free growth than keeping them as dry as they can be, so that they be not distressed; and as there is very little growth during the winter, it is but seldom they require watering. Here are stocks and mignonette fast showing for bloom. These have been sown in the autumn. The next box contains pinks and pansies. These are called store pots, and by some, thumb pots; the object of potting things in small pots is the convenience they afford for stowing away, and packing to send away. These stored plants will do for planting out in beds, as soon as the weather breaks a little. All these larger plants under glass are called half-hardy; azaleas, camellias, correas, acacias, hoveas, grevilleas, and such like; they only require protection against severe frost. Observe that all these frames are totally uncovered, because the weather is mild and open; had it been cold and cheerless, they would have been entirely closed, or only tilted a little.

Now let us take a turn towards the greenhouse. All the top lights are let down, for the sake of giving air this delighful day. Here we have camellias in full flower, and the earth is quite damp that they are growing in. This is on account of the greater quantity of nutriment required while they perfect their flowers; but even watering may be too bountiful. If they were continued as wet as this, they would drop their blooms; but the fact is, they have only just been watered. Here are many heaths; and if you notice the soil in their pots, it is very nearly dry; they are nevertheless a little moist. They are not watered more than once in three or four days or a week; but they must not be allowed to flag or droop, because a few hours thus would kill them. The Indian azaleas are wet like the camellias, because they are swelling their buds, and want a good deal of nourishment until after they have bloomed and completed their growth. All these Botany Bay plants are very much like heaths in their habits; they grow in light, spongy peat earth, through which the water runs very freely, and into which the fibres grow without difficulty, although they are finer than the smallest hair. It is always desirable to keep together the plants that require similar treatment, because the necessary attention is given so much better than when they are mixed; and if you are obliged to have several distinct classes of plants in the same house, you save a good deal of time and trouble by keeping them each together—the heaths in one place, camellias in another, instead of attempting to set the house off by mixing them judiciously. Geraniums want a house to themselves to be grown really well; for, as you observe in this little house, all the plants are near the glass; in fact, they cannot be too near, if there is but room for them to grow without touching it. They want all the light they can have; and being very succulent, they bear no frost. They can only have air when the weather is very mild, and there are no drying winds; they also require plenty of room: there ought to be three or four inches of room all round each plant, otherwise there is no free circulation of air, nor is there sufficient light. The hot-house looks well, and feels comfortable; but if we remain long here we shall feel the disadvantage of leaving it almost in a state of perspiration, and encountering a change of 20 degrees. Observe, the glass out of doors stands at 45 degrees, and that in the hot-house is 65 degrees. The air in the latter is kept moist, otherwise the plants would be dried up. The conservatory looks well: the rhododendrons, roses, azaleas, Persian lilacs, and that beautiful white-flowering shrub, Deutzia scabra, have been forced, and all those bulbs have been forced also.

We will just look to the forcing-house before we go in, but you see nothing but the camellias are in bloom naturally. The other

plants in flower have been brought from the pits, hot-house, greenhouse, and other covered places; for the conservatory is, in fact, a show-house furnished by the other contrivances for preserving or getting plants forward. This next house is the principal means of producing things out of their season. Observe, in another week these hardy azaleas and kalmias will be forward enough to be removed to the conservatory. Some are not so forward, and there are others not yet moving; these last are only just put in. It is by a succession of plants that we continue a bloom: when these are all out of flower, those in the natural ground will be in bloom.

Now these forced plants are not managed according to the common practice among common gardeners, but they are fairly brought out of their usual season by several years' forcing. As soon as they decline in flowering, they are taken as much pains with as they have been to get them into bloom; they have plenty of light, plenty of water, plenty of attention, until they have properly completed their growth, which will be two months before those in the open air; they are then plunged in the open ground in a shady situation, and remain at rest until the time arrives to put them again under glass. The consequence is, that they flower strong and early without so much heat as would be necessary were they merely selected from plants never forced before. The plan of throwing away plants that have been forced, or cutting them about and planting them out to recover, is very bad. A vine never forces so well the first or second year as it does the third, by which time it is reconciled to its new season, and it is the same with flowers if they are carefully managed.

We must now return to the house, and the next ramble shall be in the kitchen-garden and forcing-ground, but first on our way see what the man has in that frame. It is the Neapolitan violet and the tree violet, both in full flower. Now these plants are not in pots, but simply planted in three inches of good loam on a very moderate heat of dung. He has been supplying the drawing-room and house generally all through the winter from this frame, and even now there is abundance, and they will last till those in the open beds and borders supply their place. There is not a sweeter perfume in the world than that afforded by the violet; no, not even that of the rose. You see they have nearly mowed all the lawn, and how much better it looks than it did when the dark green tufts spotted it all over. Now what notes have you made? Ah! that will do; you have noticed the two principal subjects—first, the necessity of keeping up the succession of forced flowers, by introducing plants at different seasons; and next, the necessity of keeping the same plants for succeeding years, instead of following the notion so generally prevalent, that those plants force best that have not been forced before.

Yesterday we disposed pretty well of the flower parts of the establishment; now let us look to the kitchen and fruit-garden. The men are at work in all directions. One is earthing up peas and beans that have come above ground, and the one that follows him is putting sticks to the peas; he sticks some on each side that cross one another at top, by sloping both inwards—this forms a great protection against the spring frosts. Another is removing all the hand-glasses from the cauliflowers, because on fine warm days like this they cannot have too much air; if the wind was cold, they would only be tilted a little on the side away from the wind, and if it were frosty, they would not be raised at all. At the further end, the man is taking one plant out of every hand-glass, and planting them out in threes, to be covered by other glasses; this is to give those that remain more room, for as they grow they soon require more than they have at planting out; some put five under a handglass, and at different times reduce them to three, which can be grown under the full-sized glasses. Where, however, they are grown very fine, they only leave two. Those which are removed frequently come in before those which remain, although not so fine, the check they receive throwing them into flower. Some more peas and beans are being sown in that quarter, and on the warm border near it they are planting out lettuces of sorts. Here they are picking out celery plants to grow a little strong: the ground has been well manured, and the bed is just the size to be covered with that frame with its three lights. They will cover the young plants from frost, but that is all; the seeds were raised in heat, and they have got a foot thick of hot dung under the three inches of soil. It will be necessary to cover with mats every night. It often happens that those plants raised early run to seed instead of growing well, but it is always useful for soups whether it grows well or ill. The seed now sowing is more likely to make fine plants than those planted out. The man yonder is pulling up two plants out of every three on that piece of cabbage plants. They are excellent now to eat, and those which are left are just the right distance to cabbage well and pretty soon too. The seed they are sowing to the right is summer or round-leaved spinach; this will be ready to eat by the time the winter kind, which is by the side of it, is over. In the forcing ground they have sea-kale covered with dung, and in the frames there is asparagus fit to cut; these

two or three hot-beds have supplied the house for weeks with an occasional dish, and will continue to do so till that in the open ground is ready. The cucumbers look well. As their vines grow, observe how carefully they are spread the way they are to cover the surface; by taking off the ends of the shoots, lateral branches are produced, and you see fruit at about every joint. Now the gardener will not allow more than two or three cucumbers to swell to the full size at the same time on one plant, that is to say, not more than three the same age: suppose there are three six inches long, he will take off all but three that are two inches long, unless a good supply of fruit be required, and numbers are preferred to handsome quality. Here are some forwarder; now you observe here are three just ready to cut, full eighteen inches, there are three more close upon a foot long and growing fast, and three more just well forming, three inches; this is an excellent plan of regulating the supply, and keeping the fruit moderately handsome. Those frames on the left are full of strawberries, and you see fruit fit to gather even at this early season. These are simply planted out on a good six inches of rich loam, on a common hot-bed, in the soil itself, not in pots; and by giving air judiciously, and attending well to the watering, they fruit better than those in pots; but they have strawberries on the top shelf of the vinery, and they are just in a right state to follow those in the hot-bed. On the walls the men are looking over the trees, and here and there rubbing off the buds that would grow where they are not wanted; all those, for instance, that would grow straight out from the wall, and others that come too many together where there is already plenty of wood. Here they have hooks along the top of the wall, on which to hang nets or mats to keep off the cold winds and frosts. I have often thought it not worth the trouble. The trees are far more healthy without covering, unless the situation is very bleak. However, to those who will take care and go to the trouble, it may occasionally save a crop. The examination of the vines and wall trees is necessary, because, besides other matters, there may be many of the branches loosened and require nailing. This, you observe, is a busy month; there is a general sowing going on of almost everything.

We will go round home through the flower-garden again. The annuals sown under glass, I observe, are all up and growing strong, and they are sowing them in the open ground in patches, where they are to remain. They seem also to be preparing the Dutch or geometrical garden, for the spring changes to be made with verbenas, geraniums, and other subjects calculated to last in flower all the summer and save further trouble. All the climbing plants against the wall want regulating, pruning, and nailing; they get untidy, and if neglected long hardly get right again. Those on trellises only want tying, but even then it should be carefully seen that the plant does not wind about behind the trellis, because if it be anything that grows much, like the honeysuckle, rose, wistaria, and others which have woody stems, they cannot be withdrawn again, because they become obstinate, and would then in time break the trellis from the wall. The roses are pretty forward, but it is better to prune them at twice or even at three different seasons to prolong the bloom. If rose trees are left with long shoots, three or four or more of the eyes towards the end begin growing, and all the buds nearer the stem do not even start. If the shoots are cut back half way, or quite back to one or two eyes, both will start. If half the trees then are cut back, and half left the full length of their shoots, they will both start at the same time, those cut back growing stronger perhaps than the uncut one, which however has only a few of the eyes nearest the ends of the branches. After letting these grow together a month, you throw the unpruned one back a full month by cutting it back as you did the other, because it makes it start again from the back eyes and lose all the month's growth it had made, and which is of course cut off. Thus you make two complete seasons of bloom. I do not however approve of cutting the roses back to two eyes until the head has become proportionate to the height of the stem. We shall next month see great alterations.

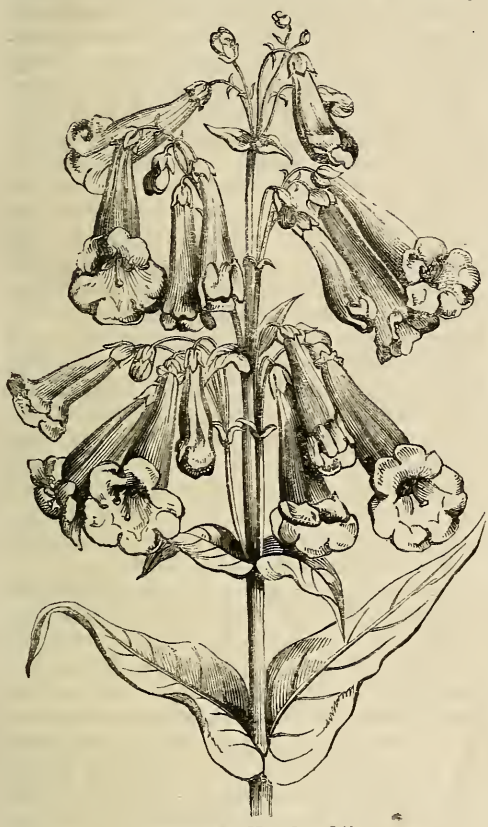
PENTSTEMON VERPLANCKII.

Pentstemon Hartwegii, *var. Verplanckii* (M. Verplancke's Pentstemon).—Scrophulariaceæ § Antirrhinideæ-Cheloneæ.

This species belongs to the division of the genus Pentstemon, so numerous in species, which includes the Mexican plants, herbs, or under shrubs with lanceolate leaves, exserted stamens, the upper filament smooth at the base, the corolla tubular with the under lip bearded, the peduncles few-flowered, and arranged in the manner of a terminal panicle.

This variety, raised by M. Verplancke, of Ghent, differs from the typical species by an extremely vigorous habit, by its broad leaves,

and stem more than three feet high, and in having a panicle well furnished with flowers, the peduncles bearing from four to five blossoms, which are much larger, the limb being wider and broader than in the original, or indeed any other variety. The tube is perfectly



Pentstemon Verplanckii.

funnel-shaped, full, and marked. The entire corolla is of a bright purplish tint, merging to rose towards the limb, the throat being white.

The name of Mr. Verplancke is well known in connexion with the culture of madder in Belgium. One would almost say that that rubiferous plant, so much used in furnishing the rich and warm tints, from the deepest purple to the most delicate rose, is here represented in the beautiful colours of the corolla. There can be no doubt that this variety will soon be in general request.

Some authors write the name of this genus *Penstemon*, instead of *Pentstemon*. The etymology of the name rests in the two words, *pente*, five, and *stemon*, filament, from there being five staminal filaments in the flower; it is therefore proper to write *Pentstemon*.

A circumstance connected with this species of Pentstemon may be here noticed; and it should induce horticulturists to propagate the plant from the seed. Some four or five years since, G. F. Dickson, Esq. received seeds of this Pentstemon direct from Terre Fria, in Mexico. These seeds produced a variety, of which each flower was transparent as glass at the lower side of the corolla, so that the filaments of the stamens could be seen from the outside; it was called *diaphanus* from this particularity. It would be interesting to try by sowing whether M. Verplancke's variety could not be made to assume this translucency, which with its charming rose colour would have an admirable effect.

Our figure, and the history of this fine Pentstemon, are derived from the *Annales de la Société Royale de Botanique de Gand*, a Belgian periodical, well conducted by Professor Morren.

We have already explained (p. 77) that this plant is a variety of that species commonly, though erroneously, known in gardens as the *P. gentianoides*, which is altogether a different plant. The error has become established as far as this country is concerned, from the fact of its having been followed by the two leading botanical magazines published at the time the plant was first introduced.

FLORICULTURE OF THE MONTH.

BY GEORGE GLENNY.

Of all our favourite flowers we can hardly place the auricula second to any thing, and we are truly sorry that they have been almost banished from the metropolis. It is true they require air and attention, but they occupy so little room, they are so easily grown, they are so long interesting, and so beautiful in flower, that we do hope to see them undertaken by amateurs. The cost is not so great as to deter anybody from beginning, and according to all the laws of showing, they might be purchased *this month* and *shown next*, the law being that the grower should possess them six weeks. It is well understood that the merit of blooming them well is sufficient to entitle any one to a prize, and that all the growth before blooming is of minor consideration, if they are regulated the last six weeks. Take a dozen or two to begin with, and these may be picked out at James Dickson's, or ordered from the north, in such a state as to warrant a hope of blooming well with care.

Place these in a dry frame, for they will be already top-dressed to your hand; keep the frost off by covering up with cloth or mats for the night, which covering must not be taken off in frosty days; give air on warm days, but when the sun is very hot, which it frequently is in March and April, prop up the lights all round, and lay a light covering on to shade them; water them regularly as soon as they approach dryness, and you will have the pleasure of seeing them advance rapidly. But we cannot do better than refer the reader to a treatise on the auricula in a former part of the *Horticultural Magazine*, a treatise which was founded on actual practice, and which will enable anybody to grow them with success. The polyanthus has perhaps been neglected more than the auricula, but there is the same excuse,—they will not grow in the smoke of towns, and possibly it will require to be five or six miles from London to do well. The manner in which it has been shown at several places near town is a positive caricature on the flower, enough to set any one against it; but we believe if some of the northern growers would be at the pains of sending us a few pips to show the difference, there would be many persons willing to cultivate a plant that requires so little trouble. They should be grown in the open border, in a shady place, and in strong loam from rotted turves; the greatest care must be taken to keep off slugs and snails, and, as the flowers rise, earwigs also, for they devour the bloom before it is half grown. It is a common practice to show these in pots, and in some places they stipulate that the plant shall be *grown in pots*. If so, you must act accordingly. They will require the protection of a frame if in pots, because, if the frost get through the side of the pot, it would damage the bloom if not the plant altogether. The best sorts of these flowers are reported in the *Garden Almanac;* we might here also refer back to the treatise on the polyanthus.

The chrysanthemum has had a start; there are no less than from thirty to forty subscribers to the Newington Society for the encouragement of that flower, and the chief growers have approved the standard of perfection laid down in "The Properties of Flowers and Plants." Nothing conduces so much to the advancement of a flower as a standard to go by in judging its merits. The varieties bought in are purchased with a reference to what is likely to win, they are set up by the same rules, and as nothing is left to the taste or prejudice of a judge, the showers know what they have to expect, and there is no chance of disappointment from a difference of opinion. The camellia growers are a little disturbed at the constant influx of foreign plants, to be sold at what they will bring, and the consequent reduction of price on all they have to sell here. In fact, the auction business has been so incessant, and the prices of some things so low, as to glut the market. When we observe that particular plants, among the coniferæ especially, selling freely among our nurseries at three shillings and sixpence each, have been bought at tenpence each, we may judge the ruin that is taking place somewhere, especially as the auction expenses have to be taken from those low prices. But our gentry should take a lesson from the following simple fact; while the trade were picking up three-shilling plants at tenpence, gentlemen in their ignorance were buying larger and commoner plants at three half-crowns, that any nurseryman in the metropolis would have sold them at half-a-crown. Nothing can be more unwise than for gentlemen to attend sales, unless they know what they are buying. Last year, hundreds of dahlias were sold at the smallest prices under good names, but turning out, as many did, erroneous, they deceived the buyers altogether. Every grower may rest assured that the safest way to procure flowers is of respectable florists. If they are somewhat dearer than others appear, they may nevertheless be cheaper in the end.

Roses should be planted this month as early as possible, for they are greatly weakened by late removals; nevertheless, if they are ordered directly, and planted the instant they arrive, and that in good strong loam with a little rotten dung mixed at planting, they may do well. We should refer to back numbers, or to the almanac, for the sorts, but nobody should be without plenty of standard and half-standard roses; they hardly interrupt the harmony of the beds, stick them where you will. Buy none but the perpetuals, hybrid Chinas, and smooth-barked kinds: the summer roses are only fit for those who show in the month of June; the others give bloom at all seasons. You are never without a rose until the frost beats you by cutting everything off, nor is it a slight frost that will do it. It is as common to see the China and perpetual kinds in flower at Christmas as it is to see chrysanthemums.

We would strongly recommend pink and pansy growers who are wanting new things, to order them at once, and plant instantly; and moreover we would have them get enough to plant half in a proper bed, and the other half in a pot of rich soil—half loam and half cow-dung or leaf mould, and if you are obliged to add sand to render the adhesive soil lighter, let there be as much cake dung or leaf mould as there is sand. We merely give these hints to persons who have driven it off: we do not defend late buying nor late planting. The pink growers, who have not got Read's Jenny

Lind and Turner's Double X will find themselves a stand or two behind those who have these flowers; they are both advances in the right direction. Before we conclude, we desire to impress upon the minds of the judges of the Horticultural and Botanical Societies to pay some attention to the real merits of novelties, and not fearfully mislead the inexperienced growers; if they have any pride, they cannot look back upon some of their decisions without infinite pain. We can hardly imagine anything more galling to a high-minded man, or one who prides himself on doing justice, than to see the subjects which he has pronounced first-class, universally rejected, the very first season, as worthless. They are paid for their judgment; surely they ought to exercise it if they have any, or confess their deficiency, if they are not blind to it; we are saying nothing now but that which an examination of the prize lists for the last three or four seasons, and noting the universal condemnation which some of the selected ones have met with, fully justifies us in saying, and we entreat others to do as we have done, for they must come to the same conclusion. However, we are turning over a new leaf in Floriculture, and we, having provided an unerring test,* shall be disappointed if we see the judges at great societies counteracting the march of improvement by awarding prizes to new subjects of little or no merit; we shall not hesitate to give our opinion on any subject that may be sent to us, and if it reach us on a Tuesday, we shall submit it to a higher authority than ours, the only authority that we will bow to if they happen to think differently. We shall be glad to see any new polyanthus, camellia, primula, or any other subject that the raiser or possessor wants an opinion of or desires to bring into notice.

The French florists have a great many fancy dahlias to come out this spring; as usual, the great majority are good for nothing; but when we recollect the grand conspicuous commanding variety, the *Empereur de Maroc* of last year, we cannot deny that they raise some stars worth attention; we consider that flower by far the most striking of the fancy flowers, and we should have some faith in the man who sent it out, for he will be less satisfied with an inferior thing than he might have been. Mr. Salter, who has had a good deal to do with the improvements in the French flowers, has left Versailles and settled as a florist at Hammersmith, where he will be an active agent in introducing French novelties. The ground he occupies once belonged to Lee and Kenedy, and was used to prove the various kinds of fruit, after the same fashion, or rather before the same fashion, as is adopted in the Horticultural Gardens.

NEW FLOWERS AND PLANTS.

Exacum zeylanicum, *Roxburgh* (Ceylon Exacum).—Gentianaceæ § Gentianeæ.—A very pretty annual plant, with erect four-angled glabrous stems, branched in the upper part in a corymbose manner, and bearing opposite, sessile, elliptic-oblong or lance-shaped leaves, which are distinctly marked with three nerves or longitudinal veins. The flowers which grow in the leafy corymbs which crown the stems, are of a rich purplish-blue, large and handsome; they are rotate, that is, they have a short tube, and a wide spread limb, which is divided into five oval lobes. The beauty of the flowers is considerably increased by the large prominent yellow anthers. Native of Ceylon.

Introduced in 1848 to the Garden of the Royal Dublin Society, at Glasnevin. Flowers in September. It bears the names *Chironia trinervis* (Linnæus, not of the gardens); and *Lisianthus zeylanicus* (Sprengel). *Culture.*—Requires a stove; turfy-peat soil; propagated by seeds, which should be sown *on the surface* of damp sandy-peat soil. The growing plants, though freely watered, must be well drained.

Rigidella orthantha, *Lemaire* (straight-flowered Rigidella). — Iridaceæ. — A pretty bulbous plant, of robust habit, with ample deeply plicate or folded leaves, and showy flowers, larger than the other species of the genus. The flowers grow on a branched many-flowered scape; they are of a rich scarlet colour. In this species the flowers, instead of being bent as in the others, are always erect; and the interior segments of the perianth, which in the others appear as it were in a rudimentary state, are in this much developed, being equal with, or exceeding the stigma. Native of Mexico. Introduced to the Belgian Gardens in 1844. Flowers —— ? *Culture.*—Requires a greenhouse; peat and loam, intermixed with leaf-mould; propagated by offsets from the bulbs.

Anthadenia sesamoides, *Lemaire* (sesamum-like Anthadenia).—Bignoniaceæ § Sesameæ.†—A very showy biennial, having an affinity to *Sesamum indicum;* and in habit

* Glenny's Properties of Flowers, in a separate volume. Price 1s. Houlston & Stoneman.

† According to the *Hortus Vanhoutteanus:* probably Pedaliaceæ.

and size having some resemblance to our common foxglove, *Digitalis purpurea*. The stem is slender, sub-tetragonal, covered with silky viscid hairs. The leaves are opposite, soft, lanceolate, the margins revolute, and deeply toothed; they are covered with small crystalline dots, which sparkle in the sun like diamonds, each dot being furnished with a short hair. The flowers are large, handsome, and numerous; they are axillary; the colour is rose, dotted with purple in the interior, the lip of a fine light yellow. Native of intertropical Western Africa. Introduced in 1845 to the Belgian gardens. Flowers in the summer. *Culture.*—Requires a stove, with a moist atmosphere; in fact, such as is proper for balsams, with which in culture it may be associated; rich light loamy soil; propagated by seeds.

Lisianthus pulcher, *Hooker* (beautiful Lisianthus).—Gentianaceæ § Gentianeæ.—A most beautiful shrubby-growing plant, attaining, in its wild state, the height of from five to seven feet, with obtusely four-angled erect stems, bearing opposite ovate-lanceolate acuminate leaves attached by short footstalks; in the leaves there are two pairs of principal ribs besides the mid-rib. The flowers grow in terminal trichotomous panicles, open, the blossoms gracefully drooping; the latter are funnel shaped, dividing rather obliquely into a limb of fine ovate obtuse lobes; they have a good deal the form of the blossoms of some species of Pentstemon; they are of a rich deep scarlet, the mouth streaked with dark yellow. Native of New Grenada, in the Monte del Moro. Introduced in 1846. Flowers in the autumn months. *Culture.*—Requires a moderate stove heat; loose turfy-peat soil; propagated by seeds or by cuttings.

Stachytarpheta dichotoma, *Vahl* (forked Stachytarpheta).—Verbenaceæ.—An annual or biennial plant, growing from two to three feet high, with a straight slender tetragonous stem, throwing out branches in pairs. The leaves are ovate elliptical, longish attenuated, and sharply dentated on the margins; the upper surface smooth, and pierced, as it were, with small white points or specks, which however are only to be seen by the aid of the microscope. The flowers grow in an erect spike, the rachis being a foot or more in length, and quite smooth; the calyces and bracts are also smooth, the latter membranous and lance-shaped; the corollas large, handsome, of a fine deep violet blue. The plant is very showy, the blossoms being freely produced. Native of South America. Introduced to the Belgian gardens in 1846. Flowers in summer. It is the *Verbena dichotoma* (Ruiz and Pavon). *Culture.*—Requires a greenhouse, or grows outdoors in summer; rich light loamy soil; propagated by cuttings or seeds.

Amorphophallus leonensis, *Lemaire* (Sierra Leone Amorphophallus).—Araceæ § Dracanculeæ.—A singular plant, belonging to a group of plants but little understood. It has a roundish depressed rhizome, with numerous fibrous roots. The barren stem, or at least the frond, grows about three feet high; it is entirely smooth, robust, and divided at the summit in a trichotomous manner, and with numerous pinnatifid ramifications of smooth spine-like leaflets, which are decurrent linear-lanceolate acuminate, recurved, and hanging in an elegant manner, and giving it the appearance of a palm tree of the torrid zone. There are three varieties known, one with stems entirely pale green, another with the stem brownish, and spotted with green or white, and a third with the stem entirely dark brown, powdery, and spotted with white. The inflorescence is included in a short hooded painted spathe, on a roundish contracted club-shaped spadix. Native of Sierra Leone. Introduced in 1845 to the Belgian gardens. Flowers —— ? *Culture.*—Requires a stove; light loam and leaf-mould. In a state of rest water must be sparingly applied, and it may be laid in any dry part of the stove, where it may remain till the time to repot it in March.

Amaryllis leonensis, *Lemaire* (Sierra Leone Amaryllis).—Amaryllidaceæ § Amaryllideæ.—A very pretty Amaryllis of the Habranthus section. The bulbs are ovate elongate, and bear two or three linear leaves, somewhat keeled on the lower side. The pulverulent scape bears two flowers, which are of a vivid vermilion flesh colour, with a conspicuous star in the centre; the tube elongate funnel-shaped, the limb large and spreading. The blossoms are large and fine. Native of Sierra Leone Introduced in 1845 to the Belgian Gardens. Flowers —— ? *Culture.*—Requires a stove; rich loamy soil; propagated by offsets.

Macleania punctata, *Hooker* (dotted-leaved Macleania).—Vacciniaceæ.—A very beautiful low evergreen shrub. The branches are slightly angular. The leaves alternate, inclining towards a secund arrangement, sessile, cordate, or, in the case of the uppermost ones, nearly oval, of leathery texture, glossy, and distinctly dotted. The flowers, seated on little stalks, grow in a crowded manner from the axils of the upper leaves, as well as at the apex of the branches; the stalks are club-shaped, red; the calyx fleshy, turbinate, with five wing-like angles, deep red; the corolla fully an inch long, between cylindrical and urceolate, rose-red, except at the mouth, where it is yellowish white. Native of the Andes of El Equador. Introduced in 1847. Flowers in the autumn months. *Culture.*—Requires a warm greenhouse; loam and

peat soil ; propagated by cuttings, planted in sand under bell glasses in a gentle bottom heat. Probably better adapted for planting out in a warm greenhouse, than for pot-culture.

PHRYNIUM TRIFASCIATUM, *Lemaire* (three-banded Phrynium).—Marantaceæ.—A very handsome herbaceous perennial, quite stemless, the leaves (all radical) broad oval-elliptic, sharply pointed, smooth above and finely ornamented with three bands spotted with white ; one of these bands or stripes occupies the centre, the other two run parallel with the margins, and are of an irregular form ; the margins are slightly undulated, and the under side is covered with soft whitish pubescence ; the petioles are straight, glabrous, more or less amplexicaul, and dotted with white. The scape, which issues from the root, is short and many-flowered. The flowers are large, and of a fine golden yellow, composed of six thin segments, the three outer ones linear-oblong, and united into a tube at the base, two of the inner series ovate-oblong, the other one much smaller ; the column is erect, short, slightly swollen and convex at the summit, and horizontally bent and bilobed, resembling the head and bill of a bird. Native of Mexico. Introduced to Brussels by M. Galeotti, in 1845. Flowers——? *Culture.*—Requires a stove ; loam and peat ; propagated by division.

ECHEVERIA FULGENS, *Lemaire* (fulgent Echeveria).—Crassulaceæ § Crassuleæ.—A pretty species, nearly allied to *E. bracteolata*, from which it differs in having a simple, not forked, scape, the leaves rosulate and not caulinary. It is allied also to *E. lurida*, differing from that in having two-coloured flowers, and unicoloured leaves. The leaves are obovate-spathulate, with a membranaceous fimbriated margin. The flowers grow on a simple elongated reddish scape, and are of an intense vermilion-scarlet tipped with orange ; the petals are acutely keeled on the back, and gibbous at the base. The cicatrices marked on the stem by the fall of the leaves, are large, oval and brown-coloured. Native of Mexico. Introduced to the gardens of Belgium in 1845. Flowers——? *Culture.*—Requires a greenhouse ; well-drained sandy loam ; propagated by its succulent leaves planted as cuttings.

MILTONIA SPECTABILIS, *var. purpureo-violacea* (purple variety of the showy Miltonia).—Orchidaceæ § Vandeæ-Brassidæ.—This is a beautiful and striking variety of the well known *Miltonia spectabilis*. From that plant the present differs only in the colour of its blossoms. Instead of the whitish sepals and petals of the original kind, we have here the same organs of an intense purple-violet ; and the lip, which in that is purple, and consequently most deeply coloured, is here lightest, being of a paler purple than the sepals and petals. It is a pseudo-bulbous epiphyte, with strap-shaped leaves, and peduncles rising from the base of the pseudo-bulbs, bearing each one large blossom. Native of the Organ Mountains in Brazil. Introduced in 1847. Flowers in September. *Culture.*—Requires a moist and somewhat high stove heat ; rough turfy peat soil, or to be attached to a block of wood ; propagated by division of the plant.

CALONYCTION MACRANTHUM, *Lemaire* (large flowered Calonyction).—Convolvulaceæ § Convolvuleæ. A magnificent perennial greenhouse climber, with an elongated tuberous rhizoma, and long, smooth, milky, climbing stems, of a sombre purple colour. The lower leaves are cordate-ovate, acuminate; the upper ones hastate, with roundish basal lobes. The flowers grow in umbels of four or five together in the axils of the leaves ; they are large and strong; the calyx is tubular, deeply five-parted, the three outer segments membraneous at the borders, and bearing on the outside a long divaricated horn; the tube of the corolla is cylindrical, delicate green, merging to white at the summit; the limb pure white, nearly five-lobed, each lobe being traversed by a broad fold or plait, which is prominent underneath, finely striated, and inclining to green. The flowers are from six to seven inches across, and the tube alone more than four inches long. Native country not known. Introduced to the Belgian gardens before 1846. Flowers during the summer. It is the *Ipomœa Krusensternii* of the *Belgian gardens;* and is related to the *Ipomœa Bona-nox* of Linnæus, the *Calonyction speciosum* of Choisy. *Culture.*—Requires a warm greenhouse ; rich loamy soil ; propagated by seeds and by cuttings.

SISYRINCHIUM LONGISTYLUM, *Lemaire* (long-styled Sisyrinchium).—Iridaceæ.—A pretty perennial herb, with the habit of a corn-flag. Its stem, proceeding not from a bulb but from a bunch of fibres, is simple, or scarcely at all ramified. The leaves are linear-ensiform, and glaucescent, as is the whole plant ; they are sheathed and sharply pointed. The flowers, which are furnished with long pedicels, and issue, three to five, from two-valved spathes, are of a fine yellow, and have innumerable bracts ; the petals, which are unguiculate, roundish-ovate, and revolute, have a small purple spot near the claw, which produces a very pretty effect. The style projects beyond the corolla, and has a capitate stigma, issuing from a long, hairy, papillous tube, formed by the close joining of the staminal filaments, the anthers of which form a sort of ring under the stigma. It is hence referred to a section of the genus called *Androsolen*, in which the stamens are distinctly connate into a tube. Native of Chili. Introduced into the gardens

of Belgium in 1845. Flowers——? *Culture.* Requires the shelter of a frame or greenhouse; turfy peat and loam; propagated by seeds, or by dividing the roots.

Passiflora myriadenia, *Lemaire* (glandular Passiflora).—Passifloraceæ.—A handsome climbing shrub, with smooth, somewhat viscous stems, growing to a considerable length and somewhat striated. The lower leaves three-lobed, hastate, the upper ones five-lobed, with a cordate base; the stipules are rounded and fimbriated with glands, the teeth of the leaves are glandular, the lower side of the leaves is studded with innumerable glands, and the petals, calyx, and involucre are all glandular. The upper surface of the leaves is smooth. The flowers are attached by long peduncles; they are large, the perianth white, the double row of coronal filaments violet at the base, merging to lilac at the summit. Native country not known. Introduced into the Belgian gardens before 1846. Flowers in summer. *Culture.*—Requires a stove, or probably may succeed in a warm greenhouse; peat and loam; propagated by cuttings.

Sedum Kamtschatkia, *Maund* (Kamtschatkia Stone-crop).—Crassulaceæ § Crassuleæ.—An ornamental species, of perennial duration, growing eight inches in height, the stems furnished with oblong coarsely serrated leaves, alternately disposed, and becoming branched at top, in a cymose manner, where the flowers are produced. The latter are numerous and attractive, looking like little golden stars, their colour being yellow, slightly tipped on the back of the petals with red, which is obvious in the unexpanded blossoms. It is very well deserving a place among border flowers. Native of Kamtschatkia. Introduced before 1846. Flowers in June and July. *Culture.*—Perfectly hardy, but preferring a dryish situation; common garden soil, or suitable for rockwork; propagated by dividing the plant.

Loasa picta, *Hooker* (painted-flowered Loasa).—Loasaceæ § Loaseæ.—A rather pretty annual plant, with stems about a foot high, dichotomously branched, weak, but nearly erect, and clothed, together with the leaves, with thin pubescence and numerous stinging hairs. The leaves are rhomb-ovate, acutely lobed and serrated, pale green, the lower ones stalked, the upper or floral leaves sessile, lance-shaped, and coarsely serrate. The flowers grow in elongated racemes, and are comparatively large, drooping, the petals yellow in the lower half, the rest white, reflexed obovate and cucullate; the petaloid scales prominent, ovate-acuminate, bifid, cucullate at the base, white, beautifully mottled with red. Native of Chacapoyas, in the South American Andes. Introduced in 1848. Flowers in summer and autumn. *Culture.*—Half-hardy; that is, requiring to be sown under shelter, and planted out in May; rich light soil; propagated by seeds. It will probably make a pretty bed in the flower garden.

JUGLANS PITTEURSII.

Juglans Pitteursii, Morren (Pitteurs' Walnut).—Juglandaceæ.

This new walnut, nearly related to the *Juglans nigra*, has been figured and partly described by Professor Morren, in the *Ghent Annales*. From the account there given, it appears to be a handsome and vigorous tree, with pinnated leaves, having the leaflets lance-shaped and saw-edged, and bearing depressed ovoid nuts, of good flavour, and suitable for the dessert. It is named Noyer de Pitteurs.

The *Juglans nigra* just mentioned, which bears also the name of American nut, has numerous lanceolate dentated leaflets to its pinnated leaves, the petioles and lower surface of the leaves being pubescent. The fruit is globular, somewhat top-shaped, the summit being elevated and pointed, and the surface punctured and scabrous. This brief description will serve to contrast with the following account by Professor Morren, of Pitteurs' walnut, translated from the above-named periodical:—

"M. Theodore de Pitteurs, Hiegaerts, president of the council of Limbourg, while I was on a visit to his seat at Speelhof in 1847, directed my attention to a large and handsome tree, cultivated under the name of American nut, but whose characters seemed not to agree with the species to which it had been assigned. This tree, which had made considerable growth, might be from fifteen to twenty years old. The time it was planted is not exactly known. It has the habit of the black nut, with grey smooth bark, and the body well branched and leaved. The leaves are arranged in a pinnated form, the leaflets being in pairs, distant, nearly opposite, elongated, lanceolate, and toothed like a saw; the under surface, as well as the petiole, shows a few hairs. There are from five to six pairs of leaflets. I have not seen the flowers. The fruit, however, presents a marked difference compared with the American nut. In the tree at Speelhof, the nut is furnished with a short petiole, often transverse. The fruit is ovoid, and at once depressed and compressed in the form of an ellipsoid, flattened above and beneath; the contour is round, and the rugosities of the green epicarp or outer covering are scarcely perceptible, even much less so than on the common American black nut. In the middle of the fruit, at the summit, which is never raised like a cone as in the black nut, there is

a circular opening, or umbilicated cavity, with a fringe-like border, the organic summit of the nut being seen in the form of a rayed nipple. The present differs also from the black American nut, which has the endocarp or shell ovoid, compressed in the middle and slightly conic at the top. On other nuts the cone disappears entirely, and is even replaced by a depression. The rugosities of the endocarp of the Speelhof nut are less prominent, and the punctures fainter than in the common American nut. The form of the inside corresponds with the irregularities of the outside of the nut; it is white and very good to eat, only it is harder than in the common *Juglans regia*.

"The odour of the rind is strong, penetrating, and continues to be felt a long time. The rind would make a very good preserve with vinegar, as is sometimes made by the English with the rinds of the common walnut. When it is still young and green it may be prepared and preserved with sugar cooked '*à la plume*.' The nuts also make an excellent dessert. The preserved walnuts of Rheims are in great repute in France, whence they are obtained by many families in Belgium.

"I think I cannot do better than name the present walnut, a description of which I have not been able to meet with, after its honourable proprietor, a gentleman to whom our national agriculture is much indebted.

"This walnut of Pitteurs' is perhaps the only specimen of its kind which exists in Belgium. It would therefore be advantageous for arboriculture that it were extensively propagated, as so remarkable a tree is well calculated to excite a peculiar interest."

NEW CAMELLIAS.

The continental gardeners are famous for the culture of camellias, especially in the department of raising new varieties; and although perhaps sometimes in their desire to accumulate new kinds, the standard of excellence may be to some extent overlooked, yet many very fine varieties have been obtained from this source. Those enumerated below are of foreign origin, and are figured and described in the *Ghent Annales;* judging from these materials, they are above average merit, and deserving of cultivation. They are all varieties of the *Camellia japonica;* the particulars of each variety are translated from the above-named work:—

Zavonia.—The introduction of this variety in the collections of Belgium is due to Mr. Alex. Verschaffelt of Ghent, who received it from Milan in 1844. The habit of the plant is strong and vigorous; the leaves are oval, sharply acuminate, nearly mucronate, and regularly dentated. The venation is distinct, the upper surface shining, and of a deep green, the under surface concave and paler. It is a fine variety, worthy a place in the best collections. It is one of that class which has regularly imbricated flowers, of a perfectly circular outline. The diameter of the blossoms is four inches. The petals are broad and large, entire at the margins, and slightly indented at the summit. At the centre only, they begin to change form, and become longer and somewhat pointed. The centre is well formed, compact, of few petals, these being neatly imbricated. The colour is a uniform deep rose, delicately tinged. [The flower is represented to be full and well formed; the colour rich but delicate.]

Ross's Superba.—A handsome and robust variety, of vigorous habit, having large beautiful oblong shining leaves, ending in a sharp acuminated point, and regularly dentated on the margins. The flowers, which are four inches across, are handsome, finely reticulated, and of a bright red colour. The petals, though not so numerous as in some other varieties, are large and thick: those of the outer ranges being round, entire, slightly notched in the middle, and fully two inches in breadth. They gradually become smaller towards the centre, where the innermost two or three are not more than half an inch long, being also somewhat cucullated and lance-shaped. Here and there the petals have a narrow band of white and crimson down the middle. This striping is variable both in colour and position, but generally confined to the centre portion of the flower, the outer petals being mostly of a uniform colour. Introduced some years ago by Mr. Verschaffelt of Ghent. [In the style of Chandlerii; a good bold flower, with about five rows of petals. This variety is known in England.]

Emiliana alba.—A white variety, striped with rose, and regularly imbricated. The habit is vigorous; the leaves oval-oblong, regularly indented, attenuated at the two extremities, glossy above, large, and ending in an acuminated point. The usual size of the flower is four inches in diameter, with from eight to ten tiers of petals regularly disposed; all the petals white, streaked with pink or light crimson. Those of the outer range are about an inch and a half broad, round, entire, convex or lying back, slightly undulated at the margins, often emarginated at the apex, and somewhat notched; towards the interior they gradually become oblong, the margin more entire, and the notching entirely disappears and is replaced by a prominent point; at the centre they are short, lanceolate, straight, and half-folded. The striping differs in different petals; sometimes it is deep red and broad, and sometimes faint and narrow,

but generally well distributed, which produces an admirable effect. At the base of the petals, in the heart of the flower, the white is delicately tinged with yellow. This was introduced by Mr. Alex. Verschaffelt of Ghent, 1847, from America. [A handsome, delicate, and compact variety.]

Armida rosea.—A good variety; in general form not unlike imbricata; of vigorous habit, with numerous branches, well furnished with fine healthy foliage of a broad roundish form, regularly dentated with small teeth, and terminating at the apex in an acuminated point. The flowers are about four inches in diameter and very regular, with petals of a rose colour, lighter towards the tips, and considerably stronger in the veins, broad, uniformly imbricated, and having a slight notch at the margins. It was received some years ago from Florence, by Mr. A. Verschaffelt of Ghent.

Grand Duke Constantine.—This variety is not quite so large as Zavonia. It may be considered as belonging to the number of those that are more particularly called double camellias, as distinguished from the simple as well as the regularly imbricated sorts. In its general aspect it is less bold and striking than Borgia and others of the same stamp, but it is not inferior to any in point of delicacy and richness of colouring. In habit it is somewhat vigorous, having smooth clean branches of a dark chestnut colour, with shining dark-green oval acuminate leaves, attenuated at both extremities, regularly dentated, and ending in the apex in a sharp point. The flower is about three inches in diameter, and generally of a pale rose or soft blush colour. The petals are slightly undulating and delicately tinged with pure white at the margins, those at the circumference being uniform and larger than the rest; towards the centre they become very irregular, those of the inner range being much folded and smaller, while a few at the heart of the flower again partially incline to the open and expanded form of the external range. Here and there, both on the outer and inner petals, may be seen a slight streak of crimson, while the soft blending of the rose with the white towards the margins renders the variation very distinct, and constitutes the rich and agreeable feature of this variety. It was raised by Mr. Caluwaert Vermeulen of Courtrai in Belgium, who first observed it on a branch of the variety called Pirzio. This gentleman was not slow in perceiving its merits, and had it extensively propagated. The singular occurrence of a different flower being thus accidentally developed on a particular branch, and the causes which have operated to produce a flower of the variety,—Compte de Paris on a branch of the Duchesse d'Orleans variety, or one of the Duc de Chartres on a branch of the Compte de Paris,—are easily explained by the student of vegetable physiology.

Borgia.—This charming variety is of Italian origin, and, like the balmy climate in which it has been raised, it presents attractions of the most inviting character. Its name commemorates a profound scholar and naturalist, the eminent Cardinal Borgia. It is of a handsome and vigorous habit, having strong shrubby and leafy branches, and bearing large, oval, acuminate regularly dentated leaves, of a fine deep glossy green; the under side is somewhat paler than the upper surface. As if indicative of the robustness of the flower and the habit of the whole plant, the buds are large and full, somewhat round, and disposed to open with perfect facility; this latter circumstance will doubtless render it an excellent sort for forcing into early flower, without the fear of seeing it cast its flower-buds, an evil to which many other kinds are somewhat liable. The flower assumes that habit, so commonly sought, a regular ranunculus-form; it is nearly four inches and a half in diameter, very full, finely imbricated; the colours are bright cherry red, and white. The petals at the exterior portion of the flower are from an inch and a half to two inches broad, distinctly veined, slightly notched at the margins, especially at the middle; from the circumference the petals gradually become narrower towards the centre, where they are much smaller, oval, and upright. The distinguishing feature of the flower consists in a series of broad white bands down the middle of all the petals, these bands or stripes being delicately shaded with light rose or crimson.

A FERTILIZING LIQUID.

Among the desiderata connected with gardening, is an economical liquid of easy preparation, possessing the fertilizing properties suitable for the great majority of plants grown in the open ground and in pots. The following process, which has been favourably received by several Belgian horticulturists and botanists, is highly spoken of.

Take a little horse-dung fresh from the stable, and place it at the bottom of a barrel. Then pump some water over it, and cover the top of the barrel with a board. The liquid will dissolve the salts, and other fertilizing principles of the dung. Do not expose it to the sun; and when it is to be used, mix it with four times its bulk of fresh water. Rain water which has fallen after some days of fine weather is the best to mix with it. This is found to be a most excellent fertilizing liquid. —*Annales de la Société Royale d'Agriculture et de Botanique, de Gand.*

BRITISH WILD FLOWERS.

THE SNOWDROP.

THERE is perhaps some doubt whether the snowdrop is really indigenous to this country. It is found in various parts of England, Scotland, and Ireland, but, we believe, in every instance occurring in situations which admit the possibility of its being the remains of some ancient and long-forgotten garden. The doubt is in some degree strengthened by its wide-spread diffusion, and yet local occurrence.

We mention the doubt without being inclined fully to adopt it, because although it is possible to conceive that a bulbous-stemmed plant like the snowdrop might maintain its ground for centuries, and thus in after years appear among scenes of wildness, when the once trim garden became a neglected wilderness, yet does it seem unlikely that no other hardy bulb should have accompanied it in the garden, and with it maintained its position in after years. Further than this we have no plea to urge on behalf of its citizenship.

The question just alluded to, concerns the few; its beauties interest the many. Few plants indeed are more generally known and admired, than is the snowdrop, that

"First pale blossom of the opening year."

The season at which it makes its appearance, together with the beautiful purity and simplicity of its graceful blossoms, invest it with peculiar charms, which have gained for it the praises both of prosaic and poetic penmen. One or two of their passages may be transcribed. Thus Phillips says :—

"As the dove was sent forth from the ark to learn whether the waters were abated, so does the snowdrop seem selected by Flora to find whether the frost be mitigated, and as a herald to announce the arrival of her garland. It is the first flower that awakes from the repose of winter, and cheers us with the assurance of the reanimation of nature ; and hence it has been made the emblem of consolation."

And Wordsworth too ; he thus addresses it :—

"Lone flower, hemmed in with snows, and white as they,
But hardier far, once more I see thee bend
Thy forehead, as if fearful to offend,
Like an unbidden guest. Though day by day
Storms, sallying from the mountain tops, waylay
The rising sun, and on the plains descend ;
Yet thou art welcome, welcome as a friend
Whose zeal outruns his promise !"

One more selection—and the lines are as delicately beautiful as the flower itself—

"Earliest bud that decks the garden,
Fairest of the fragrant race,
First-born child of vernal Flora,
Seeking mild thy lowly place,

Though no warm or murmuring zephyr
Fan thy leaves with balmy wing,
Pleased we hail thee, spotless blossom,
Herald of the infant spring.

White-robed flow'r, in lonely beauty,
Rising from a wintry bed,
Chilling winds, and blasts ungenial,
Rudely threat'ning round thy head.

Silv'ry bud, thy pensile foliage
Seems the angry blast to fear;
Yet secure, thy tender texture
Ornaments the rising year.

'Tis not thine with flaunting beauty
To attract the roving sight,—
Nature, from her varied wardrobe,
Chose thy vest of purest white."

Besides being made the emblem of consolation, we are told that the snowdrop's delicate blossoms were formerly held sacred to virgins.

Botanists call the snowdrop *Galanthus nivalis*, the former or generic name being derived from the Greek *galax* (milk) and *anthos* (flower) and applied in allusion to the milky whiteness of the corolla ; the latter or specific name (the Latin *nivalis*, snowy) being also applied in reference to the actual whiteness of the blossoms, appearing amongst the leaves as if some flakes of snow had lighted on and hung undissolved on the blades of grass. The common name of this plant is hence particularly appropriate ; for we might almost fancy that

"Flora's breath by some transforming power,
Had changed an icicle into a flower."

From its blossoming about Candlemas day, the monks called it "our Lady of February," a modification of which title, "Fair maid of February," it now sometimes bears.

The snowdrop is one of the Amaryllis tribe (Amaryllidaceæ), in which its unassuming simplicity strongly contrasts with the vaunting gaudiness of the greater number of its exotic allies.

The snowdrop, as is pretty well known, is a bulbous plant. Its stature is dwarf, the blossoms seldom growing more than four or six inches above the surface. The bulbs are somewhat egg-shaped, and of a dark brown colour. The leaves, of which two or three spring up from an ordinary sized bulb, are narrow, equal in width throughout, obtuse-ended, and from four to six inches long; they have a shallow groove down the middle on the upper side, and a ridge or keel on the lower side; and on the exposed part (the bases being covered with soil equal to the depth of the bulb in the ground) are of a deep glaucous green colour. The flower-stalk or scape is simple, slender, round, and bears at top a small membranous tubular spathe, or sheath, out of which comes the solitary flower, gracefully bending its slender footstalk. The blossoms are pure white, with numerous uncoloured veins; they consist of six segments, the three outer of which (sepals) are ovate-lance-shaped, spreading and hollowed out so as to be convex on the outer side; the three inner pieces (petals) are about half as long as the sepals, obtuse and notched at the apex, and erect in position; they have on the outside near the top, a small heart-shaped green blotch, and on the inside about six yellowish-green lines.

These remarks apply to the simple form of the plant. A variety cultivated in gardens has double flowers, beyond the somewhat greater endurance and size of which, no superior quality appears; indeed the single snowdrop (as in the case of many other flowers) is more beautiful in form than the double: they are of the same colour.

Some reflections on the admirable adaptation of the form of this flower to the circumstances under which it is developed, have been penned; and as they have been accompanied with an acknowledgment of the Infinite Wisdom which has "made everything beautiful in its season," we are constrained to repeat them:—

"The delicacy with which the corolla is attached to the flower stalk, enables it to move with the winds in every direction without fear of snapping, or suffering the air to defraud the stigma of its necessary part of the farina [pollen]; whilst its modest and pendent position is calculated to throw off all superfluous moisture in order that the parts of fructification may be secured. The pure white that is given to the petals of this flower, contributes in a no less happy degree to the perfecting of the pollen, as it causes them to act as reflectors to throw all the light and warmth on the anthers, which at the chilling season of the year when the snowdrop flowers, is particularly necessary."

Little need be said on the culture of so common a plant as this. The plants grow through the spring months, ripen off in summer, and commence their vegetation again late in autumn. When it is desired to transplant the bulbs, they may be taken up about Midsummer, or as soon as the leaves have decayed, and stored in a dry room till the planting time. The middle or end of August is a good time for planting the bulbs, which should be placed at a depth of about two inches. How they would be best arranged depends on circumstances: if required for an edging, they should range in a single or double line, and the bulbs may then be set about a couple of inches apart; but if required to form irregular patches in the flower beds, or among shrubs, it is best to plant a patch about six inches across, placing the bulbs at about the distance above named. For beds, they are best planted in regular order, and may be placed at two or three inches apart. They grow in any good garden soil; and should not be too frequently transplanted—not oftener than once in three years.

The snowdrop is seen nowhere to better advantage, than when springing up in the green turf along the irregular margins of a shrubbery, near the bases of isolated trees, or here and there in patches on the open lawn. By shrubbery walks it should also be largely planted. When springing up on a lawn, they have a wild natural appearance, and should not therefore be disposed with anything like formality, but scattered as it were by chance, thickly in some places and thinly in others, but connected together so as to form irregular groups of some extent. Grass plats seldom require mowing so early as to interfere with such an arrangement.

"Child of the spring, sweet snowdrop, haste
Thy bosom to unfold;
Ah! dread the vernal hours to waste,
For soon returns the cold."

NOTES ON THE VERBENA.

This beautiful little flower is valuable in a flower garden, and almost indispensable as a subject for bedding out, but so much of its usefulness depends on its habit, that some of the most showy flowers in a stand are worthless in the garden. The old *Verbena Melindres* is a spreading, creeping plant, close to the ground, rooting at every joint, and blooming its whole length, showing the whole summer a surface of brilliant scarlet. The flowers are not well formed, but until a better formed variety be found, equally dwarf, equally spreading, and blooming as brightly and abundantly, Melindres cannot fail to keep its place. Among many new and splendid varieties in other respects, there are many prevailing faults; some grow very robustly, make very long shoots, straggle a long way, and flower only at the ends; others grow very strong and tall, but require support, or else lie about without order or form; some bloom so slowly, that a truss is never all in flower, but the outer blooms decay before the inner ones open—these always look mean; others again have tall instead of broad trusses, and the individual flowers form no kind of surface, but appear so many steps, one among another. Now, we are careless about the shape of the truss, so that the blooms touch one another, and form a surface of colour. This may be flat, like V. Melindres or half a ball, or a cone, or even higher; the grand object is, to have the face of the flowers outwards, and touching each other; the preference however must be given to the spherical trusses; and all those that do not at some time or other show all their individual blooms open on a truss, are not worth keeping. The value of the verbena, as a bedding subject, for Dutch or geometrical gardening, is great, whatever form the bed may be; whatever figure we have to fill out, the verbena is ready with almost any colour, requiring only to be planted at moderate distances, for it will soon cover the ground. In planting out the verbena in any particular figure, let one plant be tolerably near all the principal points, because it the sooner fills those features which distinguish the bed; for instance, say the shape is a diamond, let a plant be at each point within a few inches, that it may fill it out at once, because it then only requires to be clipped into shape, and its growth turned inwards, and the cutting encourages fresh growth, and abundant bloom. The bed will not be long filling and coming to its colour; however oddly the shapes may be made, the same plan should be adopted. If you have plenty of plants, they may be planted nine inches or a foot apart, but the outside ones not more than three or four inches from the edge. If they are neglected after planting, they will soon straggle over the edges on the walks, and destroy the form of your design; but you must cut the shoots to occupy only the bed, lay the shoots in the direction you wish them to take, and if they do not lie without fastening, peg them down with little pegs, the form of a small hooked walking stick, which can be cut by thousands from birch twigs; or it can be done in wet weather by little bits of bass matting six inches long, dibbled into the ground, as if the two ends were being planted, for when the hole is made, the two ends of the bass, which is looped over the shoot to be held down, are put down into the hole, and the earth pressed in upon them with the dibble; this will apply to all creeping plants, and can always be done when pegs are scarce or not at hand. But it is generally enough to lay the shoots the way they are to grow; when the plants make growth, the ends can be clipped as true to the figure as the box edging itself is, which should by no means be covered at any one part by the plants in their ramblings. For such gardens as are formed into figures, and which derive all their beauty from their uniformity of design, it is absolutely necessary to attend to uniformity of colour; geometrical gardens have necessarily various shaped beds, and it is a good plan to have all the beds that are of a form, the same colour, or half of one colour, and half of another. Thus, if there are six of a form round the whole design, three may be of one colour, and three of another, but six very prominent beds should be scarlet, because it is the most striking; white is another very striking colour, if we may call white a colour; then there are pinks, purples, lilacs, crimsons, and all manner of shades but yellow, and this is the only exception to make in planting the whole. Verbenas will not supply yellows, and it must be done with something else; they will not give a blue, but they very nearly approach it, and therefore blue could be done without. The yellows may be supplied variously at different times. Yellow Allyson is a dwarf perennial that will bloom with the earliest and last some weeks in bloom, and it must then be replaced with other subjects, got forward in pots, or otherwise; but there is a so-called yellow verbena, *sulphurea*, we believe; from this we may one day have improvements in colour, (for it has not much more of the yellow in it than a yellow hyacinth,) nevertheless, we hold it to be the easiest and most permanent mode of planting a Dutch garden, to use verbenas only. The height, colour, form, and other matters,

are so easily regulated, and the bloom is uniform and permanent, clearing and regulating being the only things required after one is planted. By cutting out what may be called old wood, and leaving young shoots, the plant may be constantly renewed, as it were, at the end of the season, which may be considered about September, when the frosts begin, though in mild autumns the bloom will continue much longer. As soon however as the beauty of the plants has gone, let them be pulled up, and all the little rooted bits may be put into store pots; the small shoots may be put in large pots as cuttings, an inch apart, and covered with a glass, the cuttings to be prepared as others are, by cutting the bottom off just below a joint, and cutting off the bottom leaves. These pots, if put into a cold frame, and preserved from frost and damp, will be rooted during the winter, but if any quantity be required, or the striking is wanted to be hastened, that they may be potted off and grown for strength, use gentle bottom heat, and the cuttings will root like so many weeds. When they are rooted, put them singly in store pots, and keep them in the cold frame or in the greenhouse, or, in fact, any where, so that they are protected from frost and damp; and keep them in the store or small pots till planting time, or if it be desirable to bring a few forward for early blooming, repot them in large sixty-sized pots, and place them in the greenhouse. Here they will grow and get into bloom before planting time, so that as soon as we are clear of frosts, the beds may be dressed, and will look gay directly. But the verbena occasionally takes a shrubby habit, and there are many of the new varieties which form pretty greenhouse plants; these may be treated as such, and are the best for the borders, which they keep brilliant all the summer. It is the intermediate varieties, those which are neither shrubby nor creeping, that are so troublesome to manage, and therefore comparatively valueless; this renders it necessary to see verbenas growing before we select them When they are shown in stands, we may judge of their forms and their trusses, but we can form no idea of their habits; the finest trusses may be produced in very small quantities, and on very straggling plants, and therefore may be not good for much as plants, but even these may be desirable for exhibitions. The verbena will grow in any moderately good soil, but for potting, two thirds rich loam, that is to say, loam with plenty of vegetable matter in it, such as the top short spit of a good pasture, and the turf rotted in it, and one third turfy peat, makes the best soil for potting, or rather for growing them in the second pots. There used to be a fashion of training the verbena up a sort of trellis in pots, especially when the new varieties first came out, and we have seen them very gay, but these things look too mechanical; it is, according to our notions, an unnatural way of growing plants, something like a hundred wooden legs to a geranium, and half the number to hold up roses. It is all unlike gardening, and makes plants look unlike nature. When a good verbena is discovered in the seed-bed, we are naturally anxious to propagate it as soon as possible. For this purpose it is well to cover the plant with a glass; this has the effect of drawing up the plant, and the top should be taken off and struck in bottom heat and grown in the propagating house, or in the frame where it is struck; the old plant will grow fast and throw out side shoots, which may be taken off and struck like the first. All these cuttings will grow fast, and may soon have their tops taken again, and throw out their side shoots, which in turn may be taken, and so on, the old plant furnishing cuttings, the cuttings in turn becoming plants, and, when their tops are taken, giving their supply, until, before the season of letting out, they are multiplied to hundreds. But, there are some who will allow the plant to grow in the seed-bed untouched, but pegged down as it grows, so that some, that are free growers and strikers, will root at every joint, and form so many strong plants; others let it ramble as it likes, until the period for taking it up, and then cut it to pieces to strike and multiply during the winter; but it is quite clear that the first plan will provide the greatest number, and that when we have a really good variety, it is much the safest way, because it sometimes happens that the seedling plant from some accident or other dies, and the cuttings that are already off, and struck, form the only stock, which would have been totally lost, but for the early propagation. Nobody ought to lose an opportunity of striking a cutting of a valuable seedling, because nothing is so vexing as to lose a really good variety of anything, for such success as raising a valuable plant is not frequent, and when obtained, every precaution that can be taken to prevent its loss should be adopted directly.

NATURAL HISTORY OF CANADA.*

This subject is brought before us in a small but neatly got up volume called "The Canadian Naturalist," in which, by means of an imaginary conversation, all the most interesting subjects are described and explained by the father in answer to many pertinent questions from the son. It need hardly be observed, that in a small volume the subjects treated on must be very limited. They principally comprise curious butterflies, moths,

* The Canadian Naturalist: a series of Conversations on the Natural History of Lower Canada. By P. H. Gosse. London: John Van Voorst.

birds, and a few of the familiar subjects of the botanical world. It is doubtless a very acceptable present for youth, and would not make a bad subject for a school-book. The cuts, and what is called the getting up, are quite in the faultless style of all Van Voorst's works. There is this particular recommendation—the work is written in that plain and familiar style that nobody can mistake the meaning; and we wish we could say as much of those works in general. The following will bear out our remarks ;—

"*Charles.*—What curious and beautiful forms the drifted snow assumes ! here it lies in gentle undulations, swelling and sinking ; there in little ripples, like the sand of a sea beach ;—here it stands up like a perpendicular wall ; there like a conical hill :—here it is a long deep trench ; there a flat overhanging table ; but one of the prettiest sights is that which is presented by a lumber-shed hung with cobwebs, after a drift. The snow in greater or less masses has attached itself to the cobwebs, and hangs from the rafters and walls, and from corner to corner, in graceful drapery of the purest white ; but of such fantastic shapes, as we don't readily see.

"*Father.*—The heavy masses of snow which rest on the flat horizontal boughs of the spruces and hemlocks after a fall, are striking and beautiful ; but these must be gently deposited, or they will not rest ; they are not drifted ; a very slight wind is sufficient to shake them off.

"*C.*—We have had some severe weather during this month, yet I have not felt nearly so much inconvenience from the intensity of the cold, as one would expect from the temperature of the atmosphere. There seems to be something enlivening and bracing in our air, which prevents our becoming so much affected by it.

"*F.*—Our cold weather is generally clear and uniform, and our bodies become inured to its severity. After having spent many winters in Newfoundland and Canada, I passed one in the State of Alabama. I had congratulated myself on the thought that now I should not know cold weather ; that after Canada, the winter of Alabama could be nothing to me. But I found that slight frosts, and wet windy days, interrupted by warm ones, seemed to me almost as cold to the feelings as the severity of Canada. Before the winter was over, I sailed for England, and although the thermometer was on only one day as low as 36°, I felt the inconveniences of extreme severity, my feet becoming covered with the well-known annoyances called chilblains, and my whole frame shivering with cold : this was, no doubt, owing to the sudden transition from a climate of 76° to that of 36°. We here find the intensity of the cold as much manifested by collateral circumstances as by our bodily sensations. The creaking of the snow beneath our feet ; the adhesiveness of door-latches, or any metal, to our hands, if there be the slightest moisture on them ; the clouds of steam which pour from our mouth and nostrils when we breathe ; the accumulation of frosted leaves on the windows of rooms in which great fires and close stoves are kept ; the fringe of ice round the edges of our pillows and blankets, from our breath having frozen while we slept ; the piercing pang felt by the lungs on suddenly emerging from a warm room, and inhaling the cold air ; the pricking sensation in the cheeks ; the whitening of the whiskers, hair, and eyebrows ; the icicle at the nose ; the freezing together of the tips of the eyelashes, during the momentary twinkling of the eye ; these warn us of the real state of the atmosphere, and of the danger of remaining long exposed, even when it does not feel very unpleasant to the senses.

"*C.*—We yesterday found one of the fowls in the barn in an awkward predicament : it was lying on the floor, unable to stand : and on taking it up we perceived that both feet were frozen hard, so as to be perfectly stiff, and chinking, when struck, like stones. We brought it to the house, and put it to lie with its feet in a bowl of cold water, where it remained very contentedly for a considerable time, until its feet were thawed ; and they seemed perfectly restored.

"*F.*—They are for the present, but after having once been frozen, they are peculiarly liable to a recurrence of the accident, and rarely survive the winter.

"*C.*—I observed a curious circumstance a short time ago : I had taken a bowl of water into my room to wash my hands, but something delaying me, it remained for an hour untouched. Then, when I dipped my hands in it, it was perfectly fluid, and altogether free from any incipient crystals of congelation ; but in an instant it became a semi-solid mass, filled with minute particles of ice.

"*F.*—I have often observed the same fact, and at one time mentioned it to my friend, Mr. W. C. St. John, of Harbor Grace, Newfoundland, whose acquaintance with the science of chemistry led me to ask him for an explanation. He told me that, as 'water cools below 32°, the particles of it approach one another ; but in consequence of its being still *i. e.* unagitated, those particles, although they approach, remain equidistant from each other : —that is to say, the repulsive power (alias the matter of heat) and the attractive power acting *equally* upon every individual particle,

no set of particles can overcome that repulsive force, so as to form themselves into a new arrangement, viz. into an angle of 60°. Therefore, the water remains in a fluid state; but as soon as it becomes agitated, the equilibrium is immediately destroyed; the motion, which is impressed on the particles, is the means of bringing some of them nearer to some than to others. A union is the consequence; and when two particles are thus united, of course their sphere of attraction is enlarged, and other particles will be soon drawn into contact, and that soft, half fluid, half solid mass, is the result.' Some time after, he showed me the following passage in Parkes's Chemical Catechism, not as attempting a solution of it, but showing that the fact had been noticed before:—'If, when the air is at 22°, we expose to it a quantity of water in a tall glass, with a thermometer in it, and covered, the water gradually cools down to 22° without freezing, though 10 degrees below the freezing point. Things being in this situation, if the water be shaken, part of it instantly freezes into a spongy mass, and the temperature of the whole instantly *rises to the freezing point*.' The question has difficulties which are still unexplained.

"*C.*—There go the sleighs! how merrily they slide along with their jingling bells! I think there is no motion, not even that of a swift boat upon a smooth sea, so pleasant as the riding in a sleigh on a bright sunny day, or moonlight night. Protected from the cold by the warm bear-skins, or buffalo robes, we glide noiselessly along, and see the fences and trees shoot by us, without a jolt or shake to remind us that it is ourselves who are moving; while the tinkling of the bells on the horse's neck pleases the ear, and all is gratification! Oh! it is the beau ideal of travelling!

"*F.*—Sleighing-time is a season of general festivity: most farmers possess these vehicles; and as the agricultural operations have now ceased, and they are not immediately pressed with work, some time is devoted to excursions of friendship and pleasure; and even the travelling which business requires is made an agreeable recreation.

"*C.*—How do the farmers employ themselves during the winter season generally?

"*F.*—The feeding and tending of their cattle and other stock, a daily employment, consumes much of the short days, and the supplying of the immense fires which we are compelled to keep up, makes considerable inroads upon the residue. The grain is threshed, and cleaned, and carried to market, with other produce.—After this, or at intervals, the greatest portion of the winter's labour is performed in the forest, in felling and splitting cedars for fencing-rails, cutting hard-wood for the twelvemonth's supply of fuel, (which, with the drawing it to the homestead on large sleds, forms no small part of a winter's work,) and cutting and drawing logs for the saw-mill. So that no part of a Canadian farmer's time can be considered without employment, though in winter he does contrive to snatch a few days from toil, to devote them to amusement.

"*C.*—I see a little bird creeping up the perpendicular trunk of a maple tree; it looks just like a mouse in size, colour, and manners: is it a species of Nuthatch?

"*F.*—No: our Nuthatches are all of a light blue colour above; this is the Brown Creeper (*Certhia familiaris*), a bird much resembling that family in appearance and habits, but with a slender curved bill. It does not appear to be common with us, or if it is, it must be very shy, as I have seldom seen it. It crawls about the trunks and limbs in every direction with great agility, in search of small insects, which are lodged in crevices of the bark, and similar situations.

"*C.*—In cutting up a partly decayed birch tree a few days ago, I found it bored with long cylindrical passages, in several of which I found white flat grubs, with large brown heads, and six feet; in one I found a *Buprestis* alive, a dark brown species with lighter marks. The larvæ probably belonged to this species.

"*F.*—I should not think that our little Certhia can capture such insects as these, its bill not being at all calculated for boring; these constitute the appropriate prey of the Woodpeckers, whose sharp, steel-like bill tears away the wood, and digs into their hidden recesses; the bird perceiving, by unfailing instinct, the direction in which they lie concealed.

"*C.*—I have lately seen the Winter Gnat (*Trichocera hiemalis*), with pretty plumose antennæ, playing in the windows of our house.

"*F.*—Yonder is a flock of Snow Buntings (*Emberiza nivalis*) in their white winter plumage. They are not uncommon, though in some winters I do not recollect having seen any: they fly in flocks, and often flit about the orchards and barn-yards: when a flock of them is perched on a tree, their bright plumage in the sun presents a very beautiful appearance, looking like a number of silver ornaments sparkling among the boughs: they also show to advantage in flight, seen against a black, clouded sky, full of snow and storm; at which time they are very active. They are restless birds, never long in a place, and when one moves, all follow. In Newfoundland they are rather common.

"*C.*—Yesterday, a flock of Yellow-birds (*Fringilla tristis*) was hopping about the

barn-yard and house at intervals all day, picking up oats, and seeds of grass and weeds.

"*F.*—I have seen several flocks in the woods, and about the borders, lately, flitting from tree to tree, and twittering their sweet, but weak song.——Some weeks ago I found a mammal, which I cannot find described in Dr. Godman's American Quadrupeds, and which may possibly be unknown. I took it for a species of *Arvicola*, resembling the common short-tailed field-mouse, but with a shorter tail, and the head much rounder and more bluff; the ears were large; it was of a dark iron-grey colour. It had probably been caught by a cat, for it was lying dead on the earth, near the house. It may possibly be *Arvicola Hudsonius*, or perhaps a *Geomys*.

"*C.*—I see, at a great distance, at the margin of the forest, a sudden bright gleam of light recurring at regular intervals of two or three seconds. Do you see it? or do you know what it is?

"*F.*—It is a woodman chopping; he is too far off to be distinguished among the bushes and underbrush; but every time he lifts his axe above his head, the polished steel reflects the sun's light, and makes those fitful flashes. It has a singular appearance, unconnected, as it seems, with any apparent cause.

"*C.*—The insect world I have found to be not altogether so shut up from observation as I had imagined. On Christmas-day, I took a walk into the woods; and examining the stump of an old decayed hemlock, I found in it two minute *Chrysomelidæ*, a small black *Cantharis*, and two specimens of a pretty *Ichneumon*, which is shining black, except the middle of the antennæ, the scutellum, one ring of the abdomen, and the anus, which are yellow. These were inert and torpid, but soon became lively on exposure to warmth. I took among the wool of a sheep, near the roots, among which it insinuated itself forwards, backwards, and sideways, so nimbly that I could with difficulty get hold of it, a small apterous *Hippobosca*. I also observed, suspended from the wall of a house, a chrysalis of *Vanessa Antiopa*.

"*F.*—The Blue Jay (*Corvus cristatus*) continues as numerous and as noisy as ever. His harsh screaming voice may be heard above that of all the other feathered inhabitants of our groves, all the year through. A beautiful bird he is, with his bright violet, white, and sky-blue coat, long tail, and pointed crest; and by his airs and grimaces he appears to have no mean idea of his own personal attractions, and probably he may think his voice as charming as his plumage, as he so continually gives us the benefit of his music. He appears to tyrannize over his brethren occasionally. I once saw, in the south, a blue jay in close and hot pursuit of a summer Redbird (*Tanagra æstiva*), and Wilson records a parallel incident. He has other notes, besides his common loud squall, some of which are difficult to recognise. In the clearing, the parties of these birds, for they are hardly numerous enough to be called flocks, generally fly high, and alight about the summits of lofty trees; but in the woods, particularly in spring, they as frequently choose a lower altitude. They are wary, and rather difficult of approach.

"*C.*—These tall, but comparatively slender elms, remind me of an observation that struck me on my first entering a Canadian forest; that the trees, individually, are by no means of that gigantic size that my fancy had pictured them. The general height of the forest does not perhaps fall short of my expectations, but though the trees are most of them of good size, I have seen none of those giants which one would look for in a primeval forest.

"*F.*—I have made the same reflection; I have read of very enormous trees occasionally occurring in the woods of Upper Canada, but in this province, certainly, they do not generally surpass mediocrity. The largest boles with us appear to be those of elm, birch, and hemlock, none of which I have seen that would measure more than five feet in diameter, at about a yard from the ground. I have heard of large logs of white pine, but the trees of this valuable species have been all cut away in this neighbourhood. Possibly, in other parts of the province, the timber may grow to a larger size, but I have never heard such a fact hinted.

"*C.*—What is the cause of the coarse furrows and corrugations of the bark in many trees?

"*F.*—Let us examine the structure of a tree: here is a recently-cut maple log, which will serve our purpose. We perceive several manifest divisions, the exterior of which is the bark; this, however, is not homogeneous in its texture; the outer part is called the rind, or *epidermis;* in some, as the birch and beech, this is thin; in others, as the maple, elm, and basswood, it is thick, dry, and rough; in others, as the ash and spruce, it is scaly. The inner part is the *liber*, or true bark; and is the seat of life in the tree, the origin of the new buds; in some trees it resembles the rind in appearance, as in the maple, but in others is widely different, and may be separated, as in the elm and birch. It appears that the bark does not increase so rapidly as the wood of the tree, the increasing diameter of which forces and tears apart the rind, causing these furrows; which process is well exemplified in the stringy rind of the cedar, which is torn into lozenge-shaped divisions, like the meshes

of a net. In many trees the outer layers of the rind are being continually thrown off by exposure to the weather, and their place as constantly supplied by the outer layers of the *liber*, so that however diverse in appearance, it appears that the structure of these two is alike. In the beech, fir, &c. I conceive the *epidermis* is not thrown off. Beneath the bark, we perceive the wood, which likewise consists of two parts; the outer is the *alburnum*, or soft wood; the interior, the *duramen*, or heart-wood; the latter is usually darker in tint, and more compact in texture. These parts are composed also of strata or layers, which are very visible, as each layer exhibits two structures, the inner side of it being composed of cellular tissue, the outer of ducts and woody fibre; they do not increase in size, but a new one is formed every year, between the *liber* and the *alburnum*. If we strip the *liber* from a tree in June, we find that it readily separates, and that a mucilaginous fibrous substance is deposited between it and the trunk, which appears to form a layer of *alburnum* on one side, and a layer of *liber* on the other. In the centre of the tree we see a ring, or a section of a tube, called the medullary sheath, or *corona*, whence proceed radiating lines to all parts of the circumference, forming, when the tree is split, those shining satiny bands, so beautiful and conspicuous in the maple, beech, and birch. These are medullary rays, and serve to connect the medullary sheath with the leaves; the water taken up by the roots passing up the spiral vessels and ducts of the sheath, through the rays into the leaves. Within the *corona* is the *medulla*, or pith, which is composed of cellular tissue slightly compressed: it never increases in diameter after it is formed, and therefore its bulk depends not on the size of the tree, but in some measure on the size of the twigs; the ash, butternut, elder, &c. which have thick large twigs, having more pith than the maple, beech, or elm, whose twigs are slender. In some full grown trees, its presence is indeed scarcely to be distinguished, the cells having been gradually filled up by the juices of the tree.

"*C.*—Why does a plant die if its bark be cut round?

"*F.*—Because the vegetative life resides in the *liber*, and if this be divided, as in girdled trees, so that the upper part has no contact with the lower, no more buds or leaves can be put forth, these being produced from the inner surface of the *liber*. But if it be divided in part, that side of the tree whose connexion is unbroken will continue to flourish, while the portion immediately above the separated bark withers and dies, as may be seen in a hundred instances in our forests.

"*C.*—I have often wondered at the huge globular excrescences that stand out from the trunks of some trees, such as the maple, but more especially the birch; sometimes as large as a hogshead. Do you know the cause of them?

"*F.*—I do not, accurately; on being cut, they present the regular structure of wood, surrounded by bark, but remarkably twisted and gnarled in the grain: in the centre is always some cavity or defect. I suspect they are either a diseased growth of the tree, like wens in animals, or the accumulated layers of ages around the base of some broken limb.——

"But we have finished a year; the seasons have completed their annual course since we commenced our wild woodland rambles; many subjects of interest have fallen beneath our observation; many phenomena, more or less obvious, have occurred to our notice, calculated, I trust, to make us wiser and better. If they have tended to enlarge our information, to increase our cheerfulness, to calm and elevate our minds, to enforce a merciful consideration towards inferior animals, to open before us a wider display of the power, wisdom, providence, and benevolence of Him who is essential Love,—why, we have not wasted our time. But we have seen but a small portion of the mysteries of nature; inexhaustible stores yet remain to be unlocked; interesting and unexpected facts, hidden from the unobservant, are continually disclosed to him who walks through the world with an open eye. We may possibly undertake another course of investigations similar to the one just concluded; new beauties will present themselves to our admiring gaze; no season is so barren but that it possesses charms, either inherent or associated, peculiar to itself; and every clime affords ample opportunities for the prosecution of these studies. 'Day unto day uttereth speech, and night unto night showeth knowledge: there is no speech nor language, where their voice is not heard.' These, too, 'declare the glory of GOD,' and these 'show forth His handy-work.' This fact cannot be too strongly impressed: it should never be forgotten that we must not rest in the creature, but be led up to the Creator; and not only perceive His hand, but fear Him, trust in Him, and love Him."

THE GOOSEBERRY GRUB.

PROBABLY few persons who have a garden of fruit trees, are entirely ignorant of the depredations of what is called the gooseberry caterpillar or grub, although they may be ignorant of the cause of the damage. It is not unusual, where no means have been employed to check their depredations, to see

whole trees entirely stripped of their leaves, when they ought to be busily engaged in elaborating sap for the nourishment of the fruit, and the healthful extension of the plant. Under such circumstances the trees become all but dead, the shoots of the current year being so withered up, shrunk, and lithesome, as to admit of being tied together in knots without breaking, and the fruit becoming shrivelled and abortive.

An excellent description of this "pest of the garden" occurs in a very praiseworthy series of letters on the Natural History of Godalming,* which, as it forms a good illustration of the useful and entertaining matter of this volume, we shall here quote, adding a few remarks of our own :—

"Now the history of the pest is on this wise. Unconnected with its object, that of giving birth to one of the greatest nuisances that ever afflicted a fruit garden, the parent fly is a pleasing and good-looking insect, and is rather a favourite with gardeners, who think it the harmless harbinger of the cloudless skies which accompany its visit. I have often watched these flies glancing in the sunshine, chasing each other over the leaves, spreading out their gauzy and glossy wings, the hind wings projecting from beneath the fore wings, like those of the lappet-moth, and enjoying, to the top of their bent, the genial influence of that delicious mock summer which we always have before the chill eastern blasts which usher in the real one, and which are supposed to bring the grub into existence. I will describe the fly : the wings are four, perfectly transparent, and in bright sunshine reflect the tints of the rainbow; the head and antennæ are black; the thorax is yellow, with a large black spot above and below, the upper spot is generally divided into three; the body is of a clear, delicate, unspotted yellow; the legs are yellow and the feet black.

"The life of the fly is but another example of implicit obedience to Nature's universal law, the heaven-descended command, 'Increase and multiply.'

"Very shortly after the due celebration of the nuptials, the female repairs to the underside of a leaf, and, standing directly over its midrib, her back downwards, her wings closely folded, and her antennæ stretched straight out and continually shivering, she bends her saw under her so as to give her body a curve, and deposits her first egg on the rib itself; then a second, a third, and so on to the tip of the leaf, or as near the tip as she can find convenient standing room. She then goes to one of the side ribs, then to another, and so on, till all the principal ribs are garrisoned with her eggs ranged in the prettiest rows; the eggs are very long, and are placed lengthwise, end to end, like oblong beads on a string, yet not touching, for there is generally a space of about half an egg's length between each two. The eggs are very soft, and of a half-transparent white colour. After the first day the eggs begin to grow, and before the end of a week they have grown to three times their original size; the head of the egg is always towards the tip of the leaf, and is remarkable for having two black eyes, placed very far apart, and quite on the side; indeed so far asunder are these eyes, that, like the behind buttons on the coat of a certain illustrious coachman immortalized by Dickens, it is difficult to bring both into the same field of view.

"It is seldom more than a week before the grub makes his exit from the egg and his entrance into active life, but the period is not a constant one, varying from four to twelve days; he comes out head foremost—his head, by the way, like that of most young animals, being of unseemly size : his body is nearly transparent, but just tinged with smoke colour, the eyes so conspicuous in the egg still being very observable, but as the head becomes darker, these gradually disappear. The grub is ready to begin eating directly, so crawling down from the rib he commences operations on the fleshy parts of the leaf, in which he gnaws a little round whole. Immediately after making his first meal, the green of the leaf communicates its colour to his body, and he is forthwith a green instead of a smoke-coloured grub, but still so transparent that the particles he has eaten show through his skin as a green line down the middle of his body, and it is this green hue which tinges all the other parts. The little grubs descend from the rib in equal numbers, right and left, leaving the skins of the eggs attached to the rib, and looking like a row of empty silver purses. The depredations are now visible above, from the sudden appearance of small round holes ranged in irregular rows; in each of these holes one of the tiny gluttons may be seen clasping the eaten part of the leaf between his legs, and elevating the end of his body in the air. At this period the progress of the plague may be arrested. [The punctured leaves are recommended to be pinched off.] If you have not time to look for these leaves yourself, get some children to do it; they will soon take an interest in the occupation, particularly if backed by a few coppers. I would also recommend young ladies

* The Letters of Rusticus on the Natural History of Godalming. Reprinted. London: J. Van Voorst. This volume is well adapted to inspire an affection for the Naturalist's studies, at which we find the supercilious sneer too often pointed. It is popular, with the accuracy without the pedantry of science.

to look after such leaves, and pick them into a hand basket. If you neglect the trees at this critical time, each infested leaf will be quickly stripped of all its green, the ribs alone remaining: the grubs then descend its foot-stalk, and, wandering in different directions, each finds a leaf for himself, and the work of devastation begins in earnest.

"The grub is known to every gardener, indeed so well known that you may perhaps consider it a waste of time and paper to describe it; yet some of your readers may be glad of a description, so here it is. There is a great difference between the grubs of saw-flies—(the gooseberry grub is that of a saw-fly)—and the caterpillar of moths, which your thorough-paced entomologists don't seem to have noticed. The caterpillars of moths and butterflies have six legs, and ten, six, or four holders, two of which are quite at the end of the body, and are very powerful prehensile organs, excepting—and the exception establishes the rule—in the caterpillars of puss-moths and their allies, in which the hinder extremity is without these organs, and often elevated in a most remarkable manner. In all the grubs of saw-flies that I have seen, the tail, or last segment of the body, is either without holders, or the grub does not use them, but just curls its tail on one side, and uses it after the fashion of a finger, to steady its hold on the leaf, or else sticks it up in the air, and even then the extreme end is curled round, though holding nothing. The legs are longer than those of real caterpillars, and have more joints. The gooseberry grub has six legs, (and in this all insects that have any legs at all seem to agree,) and twelve holders, besides the curled tail: it always stands on the edge of the leaf, generally on the part where it has just been eating: the fore legs are held away from the leaf, and move with each movement of the head in gnawing, as the grub takes mouthful after mouthful. It is amusing to watch one of these fellows feeding; he stretches his mouth to the furthest point he can possibly reach, and then takes mouthfuls by a series of jerks, till he has brought his mouth nearly in contact with his middle pair of legs; he then moves it slowly back again, and seems to lick or plane the fresh gnawed edge, till he gets his neck stretched to its fullest reach, and he then brings it up by jerking out mouthfuls as before. The middle and hind legs, as well as the holders, grasp the leaf very tight during the operation of gnawing, which is almost incessant. The head of the grub is now quite black, and its eyes are no longer to be seen; the colour of the body is a dull bluish green, with a yellowish space just behind the head, and another just before the tail; it is indistinctly divided into twelve rings, and each ring has a number of warts; these warts, upon all the rings except the first, second, third, and twelfth, are ranged in three indistinct transverse rows, and on each side of each ring is one larger and more conspicuous wart; from each wart rises a strong, upright, black bristle, and there are several of these bristles on the head itself; the last ring has a black plate, ending behind in two short rather hooked points.

"When about half an inch in length, the grub leaves off eating; a very remarkable event, for its appetite is not intermittent, like that of almost all other created beings, but a continued gnawing, craving, never-ceasing, all-consuming propensity. The black head separates from the neck and splits down the middle, and the skin of the neck also splits, thus together making an opening large enough to let the grub poke out his new head, which feat he forthwith performs, and gazes about him, moving his head slowly and majestically from side to side, as though he were just landed in a new world, though a world totally unworthy any expression of wonder or approval: after the head comes the body, which is wriggled through the opening by tedious, laborious, and seemingly painful struggles. When the skin is completely cast, the grub has none of the black spots which before distinguished it; the warts and black hairs are present, but the warts are colourless: the head is clear as glass, and the two black eyes, so conspicuous in the egg and newly-hatched grub, are again visible. In about twenty minutes the black spots begin to appear, and in about four hours become as distinct and the head as black as before the moult. When the grub has regained its colour, it again begins to eat, and eats away night and day without stopping, for four or five days more. It then sickens again for its last moult, and this is performed in the same way as the first: but this time the spots, warts, and bristles are cast with the skin, and appear no more. The grub is now of a pale delicate green colour, except the yellow patch near each end, which it still retains. It has now done with eating: when hard enough and strong enough after the last moult, it marches to the stem of the bush, and quietly descends till it reaches the earth. Sometimes it crawls along a hanging branch, and drops from the extremity.

"The object of gaining the earth is to burrow beneath its surface; and as soon as the grub once feels the soil, he begins forcing his way into it head foremost, after the fashion of a mole. When he is deep enough to answer his purpose—the depth varying, by the way, from two to eight inches, according to the hardness or lightness of the soil—he makes a little oblong cell in the earth, and therein spins or

constructs a tough black cocoon, attached all round to the walls of the cells: although I say spins, the material he uses is not silk or thread, but something between silk and glue, or what we might suppose to arise from the hardening of fluid silk, an illustration rather of the uncouthest, but for want of a better it must go. In this cocoon or case he disposes himself to await the change to a chrysalis, and soon after to a fly.

"The time occupied in this round of existence is very variable: many of the eggs laid in May, before the middle of the month produce grubs that go through every change and are on the wing by the 24th of June: and eggs laid about that day, will go through their changes as far as the cocoon by the 10th of July, or 15th at the latest: the first brood thus taking about twenty-eight days, and the second generally remaining under ground till the next spring. It is not, however, clear that in all instances this insect has two broods: on the contrary, I am nearly certain that many of the late hatches never reproduce during the year, but the time of their first appearance is so variable, that a constant succession is kept, the earliest having reproduced before the later hatches are gone down.

"In my war on blight I always weigh well the remedies: many a tree has been killed to get rid of its blight; this plan is efficient but impolitic, energetic but unwise: some will whitewash a gooseberry-bush, the effect of which is cheerful and pleasing to the eye, but rather injurious to the leaves, moreover gives a very unpleasant flavour and grittiness to the berries; some will water the bushes with strong brine, thereby greatly annoying the grub by killing the leaves; quick lime has a very similar effect. It strikes me that no nostrum will ever be found that shall be perfectly efficient as regards the grub and harmless as regards the tree; it would therefore be my plan to attempt to lessen an evil that is not to be cured. I have already mentioned the good effects of smoke; the picking of the perforated leaves I have also recommended. Another benefit will arise from treading the ground very hard about the roots of the bushes. An observant gardener cannot fail to notice that when gooseberry-bushes stand singly at the end of patches of potatoes, peas, or beans, they are sure to be more infested than when in a close bed: the reason for this seems to me that the soil for all our culinaries is made as light as possible; this is effected by constant digging, hoeing, or raking: in a bed filled with gooseberry-bushes, on the contrary, there is but little moving of the earth going on, and it gets trodden hard when the gooseberries are ripening, and commonly remains so through the year. This hardening of the soil prevents the grubs from burrowing when they come down from the bushes, so they go wandering about and become a prey to the hedge-sparrow, house-sparrow, whitethroats, robins, and obese toads that are always on the look out for them; it also prevents so feeble an insect as the fly from forcing its way upwards from the cell in which it has changed; thus those on the surface and those under the surface are alike assailed by the simple expedient of hardening the soil.

Various remedies have been adopted to arrest the ravages of the voracious grub. One of these, which has been more or less successful, is to dust over the affected trees with the powder of white hellebore, which should be done when they are dewy, so that the powder may adhere to the leaves. This, however, sometimes fails, according to statements made public; probably, in consequence of the use of inert hellebore, for there is good evidence of its efficacy in other cases.

A simple, but we believe effectual plan, consists in dressing the trees on which the caterpillars have established themselves, with sharp, gritty road dust, in a perfectly dry state; this should be thrown sharply against the trees, and is also to be applied when the trees themselves are damp with dew. It must be evident that these two applications will be most effectual in dry weather, for rain would dislodge the materials employed. Contact with the insect would also seem to be essential.

A still more effectual remedy, however, is the following:—About the end of March, or beginning of April, in dry weather, remove the surface soil from beneath the gooseberry bushes, to the depth of two full inches, and as wide as the spread of the branches. Replace this with fresh, or maiden soil, which should be well consolidated. When the trees come into leaf, spread over the fresh soil a slight covering of soot mixed with quick lime. This remedy cannot fail, if carefully applied, because it is planned in reference to the habits of the insect which does the injury. The grubs bury themselves in the soil about the roots of the trees, and these change to chrysalids. With the warmth of spring they go through their other mutations, and the flies then deposit their eggs on the trees. The eggs soon produce young grubs, which feed voraciously until they become full grown, when they retire into the soil, and undergo their changes.

It may be proper to explain that gooseberry trees are attacked by at least two distinct kinds of insects, one a species of Sawfly, *Nematus trimaculatus*, or, as it is sometimes called, *Tenthredo grossulariæ*, to which the preceding quotation applies; the other a kind of Moth, the *Phalæna grossulariata*, sometimes called the Magpie-moth.

GARDENING AND FARMING FOR COLONISTS AND EMIGRANTS.

THE CHOICE OF A FARM.

As many persons will emigrate without securing a grant of land, and risk pleasing themselves when they arrive out, by renting or buying on the spot, we have first to consider what is the best general rule for the choice of a site, because the emigrant had better by far pay double rent or double purchase money for a plot well placed, than have a bad one for nothing.

There are some points very essential—first, proximity to a public road, or the means of forming a road easily; secondly, a supply of water, or the means of procuring it; thirdly, contiguity as near as may be to a populous place or a market, for on the facilities for disposal of produce does every thing turn. In vain would it be to have the most noble farm without a decent road to get at it at all seasons; worthless too would be the most promising spot on the face of the globe, were there not water in abundance at all seasons, for man and beast would alike suffer from a scarcity of that fluid, and no profit could compensate for the risk of losing stock in the absence of water. A fourth consideration is to be near a navigable river; for water carriage is much less expensive than carriage over the best of roads. A fifth consideration should be, tolerably level ground for a good portion of the farm. The pasturage may be hill and dale, because for grazing it is immaterial, so that it be fertile.

It may be said that there is no temptation to emigrate without a grant of land, but this is a mistake; a rental in any of the colonies is cheaper in proportion than any thing else; and it arises from a practice pretty general with early colonists: they obtain large grants for the sake of being landed proprietors, and intend letting from the first. The rent of farms varies of course according to the facilities with which produce can be got rid of as well as got sold off, and the local advantage belonging to it. Many, who never intend occupying or cultivating the land granted to them, and who probably never saw it, are glad of tenants at a very moderate rent; and certain it is that some land would be more profitable to rent at five shillings per annum per acre, than the freehold of some other portions would be at a pound. In most cases proximity to a river is tolerable security for the fertility of the land. Avoid if possible land which lies too low, and is naturally swampy. Nothing requires more labour than to make any quantity of swamp available for anything; a moderate portion may be appropriated, when all other features of the ground are promising; and indeed, to be near, and especially on the banks of, a river, is almost sure to involve the disadvantage of some wet, sloppy, and useless portion. The treatment of land under such disadvantages will be noticed in the proper place; but we strongly recommend that no sacrifice be made before starting, for the purpose of obtaining that which may not be approved when seen on the spot. If a grant of land can be had easy, and at very little cost, it may be worth having; but if the capital be small, it would be injudicious to part with any portion for the sake of being landlord of uncultivated tracts, which may be of no earthly use, and which may remain so for many years, until the population spreads towards it. It is well to look out for land immediately on arrival, and to keep in view the advantages we have mentioned in the search after a farm. There are plenty to let, at not unreasonable rents, to good tenants; many already cleared and in good order; and we have given some few hints about the choice. It is better to turn labourer for other colonists, and be looking out while you are paid for labouring, than to begin farming on unprofitable land.

In all cases, the expense of travelling must be taken into consideration, when the value of a farm, or the amount of rental are estimated, because this expense forms a reason why they should be lower. The land, sooner or later, suffers all the tax of travelling; for the rental has to be lowered in proportion to a disadvantage of that kind. If a farm of a hundred pounds per annum were on this side of a sixpenny toll-gate, and a similar farm in every respect were on the other, and the produce could only be brought to market through the toll-gate, the farm taxed with the toll would bear a lower rent. The vexatious incubus of tithes in England, much as tenant-farmers clamour against it, falls entirely on the landlord in like manner; for the tenant is in precisely the same situation in both cases. Of two farms, in every respect of the same value, but one tithe-free and the other not so, one tenant pays 80*l.* per annum to the landlord, and 20*l.* for tithe; the other pays 100*l.* per annum to the landlord, because the farm is tithe free; the difference in rent in all these cases being the amount paid in tithe, so that although the tenant really pays tithe, it is with the landlord's money. It is notorious that a tithe-free farm bears always a higher rent by all that the tithe would amount to. Just so with farms in colonies;

whatever disadvantages there are in the locality of a farm, lowers the rent. The more circumscribed a man's capital is, the more reason he has to be careful that he be not led away by the comparatively low rent of a distant farm.

A tolerable road is a treasure. The means of transmitting things to market cheaply can hardly be too highly estimated. Water in abundance is a necessary which no farmer should overlook; for a season of drought would otherwise blast all his hopes and ruin all his stock; therefore look well at the advantages and disadvantages of a place before you enter upon your proposed permanent home.

Take a place, if possible, with the privilege of buying it within a given time, at a given price; and plenty of eligible plots will be found in most of the British colonies, to be had on reasonable terms; but nothing should be, and nothing need be, done in a hurry. If a man be at all capable of managing for himself, his services are just such as plenty of others require, and he need not be idle; whereas, if a fear of trenching upon his little capital induce him to make a hasty choice, he may repent it ever after. Too much caution cannot be used. A man must consider well all we have said of the advantages and disadvantages of different localities; and he has this in his favour, in choosing a farm already in cultivation,—the quality of the soil is known; there is no lottery about it, nothing uncertain. All he has to do is to make himself master of facts which are known to others:—the quantity and quality of the produce; the price of everything in the locality, such as labour, carriage, and all sorts of food; the distance of markets; cost of tillage; and various other matters bearing upon the real value of the plot of ground. He has also to consider the value of any building already erected, for he has so much the less to lay out. He must not lose sight of the many costs he escapes—such as the expense of grubbing up a wood, or making roads, or fencing, and all the other subjects which are done to his hand. Nevertheless, as he may prefer a grant at a venture, and we are to assist him on a strange uncleared tract of land, we will proceed with our best instructions under the circumstances.

TAKING POSSESSION AND SURVEYING.

As you will find no building on your newly acquired land, and have to shelter yourself against wind and weather, your first object must be to select a place for your cottage. In doing so you have several material points to look to:—first, it should be neither the highest nor the lowest part. Secondly, it should be a spot whence roads may easily be made to other parts of the estate, and also to the main road, or rather way (for there may be no road), from the estate to the nearest village or town, however distant that may be. Thirdly, it should be near a spring, if there be one on the premises, or in such a situation that the water may be readily conveyed by means of an open gutter, or pipes, or other contrivance. Fourthly, it should not be surrounded with wood and thicket, but be in a spot open on one side, or so that, by clearing the wood away, it may be rendered so: if a hot climate, let the opening be on the east, or north-east; if a cold climate, let the open plain be on the south, or south-west. Fifthly, the nearer a wood, or woody shelter, the better, and regard should be had to its proximity to fine trees, which by clearing others away might be made ornamental. Sixthly, if there happen to be a river running through or by any part of the land, keep as near it as the nature of the ground will admit with safety, due regard being had to the possible flooding during heavy rains. This may be seen in any season, for even if the water be low when you survey, the banks or trees will show how high the water rises; and if the land on each side be very flat, so that in floods the water will occasionally cover it, keep further off and on higher ground; still go as near as appears quite safe. Nobody who is a stranger to the visitation of a drought, can form the slightest notion of the inestimable value of water. Look therefore thoughtfully around your premises before you do anything. Pitch your tent gipsy-like, in the most sheltered place for the night; if there is any danger of wild beasts or reptiles, light a fire all round, and let one of the party watch while the remainder sleep; but no time should be lost until you have surveyed every acre of your allotment, which, that we may direct under the worst circumstances, we will suppose to be up the country, far away from any other farm or plot of land in occupation,—because between yours and the nearest farm there may be half-a-dozen large unoccupied grants of land.

If you have temporary housing, such as a gypsy's tent, or anything better, and you are in the fine weather season, do not be in a hurry to settle the spot for your house. Pitch your tent on the best spot you can find, and try a few days if you can improve it. Meanwhile, set the labourers you have at grubbing up such portions of wood as you intend to clear, sparing, as you proceed, any particularly handsome trees. If there be any clear place, set other labourers digging and trenching it for crops, which you will sow if there be enough of the fine weather season left to perfect the produce, whether it be corn,

potatoes, peas, beans, cabbages, turnips, carrots, or a little of each of them; because you will find vegetation much more rapid in most of our colonies than it ever is in England. Let this sort of make-shift way of living, and the purchase of a cow, a pig, a few geese, turkeys, and common fowls, with an ox or two for draught, be all you attempt until settled down into some sort of house. There are fifty contrivances for keeping these few things secure; and with milk, eggs, and a barrel of flour, you cannot starve. When you have determined where your house shall be, you may begin to fell some of the nearest timber to build it with; and close to where you begin throwing the timber, set men to dig a saw-pit, so that the sticks of timber may be squared, rolled to the pit, which must be secured at the edges by timber at the sides and ends, and these sawed into proper pieces for building; which pieces can be carried away and prepared without the least difficulty, while the sticks of timber in their unwieldy state have only to be rolled to the pit.

These are some of the things to be done on taking possession; it is the best way to make use of the first few days, while you are, in fact, making up your mind as to which is the best place for your house, and becoming familiar with the estate, and all its principal features; for it consists in putting to work the ground most easily got ready, so that something like vegetation shall go on; obtaining stock enough alive and dead to keep you from starving; strength enough to move your timber the little way it has to be moved, and for ploughing; and to enable you to survey your estate at leisure, so that you may make the important, the all-important selection of the best place for your homestead.

But, suppose the selected spot be away from all kinds of river, stream, or water. The very first job must be the digging of a well, or substitute for a well, and this must be at the lowest, or wettest part of the land; we say lowest or wettest, because the latter is frequently found on the side of a hill. Here then you must set to dig. If there be any chance of getting water at a moderate depth, make an excavation to answer as a pond. If there is great depth required, it must be a well. But in general, it is of the greatest service to sink a hollow in the lowest part of the ground, that the rain may be collected, even if there be no land springs. Or if there be no borers for water in the colony, it is a pity but some one in that line were to speculate, and go out with the proper apparatus; for there are many farms, especially in Australia, that would be trebled in value if a successful boring could be made there to bring the water to the surface. But we are to provide against the worst by doing all we can; therefore take your choice. At all events, catch every drop of rain water when it comes, and let it be conveyed to the lowest part of the land, to make a pond for the cattle, when all you can hold for domestic purposes is secured. It may be, however, that the ground is porous, and requires some artificial means to keep the water from soaking away. This, however, will be treated of in its place; we mention the matter here because all these things must be thought of in fixing the locality of the house, and dividing the land into pasture and arable, wood and plain, and also in deciding upon the part intended to be made into road. We cannot anticipate the kind of tract of land you may find, but you must be prepared for the worst. The colonies afford every climate—cold in Canada, heat in Australia, and all the intermediate states in New Zealand, the Cape of Good Hope, Van Diemen's Land, and other places. You must be provided, according to the spot you are going to, against the contingencies of the weather; but there is no climate or colony in which you may not perchance meet with all the evils we have mentioned—want of water especially, because early settlers have naturally seized upon the best plots; and the longer people delay going out, the further up the country they must go, and the more likely they are to find drawbacks of some kind among the rejected tracts that are within a reasonable distance of the ports. We cannot therefore too strongly urge the necessity of looking to water. If you happen to be there in a rainy season, and water seems to be abundant, be not the less careful to provide for a scarcity, watching the places at which the water accumulates, and at these places excavating and forming ponds deep enough to retain every drop that comes, for it is of vital consequence; there is no privation, no evil that can fall to your lot, that will be felt so deeply as distress for water—the seeing of the poor cattle and the sheep suffering from thirst, and feeling yourself that you have not half as much as you could drink, and that what you have is bad.

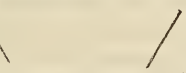
There are many other considerations necessary on taking possession, before you finally make up your mind as to the situation of your house, barn, outhouses, pig-styes, stables, and such like buildings, but we have mentioned the chief. All you have to do is to attend strictly to our advice, nor for an instant fancy any part of it as of secondary importance; we have left all secondary things untouched. The principal objects must be the choice of a good site for the house; sheltered by wood, not too high nor too low, convenient for water if there be any, adjoining the track or road,

so that it may be well approached ; or if not provided with the road or water, design the road and find the water before you decide upon the spot. Then if it be the proper season, dig, trench, or plough any favourable spot for the cultivation of a few vegetables and some grain, and sow as soon as possible, because these things will grow while you are otherwise employed.

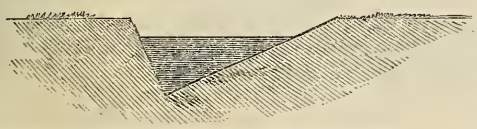
PROVIDING A SUPPLY OF WATER.

It is already shown, that unless this be provided by some efficient means, there is no security against drought ; and settlers in districts where there were no natural springs, and this important necessary has been neglected, have been forced to travel far and wide with their herds and flocks in search of it, and often in vain ; on failing, they have lost many of their stock, and been half or quite ruined. It is not enough to dig a hollow here and there to collect the rain, which while it is abundant will fill every place that will contain it ; because a long hot season will dry up all ordinary ponds and contrivances. The best way is to find the places or little pools that the rain usually fills, and that may be wet or damp even in summer, and set to work at excavating for a considerable depth. The best form for an open reservoir where there are cattle, is to keep the ends and sides sufficiently sloping to prevent the earth falling in, and the bottom of such gradual slope that, whatever quantity of water there may be, it

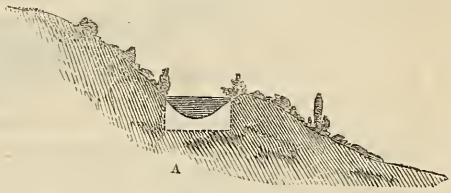
can be got at. The plan of the sides, ends, and bottom, would not be much unlike a barrow a little tilted. The bottom and end like the above, and the sides thus :—



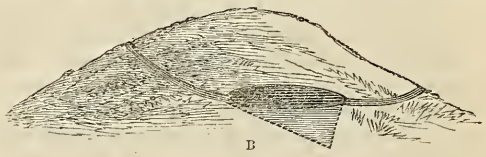
this will cause considerable labour, but is more effective when done ; and if a place is selected where the water already lies or has lain in, the soil will nearly if not quite always be found to be stiff and capable of retaining it. The advantage of such form is, that the cattle can get along the slope to the water, whether there be much or little. This is a



laborious mode of getting at water, because well sinking does not require a tenth part as much soil to be removed as this does ; but a well may be sunk for domestic use with advantage, where for cattle it would be useless. As a general rule, you should examine all the portions of the estate, and mark well where there is any water standing, or where there has been any. This will not always be at the lowest part of the ground ; but where the water naturally flows from the other parts above, it must be a good place to catch all the advantages of

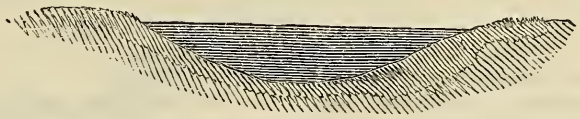


the rain that falls in the wet season. Make the excavation large enough and deep enough to hold an immense quantity, and when you have done this, afford every facility you can for the draining of the higher lands into this place ; for instance, intercept the waters that may flow from other parts. We will suppose that even a place where the water lies naturally shall be on the side of rising ground, and not at the bottom ; that is to say, that a sort of hollow or valley is formed on the side of a slope, as shown at A ; then, by excavating



that in the direction of the dotted lines one way, and lengthening it in the other direction, room may be made for any quantity of water. It may also be desirable to form ditches or drains to intercept all that would otherwise run down the other sides of the rising ground, as at B. By this means all that falls, or nearly so, may be conducted to the reservoir. This is merely to show a principle to act on ; it is not intended as a complete direction, but to show as easy a way as we know of to procure, or rather preserve, a quantity of water. It may be, that at a moderate depth you meet with land springs, which will greatly aid your supply. If you have provided a reservoir of this kind where the water naturally stands in some seasons, you may next look to the lowest ground on the estate for a place to make another ; first, that it may be a receptacle for the overflow of the one already made, and next, that it may be fed from all the available sources on the land. All natural drains and ditches should be conducted to it, and where there are none they should be made. There

are many who prefer ponds made in the form of a basin, but the work is indefinite, and you cannot so well calculate the labour; nor do you get so low by removing the same weight of earth, and if there be any chance of springs this is a great object. Besides this, the facility of wheeling away the earth is quite as great an advantage as the quantity may be a disadvantage. It is true that every foot of thickness removed from a large bottom causes many more solid feet of earth to be dug out than if the bottom were a less space; but it is also quite certain that every foot of earth removed makes room for a foot of water; and where a place is intended for a reservoir, rather than hoped for as a spring, this is a



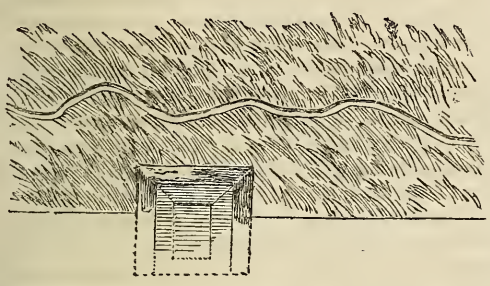
great object. In Gibraltar and in many parts of the world, the only dependence of the inhabitants is on rain water collected during their wet seasons and carefully husbanded; and where you are located far up the country and away from springs or the hope of any, this is the only thing you must depend on. Where there are proper artificers and materials, tanks may be dug and cemented, and where there are any hopes of springs within a reasonable depth there may be wells sunk; in this there is no difficulty if bricks can be had to build them round as fast as you sink them, but the main stay will be the open reservoirs dug in the form we recommend; and no one ought to treat the subject lightly, for it is the one great evil, and the only real one that the settler meets with in many places. If many small pools form in the rainy season, be not deterred from making one larger one, for the collected waters of many will be found in some quantity, long after all smaller ones are dried up. The work of evaporation is rapid in proportion to the shallowness of the pond, and the absorption of the water by the earth is vast; but where there is a good depth, and all sources are made tributary to the main reservoir, there is hope that enough may be collected to answer all ordinary purposes. We strongly recommend, therefore, immediate attention to this matter, and we would urge the necessity of excavating to a great extent, as otherwise it may as well be not done at all. If you begin to dig and find the earth porous, and likely to lose water by soaking it up, or allowing it to soak away, the excavation, whatever its extent, must be puddled; that is to say, clay must be brought from some other part, and a complete lining of it must be made all over the sides and bottom, the clay being well kneaded like so much dough, and the air completely beaten and rammed out of it, because, unless this be done, the water will soak even through the clay. It is far better to seek for a place where the ground is naturally stiff, and will hold water, which is mostly the case where the water naturally collects in the wet season, and lies for some time.

There is, however, scarcely any advantage that compensates for the absence of water and the obligation to find it; therefore we have recommended from the first the renting or purchasing of a site near a river, or otherwise abounding in water, in preference to any thing at one-fifth or even one-tenth of the price without that advantage. It is to be regretted that there have not been attempts made by proper artificers to bore for water, or that, if there have been, no account of the result has been published. There is no reason why water may not be procurable in the deserts themselves, if the bore be large enough and deep enough; and we trust that in places like the interior of Australia, the proper application of means will produce a good result; but this rather devolves upon the executive of a company than upon private enterprise. Very few individuals could afford to take out professional borers of Artesian wells and all their apparatus at their own cost; and persons of that description would not be tempted to emigrate unless they were, to a certain extent, guaranteed employment. However, while these things are difficult to be accomplished in the Colonies, the labour of men's own hands must be applied in the most effective way to obtain water; and the choice is in sinking wells or making ponds, whereby the rain may be all collected, and thus the quantity necessary for the warm season secured during the rainy one. Above all, do not keep more stock than you can provide water for; and be not deceived into a fatal confidence by the appearances of a wet season, for you will find plenty of hollow places full of water that will not even be damp in the hot weather. Make excavations sufficiently large to hold all the rain you can collect, for without this you will never be safe.

HOW TO APPROPRIATE A SWAMP.

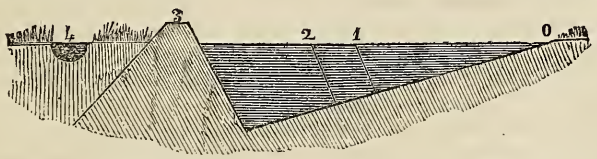
There are many swamps in different parts of the world so wet as to be impassable, yet so dry as to yield no water. The proper mode of appropriating such as these, or at least of procuring the benefit of water from

them, is to bank out a certain portion of it, so that it can be cleared out. This must be done by beginning to excavate in dry ground, close to the swamp, and wheeling on the dry stuff to the bog, quagmire, or swamp. Suppose that the swamp is large, perhaps almost without a limit, and you find even a stream or a river running through its centre, though you cannot reach it over this impassable swamp; in this case, by banking a portion so as to shut out the water while the works are going on, you may be able to form a complete reservoir of pure water close to the dry land. The earth that is taken out of the excavation



may be wheeled to the edge of the swamp, and then emptied, and when it is carried far enough inwards, turned at right angles, and again brought to the dry land. By continually heaping on the soil, it will become a safe, hard and solid bank. The excavation may be formed first on dry land, and then you may work inwards until you reach the banks you have made. If you find any want of firmness in the bank as you proceed to make it, ram the soil well down as it is put in. The soft boggy soil taken out of the swamp, which is, in fact, the bed of the river in the wet season, but rank mud and vegetable matter in dry weather, must be wheeled away, where it may dry or rot as the case may be. It is not unfrequently the case, that a river in the dry weather is not wider than some of our English brooks, but that it has a mile on each side, or more, of swamp covered with rushes, forbidding all approach to the stream, except that of cattle, at some periods of the year; but when it is in its worst state, animals would sink in the mud and be lost. It is then that we require an excavation; and while it is going on, it often requires a hand or two to pump out the water, that the work may be done as dry as it is practicable. It may be said that the whole excavation might be made in the dry land; but independently of the waste of room, there is less chance of a supply than if the deepest part is in the bed of the river, or rather of the swamp.

The stopping out of any quantity by a bank is as simple an operation as possible, because it requires only that the earth shall be thrown down at the edge, and as wide as it is intended to form the bank, travelling on it with the fresh supply as far as you mean to go, as is done with the waggons on a new-made embankment for a railroad; they are pushed to the extremity and there emptied, and so it is with a minor embankment to stop out water. Whether the portion to be banked out be twenty feet or twenty yards square, the work is carried on towards the stream, but you must be sure to make firm work of your bank, which should sink down into the mud and slush; and if there be enough of the soil to form it solid, there is nothing more permanent. The best time to commence making the bank is when the water is just drawing off; and as the more you excavate the solid ground in a right form, the better reservoir you make, so the better supply of material there is for the bank, and the wider and heavier the bank is, the more sound will be the whole affair; and the larger and deeper you make the excavation, whether it be rounded or squared next the river, the better you will find it in the end, because it will provide more water. It requires that the slope of the wall towards the river shall be of an angle of forty-five degrees, or exactly the same as a line drawn from angle to angle of an upright square: this is slope enough to prevent the earth from falling in, and you might make sure of your deeply excavated pond being pretty nearly all you want. An imaginary section of a swamp and the excavation made properly would be something like the following:—the black mark at No. 4 re-



presents the middle stream, hardly larger than a puddle, the sides for a mile being really swamps up to your middle or neck in mud and decaying vegetable matter, and nearer to the stream even much deeper; No. 3 shows the bank; from 0, as far as No. 1 is marked, is dug on dry land; at No. 2 you get into the swash, but as the bank keeps out the water that is outside there is no fear of digging on, because the water within the embankment

may be pumped out or scooped out as may be best under the circumstances. The more rapidly the excavation goes on, the more complete the work; and where there is any doubt of the strength of the wall, let means be taken to strengthen it: add more soil to the outside, without letting any fall in; but you may look for a complete supply of water up to even with the central and distant stream, and as soon as the excavation is left it will be filled.

Another mode of treating a swamp of this kind is to form a double bank from the edge of the swamp to the stream, and to excavate or dig out the marshy ground between them; and in this case form the ditch or watercourse between the two banks, and let it communicate with the excavation you have made, always preserving the form of bottom recommended, that the cattle may walk to the edge of the water and drink, even when there is only a gallon left. Let it moreover be perfectly understood, that when the water is low enough to admit of the bottom being lowered a foot, the chance must not be lost, because every foot of earth taken out makes room for a foot of water.

Another way of treating the swamp is to make a bank or roadway down to the stream itself; but in all these matters the first flood that comes down makes a general sweep of all your handywork that presents any obstacle to the progress of the waters; and except your excavation is almost at the high-water mark, that would fill up too with the ruins of its own banks. This is why we recommend the excavation to be made on dry land, with but little encroachment on the swamp; for by sinking low enough you are sure to find water, and the river must dry up altogether long before your supply is gone. Channels dug in a swamp will not last; they choke with mud and vegetation in a short time, and there is nothing more uncertain than a small river —that is, one depending on the rains for its chief supply; because it is sure to fail you when all other sources fail, and tempt you with plenty when you find plenty at all other sources. Nothing, in short, in the way of additional rent is at all equal to the vast addition of labour in having to provide water, instead of finding it in abundance. Scarcely anything makes amends for the loss of time, money, comfort, and occasionally stock, when you are forced to locate where there is no water but what you dig for. Rather buy at two pounds an acre with every advantage about you than at one pound where you have not such advantages; and rent at five shillings an acre near a market and near water, rather than have land at a gift where you are in constant danger of dying with thirst, and of losing your stock when you with difficulty save yourself.

CLEARING WOODLAND.

There is no small labour in clearing the ground of wood, but this may be lessened or increased by the handy or awkward way in which it is set about. The difficulty is greater or less according to the size of the timber, which however is generally mixed.

The tools required for this business are 1. a cutting mattock, which has one blade or cutter set straight and the other transverse—one the way of a hatchet, the other the way of an adze; 2. a pickaxe; 3. a large axe; 4. a hatchet; 5. a bill-hook; 6. a good strong but not large spade; 7. iron-bound wooden beetle, and iron wedges; 8. sledge hammers; 9. ropes; 10. cross-cut saws, two sizes; 11. hand-saw; 12. barrows.

Thus equipped, we will begin at the edge of a thick wood in which there are trees of all sizes, and underwood. We must first clear a way in between the trees, by attacking the underwood, which we may take off as near the ground as possible. We may then dig a trench along the outer edge of the wood, that is, along the side next to us, and with the aid of the pickaxe, or of the mattock, cut away bit by bit all the roots that cross the trench we are making; and although this trench may be five or six feet from the wood, the roots will intercept us every foot we go. This trench may be three feet wide and eighteen inches deep. This cleared out, we may with the pickaxe loosen the bottom six or eight inches deeper. Then we begin another trench by the side of it, or rather three feet further, as if we were going to make the original trench double the width; but we throw the soil from the second trench into the first, and continue to chop through the roots with the cutting mattock, until we come to the large roots of larger trees, which run a considerable distance from the trees. When we come to roots as thick as a man's leg, we may leave them in the trench till we have worked pretty near to the main stem; or, by way of getting rid of them at once, we may bare them to within a couple of feet of the stem, and cut them off there; though with a good cutting mattock, hatchet, and pick, the trouble of making a cut through at every trench is not much, and three-feet lengths of the roots are more portable than longer ones would be. Upon the whole, you clear your way better by cutting all the roots out as they intercept you, and throwing them out in heaps to be gathered together afterwards for fuel; or, as there will be more than can be possibly stowed away for domestic use, they may be stacked on the ground, or put in heaps to be burned on the spot, and the product spread on the land.* Of course, as we advance into the

* They should be burned to charcoal: not to ashes.

wood three feet at a time, we shall be obliged to clear the wood as we go, by chopping all the small wood close to the ground. As we arrive at the fine trees, we should look well at each before we begin to damage its roots, for it may be desirable to save some of the handsomest ; but on coming to large trees that are to be taken down, we must abandon the trench when we have brought it within six feet, and commence making a trench round the tree, fully three feet wide, and within three feet of the bottom part of the trunk. This trench is to be as deep as the straight ones, and as the earth is cleared away from the roots the latter must be chopped through. The tree should be made to fall outwards—that is to say, on the ground already cleared, and not among the uncleared portion. To accomplish this, a strong rope or ropes must be fixed high up the tree, so that a man or men on the ground may pull it the way you want it to fall. In clearing the trench round it, you of course come to all its leading roots that stretch outwards, and these are the roots that support the tree in its position, although there may be descending or tap roots to supply the chief nourishment ; when these roots are bared, you can cut away one after another until the supports are gone, when the tree must fall as it is pulled. If, however, a tree naturally leans, it is better first to clear away space for it to fall on ; or to pass it by, leaving a space of six feet all round it, and clear past the place where it would naturally fall, that is to say, the way it leans ; and in this case, you cut away all the roots on the side in which direction it leans, and your work is then simple enough, because as the roots on the other side prevent it from falling while you work on the opposite side, you have only to cut them away one by one, till the tree tears up the rest, which, as its weight lies over, it will do. A large tree when it has fallen is as much in the way as the wood was, but you must then set to work with your saws, hatchets, axes, and bill-hooks to divest it of its branches, and again the large branches of the smaller ones, cutting even the main branches into usable lengths, and the rest into stack-wood and faggot wood for burning. The trunk has first to be cut as it lies, close down to the collar of the root, and then cut again at the length which is most useful for timber, because a tree that would be immovable is thus rendered useful before it is off the ground.

The felling of large trees is a work of great labour, and interrupts the progress of trenching very much ; but there is the timber to compensate us, and when thus parted into usable lengths it can be removed to the place where it is to be used, or burned, or stacked. The but or root end of a tree is the least useful and the most difficult to move, but still it is in the way on the ground. The main trunk or timber, or what the merchants call the stick, can be best removed to the hard ground by winding a chain round it, and letting a

horse or two, or an ox or two, or, according to the size, half-a-dozen oxen perhaps, draw it sideways ; as fast as the chain unwinds, and rolls it along, it has to be wound round again, a thing easily done, because although it lies close to the ground, a spade-full or two of earth may be taken from under it in one place ; and the chain, which is double, is of considerable length, and is drawn under until the draught bar is nearly close to the wood ; it is then brought back, and taken under again two or three times, and a spike driven into the wood so that it cannot give way. The drawing power has only to unwind the chain which rolls the timber over, and this is repeated till it is got off the work on to the harder ground. The operation is the same for all, but the smaller the tree the easier it is performed. Having cleared away the tree, the next trouble is with the but, which being difficult to move on account of the projecting roots, must be split small enough to move, or to burn on the spot. By boring a hole down the centre, and loading it with a good charge of gunpowder, in the same way as in blasting a rock, it may be split with very little trouble ; but in the absence of gunpowder, bring your wedges into use ; this however produces much more labour.

When the large trees and their roots are removed, go on with your straight trenches, cutting out all roots great and small as you proceed, and filling up each empty trench with the contents of the one you are making. It may be observed, that the quantity you clear or undertake to clear, in point of width or length, is according to your own option. If in an enormous wood you make your trench about twenty rods long, and continue your trenches inwards till you are eight rods that way, you will have cleared an acre, and when cleared it will for the most be very fertile, for wood land in general has done little upon the surface, and although it may have been drawn pretty close of some of its qualities, there is left strength enough for ordinary vegetables and corn crops.

In this way may a whole wood be cleared in time ; and when the principal portion of a

grant proves to be woody, you have no choice but to clear a portion at once, partly for the wood which is required for the fencing and building, and partly for the sake of some ground to crop, and for the supply of fuel. In clearing some woods there is an immense quantity of small brushwood, underwood, or thicket stuff, which is all but useless. This it is of great advantage to burn on the ground; chop it up close to the bottom, and bring it out clear of the wood, set light to it, cover with earth, and when fairly reduced, strew the product about the soil. It is of the greatest consequence that you avoid encumbering yourself with sticks and heaps of useless wood, when you can have plenty for cutting; the room it occupies, and the frequent necessity of removing it from place to place out of your way, is a far greater disadvantage than is compensated by its worth. Secure a good supply for all purposes, but the under stuff is rarely worth taking away, and charred wood and ashes will be found of the greatest use in preparing the ground for crops, while the burning of this brushwood has the best effect in destroying a great proportion of the small vermin that infest the land near the surface. If the land be stiff and clay-like, good fires may be made with the small wood, and portions of the earth burned with it; all that this requires afterwards is to be spread over the ground. This is mentioned as bringing into use a quantity of the wood-stuff that would otherwise be a positive nuisance, because all beyond what is really wanted is sadly in the way if left on the ground, and causes a good deal of labour in its removal; while its remains after it is burned is a fine dressing for every description of soil.

Where there happens to be a very handsome tree, and such trees are scarce, which is always the case when the wood is thick and the generality of trees are close together—it is very desirable to let it stand uninjured; and lest any of the trees in the neighbourhood should damage it in falling, it may be desirable to get up such trees and saw off the branches that might reach it, and even to shorten trees by sawing off the tops; but when you are clearing for crops very few must be left, because for a certain distance around you may calculate on thus injuring whatever is growing underneath or very near them. In the case of such as are to be saved, it is better not to trench near them, first because they would be damaged by cutting their roots, and secondly because the space would be good for nothing as far as covered by the branches; the extent of branches is therefore the rule for leaving the ground undisturbed, except so far as grubbing up the underwood. It should be recollected that if a tree is sawed off instead of grubbed up, it would cost ten times as much labour to get up the roots afterwards as it does when the whole weight of the tree forms a lever to drag them up, for by chopping these roots off a few feet from the trunk, the entire but, with all these roots, are got out of the ground at once; and whether the land is dug or ploughed afterwards, they are all out of the way.

In burning the waste underwood and other wood not worth carting away, care must be taken not to kindle a fire too near the uncleared wood, as in dry weather, with the wind blowing that way, the wood itself might be kindled, and in such cases there is no stopping the fire. In some kinds of wood, or rather thicket, where there is no timber to preserve, and nothing large enough for use, firing it is a ready means of clearing away a good deal of the top; but in such cases only half the depth of the trenches should be removed, the other half should be merely loosened and cleared, because the ashes should be all kept in the top spit of earth. It should also be taken into account, that ground cleared by trenching eighteen inches will be infinitely more valuable, more easily cropped, and will yield better crops, than any that is partially, or carelessly, or less effectively cleared of the roots; for it will be less destructive to ploughs and other tools and implements used from time to time, and will be ready for such crops as carrots, parsnips, mangold wurtzel, and such like, that require depth of soil in order to be grown to perfection.

OF FENCES.

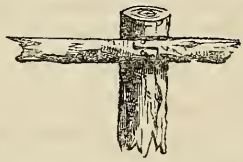
Fencing, or forming some means of keeping cattle from straying in or out of the parts appropriated to the different purposes of a farm, and especially to protect those parts that are cropped, is one of the early tasks imposed on the emigrant. The most readily made fences are those formed with stakes; and of these there are many kinds. The most permanent, and perhaps the best adapted to resist the intrusion of cattle, are those driven into the ground diagonally, and crossed thus:—

These stakes, as thick as one's wrist, being driven into the ground to the depth of about two feet, it is only necessary to drive a spike-nail through the top crossing, to render the fence firm and lasting. The preparation of the stakes consists in selecting from the wood, as it is cut down or cleared, stakes long enough to go a foot and a half or two feet into the

ground, and stand out above the surface high enough for the intended purpose ; the stouter end should be cut to a point with the bill-hook, that it may be readily driven into the ground. These stakes should be removed to the line of the intended fence, and left in sufficient heaps to supply the space from one heap to the next. While the heaps of waste and underwood are being burned, let the pointed ends of these stakes be placed in the fire long enough to char the surface ; it is the best preventive that can be found against decay ; far better than dipping them in pitch or tar, and very much less expensive. There are many ways of fencing, but this is one. Another is to drive the stakes down a foot apart ; and as they have no support, let them go down two feet into the ground. When these are done in line, split stronger stakes, and fasten them in the way of rails. The only material required in greater abundance is that for nailing. The fence would then appear as in the following cut.

Splitting the rail that goes lengthways makes a flat side to go next the stakes ; the rails should be nailed to every stake. A top rail alone will make it very strong. By driving a stake down at every foot, the opening will be about nine inches, not large enough to admit a sheep ; but they may be closer ; and seven feet stakes will make a five-foot fence very strong ; that is, two feet under the surface, and five feet above it. Where the fence is only to keep out cattle and horses, a post and rail fence will do ; this will require the posts to be seven feet long, and the larger the better, up to the thickness of a man's thigh above the ground, and the two feet under ground still larger ; holes must be dug, two feet deep, to hold these posts, which must be placed from seven to ten feet apart, and well rammed in. The rail must be composed of pieces of wood of a right length to meet one another at the posts; these would be the better for splitting, and may be composed of branches or sticks, from four to six inches through ; cut them to reach from the outside of one post to the outside of another, because they must lap over at the posts, and one spike nail must join the two.

When the posts are fixed, make two shallow saw-cuts at the same side, within four inches of the top, and four inches apart ; chisel out this width of four inches, that the rail may rest upon the ledge thus formed ; the rail that goes next the post must be narrowed, if necessary, to go in close, and the two should be mitred, to lap over each other, and the same spike driven through both. Others will mitre them sideways, and drive in two spikes, thus:—



the advantage of this is, that both rails rest on the shoulder, whereas if they are made to lap over each other the other way, one only rests on the shoulder ; that is to say, the inner one, the outer one being held only by the spike.

These rude fences are the best, the cheapest, and most durable. But there are many others. If you can saw your timber into planks, you may make a close fence by posts and double rails, and nailing the planks thereon. Many, however, will be obliged, for economy, to dig deep trenches, and form the soil taken out into a bank. In some kinds of soil this will do ; and if the soil be wet, the ditch may serve as a drain as well as a boundary fence ; if dry, the ditch must be deep enough to deter animals from getting down into it and breaking the bank. As vegetation is rapid in many of the emigrating countries, hedges of the prevailing plant for that purpose, or of any rapid growing plant that would form one, may be made at the same time as the fence is made, so that it may grow up an impenetrable barrier, in the course of time. If you have occasion for a good deal of regular timber, you will have slabs cut off from the exterior parts of the trunks, and these slabs are useful in fence making ; they may be used either for the posts or rails of rough fencing, keeping the flat

faces on the side you want to nail the rails, to hold them well together. Much, however, depends on the extent of the fence, and its strength, form, and height, must be decided upon accordingly.

Another kind of fence is the *ha-ha,* which consists of a high bank, formed by digging away the ground from the proper level, and is of great service when you do not want the view to be hidden. The soil taken out

has only to be spread over the adjoining ground. It may be very desirable for a homestead, which may be as effectually preserved from intrusion by this means as by any; and it possesses the advantage of being no obstruction to the master's view over miles of his own land. This can only be done with stiff land, or by driving in stakes close together, with slabs or planks, to hold up the ground, because it must be nearly upright to be effective, and ordinary soil would soon slip and crumble into the ditch or trench formed in making the bank or side. There are many other modes of making a boundary protection, dependent, however, on materials, and of these none but wood can be fairly expected.

PREPARATION FOR CROPS, MANURING, &c.

The clearing of wood is of itself a fine preparation; and a good dressing of wood ashes, from the burning of the waste underwood and rubbish, is all the ground need have. Grass or pasture land may yield at once to the plough, and that needs no other dressing than the turning in of the turf. But the plough will not be desirable for carrots, and beet-root, or mangold wurtzel; it is far better to have as much trenched as you wish to appropriate to domestic crops, that is to say, for your own food, as well as that of cattle. Land that has not been arable or in cultivation, will in most instances give good crops without any dressing, and this must be the fate of the first land you crop. Indeed, it ought to be, for it is the only way to know what the soil will do; and in some places, where it is rich alluvial, it yields wonderfully. It is impossible to say here what is the season for sowing, in so many different climates as are now open to the emigrant; he has only to watch the vegetation of the place, and be guided by that, as to the time of sowing and planting. In Canada the frost may break up; in some of the warmer countries you must wait for the rainy season; in Australia there may be several crops had in a year; in New Zealand you may take any English garden book of good authority, and act upon its directions. In all cases, let the first crop come off without any preparation, but in after seasons be guided by circumstances. Your stock will find you in manure, if well managed; but remember, not an atom or drop must be wasted, or allowed to run away, or dry away. Every kind of offal from the house—dirty water, decayed vegetables—everything that might be called a nuisance—should, nevertheless, be carefully preserved; removed from the dwelling, certainly, but so laid together that no moisture should run away. The most offensive matter can be prevented from becoming unpleasant by covering it with soil. Cesspools are a means of accumulating any kind of nuisance; and when these are emptied, the contents should be carried to where there is already prepared a couple of feet of loose earth, in a hole, dug, say four feet deep originally. Into this the soil, and dirt, and wet, and any kind of rejected filth, should be put; and when done, covered with at least a foot thickness of earth; here it may remain for a year, and when wanted, the whole of the soil in the hole will be a mass of fertilizing material, of which a very small portion will go a long way. But this sort of manure, composed of night soil and slops of all sorts absorbed by common soil, will nevertheless be very strong, and should be laid on the soil very thinly, to be ploughed in before it is sown, that the roots may find the benefit when they shoot down. Stable dung, pigs', cows', and poultry dung, rotted leaves, and every description of decayed vegetable and animal matter, are useful on land, especially poor land; but every acre of new ground may be fairly tried without the least dressing, that you may see what it will do without help, and act accordingly. The ground that has been trenched only wants to be laid level for broadcast sowing, or in ridges for other cropping. Suppose the country is very hot, the ground may be laid in high ridges, for the crops to grow in the bottom, and be shaded from the sun. If the land lies low and wet, let the plants grow at top of the ridges. In any case your season of sowing and the nature of the soil must determine you as to the preparation; but ground cannot be disturbed too deep; the more the air is let into it, the better everything will grow. If the ground has been simply pasture land, ploughed up, the lumps must be broken before it is sowed or planted. If it be full of weeds or roots, or otherwise foul, it should be forked over, that they may be all taken out, and burned; and before anything is planted or sown, this foulness should be cured. Ground once cleared is ready for any crop that does not require deep rooting. Land stirred six or eight inches deep with a plough would do but ill for carrots, parsnips, beet-root, and mangold wurtzel; trench ground for these crops, and the yield will be heavier and the crop handsomer than it would be with the best ploughing. Much depends on the season, much on the situation; but it is an old and excellent piece of advice, to stir the earth well, and as deep as the crop requires it. Among the preparations for cropping, the dressing or manuring of the ground after it has done something well, is among the most universal. Clay lands are the better for lime, for sand, and for knocking about; light sandy soil is the better for marling, that is, dressing with marl or loam, or any stronger soil; wet land is the better for draining; but all must be stirred

well, cleared of roots and weeds, and all sorts of foulness; and if poor, well manured, and the manure at once ploughed into the soil, that it may not be wasted by evaporation.

DRAINING.

This operation is intimately connected with your supply of water; we have already explained that you should make an excavation at the lowest part of the ground, or at least at such place or places in which the water is inclined to stand: this may not be the lowest; it may be a hollow, where the soil is clayey or retentive, and therefore the best of all places for an excavation. If there be no such place, you are already advised to excavate at the lowest part; make then deep ditches, say four feet deep, leading into it from other parts of the ground, so that they have a slight descent all the way. These ditches should be along the lower sides of the cultivated plots, and may be found useful as boundary ditches to part one portion from another. The soil taken out in forming the ditches will make a bank, an effectual fence against cattle. When the ditches are made at the lower side or ends of the ground, to lead into the excavation intended as a receptacle for water, form the drains from the highest ground as straight down to the ditches as you can bring them. The drains ought not to be more than two rods apart, and it may be that when these are formed in some grounds, they will not be found sufficient; for there are swampy and clayey lands that require them as near as one rod apart; it is however quite as well to try two rods first. These drains ought to be three feet six inches deep, and cut down in the form of a narrow V, and they must be set about carefully, in the following manner:—First dig with a common spade fifteen or eighteen inches wide and one foot deep; next take a narrow spade to make the next spit, chopping down the sides very smooth and even, but sloping so that at the bottom of the second spit it will not be more than seven or eight inches wide, or if cleanly done not much more than six inches; then use a regular draining tool, which is a narrow spade that tapers to three inches wide. After the drain is thus cleared out three feet deep, you use a proper draining scoop, and go six inches deeper, down to almost a point. Be very particular as to clearing out all the crumbs, so as to have everything smooth, that the water may have a clear run. In all this work you must begin at the lowest part and work upwards, that the water may run away from you. The drains being cleared out, you have next to consider of some material for preventing the earth from stopping them up again when you return it to its place. In England there is no difficulty in procuring tiles, but in the colonies we must use what we can get; large stones that will not reach the bottom will be effective, but the material most likely to be at hand is wood, such as the branches of trees and the cuttings of various kinds of underwood, cut so that they will go in but not fill up the bottom; there may be as much of this put in all along the drains as will nearly half fill them; and if this material be trodden down hard, it will form a good flooring for the returned soil, and yet not fill the ground down to the sharp point. But it is possible that you may neither get stones nor wood, but be dependent on the very soil you take out. If so, put in the top clods that you took from the surface; these from their size will not reach the bottom, but will prevent the rest of the soil from going below them, and thus leave an open space below for the run of water; whatever may be put in, the rest of the soil must be returned to the trench you have formed. These drains will feed the ditch you have made at the lowest part; and this ditch, or rather the ditches, will feed the principal pond, and not only relieve the ground, but supply you with what you really want in almost every situation—water for the cattle, if not for home or domestic use. Suppose the pond is too full to receive the contents of all these drains, and that for want of relief the drains cannot empty themselves in winter and wet seasons; be not therefore deterred from draining, because if by reason of dry weather the pond is low enough to receive the run of water for only one week in the whole year, it is a relief, and does the ground an immense service. More than this; if the water be in such plenty nine months or more in the year, the good very much overbalances the evil, and the end is attained; the land is relieved under the worst circumstances, and the supply of water is in most countries a blessing, besides which you may fairly conclude, that but for the drains the pond would not be so full. In short, draining the ground under any circumstances, even if apparently useless eleven months out of twelve, is of great service. These drains let air into the earth, and prevent stagnant water; for notwithstanding that the pond may be full, or at least the mouths of all the drains covered, the pond is constantly, however slowly, consumed by cattle, by evaporation, by being withdrawn for domestic use, or by all three; and though the mouths of the drains are filled, they are continually giving out some water, while more may be accumulating, so that it is not the same water standing in the same place, as is the case when the land is not drained. Nor need it be feared that land is too dry for draining to be of use. It is

always of service, though few can be induced to drain, unless they have the inconvenience of wet on the surface, and so many things press more. This is a matter which we do not interfere with; money and labour may be too scarce to throw away, or rather we ought to say to expend, on what does not really press. But let no one for an instant suppose that draining does no good to land that lies very sloping; they might have furrows on their surface, to run off the rains, but these do not avail the soil below; ground on the side of a hill is more likely to deceive us than any other. But if for no other purpose, we ought to drain to get the waters together; and the more scarce water is, the more we should be induced to drain, to get the supply in one, and that the most convenient spot. In returning the soil over the drains, it will be found that a good deal cannot be pressed in; first, because there is a part hollow and therefore the soil which originally filled the hollow place is now surplus, and secondly, because having been loosened it does not lay so close. This surplus must for the present form a ridge along all the drains, but in a season or two it will subside a good deal, and may be spread right and left to make all quite level.

HOW TO APPROPRIATE THE LAND.

Whatever will keep best, may be most esteemed for general cultivation; therefore, grain of all sorts, maize, peas, beans, millet, and whatever else may be used in the seed state, may be grown somewhat largely. In Canada, New Zealand, and other cold or moderate climates, there is but one complete season of any thing. In more tropical regions there may be two or even three seasons of grain in a year; vegetation is rapid, and the sun ripens everything very fast. But there are many circumstances that operate to vary the times of sowing. The crop that is greatly relied on in warm climates is maize or Indian corn; this in cold climates should be raised in a hot-bed, and planted out when the frost breaks up, but in warmer countries it may be dibbled into the ground from one to two inches deep, and well rolled in. This crop is excellent for all animals that will eat it, but it should be always ground into coarse meal, or boiled, for stock of any kind; and when boiled, the liquor is excellent for pigs. Besides this, the Indian corn is an article of commerce, and is getting into use in countries where they do not grow it; in fact, it may now be placed among bread-stuffs, and is by no means an ineligible article for exportation. Wheat, barley, oats, rye, hemp, flax, tares, peas, beans, and seeds of every kind that can be consumed dry or may be exported easily, may be grown with advantage, but those are best which serve for the food of man; and at least enough for one's own consumption should be grown of several kinds. Peas and French or haricot beans should be grown rather plentifully, not with a view of indulging in green vegetables so much as for a good stock of seed to lay by; for if wheat, barley, and oats fail, a man will not starve if he has peas and beans in store. In short, we know of nothing after wheat that is equal to peas and haricot beans for usefulness as winter food. Everybody knows what excellent soup the pea will make with the aid of a little meat; but everybody does not know what an acceptable food the haricot bean is when simply soaked twenty-four hours in plain water, and then boiled with a little salt in the water until it is tender. The best bean for this is the large white kidney, both for appearance and flavour, although the black, the dun, and other French beans make a very good substitute; but the white is the seed to take out. Wheat is, however, a very safe crop in most cases, and especially in warm countries, because it is so short a time in the ground, so that it is desirable on every account to sow a reasonable quantity. In Canada, where the winters are hard, spring sowing is the best, if not the only way to succeed well; for although the winter is sharper and less changeable, the summer is more certain. With regard to the seasons for sowing and doing the farming and gardening operations, they differ in different places and climates, and it is impossible for a man to pass into the interior without seeing all the way he goes the state of the crops, and learning, by the most brief and simple inquiries, the periods of sowing, which might be all learned and memorandums made at the very first stopping place. The principles of farming being understood, those points which depend on climate are easily acquired in a short time.

The method of sowing all these seeds depends on the materials and implements you can command. As it is not very likely you can command drilling machines or dibbling machines, you must be content to sow broadcast, which is, sprinkling the seed all over the ground as evenly as you can; but with regard to peas and beans, drills should be drawn with the plough, or if the space be small, by hand with the hoe, and the individual seeds be dropped into the drills at such distances as the sort demands. As in warm countries the growth is very rapid, it is well to confine the peas to dwarf sorts, and if these are two inches apart in single rows two feet from each other, the crop will be full enough. Beans of all sorts will do better six inches apart, and the rows two feet asunder; there is then room to hoe and earth up, either by hand or

with an earthing plough; we are, however, now rather describing crops, than giving directions for their culture.

Of the green crops, the most useful are cabbages, carrots, parsnips, beetroot, mangold wurtzel, turnips, and onions. All of these are excellent for home feeding stock of various kinds, and they will keep some time with care. The most temporary is the cabbage, but while good this will do for use as a vegetable, and the waste will come in for the pigs in the dung yard; all the others are more easily preserved. But though mentioned last, we must not underrate the value of potatoes, one of the most useful and nutritious of green vegetables: the quantity of these can hardly be wrong, for every kind of animal likes them; poultry of all sorts will eat them when boiled; cattle of all kinds thrive upon them, as a portion of their victuals, and we can find no substitute for it as human food, when we calculate its value, by the produce of an acre by the side of an acre of any other crop. But it must always be borne in mind that none of these so-called green crops will either keep at home, or travel so well as hard seeds; and therefore no more should be grown than will secure you with all the quantity you can possibly want, and what, from particular circumstances, you think you can sell at tolerably near markets. Of the particular sorts to take out we shall have something to say in another place, for it may be calculated upon, that a little more cost for the best adapted varieties will be well and wisely incurred.

CROPS: WITH DIRECTIONS FOR CULTURE.

The best way to provide yourself with proper and profitable crops, is to take out seeds, and not attempt to carry plants of any kind. There is scarcely a plant or vegetable worth growing of which you may not obtain the seeds; and perhaps the best information we can give will be a summary of the kinds of seeds that should be selected, their prices, and the treatment they should receive.

Garden Crops.

Pea.—The pea is perhaps the most valuable of all the vegetable seeds. Gathered green they are a luxury of the highest class, and dried they make the finest of all vegetable soups. As to the sorts, the Prince Albert, 1*s.* 6*d.* per quart, and Hotspur and Charlton, at 6*d.* per quart, are excellent early kinds; and Knight's Dwarf Marrow, Groom's Superb, and British Queen, at 1*s.* per quart, are capital later ones. These should be sown in drills, not near to one another, but one row in a place, at different parts of the garden. Peas grown away from each other, with plenty of room, bear twice or three times as much as (and a good deal finer than) peas in rows near one another. But if it be determined to grow a quarter of the garden or field all peas, the rows ought to be from three to six feet apart, according to the height they grow. When the peas are up, earth should be drawn to their stems; and as they grow taller, sticks should be placed for their support. If you find after sticking peas that they outgrow the height you expected, get taller sticks to put to them, but attempt not to take the first ones away, because the tendrils of the peas have hold of the twigs, and it would break and damage the plants to remove the sticks. When the plants have grown to the height of the sticks, pinch off the tops. When the crop is fit to gather to shell and eat green, you may indulge; but if you have any other vegetable, be sparing of the peas, because if you saved a barnful they are like so much money; they afford the most nutritious food when split and boiled in soup; they keep good for many years; they are easily exported in bulk, and always find a market at the nearest town.

Bean, French.—This is a valuable crop, and the only ones you need take out are the white haricot or kidney; they are fine to eat green, and the best of all for flavour, when the seeds are ripe. Sow them in drills six inches apart in the drill, and the drills eighteen inches from each other. When up three inches high, draw the earth to their stems. They require no more care, but may be gathered green in a young state to eat as a vegetable, or allowed to ripen to preserve as long as you please. They bear exporting, are in the seed state acknowledged as an important article of human food, and converted by a peculiar sort of cookery into a luxury by the French. Let them be well ripened before they are harvested. They are 1*s.* per quart.

Bean, French, Scarlet Runners.—This is the well-known large fleshy bean that in England is only eaten green, and before the pod gets too large, with the seed. It may be well to take a few, but the ripe seed has by no means a good flavour, so that except as a green crop, or to furnish seed to export for planting, it is not worth while to take much or to grow much. They are 1*s.* per quart.

Bean, Broad.—Early Magazan, early Long-pod, early Windsor, 6*d.* to 8*d.* per quart; sow these in drills nine inches from seed to seed, and the rows two feet apart; when they are up, draw earth to their stems, and when in bloom, pinch off the tops; these may be eaten green or saved dry for seed.

Carrot.—Early Horn, Long Surrey, and Altringham, 3*d.* per ounce. Let the ground be dug eighteen inches deep, and well broken; sow very thinly and regularly all over the ground, and rake in well; when well up, hoe

out as many as will leave the plants at from six to eight inches apart; keep them very clear from all other kinds of plants. It will be necessary to go over them with a hoe the second time, to cut up any that may have been left within the distances; these may be drawn for eating as soon as they are large enough, but to keep as a stock for feeding cattle or domestic purposes, they must be full grown before they will store well.

Beet.—Finest red, 4*d.* per ounce; sow these in a drill two or three in a place, and the patches nine inches apart. The drills may be eighteen inches from each other; when well up, take away all but the strongest in each patch. The ground should be well dug eighteen inches deep for this crop.

Parsnip, to be had at 3*d.* per ounce, and to be sown and afterwards treated precisely the same as the beet.

Turnip.—Early Dutch, Stone, Snowball, 3*d.* per ounce; the Border Yellow in cold climates; the Swedish for cattle. These have all to be sown thinly, and hoed out to six inches apart, the Swedes to nine inches; they may want going over a second time in a fortnight, to cut out any that may have been left too near together, and to clear them from weeds, but beyond this no crop gives less trouble.

Rhubarb.—Let these seeds be sown and managed the same way as beet root, and the second year be planted out a yard apart every way; the third season the leaf-stalks will be large enough to cut.

Celery.—Take out a quantity of this seed, for it is capable of being used in soups in the seed state, and an excellent and palatable addition it makes when we have not the plant for use. The solid white and red are 4*d.* per ounce, but considerably cheaper if purchased by the pound; the Giant red and white are 6*d.* per ounce. Some pains must be taken to grow this well; dig a trench a foot deep, and dig the bottom a foot lower, to loosen the soil; drop three or four seeds in holes at the bottom, every six inches, make other trenches four feet apart, and repeat the sowing of seeds. When they come up and begin to make growth you will observe which plant takes the lead, and remove the others. If the ground is rich it will require no help, but if poor, water with liquid manure. As the plants grow, draw down some of the earth to the stems, and take care that there be no lumps, but that all is broken fine, so that it may lie close; by degrees you will fill the trench up level, and you have then to dig alleys between, and begin to bank up the rows. It is only by this means that we can whiten the stems as far up as the earth covers them, and it is only the whitened part that is tender. The earthing up is frequently required, because you must not raise the soil too much at one time, otherwise it would get into the heart of the plant. This crop is useful as soon as there is six inches of whitened stem, therefore you may always begin using it a few weeks after planting, although it will not be half the size that it ultimately attains. Besides using a quantity as a salad, and for soups, always put out or leave out a few plants for seed, for the reason we have already given—its usefulness even when we cannot get the plant—besides which there is the necessity of keeping up a stock for sowing.

Onion.—A most valuable and wholesome vegetable in all climates, and one that cannot be neglected. The Spanish, Portugal, Tripoli and Deptford are good sorts, and may be had always at 6*d.* per ounce. These may be sown in the richest ground you have, well dug and levelled; sow thinly; when well up, thin them out to six, eight, or ten inches apart, according to the warmth of the climate and the richness of the ground; keep them clear from weeds, and although you may keep drawing and eating as soon as they are large enough, you must not pull them up for storing till the leaves have done growing and begun to turn yellow, when they must be well dried, and laid by in the coolest dry place you can find.

Leek.—London-flag 6*d.* per ounce. An excellent crop for the garden, often succeeding well when onions fail, and of all things desirable in soups. This may be sown thinly, and hoed out to six inches apart; or, taking advantage of wet, they may be pulled up to six inches apart, and the plants pulled up may be planted six inches apart, to increase the space occupied; the ground should be rich.

Brocoli.—Early Cape (purple and white), Cream, and Walcheren, 1*s.* per ounce. These will be the better for sowing in a patch or bed thinly, and planting out at two feet apart; but if there be not a wet season, you must well water the seed bed before you take them up, and have somebody following with the watering pot, to saturate the ground as fast as you put them in; also let the planting be done after the sun is down, and before it is up.

Cauliflower.—Walcheren, early and late English, 1*s.* per ounce. These require the same treatment as brocoli, for the check which they receive in planting out does something towards bringing on the heading of the flower. The instant the flower shows, break down the leaves so as to form as close a covering to the flower as possible; it preserves the colour and the tenderness of the head, which would soon be coarse and rank if this were not attended to.

Borecole or Kale, brown, green, curled, and variegated, 4*d.* to 6*d.* per ounce. These may be sowed in a patch thinly, and when up

transplanted two feet apart every way; but if the locality be very hot, it will only be safe to transplant in the rainy season, or to sow where the plants are to stand; in this case the drills may be drawn two feet apart, and two or three seeds dropped at every twelve inches, that the weakest may be taken when up, and only one strong one left to every foot; as soon as these have grown large enough to eat the tops, take up every other one, and leave them two feet apart.

Brussels Sprouts, 1*s.* per ounce; treat as brocoli in every respect.

Cabbage.—Treat as Brussels sprouts and brocoli. The best sorts to take out are Early Dwarf, York, Sugar-loaf, and Vanack, Large Imperial and Battersea, 6*d.* per ounce.

Cabbage, Savoy.—Drumhead and large yellow, 6*d.* per ounce. Treat like cabbage.

Sea Kale.—Sow the seeds of these two or three in a hole, with holes two feet apart every way; when they come up, take away all but the strongest. If you like to plant out those you remove, you can cover more ground with them. Let them grow and decay. The third year cover them up with earth nine inches deep, and when the plants break the ground to come through, remove the earth to the crown of the root, cut off the blanched shoots, which are boiled and eaten like asparagus. They do not all protrude, and want cutting at once; there is a fortnight or three weeks between the first and the last. Some instead of earthing them over, cover them with an inverted flower-pot in total darkness; and to force them these pans are covered with hot stable-dung or fermenting leaves. The seed is 2*s.* per quart.

Asparagus.—Dig the ground well, and if it be not naturally good, endeavour to enrich it; draw a drill, and drop a seed or two at every nine inches, and cover them up; let these rows be three feet apart, or even four; when they come up, take out all but one plant in a place. Let the plants grow up and decay, but if they bear seed, save it, for the chance of selling it or increasing your plantation; when the plants decay, cut them off. Sow salt along the row, enough to make it look white. Let it come up a second time and complete its seed. The third time it comes up, cut it for use; but when the second plants are cut down, cover with three inches of soil, and when they come up, let them grow three inches above ground, and cut them just under the surface. Price 3*d.* per oz.

Artichoke.—The seeds may be sown thinly, and the plants, when a few inches high, planted out in rows four feet apart in the row, and the rows six feet apart; or it may be better in a hot country to drop four or five seeds in each of the holes at these distances, and when they are well up, pull out all but the strongest. Price 1*s.* per oz.

Cardoon.—Spanish and large purple, 6*d.* and 1*s.* per oz. These are grown like artichokes, but it is the stems that are eaten. Those who like them may grow them, but we consider them not one-half so good as any other vegetable. As they grow they are earthed up, and the thick part of the stems is boiled, but are not nearly so fine as a good cabbage stalk.

Potato.—This crop can be raised from seed, and a packet will cost but 6*d.*; you may buy packets of twenty different sorts at that price, but this would be useless, even if they were true, because from one hundred seeds you will have a produce including early, late, round, kidney, red, white, rough and smooth, large and small; and you may select the best for increasing to a stock. In a warm country sow the seed thinly, and as soon as they are large enough to bear removing, plant them out a foot apart in rows, two feet from each other; earth them up as they advance, and clear them from weeds. When the haulm decays, dig them up carefully, and as you come to any remarkably good, or in any way singular or promising, put in a bag by themselves all that belong to that root. All the ordinary ones that present nothing very inviting throw together; the largest to eat, the smallest to plant the year following. The remarkable ones must not be touched for food, but be planted all out at the proper season, and again kept separately; from their produce you may venture to boil one or two, to try their qualities, but they must not be thrown away if they do not eat well, though they may be safely prized if they do; let those that do not boil well be planted the next year in a different kind of soil, and they may prove altogether as good.

Spinach.—There are two sorts, the round-leaved and the prickly; the one is soon in perfection, and runs to seed directly; the other is in season a considerable time. The first is drawn up as soon as there are six or eight broad leaves, and the root cut off, that the rest of the plant may be boiled; the second has the large leaves picked off to form the dish of vegetables, and therefore, so long as the leaves will grow, there is abundance of supply. They are both sown very thinly, and hoed out to eight inches apart; they soon touch one another, and this is the time to pick off the largest leaves for a dish with the prickly sort, and to pull up altogether the round-leaved sort. We have had the round leaved sort yield a good picking or two before it went to seed, though it is a summer vegetable, and starts pretty soon to flower. The seed of both is 1*s.* a quart.

New Zealand Spinach.—The leaves of

this plant are picked off for boiling; and the plants continue to produce them for a long time. In a temperate climate they do well. The seeds should be sown in a sheltered spot, and the plants put out at a yard apart every way in rich soil; about a score of plants will furnish a good supply. The seeds are sold in England at 6*d.* per oz.

Cucumber.—The ground must be dug and levelled, and three or four seeds placed in a patch two or three inches from each other, and these patches should be ten feet apart. The best kinds to take out would be Syonhouse, Cuthill's black spine, Hamilton's do., Mills' do. All may be had at 6*d.* or 1*s.* a packet. As soon as the plants have six leaves, pinch off the top to encourage side branches, and if these incline to ramble along instead of throwing out side shoots, pinch the ends off of these also, but if fruits show they may be safely left to themselves.

Squash, Vegetable Marrow, &c.—This is the name given to many of the gourds, but nearly all of the gourd tribe are eatable at an early period before the formation of the seeds; they may all be grown like cucumbers, only two plants in a hole are enough instead of three.

Parsley.—The best 4*d.* per oz. An excellent herb for broths, stews, stuffings, and other seasoned dishes. To be sown thinly in drills; when up, pull out so as to leave the plants six inches apart in the rows, and the rows should be a foot from each other; if it can be done, pull out those with the plainest looking leaves, and leave those with the best curled foliage, This is an herb constantly in use, and should not be neglected; the seed also imparts the flavour, as in the case of celery.

Salsafy, Scorzonera, Skirret, Sorrel, Balm, Bazil, Chervil, Fennel, Marjoram, Sage, Savory, Thyme, and many other herbs, may be had in packets of seed, requiring no more than sowing, thinning out to six, nine, or twelve inches apart, according to the size of the plant, and then remaining to form a complete herb bed. It is as well to take the majority of these, because there is no getting them three or four hundred miles up a strange unknown country, and a store is no sore if you do happen to find some of them. All may be had in 3*d.* packets, or even less.

Lettuce.—The best of salads, and the numerous kinds admit of keeping some all the year round. The best sorts are Bath Cos, Brown Cos, White Cabbage, all 6*d.* or 1*s.* per oz. These may be sown thinly enough to cut them out to six inches apart, and then left to heart. When they have grown to a full size, if they have an inclination to heart of themselves, there will be no occasion to tie them up; but if you want some earlier, tie up the plant so that the heart cannot grow out, and it will fill and whiten sooner. The cabbage kind heart very well; they want no aid. In England and in North America lettuces may be planted out at proper distances after they have grown large enough to be handled, but in hot countries they will not bear this, nor will they in all places come to heart at all; they will run away to seed. The best chance is to sow them where they are to stand, and give them room by cutting out all that interrupt their growth. Less than six inches apart will not do, and in some places they want nine inches, growing much larger and finer than ordinary, but this will soon be found out.

Endive.—An excellent salad for any season. Sow it thinly all over a bed; when up, cut the weak plants, leaving the rest at about six inches apart. When these have grown to a fair size, tie them up close like a lettuce, or lay a board on them, or if you do not mind the trouble of washing them for use, dig up the soil between and cover them up; they require to be kept from air and light a few days, to whiten them, but how you do this matters not; you may cover a pan over them, if you please. They are eaten raw, like other salads. The principal sorts are white curled, and white Batavian, 6*d.* an oz.

Radish.—This favourite salad root has only to be sown thinly, and drawn when large enough to eat. There is a long sort and a round sort, and of each there are several varieties. The early scarlet, early short to red turnip and white turnip, may all be had at 2*s.* per quart, and are worth taking out. Salad radish is to sow and eat like cress, mustard, &c.

Corn Salad.—The seed is 3*d.* per oz. Sown and thinned to six inches apart. The leaves picked form almost a perpetual salad; always a nice addition to any salad, and eatable by themselves.

Mustard.—An excellent salad, and a very necessary condiment in the seed state, for by grinding it, and sifting out the husks, we obtain the mustard of commerce, only very much more pure and serviceable. It is sown as thick as cress in rows to cut for salad; but sown very thin and hoed out to nine inches apart, to save seed from. If the ground be rich, it will require eighteen inches instead of nine. Seed 1*s.* per quart.

Rape salad is not so pungent as mustard, but has much the nature and appearance of it, and must be sown the same way as cress and mustard; cut at the same age; it is in most markets sold as mustard.

Cress.—Used as small salad; sown thickly in drills, and when two or three inches high, cut close to the surface. Seed 1*s.* per quart.

Cress, American. — A perennial, and

forming another kind of perpetual salad; somewhat pungent, but often useful; only requires to be sown, thinned out when up to six inches apart, and picked as wanted.

Cress, Water.—This will be useless unless you have running water, or at least plenty of water that will enable you to change it, but if you can command this, sow the seeds with a level bottom of moderate soil and nearly empty. As it comes up, water may be allowed to rise, and when once established, you may cut them up and plant any quantity, for they will strike root and grow rapidly. 6*d.* per packet.

Melon.—These are luxuries; but in warm countries, though they may already abound, some of our better sorts would be acceptable, such as Beechwood, Windsor prize, Cabul, Duncan's green flesh, and new Egyptian, which may be had at 1*s.* a packet, and a packet of each may not be thrown away. If the place be cold, there must be the usual hot-bed and frame treatment; if warm, they may be grown the same as cucumbers in every respect.

Tomato.—In hot countries these would only require to be dropped into the ground a seed or two in a hole, at about two feet apart, and they would cover the ground with a mass of fruit. In cold places, or where the summer is short, they should be raised in hot-beds, potted, and not turned out till the warm weather has set in; even then there should be a sloping bank made, with the sides north and south, and the plants should be put out so as to trail up the south side, for it is a trailing plant. The fruit would be cleaner if there were walls or wooden frames to fasten them to, but there is always the ground on which the bank can be formed. A packet of the red or yellow sort can be had for 3*d.*, and the sauce made from the tomato is in great repute.

Mulberry.—The tree will be a long time in coming to perfection from seed, but many who were deterred by the distant prospect of advantage in sowing seeds, have stayed the time out at which vines, pears, plums, and twenty other subjects would have attained perfection, and sadly regretted losing the opportunity. Mulberry seed, the black sort, may be had at sixpence per packet. It requires to be sown thinly, and when up merely thinned a little to give room to grow. The first year they may be planted out a foot apart in a row, and the rows two feet apart, for growing two years; they may then be placed a yard apart every way for three years more; then removed again to six feet apart. During all this time, you must take off the side shoots if you want upright stems, but if you require bushy and short trees, let them alone. By moving them every two or three years, you hasten their fruiting, the constant checks being also beneficial in another respect; the trees are by that proceeding completely prevented from throwing out their roots so far; indeed, if there are long rambling roots, they have to be cut back from the very first planting.

Nectarine, Peach, Plum, Cherry, Pear, Apple, and large fruits, can be taken out; and if you have not had an opportunity of saving pips, stones, &c. from fruit of your own choosing, you must trust to the seed shops. It is, however, far better to buy the fruit and know what you save. All these things may be advantageously sown where ground is cheap, and by the constant shifting from one place to another, they will much sooner bear than if they were kept in their original places.

Raspberry seed may be had of almost any of the sorts, but even here you can only depend on what you yourself save for any particular sort; but as there are no very bad raspberries brought to market, and one sort is pretty nearly as good as another to seed from, you may get this at a seed shop if you have not the opportunity of saving it yourself. This may be sown thinly on a bed, and the plants allowed to grow for one season; they may then be planted out three feet apart, in rows six feet from each other; other crops can be grown between, and the raspberries may stand till they fruit, which will be as soon as the canes are strong enough; they will all be quite good enough to use; and if you find any better than usual, take care of the plant, propagate it by parting the roots, and in time make a plantation of it. In the mean time, your seedling plantation affords you plenty. When the leaves fall, cut off the old stems and leave the new ones to bear the next year; as soon as these have dropped their leaves, shorten the strongest to four or five feet; cut all the weakest off close to the roots, and they may require stakes to tie them up to.

Strawberry seed may be sown thinly, and have a year's growth, when the plants may be dug up, and planted out a foot apart every way, on beds four feet wide, with alleys between them two feet wide; take off all the runners the first two years, that the plants may acquire strength.

Gooseberry and Currant seeds will succeed well anywhere; sow and treat as raspberries.

Nuts of all kinds may be also taken out, and treated as mulberries.

Grapes should be treated the same as raspberries.

All these fruit seeds may be had at about sixpence or a shilling per packet. The only things we should be very doubtful of would be pear and apple pips; because the perry and

cyder makers could supply bushels of pips, not one in ten thousand of which would bring a sort better than the wild ones.

The foregoing may be taken out in the form of seeds, the following as sets or roots.

Potatoes.—You might attempt to take out enough of the few best true sorts to begin your stock from. The Ash-leaf Kidney, Rilott's Flour-ball, Thurston's Conqueror, Looker's Oxonian, Soden's Early Oxford, and Burgess's Prolific, are all worth trying a few of; they must be dried under cover for some time before they are packed, and then they should be put in barrels the last thing before starting; they will be a prize when you arrive out. Plant whole tubers about the size of a walnut, six inches deep, nine inches apart in the rows, and the rows three feet from each other; when they are above ground three or four inches, draw a bank of earth up to the stems, so that there may be three or four inches of soil on the uppermost tubers produced; large sorts of potato will bear a longer distance from each other. Take up when the haulm is decayed, and store them cool and dry.

Artichokes, Jerusalem. — The tubers, which should be about the size of a good walnut, are to be planted whole at six inches deep, a foot from each other in the row, and the rows four feet apart; when up four inches, the stems should be earthed up nearly to their tops; when the plant dies down, the roots should be taken up, the largest selected for eating, the middling down to the size of a walnut for seed, the smallest for the pigs. The plant grows very tall, and will form a blind to any place eight or ten feet high.

In all the sowings, hoeings, and the like, previously directed, it must be borne in mind that clearing away the weeds is indispensable; and in the case of ground just cleared, or that has been for centuries bearing only wild plants of all kinds, there is very little chance of its being other than foul. We have said very little about weeding or the ordinary duties of the gardener. Watering in dry weather, when it can be done, is desirable. Our chief reason for recommending seeds to be sown where the plants are to remain, is that the plants may have to go a considerable depth after moisture, and removing invariably breaks off the lower spongiolets, and many of the side ones; but if the plant be sown where it is to remain, it has a treble chance of getting a supply over one that has been transplanted though only from one wet place to another. We have said very little about earthing up crops, and many other subjects that come as matter of course; nor can we say anything about the seasons for sowing, because such instructions would not suit two places of different climates; any common observer of crops and of seasons will know the spring from the autumn, and if it be a tropical climate, the crops may be sown at all times, but advantage should be taken of the rainy seasons, and the seeds sown when the ground is in the best order. If, on the other hand, it is a cold climate, and the earth is frozen half the year, any one would know when the frost breaks up that it is the time to set all things growing; and be it remembered, that in cold countries there is no snatching, hot and cold, frost and wet, mild and bitter weather, succeeding each other in the same day. In such countries it is cold while the cold lasts, and it lasts perhaps a long time; but when that breaks, warmer weather succeeds, and sometimes even burning hot, but there are no relapses, so that when once the frost is broken, plants go on well.

Farm Crops.

Wheat has to be sown, as well as you can, broadcast, that is, thinly all over the ground; the surface should then be harrowed, and rolled. Many an acre of wheat has been sown and only trodden into the ground. The harrowing is more easily managed, because you have only to carry out the spikes for a harrow, and it is hard indeed if you cannot make a frame to hold them.

Barley and Oats in England are sown at a different time to the wheat; but Australia, New Zealand, and many of the colonies in the south, defy all seasons of sowing; sometimes one thing, sometimes another, but in many places they wait for sowing a crop only till the previous crop comes off, be it at what time it may; the ground is never idle.

Indian Corn.—This is a valuable crop, because it will, in its dry state, keep its quality for many years. In a warm country it only requires to be dropped into the ground, eighteen inches apart every way, or twelve inches apart in rows two feet asunder, so that it may be possible to get between the rows to give the necessary attention. If the country be cold, or the summers short, raise the seeds in a hot-bed, to grow until the weather breaks up, and plant them out at those distances; when the ear is very young, it may be eaten green as a vegetable, boiled in salt and water, and dished up like asparagus, to be eaten with melted butter; but its chief value is as grain. It is the most nourishing food for cattle, and the meal will make very acceptable, but, by comparison, very ordinary bread; when ripe, the ears are cut and brought away in baskets. The plant makes a sort of fodder, but the stems are too strong to be eaten without being chopped small, and they are not worth the trouble when anything else can be had.

Growing Turnips, Carrots, Mangold Wurtzel, Parsnips, Cabbages, various seeds, Peas, Beans, and all other crops of the kind, is merely gardening on a larger scale ; they are all useful as food for cattle, and the sowing of them can only be determined upon according to the climate of the place, and the seasons that the climate produces.

STOCK ; AND FEEDING IT.

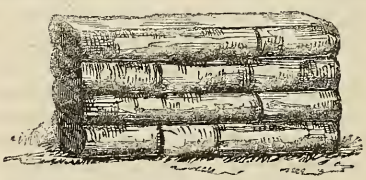
The principal advantage to the emigrant is pasturage ; he may keep sheep by wholesale, with an experienced shepherd ; these, therefore, want no feeding. Hogs, cattle, and horses, have a whole domain to range upon, if the emigrant has any extent of grant. But there must be pork, and poultry, and cows at home, and these will all aid in the supply of manure. There ought to be an enclosed farm yard, to which all the waste of the garden should be thrown to be devoured, trampled on, and converted into manure ; for where there is much vegetable waste there is of course much less dry food required. Pigs may live on vegetable food and roots all the while they are growing, and boiled potatoes, parsnips, carrots, and beet root, are all nourishing food ; it is only when they are put up for fatting that they should have meal and peas, or beans, or Indian corn bruised. Fowls generally fare well in farm yards, especially when the food is common to all ; they will mess with the pigs, and come in for their share ; and when corn is given to them, it should be where nothing else can get at it. The cow, besides green meat, may have turnips, carrots, beet root, mangold wurtzels, cabbages, and hay ; and all the animals may be brought to eat almost any thing. In the farm-yard there should be comfortable sheds and houses for the various inhabitants. The fowl-house should have nests and roosts out of the way of vermin ; but much depends on the climate, as to how nearly you can assimilate the farm-yard to those of England. There may be a difficulty in keeping fowls, geese, turkeys, and the like ; but you cannot do better than take an English farm for your model, and come as near to it in all the essentials as possible.

DWELLINGS.

The contrivance of some sort of dwelling house may form no part of the gardening or farming ; but as no man can make a tent last for ever, or depend on canvass for a permanent protection against the weather, he must look out for a house over his head as soon as he has well made up his mind where he intends to put it. In countries where wood is plentiful, the quickest mode of building is to use the trunks of the trees whole, or nearly so. These may be called log houses. The trunks being selected, or cut to the same lengths, cut them with an adze to form a flat side, which

of course will be, as the trunk lies, the upper side ; then turn it over and cut the opposite side flat, and see that it is of the same thickness

all along. Prepare as many as you will require, of the same thickness the whole length. But although we say, do this with an adze, it would be done better with a saw, if you chose to make a saw-pit. These logs so cut, and laid upon one another, form a strong, thick wooden wall, and when clamped together, and stuffed with tow, or any other material, as warm as bricks and mortar could be, and even warmer than a nine-inch wall could be. Eight or ten of these logs, one on the other, will form a tolerable height ; the lower ones may be of the thickest, and you may reduce the sizes as you get higher, both for the sake of the lighter lifting, and the safety of the wall. Of course these logs must be cut very flat on the upper and under sides, that they may lie close. The lengths must be adjusted to answer your purposes, and there should be two lengths for ever so small a house, that the joints may be broken, some lying one way and some the other, thus—say they are twelve



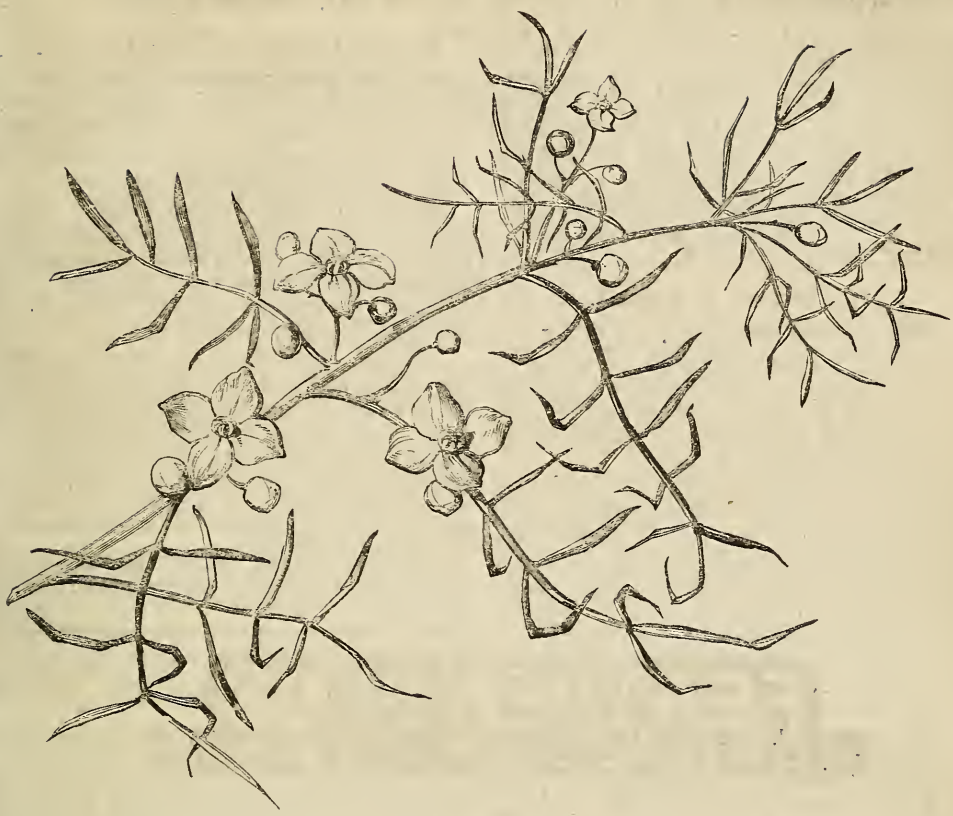
feet and eight. This evidently increases the strength of the wall, and when they are clamped together nothing can upset them. The simplest and rudest plan will be a lean-to roof, because the top can be thatched with grass, straw, weeds, underwood, or any kind of litter that can be contrived ; and the whole concern can be knocked up in a short time, as a place several degrees warmer and better than a tent. Say the sides shall be twenty feet long, made by eight feet and twelve feet logs, the highest side ten feet high, and the lowest five, and the width about ten ; the rafters would then be about eleven feet, to reach from the high side to the low side. As

the ends would be ten feet openings, let them be formed by logs of such length as will reach from outside to outside—say twelve feet or thirteen feet; and it will be necessary to cut the ends that cover the buts of the other logs, so that they fit close. Shorten the logs that you use where the door is to be, because you have a choice as to the best opening. It is well to have that in the most sheltered spot, or, if there be no shelter, let the door be at the south side or end. The rafters may be chosen from the most straight branches or poles that can be found strong enough to bear the weight of whatever is to cover as a roof; and, if you have abundance, the closer they are, the less trouble you will have to roof upon them. This is the rudest kind of *substantial* house that can be made. But if you make a saw-pit, and are pretty handy, or can get the assistance of a mechanic who understands it, he will be able to make you a house, while you may be better employed on your land. Still the walls cannot be better made than with logs, sawed flat on two sides, but worked more or less square and fair according to the capacity of the builder. Doors, windows, and openings of any kind are as easily left with log buildings as with brick; for, by simply shortening them to the lengths required to leave the openings, the space is regulated to fancy.

Let no one imagine that they can locate a few hundred miles from a town or even village, on an uncultivated and even uncleared country, and find people ready to build for them in any style of architecture. They may be glad to knock up such a house as we have described, without having even the means of stopping the window holes with glass, and being obliged to use wooden shutters when they are required to be closed at all. Presuming, however, that you can saw some of the best logs into boards, there will be no difficulty in nailing them together to form doors and shutters; and if you please to take the pains, you might use boards to cover as a roof. In such case, your rafters may be two feet apart, but they must be squared a little on the top. The boards may then lap over one another an inch or two; they will be found very useful where water is scarce, as, by running a gutter along the low part of the roof, all the rain may be caught in tubs or tanks, or conveyed by drains into any pond or other contrivance for retaining it. A box, with a hundred feet of glass, takes a very small space among the luggage, and would add greatly to the comfort of a dwelling. A package containing half-a-dozen sashes might be worth taking, because hinges for doors, nails of all kinds, screws, small tools, locks and keys, and numerous other handy things, might be packed between the bars; but all this depends greatly on whether a man is going up the country, far from towns or villages, or going, according to our advice, to choose land for himself either for purchase or renting; because, in this latter case, the less encumbrance he has the better, so that he takes out what he cannot buy when out, or if to be purchased at all, only at exorbitant prices.

We have said nothing about the floor of a house. This may be made of wood slabs, or logs squared on three of the sides, or boards, which are decidedly the best. If boards are used, moderate-sized logs should be bedded in the ground, about two feet apart, and squared with an adze, or, which is far better, cut through the middle, that each log or branch may make two, with the sawed face upwards, that the boards may lie flat. There will be no difficulty about pig-sties, and out-houses, store rooms, and so forth, as you become used to the place, and accustomed to the labour. A man soon becomes a carpenter if he has any kind of mechanical turn; and he who really knows how to go about it, would begin by building the most rapidly-constructed place he could think of, for the first make-shift, and then set about a proper house in good earnest, by squaring and sawing all his timber, and building according to the principles of carpentry. When he has made his house to his liking, he will turn his first construction to account as an out-house, store, barn, stock feeding-house, stable, or what not. But if a man goes out to build his own hut, or log house, he must be sure and take proper tools; —not one of your fancy carpenter's tool-chests, with fancy moulding planes, and all manner of things for joinery work in London; but good substantial saws of sorts, planes, chisels, adzes, hammers of sizes, hatchets, and such other articles as are used in plain substantial building.

It is not, however, to be forgotten that there are houses built complete in London to go into emigrant lands, requiring only to be put together like a bedstead; and hundreds of models of these wooden houses may be seen any day at Thompson's of Limehouse. If time be worth much, these would pay for the carriage; but still, there is nothing like going out with all the money in your pocket, and liberty to settle wherever you can get a place the best, cheapest, and most to your mind.



THE BORONIA,

ITS VARIETIES AND CULTURE.

The Boronia is an Australian family of very pretty shrubby plants, of small stature, and evergreen habit, and generally producing a profusion of very conspicuous and ornamental blossoms. In fact, there are two or three of the cultivated species, which, as greenhouse shrubs, if they are not unrivalled, are at least unsurpassed by anything that we have of the same class of plants; and a dozen of the very best greenhouse plants that could be selected must include one species at least of this genus. At floral exhibitions, few among the many subjects there collected are more conspicuous than the Boronias. They have at the least one property which adapts them for those whose gardening operations are not very extensive, for they are beautiful while quite small; indeed, young plants of these are in every way preferable to old ones. Of some of the kinds, plants only a foot high may without difficulty be had, fully as much in diameter, closely filled out with branches, and at the proper season loaded with blossoms. Such plants are perfect gems for small greenhouses. There is a degree of durability, moreover, in the blossoms of these plants, which is not the least part of their recommendation, as they continue for a considerable time in a state of beauty.

We have been familiar with Boronias in gardens for many years. The first introduced species appears to have been sent to this country in 1794; and one or two others arrived prior to 1820. The majority of the species which are or have been in cultivation were, however, apparently introduced at two distinct periods,—one between 1824 and 1826, and the other in 1841-2.

The genus Boronia was named after Francis Boroni, who was an Italian attendant of Dr. Sibthorp, and collected the specimens of many of the plants figured in Sibthorp's famous *Flora Græca*. It belongs to Rutaceæ, the natural order of rue-worts, where it forms part of the group of Diosmeæ. By some unaccountable error it is, in *Paxton's Botanical Dictionary*, said to belong to Proteaceæ, and the error remains uncorrected in the recently published supplement to that useful book.

According to the most recent catalogues,

there are twenty-one species of Boronia cultivated in the gardens of England; and among these there exists considerable variety. For real beauty and utility, however, we should prefer *B. serrulata*, *triphylla*, and *pinnata* to all the rest, to which, perhaps, for the sake of greater variety, *B. viminea* might be added. We shall, however, enumerate the different kinds, in order that they may be known. They form three groups,—those with simple, with trifoliate or trifid, and with impari-pinnate* leaves.

THE SPECIES OF BORONIA.

There are now many species of this genus cultivated in English gardens. In some the leaves are simple, in others they are pinnate. The flowers of all are rose, or purplish, and are formed of four parts. We shall briefly describe the principal of them.

Boronia serrulata, Smith (serrulate-leaved Boronia).—A dwarf evergreen shrub; leaves trapeziform, acute, serrulated; flowers deep rose, very fragrant, produced from the tops of the shoots. Native of New Holland, about Port Jackson. Introduced in 1816. Flowers through great part of spring and summer.

Boronia crenulata, Smith (crenulate-leaved Boronia).—A dwarf evergreen shrub, rather smaller than the last; leaves obovate, mucronulate, serrulated. Flowers rose, with a fringed calyx. Native of New Holland, at King George's Sound. Introduced in 1820. Flowers in the spring and early summer months.

Boronia denticulata, Smith (toothletted-leaved Boronia).—An upright habited small evergreen shrub; leaves linear toothletted. Flowers rose or purplish. Native of New Holland, at King George's Sound. Introduced in 1823. Flowers throughout spring and summer.

Boronia parviflora, Smith (small-flowered Boronia).—A small evergreen, with the habit of *B. denticulata*, but smaller; leaves obovate-lanceolate, obsoletely crenulate. Flowers pale rose. Native of New Holland, about Port Jackson. Introduced in 1826. Flowers in spring and summer.

Boronia pilonema, Labillardiere (cap-stamened Boronia).—A dwarf evergreen shrub; leaves oblong-lanceolate, entire. Flowers from the tops of the shoots rose-coloured. Native of New Holland, at Cape Van Diemen. Introduced in 1826. Flowers in spring and summer.

Boronia polygalæfolia, Smith (milkwort-leaved Boronia).—A dwarf evergreen shrub; leaves linear-lanceolate, entire, sometimes whorled. Flowers axillary, red. Native of New Holland, about Port Jackson. Introduced in 1824. Flowers in spring and summer.

Boronia ledifolia, Gay (ledum-leaved Boronia).—A dwarf evergreen shrub; leaves linear-lanceolate, entire, downy beneath. Flowers red, axillary. Native of New Holland, on the eastern coast. Introduced in 1824. Flowers in spring and summer.

Boronia viminea, Lindley (twiggy Boronia).—A very dwarf, compact, branching, evergreen shrub; leaves linear, blunt, entire. Flowers small rose-coloured. Native of New Holland. Introduced in 1841. Flowers in the spring and great part of summer.

Boronia spathulata, Lindley (spatula-leaved Boronia).—An evergreen dwarf greenhouse shrub, of erectish growth, glaucous in every part; leaves distant, obovate, entire. Flowers pale rosy-pink, freely produced, in terminal cymes. Native of the Swan River colony, in New Holland. Introduced in 1846. Flowers in the spring.

Boronia pinnata, Smith (pinnate-leaved Boronia).—A dwarf evergreen shrub; leaves impari-pinnate, with 2—3—4 pairs of linear leaflets. Flowers pink, with a scent like that of hawthorn. Native of New Holland, about Port Jackson. Introduced in 1794. Flowers in the spring.

Boronia alata, Smith (winged-petioled Boronia).—A small upright-growing evergreen shrub; leaves impari-pinnate with 3—5 or more pairs of crenated leaflets. Flowers pale rose. Native of New Holland, on the western coast. Introduced in 1824. Flowers from May to July.

Boronia triphylla, Sieber (three-leaved Boronia).—A dwarf evergreen shrub; leaves of three linear leaflets (ternate). Flowers rose coloured axillary. Native of New Holland. Introduced in 1838. Flowers in the spring and summer.

Boronia triphylla var. latifolia (broad three-leaved Boronia).—A dwarf evergreen shrub; leaves ternate, of three lance-shaped leaflets. Flowers numerous, deep rose-coloured. Native of New Holland. Introduced in 1838. Flowers in spring and summer. *B. ledifolia* of gardens.

Boronia Fraseri, Hooker (Mr. Fraser's Boronia).—A dwarf evergreen shrub; leaves of three, sometimes five, leaflets. Flowers deep rose-pink. Native of New Holland, on the banks of the Nepean River. Introduced in 1842. Flowers in the winter and spring. *B. anemonæfolia* of gardens.

Boronia tetrandra, Labillardiere (tetrandrous-flowered Boronia).—A dwarf evergreen shrub; leaves impari-pinnate, of 4—5 pairs of linear obtuse leaflets. Flowers purplish-red. Native of New Holland, in Van Leuwin's

* Impari-pinnate—pinnate, with an odd leaflet.

Land. Introduced in 1824. Flowers in spring.

There are some few other species said to exist in our gardens, but we have never met with them in a living state. Several other kinds are, however, known to botanists.

PROPAGATION.

The Boronias are increased by cuttings, rather than by seeds, which are not often perfected in this country. Where, however, imported seeds can be obtained, as they sometimes may, they produce stronger and larger plants in a given space of time. The ordinary stock cultivated in this country is obtained from cuttings, which are made to produce roots without much difficulty under the treatment sketched out below.

Seeds.—The seeds may be sown as soon as they are received from their native country, if that be at any period of the year prior to July or the beginning of August. After that time, it is best to retain the seeds till the February following, as the young plants are very liable to be lost during winter, if their germination takes place in the autumnal months. From February to May may be taken as the best period for sowing, as the plants when raised thus early, have time to become established as separate individuals in small pots, before the trying winter season arrives. The soil proper for sowing the seeds in, is light sandy peat; that is to say, ordinary light peat earth as it is usually obtained for potting purposes, intermixed with about an eighth part of pure silver sand. The pots, of which the most convenient size and form are those known as wide forty-eights (which measure six inches in width, at top inside, by five inches in depth), should have placed in the bottom a couple of inches of potsherds or bricks, broken to the size of nuts, a large almost flat piece being first laid over the hole in the bottom of the pot. On these a layer of about an inch of turfy fragments of soil should be placed, so that the finer soil above may not run down amongst the potsherds placed for drainage. The bulk of the soil employed may be passed through a sieve with three-quarter-inch meshes, and with this the pots are to be filled up to within about an inch of the top, pressing the soil down moderately firm with the hand, and making the surface quite level and even, but not flatly consolidated. On this surface the seeds are to be scattered thinly, and then covered with about a quarter of an inch in thickness of the same fine soil. All seed-pots should be marked with the name of the plant the seeds of which are sown, and the date of sowing. If a slight warmth, such as that afforded by a half-spent dung bed, can be made use of, it will facilitate germination; in this case the pots should be plunged in the material covering the bed, and the sashes may be kept quite closed until the young plants begin to grow up, when a portion of air must be admitted. If there is no hotbed, the pots may be set on a shelf in a greenhouse, where the process will take place, though not so rapidly. It is objectionable to apply much water to seed-pots before germination has taken place, and this is especially the case, if the seeds are very small, and consequently deposited all but on the surface; and yet in fine sunny weather, the surface of the soil dries so much as to become unsuited to facilitate germination, and requires watering, perhaps every twenty-four or forty-eight hours. To obviate this evil, which is more felt when the pots are set in a greenhouse than when in a hotbed frame, it is a frequent and advantageous practice to cover the surface of the soil, immediately after sowing is completed, by a layer of loose damp moss, which is easily kept just damp, by an occasional sprinkling, and prevents the drying of the soil by evaporation. This plan, however, has its disadvantages; it entails more exact attention. For if the covering of moss is left on after the young plants begin to break through the soil, it blanches and etiolates them; and if this continues long, they are either seriously damaged, or if weak altogether destroyed. Hence the necessity of almost daily examining seed-pots when they are covered in this way. Whether covered or no, it is certain that the soil about the seeds must not be suffered to become thoroughly dried, for moisture is absolutely essential to germination. Therefore, if the pots are not covered, they must be watered, as often as they become somewhat dry. It is an advantage to use tepid water on these occasions, and it should be applied by means of a very fine-rosed watering pot, a very fine-capped syringe, or jerked from a stiff-haired brush.

When the seedlings are so far advanced, that the cotyledons or seed-lobes are fully expanded, and the little heart shows a tendency to push up other leaves, they should be transplanted, or, as it is technically termed, "pricked out" into other pots, prepared in a way similar to the seed-pots, and filled with the same kind of soil. Here they are placed an inch or so apart, and after transplanting must be set into a close frame, where there is a temperature of about fifty degrees, in which they remain for a week or fortnight, or until they begin to grow a little; they are then by degrees exposed more and more to the ordinary temperature, being however sheltered at night, and during rainy or stormy periods. There is no better place for them in winter, than on a shelf near the glass in a greenhouse.

These young plants must *never* be suffered to become dry at the root. They may be potted separately into small pots as soon as they have made some advance from their last transplantation, provided this potting can be done not later than August. If they are not enough advanced to admit of its being done in August, it is better deferred till the February or March following.

Cuttings.—These plants are not difficult to raise from cuttings, provided they are carefully managed. The cuttings selected should be the short leafy (not flowering) shoots, which push out at different periods of the growing season; and these should be taken when they are become in a degree hardened, or mature, but without being fully ripened. The tips of the shoots about two inches long are to be selected. From these, whatever leaves may be attached to the lowermost three-fourths of an inch, are to be cut clean off with a sharp knife; then immediately below where the lowest leaf was attached, the stem is to be cut through at a right angle, and with a clean sharp cut, so that the bark is not injured in the process. The cuttings are now ready for planting, and but few should be cut before they are planted. For this reason, the cutting-pots should be first prepared; and they are done in this way:—A pot and a bell-glass are selected, the latter rather less in diameter than the former: the pot is filled one-third with broken potsherds, on which is laid first a thin layer of moss to keep up the soil; then a thickish layer of very sandy peat, moderately fine and moderately dry, and this is pressed down quite firm; on this is laid, three-quarters of an inch in thickness, a layer of silver sand, the surface of which is about level with the top of the pot. The whole now receives a good watering, sufficient to damp it thoroughly. When this has drained a little, the pots are ready for the cuttings. The edge of the bell-glass is now to be pressed on the surface of the sand, so as to leave a mark; within the space thus marked, which the glass covers, the cuttings are to be planted. The only tool is a dibble, a small taper pointed piece of stick, the point of which must be a trifle thicker than the diameter of the stem of the cutting at its base, so that a hole made by the stick will admit the cutting without any pressure or rupture. The dibble is thrust just through the sand, on to the sandy peat, and by a slight twist is removed, leaving a hole in the sand. Into this hole the base of the cutting is put, *so that it rests on the bottom of the hole*, which is closed up around the cutting by inserting the dibble at a little distance on every side, so as to press the sand firmly about the cutting. When all are planted —about an inch apart—they have a light watering, and when this has dried a little, the bell-glass is put on, and the pots removed to a mild hotbed, or into some situation where they may enjoy a slight bottom heat. They require shading—best done by paper caps—from fierce sun-heat, and the glasses must be wiped dry occasionally to prevent damping off. A successful result is evidenced by the cuttings continuing to look fresh and green, and by and by starting a little, the latter sign generally indicating that roots are formed, and that a new line of treatment must commence. Shading is now discontinued, and instead of close covering, the glasses must now be tilted a little on one side, at first for an hour or two daily, and then for a longer period, until they will bear to be removed entirely. In about a week after the glasses are removed entirely, the cuttings may be potted separately into small thumb pots, after which they must be kept in a close warm frame or house until they begin to grow, when they must be gradually hardened to bear the temperature and atmospheric conditions of the greenhouse.

GENERAL MANAGEMENT.

Young established plants, whether from seeds or cuttings, require to be pushed on vigorously, and at the same time with judgment. Almost all of the Boronias like a temperature higher than that kept up in a greenhouse, during the period they are making their growth in the spring; and it is surprising what a difference this little stimulus effects both in their size and appearance. But it must be given at the right time, and not beyond the proper degree, or the result will be different. The time to apply this extra stimulus is when the plants are naturally commencing their growth. In the case of young plants, this may be made to take place in spring, and again towards midsummer, supposing the cuttings or seedlings to have been well established in their pots in the autumn, and to have stood during winter on a shelf near the glass, and protected against much cold. During the winter they may be shifted into five-inch pots, known as small forty-eights, which must be well drained; this may be done in the early part of March, and they may then be placed in a moist atmosphere, where the temperature averages 55° by artificial means, and does not fall much below 50° by day, nor below 40° at night. If they have been standing in a greenhouse, this increase of temperature must not be brought about suddenly, but the plants must first be placed in the coolest part of the structure, and afterwards more fully exposed to this temperature. It is of the utmost importance that the pots be well drained; nothing can make amends for any, the least,

defect in this particular. The temperature and climate recommended is about intermediate between that of an ordinary stove and greenhouse; it may be called a sub-tropical climate, and it is of course intended that, in proportion to this degree of heat, a degree of moisture also is to be present, sufficient to render the heat agreeable to vegetable life: no dry arid state of the atmosphere, but a genial warmth and moisture. Such a climate will be exciting; this is just what is required. The young plants will push out their shoots, but they must not be suffered to grow at random. As soon as the young shoots have grown an inch or two, the top of them must be nipped off: presently others, before latent, will now be excited, and these in their turn must be nipped. Thus is the foundation laid of a bushy habit of growth. If the plants prosper and fill their pots with roots, they must be again shifted; but this may usually be deferred until after they have been hardened and rested. After about six weeks of this excitement, the plants may be rested a little, by removing them to an ordinary greenhouse, where they must be set out of the way of draughts, but in other respects submitted to the ordinary conditions which there exist. They must never, however, get dry at the root, nor must the soil be over-watered. The lower temperature will arrest growth, and tend to harden that which has already taken place. Here they may remain till about the middle of June, when it is contemplated that their pots will be sufficiently filled with roots to admit of their being placed in pots somewhat larger. From the small forty-eights they may be transferred to large thirty-twos. They may then be again placed in a moist, rather close atmosphere, where the temperature ranges about the points already described: and here another growth will be excited, which may be prolonged for six or eight weeks, the plants then being hardened to stand during winter in the greenhouse. This second growth must, in like manner with the first, be nipped as soon as the shoots are a couple of inches long, and in this way close dwarf bushy plants of considerable size will be obtained in the course of a season. These plants would bloom well in a warm greenhouse the following spring.

When still larger plants are required, it is only to continue the same processes of shifting, exciting, and resting; taking care that there is no excess in either the one or the other. After the first season, however, it is as well to be content with one annual excitement in the spring, continuing the plants for the remainder of the year in a greenhouse, or in a greenhouse pit during summer. Very large plants of most of the Boronias are usually much less vigorous and healthy looking than younger ones, so that it is really preferable to raise a supply of young plants annually, and destroying those which have passed their prime condition.

The secret of having dwarf, compact, bushy plants of these Boronias lies, as it does in the case of nearly every other subject, in the practice of continually nipping the young shoots as they make progress. It must not be delayed until there is something to cut away, but the point or heart is to be picked out with the thumb-nail as soon as the shoot has reached the length required.

The proper soil for Boronias is sandy peat earth, turfy as a matter of course, for no other kind of soil should be used for valuable potted plants. This turf should be that of what is called light peat soil, and it must, either naturally or artificially, have a good proportion of sand intermixed with it. It should be used in as rough a state as the size of the pot employed will admit, and on no account should ever be sifted, but merely broken to the requisite degree of fineness by the hand.

Boronias are very impatient on the subject of watering. They will not bear neglect, for a thorough drying is highly dangerous, if it be not in all cases fatal to them. Neither do they do well under officious treatment in this respect, which is liable to expose them to the other evil of being over-watered; the effect of this is to chill and sour the soil, which, under a continuation of excess, soon becomes soddened and unwholesome. There is an intermediate danger into which the cautious may be apt to fall. Impressed with the necessity of preventing their getting dry, and fully appreciating the evils of excess, they may think to escape from the dilemma, by frequent yet limited applications. This, however, is a great evil, no less than the others. Under these circumstances the plants are certain soon to suffer from want, the lower soil becoming perfectly dry, while the top appears in danger of becoming soddened. The only proper course is to water thoroughly, and attentively to see that such a watering is repeated neither too soon nor too late.

One more word as to potting. Our own opinion is decidedly in favour of moderate sized pots for these plants. Shifting them into very large pots is often productive of evil, and is always fraught with danger, especially in the hands of inexperienced cultivators.

A STROLL THROUGH THE GARDEN,

BY A TUTOR AND HIS PUPIL, IN THE MONTH OF APRIL.

Now that we have really spring weather, we will take a turn through all the gardens and houses, for everything seems animated, and the gardeners busy. The winter, you observe, has made even the hard paths rotten and soft, so that the men are rolling the gravel to press it down into its place. The cabbages are growing rapidly; you may see that the forwardest are all going to heart. These hearts, however, are soft, and pretty nearly green all through; but many of the most advanced are tied in tight with a piece of matting to confine them, that the inside may be whitened earlier than it would be if not confined. The peas that were struck so early are growing rapidly. Many of the rows of brocoli are nearly all cut, and the winter greens generally have been a good deal cleared away for the supply of the table the last two months, so much so that they are pulling the rest up to clear the ground. Those that have not become fit to cut yet, will be put in close together in some waste corner and complete themselves there. Observe the man hoeing out the turnips and carrots that were first sowed; you see he destroys all the plants that are at all crowded, leaving only one plant to every six inches of ground, and he cuts up all the weeds at the same time. See, also, another at the earliest onions. They would have done very well had they been sown much thinner, for he cuts up a great many. Those beds that are raised up above the others a good deal are asparagus beds. They will soon send up their shoots fit for cutting. The crowns of these plants, which are the tops of the roots, are eight or nine inches below the surface; so that when a bud shows above ground, the gatherer digs down by the side of the shoot, and cuts it off with five or six inches of white stem. Now, this is totally useless and not eatable, contrary to almost every plant in nature; for the whitened part underground of celery, kale, leek, &c. is more tender for blanching, while this is more tough. The digging, sowing, hoeing, raking, &c. are going on more than ever; but there is nothing very new in any of the work. The greenhouse, as you now see, is well supplied with flowers. All the acacias, hoveas, chorozemas, and many heaths are in bloom, and many of the camellias are in flower still. The hothouse has a few beauties, and the grapes are wonderfully advanced. If you take notice, every vine shows a different season: this is caused partly by the branches being brought into the house at different times, and partly by their being of different sorts. The dahlias that are in pots are shooting up in all directions; when these are long enough to take off two complete joints, they are cut just below the leaf, the lower leaves taken off, and the cutting struck under a bell-glass in small pots. All those small plants under the glasses are dahlias, struck and striking. The shrubbery begins to look cheerful. The China roses, Pyrus japonica, azaleas, rhodoras, lilacs, and other spring flowering shrubs are getting very forward, and will soon be in full bloom. Here we are at the conservatory, which is in perfection. Those rhododendrons, Chinese azaleas, roses, and deciduous azaleas, have all been hastened by protection, and brought forward in the place you see them; others by the hothouse and greenhouse. Those few odd-shaped flowers on long spikes are of the orchidaceous tribe, while there is abundance of all the spring flowers which we may not have for some time out of doors. The flower-garden is now interesting. Observe the beds of pansies, how many of them are blooming, and how brilliant they appear. All this loose-looking earth between the plants is decomposed dung—that is, dung rotted into mould. Every shower of rain washes some of the virtues of it down to the roots, and gives great strength to the plants, which throw up larger flowers in consequence. The wallflowers are all in bloom, and fill the air with delightful perfume; and the hyacinths and early tulips are giving us the benefit of their beautiful colours. The crocuses seem to have gone past their prime; but there is no end to the subjects that are emulating each other, as it were, in the development of their flowers. But look at the interesting display in the tulip bed; although not a bud has come to its colour or size, nothing can surpass the symmetry and beauty of their stately forms. Even the hyacinth bed, which is as large and more varied in its coloured pyramid of flowers, does not seem so noble as the collection of tulips drawn up, as it were, in military array, with the tallest in the middle rows, and the lower ones on each side. In another fortnight, it will form a canopy of flowers, supported by innumerable upright green pillars, presenting an object which nothing can surpass; while this awning over our heads will protect them from the sun and rain, and prolong their beauty several weeks. The men are now pruning the rest of the roses, which, as you see, have shot out their green buds nearly all the length of the branches, except the few eyes nearest the main stem. By cutting these all back to two or three eyes that have not started, they will be put back a whole month in the flowering, while those pruned early, being already shot nearly half

an inch, will go rapidly to flower. The fruit-garden exhibits early signs of plenty; the fruit-buds and flowers completely cover the trees, and everything is promising; but there is little doing. Covering the walls against frost, is resorted to a little in March; but there is a great difference of opinion as to its efficacy. There has been some grafting done on a few old trees, I observe; but I shall explain that to you at home.

I promised to explain grafting to you. It is by grafting and budding that we multiply a good fruit, for by splicing a small branch of a good fruit tree on a growing plant of a wild and worthless stock or tree of the same family, we make a new tree of the sort we require. The stock, or wild tree, does not in the least affect the piece we graft on it, for it merely finds the nourishment. Suppose you wanted to splice a bit of wood on your walking-stick or your fishing-rod, to make it longer: you would cut a slope on the stick, and another slope on the piece you want to join to it, and make them fit neatly,—would you not? Well, do exactly the same by the graft and the stock, only, instead of binding it so hard as you would your stick, merely tie it firm to prevent its slipping, and surround the join with clay or cement to keep the air from drying the sap; and the graft will have this advantage over your stick, that the sap which rises from the stock will feed the graft, and it will join as firmly as if it had been a part of the original; whereas, if your stick was bound up for several years, it would come apart when you took off the binding.

If the weather prove dry to-morrow, we will pay some attention to minor operations which are going on in the flower-garden. For instance, you saw a quantity of large empty pots standing in the frame-ground. These are for potting the carnations and picotees. They will be filled with one-fourth or nearly of potsherds or crocks at the bottom. This is to secure good drainage. Next, a quantity of the compost mixed on purpose, and consisting of two-thirds loam from rotted turves, and one-third decomposed dung from an old melon-bed, or cow-dung rotted into mould. The pot in which the plants have been wintered, will only require tapping against the potting bench, wrong way upwards, and the ball of earth will come away whole. This may be so adjusted in the half-filled pot as that the collar of the plant may be even with the surface, and the earth should be pressed in round the ball. By placing of the carnations and picotees in those large pots, which are what the gardeners call twelves, they will bloom admirably. If we take a walk round to-morrow, we shall see the men potting them. I did not go all over the kitchen-garden, because the men at a distance were only repeating the operations we have already seen. Nevertheless, the sowing of peas and beans, onions, radishes, and salad herbs, is as necessary this month as last. So, indeed, is the planting of potatoes; but we have had enough for this day.

The frost this morning is not very sharp, but it is sufficiently severe to show how necessary it was to cover up everything tender. The pansies look damaged, but that is only the injury of the blooms already expanded; and all the frames being matted over, there is no harm there. You observe now the men potting the carnations and picotees in the way I described. The youth whom you see at the long bed of ranunculuses is top-dressing with decomposed dung from an old melon frame, the earth having been loosened yesterday, and the lumps all bruised, for the purpose of getting it close up at the roots of the plants. Yonder, you observe the gardener removing some shrub; this is not done because it is proper, but because it is necessary. He is now obliged to be careful, and take up every fibre with the plant, otherwise it would scarcely recover the removal. The gardener is either supplying some deficiency, or making some new arrangement by order. He could not have delayed anything of the kind to this late period, had he known it was to be done earlier. The auriculas are sending up their blooms fast. The man who is examining them is cutting out some of the pips, where there are more than the plant can do justice to. Where you see him tucking little bits of cotton in between the pips, it is for the purpose of preventing them injuring one another. By means of this wadding, he can place every bud in a position to open well without damaging the others. He takes those that are forward enough for this from the frame to yonder shady place, and covers these with a hand-glass. He will have to watch them daily to adjust their opening flowers. The polyanthuses on the border are very wet, for they require abundance of water, and the sun has in one short hour taken all the frost out of the ground, which now seems as if it had been rained on. Those pots full of cuttings will have to supply the clumps and borders with plants. You see there are verbenas, petunias, hydrangeas, heliotropes, scarlet geraniums, China roses, and several other subjects, intended for the beds and borders. They are only cuttings, and are placed under the glasses in these pots to strike root. Another man is picking off all the dead and yellow leaves from the plants in the frame; and see how carefully he throws those decaying leaves

out of the reach of the plants, and outside the frames; for decaying leaves in a frame will often engender the worst consequences, in mildew and destruction. We will take one turn in the kitchen-garden and melon-ground. All are busy; some are sowing, others hoeing and earthing up. One man is sowing carrots and beet-root. Those large seeds which he will sow next are the seeds of seakale, and they will come up presently; but the plants will not be fit to cut for two years at the least —perhaps, three. He has also some rhubarb to sow. Further on, we observe that the beds are prepared for sowing all the cabbage tribe. The more perfectly you recollect the proceedings of last month, the more you will discover the resemblance between the practice of one and the other. In short, nearly every kind of sowing is repeated, because it is necessary to have them come to perfection one after another, and the crops can only be brought so by sowing and planting out at different times. There is a man sowing rather a large space with onion seed. This is to grow into the main crop. The seed under this hand-glass is celery. The glass will form a protection against very severe weather. These pots of seeds are tomato, capsicum, and dahlia. They will be placed in one of the hot-beds, or perhaps the gardener will make one up for such things and flower-seeds; for dahlias, cockscombs, balsams, and all the half-hardy annuals, should be sown this month. This, too, is the proper month for sowing anything that was not sown last month. But I observe that there have been no potatos planted this month as yet; and this must be done for the main or principal crop. They will plant none but whole sets, which will be a foot apart in the row, and the rows two feet from each other. The easiest way of doing this, is to draw the drills first, four inches deep, and then fill up rather above, so that it may be full the four inches in depth. We have now got through our rambles for the present. You have only to treasure up all you have heard and seen, because you will find the instructions highly useful, and gardening will become as attractive to you as any other amusement, if you once take pains to learn.

FLORICULTURE OF THE MONTH.

BY GEORGE GLENNY.

THERE never was, perhaps, a more determined spirit than now animates the practical florists of the metropolis, nor a greater disposition to sift matters that affects their interests to the bottom. Some time since a writer suggested the use of new cow-dung in great quantity in the formation of ranunculus beds, and the same thing was advocated in a gardening newspaper some years ago. At a meeting of the Kingsland branch of the Society for Encouraging Floriculture in Great Britain, the subject of ranunculus culture was freely discussed in the presence of forty members, many of them highly successful cultivators; and there were some points on which there was not the slightest difference of opinion. One and all repudiated the use of dung next the roots, but agreed it should be some distance below the tubers, varying in the distance, however, from six to twelve inches. Another point on which all agreed was the danger of using new cow-dung; various grounds were urged, among which was the fearful risk of the black maggot, which it was affirmed resulted from the blow of a fly, that the green cow-dung would be sure to draw if it existed in the neighbourhood. All the modes of culture adopted by the successful growers appeared to be conducted on the same principle, and varied only in immaterial details. For instance, growing in the cleanest and best seasoned loam, with a layer of well-decomposed dung somewhere below it; shading from the heat of the sun during the bloom; keeping the roots liberally supplied with water; preventing its evaporation during bloom, if possible, by laying tiles between the rows; keeping the earth well stirred in all the early stages of their growth, and close about their stems; and taking them up when the leaves turn yellow. There was a singular unanimity among the members. Blooms of Camellia japonica, Andromeda floribunda, some of the Begonias, heaths, &c. were exhibited, but rather to remind one another of the season, than as novelties.

The dahlia growers are feeling the effect of the last show, so mistakenly called glorious, because instead of having twenty or thirty seedlings capable of producing six blooms each, there were perhaps a hundred and thirty that could only produce three each, and even these very bad. The orders will be so much lessened that nothing but a first-rate show, without any trickery, will restore the trade, and this is contemplated upon a good scale; but as arrangements are complete for weekly shows of new flowers, there will be less interest in a general seedling show than there might have been had no such opportunity existed. Advertising may do a good deal for a few flowers that deserve growing, but so little has been heard of the one hundred and fifty candidates, that many of the even highly-favoured ones

will have very few admirers. When we consider that a well-authenticated novelty in dahlias has been known to realize 1500*l.* or say only 1000*l.*, we very naturally regret any circumstance that should render a really good one less popular than it might be; and yet we are told that such is the self-reliance of some dealers, that they, with the fullest confidence, guarantee a thing to be good, reject opinions that have been of service, find but half the orders they expected, and then wonder how it happens; or set down the circumstance to a decline of the dahlia trade. All this is wrong: dealers may guarantee what they please, and put forth the most exalted characters to their favourite flowers, but the public naturally turn back to their former catalogues and compare notes; they find in these catalogues certain flowers equally as much prized, equally guaranteed, quite as flatteringly described, and yet never worth half the money; and they naturally say, "We want some better evidence of the goodness of a flower than the guarantee of the gentleman who has already guaranteed so many useless ones to be first-rate show flowers." We do not mean to say that any judgment is infallible, or that any flower can be thoroughly relied on; and we have in our description in our annual list abstained from saying that a flower is first-class or first-rate, or all it ought to be, unless there were distinct points reconcileable to the opinion of impartial observers, and then very seldom. We have described the flower as it was, going into the particular points, and hiding neither its faults nor its beauties. We do not deny that flowers have turned out uncertain; we do know that flowers let out under names identified by us with many excellences, have turned out anything but what they ought, or what we described. In one or two cases we discovered that we have described, and given a favourable opinion of one flower, and have seen another one substituted for it; this *may* have been a mistake, but we cannot think it likely. In our description of flowers this year we have conjured up no beauties that have not been manifest, nor have we described blemishes which were not very apparent; hence, our descriptions have to be read as a guide, and each sentence weighed, and we strongly recommend everybody who intends to buy a few of the new dahlias, to throw all catalogue descriptions overboard. to look at the descriptive list in the Almanac for 1849, and make up their minds from those descriptions, for they will not deceive. If we say one flower is a splendid form, but small, they have to consider whether they value size or form; if we say a flower has a splendid petal, more coarse than we like, but, nevertheless, novel and beautiful, they may rest assured that coarseness is a real fault; if we say that a flower has a good petal, but large, and rather open, but that it is a fair fancy flower, they may safely conclude that large and rather open is no imaginary drawback—it is a real fault; but candour in a description serves a flower that has any merit at all, much more than the sweeping "warranted to be first-rate." This month will show us some auriculas, and we hear from Mr. Lightbody of Falkirk, that James Dickson will have some northern novelties to show, worth looking at. We have no show near London of any consequence. The only place of exhibition where we are pretty sure of seeing some is the Surrey Gardens, and most likely, as the thing is reviving a little, the society at the Thatched House at Hammersmith may produce a competition; but we hope to see many new growers this forthcoming season. Good average verbenas have become very plentiful, but the great number of average merit spoils the sale of particular ones, and the growers hardly know how to choose. Certificates must now be given for nothing but really first-class things; that is to say, varieties that beat those already out in their style or colour, or are equal to the best in form, and of a new colour. The Potentilla is likely to become a favourite, and being hardy, and a healthy perennial, it will be very popular; some have been recently figured in the *Cabinet*, which, if at all like the originals, show that there is a disposition to improve. The town has been inundated with camellias, which have been sold by auction at the price of weeds; and nursery sales have been very plentiful, not so much as part of a system, as from obligation. That oppression which has overcome many tradesmen has hung threateningly over the nursery trade, and there will yet be many sacrifices; not that any one need attend a sale for bargains: they are to be had at nurseries that threatened to swallow the whole trade, at less than they cost; and concerns that could do no good in regular trade, are doing mischief as they decline. The Great Northern Tulip Show is advertised to take place in May; we shall have the particulars, perhaps, by the 1st, but we believe there will be a great muster of cultivators on the occasion. Among the sources of congratulation for the florist, we may mention the alacrity with which members join a new Society, in which every member has to pledge himself, not only to act honestly and honourably in his own dealings and showings, but also to promote a like conduct in others, by exposing anything that is otherwise. Many gentlemen have declined exhibiting, only because they were obliged to show against dishonourable exhibitors; instead of showing

his own flowers against somebody else's, he had to show against all that the somebody else collected of other persons, and the return of these to the floricultural ranks will be a reunion worth recording. The gentry are in fact turning florists; some are resuming the fancy from a sheer love of flowers, and seize upon the new Society and its pledges as a sort of excuse. We regret that there are writers who persist in keeping up the book-system of culture for flowers, and recommend to amateurs plans of culture which will, if followed, prove very discouraging; for instance, when a man who has not only totally failed for himself, but also failed, to the destruction of fine collections, for other people, is employed in the ungracious work of leading others, "it is too bad." We can only earnestly recommend those who intend to cultivate flowers, to read the treatises that have been written by men known to succeed, and known to be original writers, and not copyists, or followers of book-lessons, and they will find that the simplest culture is the best; that there is no mystery in gardening; that some of our very best practical men were never brought up to the profession; and that the moment they read anything they cannot clearly understand, they should dismiss the book or paper in which they read it. They will find plenty of instruction in the various treatises published in this work, to which we can refer with confidence, and they will want no further instruction. Many new geraniums are upon the eve of coming out, and many others are out; Mr. Foster, of Clewer, enters the field again in earnest, and his flowers are coming out through Mr. Bragg, of Slough, instead of Mr. Catleugh; but we trust there will be a successful struggle against the prop system of showing; we objected to it many years ago, but the leading Societies encouraged it, and we have counted one hundred and seventy props to one plant; since then, that is to say within a year or two, other writers have begun to condemn it, as if a new light had broken in upon them, and they had all at once discovered how wrong it was to encourage that mode of showing, and were the first to discover it. However, we are glad the subject is, after all our boring, becoming generally disapproved, and that something like a return to gardening, instead of mere mechanism, is likely to ensue. The judges at shows would soon cure the evil by giving prizes to those best grown without sticks, in preference to those with them. For our own part, we candidly avow that if there were any present at a show where we were judge, that had been grown at all well, and were not contrary to the rules of the show in other respects, we would at once place them before others four times the size with sticks to hold the flowers in their places. There is a sort of stir among cottagers upon the subject of giving them prizes for flowers; many of the most intelligent members, seeing how much more profitable it is for the cottager to grow carrots, potatoes, beet-root, parsnips, and other vegetables that are really wholesome and nutritious food than it is to waste their time on the tending and dressing show pinks, and growing other flowers for show, have advocated the increase of prizes for the useful things, and taking them off for pinks, pansies, and bouquets. Staines fell into this last year, as well as some others; Norwich continued to give prizes for the most trumpery flowers, and was literally parsimonious with prizes for all the useful vegetables. We are quite sure the more the clergy and gentry think of the fact, that a dozen pinks would cost anybody more time to attend to properly than a rod of carrots or potatoes, the more will they see the impropriety of wasting a shilling in the encouragement of a waste of time. Messrs. Chandler have, as usual, had an extensive show of Camellia japonica, and including among them most of the new varieties; the thousands, however, of healthy plants that have been imported and sold within a few weeks, have greatly militated against the interest of such exhibitions, and still more against the purchase of plants; besides, there is hardly a nursery now that has not its collection of the Camellia japonica; and there is this difference in the short and extensive stocks,—the one comprises none but the best, which are all that excite curiosity,—the other contains everything, good, bad, and indifferent, and you have almost to ask for the best before you can see them. It is like going over a bed of tulips containing two or three thousand of all the common ones in cultivation, with a few good ones sprinkled among them, and then examining a choice selection of three hundred, every one of which is a gem in its way.

CURIOSITIES OF VEGETATION.

THE BOTTLE-TREE OF AUSTRALIA.

On rocky eminences in the interior of Tropical Australia, this tree, remarkable in locality, form, and quality, was met with by Sir T. L. Mitchell, in his surveying expeditions in search of a route from Sydney to the Gulf of Carpentaria. In most instances it was found to be almost solitary, in which detached condition it is mentioned, in the journal* of that explorer, as occurring on

* Journal of an Expedition into the Interior of Tropical Australia. By Lieut.-Colonel Sir T. L. Mitchell, Kt. D.C.L. London: Longmans.

Mount Abundance and on Mount Kennedy, both situated between latitude 26° and 27° south. On the table land of Hope, near latitude 25° south, it was found growing more gregariously, on the stony banks of the channel of a torrent from the hills. It seems, however, to be the general habit of this tree to grow detached and isolated, as it were, for some others are referred to as growing in various solitary singular situations.

Sir Thomas Mitchell has named this plant, (which proves to be a new genus of the natural order Sterculiaceæ,) Delabechea, after Sir Henry T. De la Beche, as president of a Society, (the Geological,) which has greatly encouraged him in his Australian researches; and in honour of a science which has occasionally thrown some light on his dark and difficult path. Dr. Lindley has described the species as *Delabechea rupestris*, from its habit of growing among rocks. Our engraving, prepared from a sketch published in Sir T. Mitchell's journal, gives an idea of the general appearance of the tree.

Delabechea, according to Dr. Lindley, agrees with Sterculia in the position of the radicle [the embryo root] with respect to the hilum [a scar on the seeds, showing where they had been attached]; but it is otherwise a Brachychiton, with which it more especially corresponds in the singular condition of the seeds. These are placed six together, in the

interior of long-stalked, ovate, mucronate, smooth, deep-brown follicles [the peculiar kind of seed-pod or carpel], of a tough papery texture, and lined with a thin fur of stellate hairs. The seeds themselves are also closely covered with starry hairs, which are so entangled that they hold the seeds together firmly; these hairs, however, are absent from the upper half of the seed, whose thin brittle vascular primine [the exterior integument of the ovule] is shining, smooth, and marked with a brown nipple, the remains of the foramen [an aperture through the integuments of the seed]; within the primine lies the bony crustaceous secundine [the second integument of the ovule, within the primine], which is quite loose, and seems as if it were independent of the primine. Eventually the end of the thin brittle primine breaks like an eggshell, and the secundine falls out. The seeds themselves remaining attached to each other and to the follicle, resemble six deep cells, or may be rather compared to half-a-dozen brown eggshells, placed on the broad end, from which the young have escaped through the point.—*Lindley, in Mitchell's Journal.*

The *Delabechea rupestris* is a large tree, of very droll form, having a tumid trunk, swelling or bulged out in the middle like a barrel, and contracting at the base and just below the first springing of the branches above, as represented in the engraving. It is this singular form which has suggested its name of the Bottle-tree. The wood is white, of remarkably loose texture, soft and brittle, owing to the presence of an enormous quantity of very large tubes of pitted tissue, some measuring a line and a half across, which form the whole inner face of each zone of wood. The leaves are linear-oblong, acuminate, and entire. The inflorescence is axillary and trichotomous.

In his description of a remarkable specimen of the Delabechea found on Mount Kennedy,

Sir T. Mitchell states that its girth was thirty feet at its greatest diameter, and only sixteen at the ground. In this situation there was only one companion of the same kind, a very young tree. "Of its quality, much, I am sure, remains to be said, when it becomes better known; the wood being so light, moist, and full of gum, that a man having a knife, or tomahawk, might live by the side of one without other food or water; as if nature, in pity for the most distressed of mortals, hiding in solitary places, had planted even there this tree of abundance. The wood must contain a great portion of mucilage, for, on chewing it, it seems to contain as much nutritious matter as fibre." When boiling water is poured over shavings of this wood, a clear jelly, resembling tragacanth, is formed, and becomes a thick viscid mass; iodine stains it brown, but not a trace of starch is indicated in it. No doubt the nutritious quality of the tree is owing to the mucilage, which is apparently of the same nature as that of the nearly allied *Sterculia tragacantha*, the Tragacanth tree of Sierra Leone.—*Lindley.*

"The pods contain a great number of seeds, which are eaten by the natives, and also by many birds; and from the circumstance of having found one pod half eaten by a bird on a rock, the very apex of a lofty summit, the solitary locality of this tree may perhaps be considered at least partly owing to its seeds being the favourite food of some birds inhabiting such places, each seed probably requiring to be picked out of the thick shell, in order that it may grow." *

The barrel-like form of the trunk of this tree is not quite peculiar to it. Other trees of the same natural order Sterculiaceæ, as the *Chorisia ventricosa* of Nees, and *C. insignis* of Humboldt, have trunks of a similar ventricose character; in the former case covered with spine-like processes. Indeed it would seem that a tendency towards a short lumpish growth of the trunk is somewhat common in the order. This is indicated in the Baobab of Senegal, which is almost as broad as it is long; several trees measured by Adanson being from sixty-five to seventy-eight feet in circumference, but low in proportion, the height not exceeding twenty or thirty feet; as well as in the great buttress trees, or silk cottons of tropical America.

CLIMBING PLANTS ON WALLS OR TRELLISES.

Many of these very beautiful objects lose all their best effects by ill training and neglected pruning. The varieties of the Clematis are very delicate in their stems, and if not watched as they grow, and made fast, they fall over, and frequently break in the attempt to get them up again. *C. Sieboldii* and *C. azurea grandiflora* sustain an enormous plant on a stem not larger than a small packthread; and if the heads be once allowed to hang over to any extent, it becomes almost impossible to set them to rights again. From the instant a young plant begins to grow, it needs support, and every attention must be paid to the mode in which it is to be trained; for if the plant is to cover a broad space, it should be topped or cut down, so that two lateral shoots may be produced; and these should be trained horizontally, as far as the space is to be covered, and then the ends pinched off. The plant will most likely branch at every joint; but if some of the joints fail to send out shoots, pinch the top out of one that comes next the vacancy, that it may send out lateral shoots to supply the deficiency, and eventually train all these upwards from the whole length of the stems. By this means a trellis or wall is soon covered. Again, while the plants are young it will increase the rapidity of their growth to pick out the bloom buds as fast as they appear, that all the strength may be thrown into the branches. The *Glycine*, or *Wistaria sinenses*, is a curious plant to manage. We have seen it remain a stunted, shrub-like plant for several seasons; this is chiefly owing to being pot-bound when put out, and the ball being too hard to receive the benefit of moisture. It then depends entirely on the outer fibres, and the roots, perhaps, being coiled round and round the collar of the plant, fairly choke it, because the roots will swell and bind the stem as firmly as if it were bound with a cord. When they are put out they should be loosened, the roots spread out, and the plant well watered. The soil should be good loam from rotted turves. When the plant begins to start, you must treat it according to what it has to do: if you want it to run a single stem a long way, cut the plant down to the strongest shoot, pick off all the blooms, and rub off the buds that are below the strongest, so that only that one shoot shall grow. If you want it to spread directly on both sides, pinch the top off this strong shoot, at the third joint; this will cause lateral shoots to come, when the best two, one on each side, may be allowed to grow, and may be trained horizontally, till they fill up their allotted space in width; they may then have their ends turned upwards till the end of the season; but before they start for the next year's growth, prune the upright part off, and let the eyes break all the way along, to grow upwards, and fill the wall or trellis. On the other hand, if one stem is to be carried as far as it will go, or to any considerable length, without side branches, cut the top down to the

* Journal, p. 181.

strongest bud that is breaking, near the top, and rub all the others off, that the whole strength may go the elongation of that branch, till it has reached where it may branch. But there are some climbers that are most effective when allowed to grow wild; that is to say, when they have covered the space wanted to be embellished, and the top allowed to get wild and bushy. Care must be taken in this case to fasten all the upper parts of the branches very strongly, because the head is of great weight, and would draw the nails, unless there are plenty of them, and they have good hold. The common or scented clematis is of this description; the honeysuckle is especially so. The passion-flower is always more elegant when thus left at liberty; but they must be annually trimmed, moderately, indeed we may say pretty close, because they are sure to grow wild enough. The best effect is produced by dividing the wall into panels, or equal widths; for each and the various subjects may be trained to fill their allotted width at bottom, after which all the growth would be upwards. A wall filled with different climbing plants has the prettiest effect; but if the plants are allowed to run up without filling the bottom at starting, there will be no getting them right afterwards, without actually cutting them down again; and whether it be a common fruit-tree, or any other plant trained, nothing looks worse than to see the walls bare at the bottom. Of course, there are hundreds of different climbing plants, but the principles are the same, and the management should be similar. Another mode very successfully adopted on the fronts of houses is to train things naturally of a dwarf habit to finish to the top of the lower windows and door, and to train others with single stems up to that height, and then let them fill the upper part of the front; by this means the two portions form a very different feature, but highly interesting and effective. The *Wistaria sinensis* is well adapted for the upper part, for a single stem of that plant could be grown thirty or forty feet high, if necessary, and all the beauty of the plant be commenced at any height. Perhaps there is nothing more neglected, in a general way, than climbing plants; and this fact induces us to select that subject for the present paper.

OBSERVATIONS ON PLANTS WHICH APPEAR INCAPABLE OF HYBRIDIZATION.

BY M. LOISELEUR DESLONGCHAMPS.

(Translated from the Ghent Annales.)

About four years ago, having occasion to speak of Mr. Lecoq's work on hybridation, I expressed some doubt as to the possibility of practising this process equally on all kinds of plants; at the same time I was not unaware of the great advantages that may be obtained by hybridation. I had frequently recommended one of my friends, residing in Provence (France), and in whose garden *Datura arborea* had been frequently crossed, to try to obtain a hybrid from the magnificent flowers of that plant, and the violet flowers of *D. fastuosa*. Latterly I endeavoured to avail myself of the genialness of the climate in which he resided in trying to cross several species of Amaryllis and Passiflora, in order to obtain new varieties. But however ready to admit the power of this process to modify species, I am still of opinion that it has its limits, and that there are genera which, from the nature and conformation of their flowers, will not admit of its successful application by any mode of procedure whatever. However, a great many horticulturists are so persuaded of the possibility of hybridizing in all cases, as to believe that the slightest variety they meet with is the result of this practice of crossing, though it has not really any influence in their production. But to return to the difficulty, or rather the impossibility, of crossing certain plants.

After having carefully studied the development of the flowers of wheat, in trying to ascertain what could be the causes which had produced so great a number of varieties of that genus, and if the application of the pollen to the stigmas of the different species might not produce modifications of form and new varieties, I was led by experience and observation to ascertain that the fecundation of the female organs of these plants took place secretly—that is to say, the pistils were impregnated with the pollen of the anthers before the calices were yet open. From this circumstance it has appeared to me that hybridation in such kinds of wheat is impossible, either artificially or naturally, and consequently, that the numerous varieties which exist in this genus have all been produced by unknown causes, but which are something different from what is called hybridation. But wheat is not the only plant which seems to be incapable of hybridation. Thirty years ago, and at a time when artificial crossing was much less in vogue than it is at the present day, I was induced to try to obtain some new varieties in the poppy (*Papaver*), by crossing the species of Tournefort, the flowers of which have remained to the present of so bright red a colour, with the poppy of our gardens, which on the contrary has produced a great many varieties of colour; but I could not succeed at all, for I found, in submitting Tournefort's poppy to the process of impregnation, that before the calyx of the two sepals which envelope the petals and the organs of generation

were yet open, the stamens had already shed their pollen on the stigmas, and that consequently the act of fecundation was made in secret, and the same as in the case of the wheat. However, I was not disheartened; and after having made this observation, I believed I should yet be able to obviate the difficulty which presented itself, by forcibly opening, early in the morning, the two folioles of the calyx before their natural expansion, in the hope that I should be able to find the anthers still closed. But I was disappointed, for to my great surprise I found that the stigmas had already received the fertile powder of the anthers. It appears to me, therefore, that the flowers of the poppy, by their conformation, are evidently incapable of being crossed. This circumstance, however, has not prevented the flowers of the common poppy, whose organization is the same as that of those of the species of Tournefort, from producing a great many varieties.

A short time before the incident I have just related, I found, by chance, one with double flowers, which had, so to speak, sprung up spontaneously in my garden, and which I preserved, allowing the seeds to sow themselves, as it were. Some years after I had flowers with twenty different colours from this plant.

From these observations we may conclude that it is not requisite to cross the poppy in order to produce those numerous varieties, which are familiar to every one, since they are continually crossing themselves without demanding any care or trouble at our hands. Other plants which I have not yet noticed may be, by the organization of their flowers, in the same case as the wheats and the poppies; but I think that the vine in its floration presents a conformation in which it would be difficult, if not impossible, to submit it to the artificial process with success. The flowers of the vine are composed of a calyx with five very short teeth, and five small petals adhering at their summit, and swelled out by the development of the anthers. This disposition must be favourable to the internal process of fecundation, and prevent the pollen of any species or variety whatever from coming between the pistil of a flower of this genus and its own stamens. If, then, I am not wrong as to the manner in which the phenomenon of fertilization takes place in the flowers of the vine, it appears to me very difficult, if not quite impossible, that artificial hybridation can have any influence on their fructification. It may be asked, How, then, has this genus been able to produce so many different varieties of fruit, so various in size, form, colour, and especially in flavour, that the wines which have been made from them offer more numerous and decided points of dissemblance in this respect than the grapes themselves? Of the almost innumerable varieties of vines which are to be found at the present day, both in the vineyards and in nurseries, very little of the origin is known. They have all, more or less, been raised long ago, nobody knows how, though, by whom or what means, it is more than likely they originated from a very small number. There are only probabilities in this matter. We may perhaps be permitted to suppose that the vine, which was originally from Asia, and first cultivated in that part of the world, possesses great fecundity, which has caused it to produce the more varieties as it changed climate, soil, and exposure; and that the more it has been modified by these different causes, the more it appears susceptible of being modified still; for from the seeds most recently sown, new varieties, entirely different from the primitive sorts, have appeared, springing up as it were from each pip.

DIGGING, TRENCHING, ETC.

The operations of this class which are performed in the cultivation of the soil, have for their objects its pulverisation and aëration, and the intermixing of its particles, to the depth to which the roots of the crops penetrate. In a general view, every operation of this kind may be said to be advantageous. Very light and loose soils, indeed, are sometimes benefited by a certain degree of compression and consolidation, and to this extent should be left for a time without digging; but in the greater number of cases, the fertility of the soil is increased by at least an annual thorough trenching, and by digging or forking to a less depth several times during the year, either between the crops, if they remain long on the ground, or during the short intervening period between the removing of one crop and the replacing it by another.

The advantages obtained from the proper pulverisation of the soil are numerous and important. In the first place, greater scope is afforded to the roots of the plants; and on the number and healthy action of the fibrous extremities of these roots, the vigour of the plants is mainly dependent. It is the spongioles of the roots which draw up from the soil the various matters which go to the nourishment of the plant; and therefore the more the soil is pulverised, and the number of these spongioles increased, the more nourishment will be absorbed, and consequently the greater vigour

will be attained. This action of the roots is assisted by other conditions produced by pulverisation. Thus the capillary attraction of the soil is increased, and consequently its humidity is rendered more steady and uniform. In dry weather, when a consolidated soil would have become arid and unable to support vegetation, a pulverised soil would be furnished by this capillary property from the moisture beneath it, and it would also absorb with greater facility the nightly dews which fell upon it. The temperature of the soil is also heightened by pulverisation, and its more equable state of humidity condenses certain gases from the atmosphere, which become converted into food for the plants. The chief advantage, however, is that derived from the manner in which it increases the number of fibrous roots or mouths by which the plants are enabled to imbibe their food, from the more speedy and perfect preparation of this food, and from the greater regularity with which the latter, being so prepared, is conducted to the roots.

Aëration, or the free admission of the atmosphere among the particles of the soil, is very beneficial; some of the elements of the atmosphere being condensed, and thus supplied to the roots. In summer, one advantage of aëration is the thorough heating of the soil, which increases its capacity for absorbing moisture, and must materially assist the decomposition of what vegetable matters it may contain. In winter, aëration favours the minute mechanical division of the soil, by the freezing of the water which it contains; for as water in the solid form occupies more space than when fluid, the particles of earthy matters, and of decomposing stones, are thus rent asunder and crumble down into a fine mould, so that well-aërated soils thus receive an accession to their finer particles every winter. The action of the atmosphere will also disintegrate and sweeten such soils as may have become soured or soddened, if the cause of the latter condition has been removed.

The intermixing of the particles of the soil, by the repeated processes of digging, trenching, &c. is favourable to its fertility. The heavier particles have a tendency to settle downwards, leaving the surface light and spongy, which tendency is sufficiently checked by these operations, if they are frequent enough; and thus the mechanical texture favourable to the increase of roots, the preparation of food, and the drainage of superfluous water, is secured. Manures and composts, too, when added to a soil to aid its fertility, require to be intimately blended with its particles, and this result is obtained during the processes of digging and trenching.

Each of the operations referred to, claims a separate and detailed consideration. Before proceeding with these, however, it may be remarked, that dry weather is most proper for executing the whole of them; and the soil should also be comparatively dry, that is, not so wet as to become pasty or adhesive from the necessary trampling by the feet. Nothing is so effectually opposed to the pulverisation of the soil, which is one of the main objects to be effected, as the burying of any portion of it in this mortar-like condition; and yet it is very commonly practised. Common-place operations of this kind are too often thought to be entirely independent of such considerations as that of the weather in which they are performed; and yet it is not too much to say, that very many of the advantages of the operation are lost from inattention to this point. This evil is most serious in heavy clay soils; and becomes of less importance when the soil is very light and sandy. Another point which should be borne in mind is, that snow does not improve the texture of the soil when dug or trenched in, and materially lowers its temperature by abstracting from it the heat it may possess. Whenever these operations, therefore, are performed at a time when snow is on the ground, it should not be turned in or mixed up with the soil: no harm will, however, result from casting it, as the work proceeds, *on to the top* of the turned-up soil. Dry frosty weather affords a very favourable time, for trenching especially; but when it is possible, all those portions of the garden which are designed to benefit by exposure to frost in winter, should be dug or trenched in the autumn, or in the earlier part of winter, in order that the surface may be turned over during the continuance of frost, so as to expose a greater portion directly to the influence of the atmosphere.

Digging.—This operation consists in turning over the surface-soil to the depth of from eight inches to a foot, or in technical language, "one spit deep;" that is, the depth of the blade of the spade. This is done with the view of lightening up the soil to that depth for the reception of some fresh crop, or to mix in manure with the upper stratum of soil, or sometimes to bury down weeds and rubbish, with a view to producing a neat and orderly appearance. The first part of the operation is to remove a deep open furrow at one end, or along one side of the piece of ground to be dug. Digging cannot be carried on in a workman-like manner unless this furrow, technically a "trench," is of sufficient capacity to admit of the reversal of the position of each spadeful of soil, as it is cast down. Taking the depth at one foot, the width of this trench should be about a foot, rather more than less. The earth which is taken out to form this trench should, if the piece of ground

is of moderate size, be wheeled to the opposite end or side, and there deposited on a ridge, for the purpose of filling up the trench when the digging is completed. If, however, the plot be a large one, much labour in wheeling may be saved, by dividing it into two parts of equal width ; the soil of the trench taken out from one part being deposited as above, along the contiguous end of the other part. In this latter case, the one part is dug first, and its trench is filled up by soil obtained in opening a trench at the contiguous end of the other part, which is then dug, and the trench finally filled up by the soil first taken out. If the space is not large enough to render this plan necessary, the trench is opened at one end, and the soil thus obtained removed to the other ; the digging proceeds regularly over the piece, and the trench is filled up at last by the soil taken out at first, and removed for the purpose to the opposite end. In working, this trench should always be kept straight across the ground, because if it be allowed to get crooked by irregular advances in the digging, its length will be increased, and in the same ratio its capacity will be diminished ; or if not diminished, the soil provided for filling up the trench will not be sufficient. In either case, the surface will become uneven, which has a slovenly appearance ; and besides, in this case, extra labour is involved in rectifying the error. When the trench is taken out, a row of spadefuls taken from the undisturbed part of the soil is to be cast to the farther side of the open trench, each spadeful being reversed as it is cast from the spade ; that is, the bottom is to become the top, and *vice versâ*. Another row of spadefuls is then to be cast against, or rather on these, so as to form a line or ridge of turned-up soil, the top of which must range with the ordinary level of the ground. Some care should be taken to get this point properly secured at starting, as the levelness of the work depends a good deal upon it. The ground will now present a clear, open, straight furrow between the undug and the dug portions of soil ; and this furrow is to be kept clear and straight during the progress of the work. The blade of the spade should be inserted each time nearly in a perpendicular position, and should be forced down to its full depth, both the hands of the digger being then at the top end of the lever or handle. The spade is forced down by pressing the hollow part of one foot on the upper edge of the blade, which is called the tread ; and if the ground is hard, the operator's shoe should be protected by what is called a digging iron, or foot iron, which is a plate of iron fastening by means of a strap to the hollow part beneath the shoe. In lifting up the spade (supposing the operator to work right-handed), the left hand retains firm hold of the top of the handle, while the right is passed downwards about half way, and by it chiefly the spadeful of earth is lifted up. The spade is now turned (chiefly by the left hand) over *from* the operator, and the earth thus cast in a reversed form against the former row of spadefuls, on the other side of the open trench. The workman thus proceeds across the piece of ground, moving backwards and forwards from end to end until the whole is dug. The work is better performed when moderate sized spadefuls are moved, than when these are much larger ; the pulverisation and intermixing of the particles being in the former case more complete than in the latter. Where pulverisation is the object, the soil should be comminuted and broken with the spade as it is turned over ; but if the aëration of the soil is the object, each spadeful should be preserved as entire, and laid as open and isolated as possible, the surface being left rough, and not at all comminuted. When manure is added, it should be mixed as regularly as possible throughout ; and the roots of all perennial weeds, where they exist, should be carefully picked out as the work proceeds. None of these things can be properly done unless there is a clear open furrow.

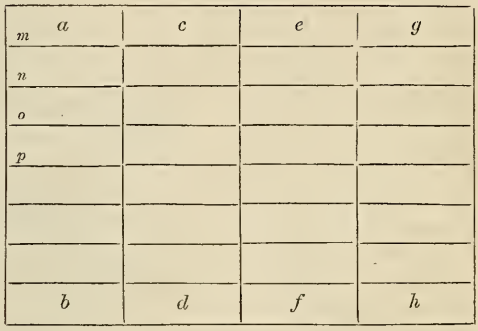
The principal varieties of digging are called *ridge-digging* and *flat-digging*. The former consists in laying the surface in parallel ridges. A section of ground so dug would show the appearance of a series of equal-sided triangles having been placed together to form the surface ; under such circumstances, about two-thirds more of the surface is exposed to the atmosphere, than when the surface is level. Flat-digging is chiefly adopted when the object is merely to present a fresh surface of clean earth. It is done by thrusting in the spade in a very slanting direction, as shallow as circumstances will permit, and simply turning over the soil so taken up in the same place, without having any open trench or furrow of any consequence. The object is, in general, just to bury weeds and such rubbish as will speedily decompose.

Forking is an operation very similar to digging in its nature and object, only instead of being performed with a spade, a digging-fork is employed. An ordinary digging-fork differs from a spade in consisting of three or four flattened prongs, instead of being a plain sheet of metal. The object of this operation is the lightening and pulverising of the surface. It is often resorted to before planting light crops ; and where ground has been ridge-trenched, or ridge-dug for the winter, it is usual to fork it down level in the spring when required for cropping. Sometimes the soil is forked up during the progress of the growing crops, with a view to their benefit ; and there

is no doubt they derive much advantage from judicious assistance of this kind. The loosening of the soil in this way is one of the best of all specifics against the injuries resulting from drought.

Trenching.—This operation may be called an amplification of digging, and consists of turning up the soil to the depth of two or three feet, instead of one, which is about the depth of proper digging when well executed. Its objects, also, are the same as those of digging. The manner of setting about it depends, as in digging, upon the space to be operated on. If this is small, or only of moderate size, the trench is to be opened at one end, and the soil thus taken out removed to the other end, for the purpose of filling up when the work is finished. But if the space is large, it may be divided into two, four, six, or more, strips of equal size, ranging either lengthwise or crosswise, as may be most convenient; and an opening being made across one of these portions, the soil is to be wheeled to the end of that portion where the work will finish. Thus, supposing there to be six portions ranging north and south: an opening is made, say at the south end of the first portion; this soil must be removed to the south end of the sixth portion, and the trenching will proceed from the south to the north end of the first part, then from north to south in the second part, from south to north again in the third part, and so on to the end. In this way, a large piece of soil may be trenched without involving any material degree of labour in opening the trench at the commencement.

It is absolutely essential, if the operation of trenching is to benefit the soil, that the top portion of earth—that is, the fertile surface soil, whether six inches or two feet in thickness—should be kept at the top, and not buried beneath any portion of crude soil from below; and this must be attended to, notwithstanding that the depth of the trenching ought in all garden soils to extend from two-and-a-half to three feet. Many persons suppose trenching to mean simply the turning over, from bottom to top, the whole of the soil two or three feet deep; but in such case, if the land be sandy and the soil shallow, a bed of sheer sand would be brought to the top, and the fertile soil buried. So if chalky, the top would be made to consist wholly of chalk, and if clayey, wholly of clay; and even in the best of land, if the soil from the very bottom is brought at once to the top, it will not be fit to support vigorous healthy crops. The proper way is to turn up the soil as deep, but no deeper, than the soil is of good quality. A portion below this is then to be broken up and loosened, in some cases turned over likewise, still being kept below the good soil; and a small portion of this may, at each time of trenching, be well mixed with the upper soil, by which the bulk of the latter will be gradually augmented, so that ultimately, if this practice is followed up, the depth of good healthy fertile surface-soil may be made equal to the entire depth to which it is found necessary to extend the trenching. It may perhaps render these remarks more intelligible, to introduce the following diagram, which illustrates the mode of trenching in slips, and also the practice of keeping the surface-soil at or near the top. The diagram may be supposed to represent a plot of ground eighty feet wide, and any convenient length; this is divided into four strips of twenty feet wide each, indicated by *a b*, *c d*, *e f*, and *g h*. Then across the first slip at *a*, a trench (*m*) is to be marked



off, two or three feet wide. The top (good) soil is to be taken from this trench and wheeled and deposited near *g*, just at the edge where the last cross trench will come. When the top earth is taken from *m*, another trench (*n*) is to be marked out, and the surface-soil from this also removed to *g*, and placed with that from *m*. Then take out the bottom earth from *m* to the intended depth of trenching, and wheel that also to *g*, but keep it distinct from the other or top earth. The bottom of the trench *m* is now to be broken up nine or ten inches deep, by means of a digging-fork, and allowed to remain where it is. The bottom earth of *n* is then removed to the same depth as that of *m*, and cast on to the broken up base of the trench *m*, and then the bottom of *n* is broken up with the fork. The top earth from a third trench (*o*) is then cast across *n* to fill up the trench *m*, which is then full, having been made up from the lower part of *n* and the upper part of *o*. Next, the lower part of *o* is cast into *n*, and the bottom of *o* is forked up and left as in *m* and *n*. The top soil from a fourth trench (*p*) is then taken off to fill up *n*, and the work proceeds in this way till the end (*b*) is reached, when the soil from *d* is used in the same way, and the same course proceeds along the second slip to *c*; then by *e* to *f*, and thence from *h* to *g*, where the soil

from *m* is in readiness for filling up, that from the bottom being of course placed at bottom, and the upper or good soil above it. In order that this may proceed regularly, and that the surface may present its proper level throughout, it is necessary that the slips *a b*, *c d*, *e f*, *g h*, be of equal width throughout; the cross trenches also, *m*, *n*, *o*, &c. &c. must, for the same reason, be kept accurately to the same width throughout. The lines, both of the wide slips and cross trenches, are marked by measuring accurately the proper distance at each end with a rod; the garden line is then stretched quite tight, from one of the points thus ascertained, across to the other, and then a slit or notch is made three or four inches deep by the spade, close to and parallel with the line.

This mode of trenching is most suitable for land when first broken up, and for that which is of inferior quality. In the case of deep soils of good quality, it is not necessary to guard so carefully against bringing the lower soil to the top; but even in this case, it is best to bring it up gradually. Thus, supposing it to be trenched three spades in depth, the second (*y*) may be brought to the top, and the first or top (*x*) put in its place; the third (*z*) being merely turned over, but kept below the other two, and the base beneath the third broken up and left. Then at the second trenching, the third or *z* may take the second place, *x* being returned to the top, and *y* placed at the bottom. At the third trenching, *z* may come to the top, and *x* the original top may go to the bottom, *y* also occupying its original position between the other two. In this way the surface is each time thoroughly changed, without in either case bringing crude soil to the surface.

As regards the depth to which it is desirable to trench, a few words may suffice. In breaking up fresh land for a garden, a depth of about three feet will be proper. This will be four spades deep, supposing the spade-depth to average nine inches in working, which is near what it does. Three spades-deep should be turned over, according to the principles already laid down; the fourth may be broken up and left in the bottom. In trenching land which is regularly brought under cropping, it is not necessary to trench so deep as this every year; about every second year will suffice, in the intermediate year the ground being broken up three spades deep. It will also be proper, in trenching ground in such circumstances, to apportion the depth of the operation to suit the particular crops which are to be next planted. For growing vegetables, there should be from two-and-a-half to three feet of good workable soil, and the oftener this is turned over by trenching, consistent with other features of management, the better. For flowers, an average depth of two feet will be sufficient; and where circumstances admit, it should be remembered that these are as much benefited by the trenching and proper management of the soil, as are vegetables.

Whenever the operation of trenching is going on, care should be taken to remove the roots of all perennial weeds; these should be carefully picked out, and *removed entirely* from the ground, and are most suitably conveyed at once to the rubbish heap. The roots of most kinds of perennial weeds, if left in the soil, spring up and prove very troublesome during the growth of the crops. If manure is to be added, it should by no means be thrown entirely into the trench, as is often done; neither should it be placed in a layer between any part of the soil, but should be well intermixed with that part of the upper soil just below the surface, and downwards as far as may be proper for the particular crop to be planted. To facilitate this mixture, and also the mixture of the particles of soil, the finished portion should present a sloping surface towards the work, against which the soil and manure may be cast as the work proceeds, instead of being placed in horizontal layers. When any coarse vegetable refuse is trenched in, it must be buried sufficiently near the bottom of the trench to be out of the way of planting. In order to do these things effectually, as well as to preserve the proper level of the surface, the trench must be kept open and of equal capacity throughout the progress of the work.

As in the case of digging, the surface of trenched ground is sometimes laid in ridges instead of being placed flat, and this is called *ridge-trenching*. Its advantages are the same as those of ridge-digging. Another kind of trenching, called *bastard-trenching*, consists in turning over the upper spadeful, the second being broken up and left in the bottom of the trench. It is a common practice to trench two spades deep; but it is much better, in all cases, to break up the ground at least three spades deep, where the operation is required at all.

As already remarked, these operations of digging, forking, and trenching, are best performed in moderately dry weather. When the weather is wet, and also when the surface is wet from recent rains, or during a thaw after frost, nearly as much injury is caused by the necessary trampling on the ground, as would counterbalance the advantage of the operation. When a portion of the top soil is thus worked up to the consistence of mortar, and in this state turned in, in the process of digging or trenching, it can no longer be friable, as it should be, until the superfluous water has been absorbed from it, and itself disintegrated, either by the action of the at-

mosphere, or the operations of culture. This evil is especially experienced on soils approaching the character of clays: on very light sandy soils it is of much less importance. Some of the latter admit so readily of the passage of the water, as to be in a fit state for working immediately after a heavy rain. As some guide in this respect, it may be assumed, that whenever trampling on the surface works the soil into a kind of paste or batter, it is improper to prosecute any operation which involves such trampling, unless a board can be used to keep the feet from contact with the soil.

The tools employed in these operations are the spade and the digging-fork. Spades are of various sizes, but in an ordinary full-sized one the blade is about a foot long and eight inches wide, and should be of good tempered steel. The fork may have three or four prongs. The garden line and measuring rod are also employed. A convenient size for the digging-fork is indicated by the annexed proportions :—Width of entire prongs (three in number), seven inches at top, and six at the points; prongs thirteen inches long, seven-eights of an inch square at top, tapering to a point; handle two feet two inches, one and a half inch diameter.

Cupressus lusitanica.

HARDY CONIFEROUS PLANTS.

THE GENUS CUPRESSUS.

Cupressus, *Linnæus* (the Cypress).—Coniferæ § Cupressinæ. The name of the genus has been supposed to be derived from *Cyparissus*, a beautiful youth of the island of Ceos, who was changed into a Cypress. Others, however, derive it from *kuo*, to produce, and *parisos*, nearly resembling, in allusion to the regularity of the branches; and others, again, from the isle of *Cyprus*, where one species was found in abundance.

1. *Cupressus sempervirens*, Linnæus (common, or evergreen Cypress).—Leaves small, imbricated in four rows, convex, adpressed, smooth, shining, persistent. Cones sessile, globose, covered with large, angular, corky scales.

There are two varieties of this tree in cultivation :—

C. s. stricta, the most common form, with upright adpressed branches.

C. s. horizontalis, with the branches spreading.

An elegant, tapering tree, very much resembling the *Populus fastigiata* in outline, and long known in old English gardens. It is a native of the isle of Crete, the inhabitants of which boasted that the tomb of Jupiter was there, and that it was shaded by magnificent specimens of this tree. It is intimately associated with biblical and classic times, and has on this account been always looked upon with a degree of reverence. The most remarkable tree of this species in the world is the cypress of Soma, where the first battle was fought between Hannibal and Scipio; and, as Landor says in his *Conversations*, it is the object most worthy of being seen in Italy, unless it be the statue, at the base of which fell Julius Cæsar. According to the Abbé Berlese, who made a tour through the north-

ern part of Italy in the year 1832, this remarkable tree girted twenty feet, and was seventy feet high, though it had for many years lost its leading shoot. Popular tradition says it was planted previous to the birth of Christ; and it is affirmed that there exists an ancient chronicle in Milan which proves that it existed in the time of Julius Cæsar, B. C. 42. The cypress of Hafiz, said by some to have been planted by himself, is also entitled to particular notice. It stands in a plot of ground near to the cemetery of the great poet, and not far from Shiraz. The tree is now upwards of 500 years old. Those planted by Michael Angelo in the garden of the convent of the Chartreux, formerly occupied as the baths of Dioclesian, are about fifteen feet in circumference. Some of the largest specimens in England are at Syon, the seat of the Duke of Northumberland, where it is no doubt 200 years old, the species being mentioned as growing there, both by Turner and Gerard.

The cypress tree has formed a fruitful theme to poets in all ages of the world. Being evergreen, it was adopted as an emblem of immortality; and judging from its appropriation in some eastern lands, it appears to have been looked upon with the same feelings as the yew-tree awakens in this country. Thucydides relates that the Greeks who died in the cause of their country had their remains preserved in cypress, so that both in its living and dead state it was held very dear by them. The gates of St. Peter's Church at Rome, made of this wood, had lasted from the time of Constantine, about eleven hundred years, as fresh as new, when Pope Eugenius IV. ordered gates of brass in their stead. Horace states that whatever the ancients thought worthy of being handed down to the most remote posterity, was preserved in the wood of this tree.

The plant is strictly funereal, and not, as Bose thinks, from association merely, but from its sad-and sombre colour, which points it out as one of the fittest ornaments to places of burial. Its gloomy aspect is its chief recommendation for cemeteries, but it has others which ought not to be overlooked: it is one of those "eternal" trees which give permanency to localities appropriated by man; for of all others this tree is the least affected by the vicissitudes of centuries. Green and flourishing it will remain; and if a tithe of the traditionary statements made regarding it be correct, one would be almost tempted to say that trees now in existence are likely to remain until the world is over. Its tapering figure contrasts well with gravestones, which are generally flat; and to the fanciful or poetical mind, its pointing to heaven indicates the bent of the good man's soul. It is, furthermore, exceedingly well adapted to the grave-yard on account of the narrow space which it occupies, for whilst it creates shelter and shade, it admits plenty of sunshine even close to its stem.

The cypress is propagated by seeds, which are to be had in abundance in England. The cones should be left on the trees till the middle of February, when they are perfectly ripe. They may be either dried in the sun, or exposed to the influence of fire heat; but where large quantities are required, the writer has found it more economical to place the cones, along with other coniferæ, on a kiln, which he has had erected expressly for the purpose. After they have been subjected to heat for a whole day, not exceeding 110 or 115° Fahr., a portion of the seed may be had by sifting the cones, and the remainder will be got by thrashing. The proper time to sow the seeds is the middle of April; and the soil selected should be sandy loam, raked very smooth and even. A quarter of an inch will be a sufficient depth of covering, and moderate and uniform waterings are indispensable. They may be sown in a frame, with a very slight bottom heat, or in pans placed in a frame without bottom heat, or in the open ground sheltered by a *dead fence* from the sun. I adopt the last plan, but great care must be taken to shelter them securely from frost and cold in winter-time, for they are very tender when young, and apt to be entirely cut off. When two years old, they should be placed in nursery lines, *and shifted every subsequent year*, else the roots will get hard, bare, and rambling, so that when they are placed in their final station, a great many deaths will be the result. To obviate the necessity of shifting them every year, some nurserymen plant them in pots, and from these they require removal every second season only. The operation of shifting should be invariably performed in April. Plants in pots, two feet high, are 1*s.* 6*d.* each (1848).

2. *Cupressus thyoides*, Linnæus (thuja-like Cypress, or white Cedar).—Leaves in four rows, imbricated, adpressed ovate. Cone globular, small, blue, like those of a juniper.

The varieties are—

C. t. foliis variegatis, which has the leaves blotched with white.

C. t. nana, the habit of which is dwarf.

A beautiful evergreen tree, long familiar to the English gardener, but never so sufficiently well tested in this country as to give any indication of its suitableness to be grown as a timber tree. It luxuriates in the great cedar swamps throughout the maritime districts of Maryland, New Jersey, and Virginia, where it reaches the height of eighty feet, with a trunk three feet to four feet in diameter, being

frequently clear of branches to the height of fifty feet. This tree is thickly garnished with leaves of a deep green colour: it assumes a conical outline, and is well adapted to form an agreeable contrast to white buildings, and in the distance, during summer time, it often displays itself to great advantage beside white poplars, especially if it is planted in masses. It grows slowly for the first few years; but in a deep free loam, where there is plenty of moisture, it puts on a vigour which leads to its being recognised as a distinct species.

The wood of this tree is light, easily worked, fine-grained, and lasting. In one important respect (that of resisting the effects usually produced by alternate exposure to wetness and moisture), it stands superior to every other description of American timber; and this fact has led some of the railway companies of the present day to import it in large quantities, in order that it may be tested as to its fitness for sleepers. The houses of Philadelphia, Baltimore, and New York, sufficiently prove its great usefulness in those places; for it is not only extensively used in the construction of their roofs, but in the shape of household utensils, such as pails, tubs, churns, casks, &c. For several out-of-door purposes it is found a valuable auxiliary in helping forward the commerce and agriculture of the country. The sides of fishing boats are formed of it, and in the shapes of gates, fences, &c. it lasts for half a century. Had Cobbett urged the adoption of this tree in England instead of the locust, he would have earned for himself a better reputation, and conferred a real benefit on his countrymen.

To extensive proprietors of cold, marshy land, the writer would confidently recommend this tree to be planted on an extensive scale. To those also who have lands in maritime places, this tree offers every inducement, for it appears that the meadows of Virginia and Maryland are exposed, during high tides, to a considerable depth of salt water, a circumstance which has no effect whatever in retarding the growth of the trees.

The cones should be imported, and subjected to heat as recommended for those of *C. sempervirens*. Boxes or pans are most convenient for this species, because they can be shifted away from the sun at pleasure. Light sandy soil should be selected, and the seeds should be covered to the depth of a quarter of an inch. The boxes or pans should have the advantage of a slight bottom heat, and when the plants are completely up, care should be taken to withdraw them to a colder atmosphere. They should remain two years in the boxes or pans, and then be planted out during the month of April in the open ground, where they will require protection during winter, at least for a few years. Plants, one foot high are 6*s*. per dozen (1848).

3. *Cupressus lusitanica*, Tournefort (Cedar of Goa, or Portuguese Cypress).—Leaves in four rows, imbricated, adpressed, somewhat glaucous, terminating in spines, awl-shaped. Cones globular, covered with eight-angled rough reflexed scales.

A beautiful branchy evergreen shrub, of an elegant pendulous outline, and well entitled to take its place on the best kept greensward. It has been known in England since 1683. One of the largest trees stood in the grounds of the Duke of Richmond at Goodwood, but it was killed by severe frost in 1740. At the present time, the finest specimens are at Elvaston Castle, and in the arboretum of the London Horticultural Society. A free, deep, loamy soil is its delight. Seeds are sometimes imported from Portugal, but a great many plants are raised by cuttings treated like the more common sorts of heath. According to Miller, the tree is abundant at Bussaco, near Cembra in Portugal, where it is called the cedar of Bussaco. The seeds of this species should be treated in the same way as the foregoing. Plants one foot high are 1*s*. 6*d*. each (1848).

4. *Cupressus torulosa*, Lambert (twisted or Bhotan Cypress).—Leaves obtuse-ovate, small, adpressed, imbricated in four rows, of a light green. Cones about the size of a sloe, globose, angled, brown; scales bossed.

One of the most elegant trees of the Himalaya, where it grows in great profusion at a height of 12,000 feet above the level of the sea. It is there called the Hill Cypress. It is not improbable that this species may become serviceable even as a small timber tree in England, or at any rate rank with the most common and useful of our large evergreens. The writer has had seeds sent from an elevated part of the Himalaya, and one-year seedlings appear to be as hardy as the common larch and Scotch pine. By far the best way to treat this valuable cypress is to steep the seeds a week before sowing them, and commit them to the *open ground* in the middle of April, so situated that the mid-day sun may not strike the beds where they are sown. They require a great deal of moisture, moderately and regularly supplied, yet often and carefully administered. The seeds should be covered to the depth only of a quarter of an inch, and the young plants should remain in the seed-bed for two years, when they may be treated like larch or Scotch pine plants. It is not necessary that the seeds of this species should be sent by the overland route from India, for it has been satisfactorily proved that they will vegetate freely after being exposed to a five months' voyage. One year

seedling plants 2*s.* 6*d.* per dozen, and those one foot high 1*s.* 6*d.* each (1848).

5. *Cupressus pendula*, Thunberg (pendulous Cypress).—Leaves imbricated in four rows, keeled, adpressed, clasping the stem, very close, scale-like. Cones about the size of the foregoing, obtuse, eight-angled.

A graceful plant, introduced from Chinese Tartary at the commencement of the present century. By many botanists it is reckoned a mere variety of *C. torulosa*, which it rivals in elegance of outline. It is hardy in the climate of Britain, but is not yet common in collections. There is a fine specimen at Kew. Plants one foot high are 10*s.* 6*d.* each (1848).

6. *Cupressus thurifera*, Humboldt, Bonpland and Kunth (thuriferous Cypress).—Leaves ovate-lanceolate, acuminate pointed, scarcely a line in length ; those on the young shoots about one-third of a line long.

In Mexico, where this species is found at a height of 5,000 feet above the sea, it forms a fine tree, growing from fifty to sixty feet high. It was introduced to England in 1837. There is a plant of this species in the arboretum of the Horticultural Society. It is considered to be hardy, and will probably attain to the height of twenty-five feet in this country. Plants are to be obtained of Messrs. Whitley & Osborn, Fulham.

7. *Cupressus bacciformis*, Willdenow (berry-bearing Cypress).—This is a hardy tree, growing twenty feet high, and was introduced in 1818.

8. *Cupressus Lambertiana*, of gardens (Lambert's Cypress).—A beautiful fastigiate-headed tree, named in honour of A. B. Lambert, Esq.

9. *Cupressus Uhdeana*, Booth (Udhe's Cypress).—Cultivated in the Fulham Nursery, and represented to be hardy.

10. *Cupressus Tournefortii*, Audibert (Tournefort's Cypress). — Cultivated since 1834.

11. *Cupressus religiosa*, of gardens (sacred Cypress).—Supposed to be sufficiently hardy to bear the climate of England.

Little is known respecting the last five named species, which have not been seen by the writer.

FUCHSIAS AS SHOW PLANTS.

The most extraordinary fact connected with the cultivation of this attractive plant is, that not one specimen in a hundred shown at public exhibitions is at all well grown ; these are driven along at steam rate into every form but the right one, and most of them hang lopping about, appearing as if half dead for want of water, simply because, although a greenhouse plant of a hardy description, robust, and capable of bearing even a little rough weather, it is treated as if it were a stove plant, and pushed along at all hazards. Now, the fuchsia wants no more heat than a heath or a Botany Bay plant, but because it will bear it, every body gives warmer culture. Cuttings struck in autumn, or even spring, are driven along to form six-feet plants in a few months. One of the effects of this is lanky, uncouth growth, with limbs and leaves few and far between, incapable of supporting themselves. Another effect is, that the plant no sooner encounters the change from its nursery to the open air, than it exhibits every sign of distress, and fairly flags. Now, it is greatly to be regretted that any plant should be spoiled ; but to see a whole family ill used, to see all the exhibitors failing in the same point, to see fuchsias invariably the worst things at a show, is doubly vexatious. How, then, ought fuchsias to be cultivated ? Why, according to the present system, potted in highly-manured compost, placed in an intermediate house, or even a stove with some folks, watered lavishly, and often shifted from one sized pot to another, or put in a large pot at first, so as to prevent the necessity of shifting. This will produce fuchsias as they are now shown, but let other practice be adopted. They should be struck in the greenhouse, potted and grown in pots out of doors without covering all the summer, stopped or otherwise according to the habit of the plant, watered carefully and regularly when required, and kept in moderately good form by pinching in here and there a vigorous branch, or any shoot inclined to ramble. When the cold weather sets in, or is about to set in, remove them under cover for slight protection, but give no heat ; keep them from frost, but that is all. The leaves will fall, the plant will want no more water, and nothing more need be done for them than keeping them from severe frosts. In the early part of the year the plants will begin to swell their buds a little, when you must prune them to some form, either very bushy or pyramidal, but this depends on the habit of the plant : make due allowance for the length of growth of the shoots, and cut accordingly. The old shoots should be cut back tolerably close if the plant is to grow pyramidal, but when cut, be quite as particular not to allow them to grow too fast. On no account have a fire if you can cover up the frame or house to keep the frost out without one, for it is very desirable that they grow slow and steady, and be not driven with fire heat. It would not matter how low the temperature was, so it were safe above 32°; but as the season advances, the natural increasing heat will require them to have all the light and air that can be given, and the plants

turned daily to the light, that all sides may be alike. Nothing is worse than to let plants of any kind grow one-sided or one-fronted. They must have water pretty regularly, according to their wants. By this kind of growth you will find the branches come thick, the leaves close and shrubby, and the bloom infinitely more abundant than you ever had before. If any of the shoots take up to very vigorous growth, you must shorten them, that it may check that disposition. If there are too many shoots, rub some off, but that is a doubtful case in many of the sorts, which are far too open: as these come into flower they will be robust and hardy, they will travel better, and sustain the heat of a room longer; they will completely put aside their more tenderly-used neighbours, and completely prove that the whole family have been misgrown, misunderstood. The soil in which they should be grown is loam from rotted turves and turfy peat, chopped up and run through a coarse sieve, no dung, crocks for draining one-third up the pot, and no shift to take place until the roots fairly begin to mat round the sides of the pots they are in. The pale varieties require shading, and almost to be deprived of air, otherwise the white turns foxy. If this be so, you must put off the confining of them till the flower-buds begin to swell; the want of air is always detrimental to the strength of the plant, but the spoiling of the colour may be as bad, so that you must postpone to the latest period the shutting up and shading of the white varieties. When the pots are shifted, you must take care to put the soil down between the side of the pot and the ball of earth that comes out of the other, and the fibres must not be bruised by the stuffing of the compost down the sides of the pot. Those who will grow them once this way will soon see how far superior they are to the ordinary plants exhibited at shows.

PINK BEDS.

We prefer making pink beds in the early autumn, as soon as the pipings have rooted well; but for the convenience of those who begin in the spring, the bed should be made up of rich loam from rotted turves, and at one foot deep, two or three inches of well-rotted cow-dung should form a kind of bottom to which the roots may run. The easiest method of managing the bed is, to dig out a foot deep, put in the cow-dung, then the soil; and if the planting has been delayed, so that the plants have a second move instead of coming direct from the striking-bed, they must be taken up without damaging the fibres, and very carefully planted with the roots spread out. After being well watered in, they must be covered from the frost; for freezing and thawing would disturb all the roots, and almost push the plants out of the ground. But the first thing to take care of in a pink bed is the drainage; for if the bed be not well drained, in vain may we attempt to grow and bloom them in good colour: they may live and flower, but they will be small and rough and poorly laced. Some outlet must be found for the water, and a regular drain must be constructed the whole length of the bed, if there be no others about the premises, but it would be awkward to be obliged to drain every bed separately. A whole garden should be underdrained at first, before any other operation is performed, and even before it is laid out. However, although coarse vegetables may grow well enough for use on undrained land, delicate florists' flowers, such as the pink, ranunculus, picotees, pansies, and nearly all others, will not; and those amateurs who may complain, and do complain, that they are buying-in every year and yet cannot keep up their collections, (and this is the case with hundreds,) may find all the evil in their undrained gardens. The want of vigour, of colour, of increase, are natural consequences of growing florists' flowers on undrained land. On this account, therefore, we must be understood to direct, that if no part of the ground be drained, there must be a drain the whole length of the bed, two or three feet below the surface, and that this drain must have a natural or artificial outlet, to secure a good bloom. By keeping off the frosts after the pinks are carefully planted nine inches apart, (for although six will do, nine is better,) the roots will keep steady and gain strength every day; by exposing them to frost, the ground, constantly shrinking and swelling, will break their roots, and in two or three alternate frosts and thaws heave many of them actually out of the ground. The best litter to keep off the frost is peas-haulm, for it may lay on thick without excluding the light. Another way is to peg a netting six inches above them, so that waterproof cloth or matting can be thrown over at night. But if the plants are removed with care, without bruising their roots, the beds may be made up as late as January, February, or even March, if the proper time has gone by, and with care a good bloom may be secured.

LISIANTHUS PULCHER.

Lisianthus pulcher, Hooker (beautiful Lisianth).—Gentianaceæ § Gentiancæ.

One of the finest of the genus Lisianthus. The habit is shrubby; the flowers produced in terminal panicles, drooping, and of a fine scarlet colour. In shape they are not unlike

those of some of the slender tubed Pentstemons.

Mr. Purdie sent it from New Grenada to the Royal Garden of Kew. It was found by him in the Monte del Moro, in October 1845. Our sketch is from a figure published in the *Botanical Magazine*.

The species is of erect shrubby habit, tall, growing from five to seven feet high in its native country. The branches are opposite, and obtusely tetragonal. The leaves are

elliptic-lanceolate, on short stalks, growing opposite on the stem; they are four or five inches long, and furnished with two pairs of ribs branching out from the costa or midrib, the lowest arising from near its base, and the others between that and the centre of the leaf. The flowers grow in terminal, trichotomous, scarcely leafy panicles; they are drooping in a very elegant manner, the corolla an inch and a half or more in length, funnel-shaped, with the tube narrowed at the base, curved a little upwards, and divided in an oblique limb of five spreading ovate-obtuse lobes; the colour is scarlet, and the mouth is marked with yellow. The flowers are produced at the latter end of summer.

Naturally, this plant grows under the following conditions:—The soil is peaty, in a thin layer, and of a dry nature, lying on shelly limestone rocks. The climate is moist and temperate. The heat is never excessive; the thermometer sometimes falls so low that ice is formed, when the sensation of cold is very intense. The elevation of the locality where the plant is found, is between 7,000 and 8,000 feet.

The inference from these facts is, that we should place the plant in a greenhouse, where it may be kept moderately close. Here, in summer, a moist atmosphere should be kept about it; although at no time should there be anything like excess of moisture at the roots. To this end, the soil, of a peaty nature, should be light and turfy, and well drained. It has been suggested that fragments of limestone might be used for the drainage, in imitation of its native limestone rocks. There appears in the young plants to be a certain degree of delicacy, but probably not more so than in the case of the *Lisianthus Russellianus*, which is generally found to be of rather difficult culture, although some few cultivators have succeeded well with it. This species is, however, generally grown, during its early stages, in a rather high temperature, such as a vinery or melon-pit; then wintered rather dry in a cool part of the stove near the glass, and in spring again excited in an increased temperature. The soil used for them is of a light, rich, sandy nature.

It is probable that this species may be best propagated by seeds, as in the other species grown in this country. Being of a suffruticose habit, however, it is probable that sometimes cuttings may be produced, and thus afford another means of propagation.

THE FLOWER GARDENS AND ORCHARDS OF ANCIENT GREECE.

Among a people like the ancient Greeks, who found so much delight in painting and sculpture, in poetry and philosophy, in all the multiplied and varied graces of literature and art, we naturally expect to discover a strong predilection for the simple and delicate luxuries of the flower garden. The inhabitants of old Greece, whose minds were ever keenly alive to whatever of the beautiful or rich existed in their favoured country, enjoyed nothing more than the soft repose afforded by some artificial and secluded plantation, adorned with blossoming trees, flowering shrubs, and brilliant ornamental plants, which pleased the sense with a variety of sweet perfumes, while they delighted the eye with their variegated hues. No very accurate description of any one particular Grecian garden has been bequeathed to us by the writers of Hellas; but from the many scattered hints and touches which we discover in the delineations of those authors whose study and occupation it was to celebrate

the beauties of their own country, we may perhaps be enabled to form an idea, somewhat defined and truthful, of what a flower garden was in the early times of Greece.

If the gardeners and florists of ancient Hellas were deficient in the elaborate scientific knowledge of modern times, if they knew not how to bring the plants under their care to the highest point of perfection, yet may we allow them the merit, not too often exhibited in these days, of displaying a pure and simple taste in the management of their flowers, in the general plan of their gardens, and in the disposal of the various parterres, which were generally laid out as a fertile spot of ground more or less extensive, in the rear of the dwelling-house. Sitting in the shade of a verandah of lattice work, twined with the rose and honeysuckle, the Greek of the olden ages could extend his view along a sweep of ornamental grounds, presenting a brilliant variety of hues, and exhaling a delicious fragrance, which sweetened the atmosphere and was carried by the wind across the country in every direction.

On the summit of small mounds, dispersed with regularity over the garden, rose pomegranate trees, around which were planted myrtle bushes, roses, and agni-casti; while the open spaces which intervened were chequered with beds of small roses, lilies and violets, bordered with rows of the golden crocus, of which Theophrastus remarks, that it delighted particularly in the edges of pathways and trodden tracks. Occasionally, in place of flower-beds, they laid out broad levels of close greensward, profusely gemmed with the violet, the blue veronica, the pink and the pale primrose, the golden motherwort, the daisy, the cowslip, the periwinkle, and the pimpernel. The appearance presented by that portion of the garden, cultivated after this fashion, must have been peculiarly dazzling, though perhaps exceeded in richness and beauty by the aspect of the various parterres where each species of flower flourished in a separate compartment. A broad expanse of white violets first, perhaps, met the eye; this was strikingly contrasted by a bed of the golden cynosure, relieved by one of irises, of hyacinths, of the ranunculus, of the blue campanula, or Canterbury-bell, of the white gilliflower, the carnation, and the asphodel; while banks of rich purple violets imparted splendour to the spot.

Dr. Nolan, in his paper on the Grecian rose, would have us believe that that magnificent flower was unknown in the earlier ages of Hellas; but this opinion is not borne out by authority. It is indeed entirely crushed by the testimony of innumerable writers, upon whom dependence is to be placed. Herodotus speaks of the rose of sixty leaves, which he says was found in the gardens of Thrace, and at the foot of Mount Permios.* He also compares it with the red Niliaclotus. Stesichorus, an older poet than Anacreon, places it among his list of the flowers which composed the chaplet. We shall avail ourselves of Mr. J. A. St. John's translation of his verses on this subject:—

> "Many a yellow quince was there,
> Piled upon the regal chair;
> Many a verdant myrtle bough,
> Many a rose-crown featly wreathed
> With twisted violets that grow
> Where the breath of spring has breathed."

The "rosy-fingered morn" of Homer satisfies us that he was acquainted with this favourite flower; we need not therefore turn to any other authorities for testimony on this question, but proceed with our view of the Greek flower garden. It matters little at the present day at what period precisely the rose made its appearance in the gardens of Greece. Suffice it, that as soon as known it began to share with the violet the admiration of the Hellenic florist. It was the fashion to form whole plantations, equal in size and beauty to those of Serinaghur, of this delightful flower; and so great was the estimation in which it was held by the Greeks, that they spared no pains to be able to secure a constant supply of the luxury which they considered so rare. In this they succeeded in an admirable manner. Every month saw roses blooming in Greece. One method was to preserve the buds among green barley corns in an unglazed jar. Numerous other plans were pursued, so that from January to December a constant succession of rose-crops, if we may be allowed the term, flourished in defiance of the regulations of the seasons. The banquetting chamber, during the frosty months, was decorated with fresh rose-buds, and chaplets and garlands of roses were not wanting to add to the beauty and fragrance of the festive gathering. The rose season, in the most southern parts of Greece, commenced as early as April, but where a genial temperature was wanting, art often supplied the deficiency. Several varieties of roses were known—among others, the white, the moss-rose, the rose of a hundred leaves, accounted the sweetest by Aristotle, and the wild rose, not wholly inodorous. To impart a richer fragrance to the flower, it was not uncommon to plant garlic near the root. Coloured roses were sometimes blanched by repeated and powerful fumigations of sulphur being applied to them while they were opening their leaves.

"To cause them to bloom in January,

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* ἐν τοῖσι φύεται αὐτόματα ῥόδα, ἐν ἕκαστον ἔχον ἑξήκοντα φύλλα ὀδμὴ δὲ ὑπερφέροντα τῶν ἀλλῶν.

various means were resorted to; sometimes the bushes were watered twice a-day during the whole summer; on other occasions a hollow trench was dug at a distance, of almost eighteen inches round the bush, into which warm water was poured morning and evening; while a third, and perhaps the surest method, was to plant them in pots or baskets, which, during the winter months, were placed in sunny sheltered spots by day, and carried into the house at night; afterwards, when the season was sufficiently advanced, these portable gardens were buried in the earth."*

The lily, "the flower of innocence," as it has been called, was one of the favourites in the Grecian flower garden. It was probably introduced into that country from Suza or Egypt. But of this, as of most of the plants of the same land, little certainty exists. But the Hellenic gardener was not content to behold the rich hues of the rose succeeded by the virgin whiteness of the lily. That fair flower, therefore, which naturally begins to bloom when its prouder rival is fading, was often compelled to assume various colours, imparted to it by the ingenuity of art, an ingenuity seldom or never, we believe, exercised in these times. But the Greek delighted to see the delicate bell of the lily putting on a deep red or purple hue. The former was caused by infusing, before planting, cinnabar into the bulb; the latter by steeping it in the lees of purple wine.

Whether allowed to bloom in its original simplicity, or dressed in foreign colours by the art of the florist, the lily was too beautiful, in the eyes of the Greek gardener, to be allowed to fade at the season appointed by nature. Accordingly, in order to produce a succession of lilies, some bulbs were set near the surface of the ground. These soon made their appearance, and flourished in their full maturity, drooping in decay just as a green sprout from the deeper-set root burst above the earth, and so on throughout a large portion of the year.

The neighbourhood of fountains was especially chosen for the beds of lilies, and along the dark borders of small streams grew the flower which was pre-eminently the favourite of the Athenian people; the purple, double, white and gold violet. This, with the pansy, "streaked with jet," the purple cyperus, the iris, the water mint, the hyacinth, and the narcissus, formed a rich bordering to the velvet turf, and was sometimes also found in company with the willow-herb, the blue speedwell, the marsh marigold, the jacinth, and the early daffodil,

> "That come before the swallow dares, and take
> The winds of March with beauty."

* St John's Ancient Greece.

Here and there, in the Greek garden, which presented no formal regularity, no line-and-measure strictness, rose little sunny hillocks, wrapped about in a tangled net of wild thyme, sweet mint, and marjoram; while, interspersed among the other flower beds, were patches of geraniums, of the spike lavender, the rosemary, the flower gentle, the white hermit, the hyssop, the baril, the cytisus, the rose-campion, the columbine, the yellow amaryllis, and the celandile; while close at hand—

> "Their gem-like eyes
> The Phrygian melilots disclose."

In the beds, again, were to be seen clusters of the balm gentle, the red, the purple, and the coronal anemone, which beautified the fields of Attica as early as the month of February; the yellow, white, pale-pink, and blue convolvulus, with our lady's gloves, and the flower of the Trinity. Of the southernwood, which the Greeks usually cultivated in pots, Della Rocca observes, that, when growing in thickets, it constitutes one of the greatest beauties of the Grecian Isles. It borders the streams in wild profusion, and, growing to the height of twelve or fifteen feet, presents large masses of red and white flowers [?] most grateful to the eye.

The summer savory, the œnanthe, the silver sage, St. Mary's thistle, and the amaranth, were among the other ornaments of the garden; while the rhododendron commonly rose above them, with its gigantic clusters of rich purple flowers. To conceive the beauty and brilliancy of such a garden would be difficult; so varied were the colours which met the eye, so profuse the masses of flowers which alternated with each other over the parterres; so delicate and fragrant the odours which rose from them and mingled their scents, that if we conceive the possibility of intoxication following the enjoyment of a pleasure so simple and refined, it would be after luxuriating in the pleasure of an ancient Greek garden. It must not be supposed that, full as is the list we have given of the various plants which bloomed in Hellas, we have mentioned more than a portion of them. The scattered descriptions which have come down to us enumerate many others; and it is probable that some escaped the notice of those authors from whom we take our information. However, the plants and shrubs which we have noticed are sufficiently numerous and varied to afford an idea of the rich floral treasury stored up in the gardens of Attica. Science, as we before observed, had made but moderate progress then. Horticulture had not been reduced to rule; but we fancy, were the florists of modern times to be acquainted with all the arts and expedients which the

gardeners of that early age put in practice in the cultivation of their flowers, we should witness considerable improvement in the science.

But the garden was not a mere succession of flower beds and violet banks, and groups of ornamental trees; spreading lawns alternated with shrubberies, bosquets, close and shady thickets, curiously planned arcades, and avenues composed of trees so disposed that they presented a variety of blended hues and foliage, which offered an agreeable aspect to the eye. In the summer months the hot rays of the sun, unless intercepted, would have caused annoyance and inconvenience to those who were tempted to walk out and linger among the flower beds. Here and there, therefore, were planted numerous trees, the cedar, the cypress, the black and white poplar, the ash, the linden, the elm, and the platane, either singly or in well-disposed groups. Further to secure a cool and pleasant atmosphere, the gardens of the wealthy were adorned by splashing fountains, placed either in the midst of the lawn, at the head of every avenue, at the entrance of the bowers, under the shade of the arching arcades, or else throwing upward clouds of spray in the centre of the planted parterres, and supplying numerous little channels which conducted the water wherever it was needed for the purposes of irrigation. We are, of course, seeking to afford an idea of the pleasure grounds and gardens of the rich, for in the little, tastefully cultivated plots of the humbler Hellenes such attributes of wealth could not be looked for.

The evergreens of Greece were numerous. First among them is the myrtle, which attained a high perfection. In one spot it might be observed blooming as a small shrub, dotted with those delicately white blossoms which impart so much beauty to it; in another, rising to the height of a tree; while elsewhere it was planted in dense clusters and arched in bowers. These, when spotted with its blossoms, intermingled with those of the jasmine, the eglantine, and the yellow tufts of the phillyrea, presented a spectacle than which nothing more exquisite can be imagined.

> "The land where beauty had her birth,
> Where greenest valleys tempt the eye,
> Where brightest flowerets gem the earth,
> And where the sweetest songsters fly
> Aloft, below the bluest sky;
> Where gardens full of fairest flowers
> Oppress the breeze that wanders by;
> Where fountains fling their pearly showers
> 'Mid verdant lawns and myrtle bowers;
> A land whose beauty cannot die;
> But where the race that gave it fame
> Is lost in slavery and shame."

The berries of the myrtle, which in some particular places assumed a black colour, were often esteemed a delicacy.

"Thickets of the tamarisk," says Mr. St. John, whose description of the flower garden of ancient Hellas is by far the most complete of any that has been written, "the strawberry tree, whose fruit is said to be exceedingly sweet, the juniper, the box, the bay, the styrax, the andrachne, and the white-flowered laurel, in whose dark leaves the morning dew collects and glistens in the sun, like so many tiny mirrors of burnished silver, varied the surface of the lawn, connecting the bowers and the copses, and the flower beds, and the grassy slopes, with those loftier piles of verdure, consisting of the pine-tree, the smilax, the cedar, the carob, the maple, the ash, the elm, the platane, and the evergreen oak, which here and there towered in the grounds. In many places the vine shot up among the ranges of elms or platanes, stretching its long twisted arm from trunk to trunk, like so many festoons of intermingled leaves and tendrils, and successive clusters of golden or purple grapes."

The blue and yellow clematis was a favourite. It hung its loving garland around the stems or along the boughs of the trees, in company with the tender honeysuckle and the bryony. Sometimes a large silver fir rose at intervals over the grounds, with its bright yellow flowers, and, supported upon it, the mistletoe threw immense clusters of its foliage over the trunk and branches. The ash tree was occasionally cultivated, and formed a majestic ornament to the pleasure grounds. Its bark, generally four or five inches thick, was stripped off once in three years, an operation which caused it to flourish with additional vigour every time it was repeated,

It is to be regretted that we have not been furnished with any complete and exact description of an ancient Greek flower garden, which might be considered as a type of the national taste in that respect. We cannot, much as we may desire, take our readers with us through the entrance of the grounds, down the principal walks, and through the intricate maze of flower-beds, bosquets, and shrubberies; we can but point out the leading features which characterised the generality of gardens, without delineating a picture of the whole. Doubtless, although the artificial arrangement observed was so judiciously planned that the garden appeared as though it were merely the work of nature, there was, nevertheless, a harmony which pervaded the whole, and excluded extravagant combinations, allowing each particular species of ornamental disposition to melt, as it were, into another, so as to present a natural and pleasing appearance.

The Greeks possessed an exquisite sense of

the beautiful. Their ideas of elegance were chaste and refined ; they never liked monstrosity, and only sought, in the adornment of their gardens, to produce that combination of colours, that variety of species and contrast of foliage, which would result in an agreeable and harmonious whole, too variegated to be monotonous, and too artistically arranged to be glaringly unnatural.

Among the numerous reasons which conduced to render horticulture an art much favoured by the ancient Greeks, was the constant use of flowers in the ceremonies of domestic life and of religion. Crowns and garlands of flowers were in perpetual demand; for in the performance of nearly every rite, civil or religious, the officiating persons had their brows bound with certain wreaths. The Spartans at their festivals — the priests, priestesses, soothsayers, prophets, and enchanters—appeared with symbolical crowns of leaves, seeds, or flowers on their heads. The actors, dancers, and spectators at the theatres wore them in profusion, while every guest at an entertainment was usually decorated more or less abundantly with them. The pious placed garlands at the doors of the temples, or near the altars of their gods. These practices called into demand an immense quantity of flowers fit to be employed for such purposes ; and, when the season no longer admitted of a sufficient supply, recourse was had to art, which, in part at least, supplied the deficiency. Holland thus translates a curious passage from Pliny on this subject. He is speaking of the use of crowns among the Romans.

" Now when these garlands of flowers were taken up and received commonly in all places for a certain time, there came soon after into request those chaplets which are named Egyptian ; and after them, winter coronets, to wit, when the earth afforded them no flowers to make them, and these consisted of horn shavings dyed into sundry colours. And so, in process of time, by little and little, crept into Rome also the name of corolla, or, as one would say, petty garlands ; for that these winter chaplets at first were so petty and small ; and, not long after them, the costly coronets and others, corollaries, namely, when they are made of their leaves, and plates, and latten, either gilded or silvered over, or else set out with golden and silvered spangles, and so presented."

Pollux has a list of the principal flowers used in crowns and garlands by the Greeks, which we may thus translate :—

" They had these flowers in their chaplets : roses, violets, lilies, the water-mint, anemonies (or the wind-flowers), wild thyme, crocuses, hyacinths, the gold-coloured aurelia, the hemerocallis, (or flowers which bloom but for a day), the elenia (a certain herb produced from the tears of Helena), the thernalia (a plant the leaves of which are lit for the wicks of lamps), the asphodel, the white daffodil, the sweet lotus, the camomile, the parthenis, and such other flowers as are delightful to the eye, and possess a sweet fragrance."

The smilax and the cosmosandalon are also enumerated by Cratinus among garland flowers, among other uses of which was to crown persons returning from a voyage and soldiers going to battle, to adorn the triumphs of the conqueror, and to decorate the marriage festival. Other circumstances contributed to render flowers loved and sought after by the Greeks. The religious ceremonies they assisted to decorate ; the traditions which gave rise to those ceremonies, were often in some measure connected with flowers, shrubs, and trees. The inhabitant of ancient Hellas could, whilst walking in his gardens, imagine himself surrounded with the nymphs and goddesses whose existence formed part of his creed. The laurel recalled to his mind the transformation of Daphne ; the cypresses represented the daughters of Eteocles, whom the gods punished with death because they dared to rival them in dancing ; the myrtle was a beautiful maiden of Attica, who excited, by her superior loveliness, her swiftness of foot, her endurance of toil, the jealousy of all the youth of the country, who therefore slew her to gratify their malicious envy ; the mint, simple plant as it is, was the mistress of Pluto; the rose-campion arose out of the blood of Aphrodite ; and the humble cabbage from the tears of Lycurgus.

In like manner almost every flower, shrub, and tree which flourished in the gardens and pleasure-grounds of Greece, was connected in some manner or other with the traditions which were handed down from the earliest times, and were recollected long after mankind had ceased to put faith in them. This, as we have said, tended to nourish and foster the attachment to flowers and flower gardens, which was observable all over the country, though the national taste also was addicted to this species of cultivation above all others. There was a taste for art in Greece, a taste for the elegant and beautiful, and, consequently, there existed a deep-rooted love for flowers. The climate lent its aid, and allowed whatever was cultivated to arrive at an early and rich maturity.

From the flower garden we proceed into the orchard, not wholly devoted to fruit trees. The vegetables which we, in modern gardens, usually see in spots devoted exclusively to them, and called kitchen gardens, grew in broad beds and borders, while the trees were planted along the edges and at the corners. Instead of walls, hedges

were commonly in vogue. These were generally formed of black and white thorns, brambles, and berberry bushes, and also the Indian cactus, which formed an impenetrable fence. The cactus grows luxuriantly in Greece, and attains a considerable height. On the banks of these hedges, springing out from dark masses of verdure, flourished, in luxuriant abundance, numerous plants—the enchanter's night-shade, the euphorbia, the iris tuberosa, the red-flowered valerian, the ground ivy, the physalis somnifera with its red seeds, the globularia, the heliotrope, the pennycress, the bright-yellow scorpion flame, the broad-leaved cyclamen (or "our lady's seal"), with pink flowers and light-green leaves, veined underneath with yellow. Among the ancient Parthians, it was the custom to surround the gardens with hedges of a fragrant creeping plant, denominated philadelphos, or "love brother," which was interlaced so as to form a kind of network, forming a sufficient protection against the trespasses both of man and beast. It was only in mountainous districts, where frequent torrents threatened the gardens, that stone walls were employed to encircle the orchards.

One peculiarity there was which impressed a landscape in ancient Greece with a character of peculiar beauty. It was, that the custom was general to plant long rows of olive trees to mark the boundaries between separate estates. The plains were therefore intersected with extended lines of these remarkable trees. In the olive grounds they were also planted in straight rows, apart from each other, that the wind might play freely on all sides. The air of the mountains was most favourable to the growth of the olive, for it was remarked that the oil produced by those which grew on the plains was of a far inferior quality to that which came from the light dry soil of the hills.

The apple, the pear, the cherry, (which grew sometimes to the height of forty feet,) the damascene, and the common plum, the quince, the apricot, the peach, the nectarine, the walnut, the chestnut, the filbert, the hazel, the mediar, and the mulberry, were to be found in the Grecian orchards; as also the white, purple, and red figs, the pomegranate from the northern shores of Africa, the orange, now planted under artificial shade at Lemnos, the citron, the lemon, which, together with the orange tree, blossomed in June; the date-palm, the pistachio, the almond, the service and the cornel-tree.

An orchard in Greece was planted not merely with a view to the value of its produce, but also to pleasure. The trees were disposed so as to form umbrageous avenues, which occasionally opened upon broad green lawns, and sometimes into the vineyard. From the neighbouring garden a constant cloud of perfume was wafted in, which lent a charm to the place, while, in the proper season, the smell of the fruit mingled deliciously with the fragrance from the corn-fields and meadows. Occasionally common foot-paths traversed the orchard, and the passers-by were permitted to pluck at will such fruit as hung within their reach.

The ancient Greeks attained much celebrity in the management of their orchards. The practice of grafting was known to them; we extract Mr. St. John's account of the manner in which this operation was performed:—

"Some few of the rules they observed in this process may be briefly noticed. Trees with a thick rind were grafted in the ordinary way, and sometimes by inserting the graft between the bark and the wood, which was called infoliation. Inoculation also, or introducing the bud of one tree into the rind of another, was common among Greek gardeners. They were extremely particular in their choice of stocks. Thus, the fig was grafted only on the platane and the mulberry; the mulberry on the chestnut, the beech, the apple, the terebinth, the wild pear, the elm, and the white poplar (whence white mulberries); the pear on the pomegranate, the quince, the mulberry, almonds, and the terebinth; apples on all sorts of wild pears, and quinces (whence the finest apples, called by the Athenians, Melimela), on damascenes also, and *vice versa*, and on the plantane (whence red apples)."

Another way in which the Greeks were accustomed to impart a blush to the apple, was by planting rose bushes round the foot of the tree. The walnut was grafted on the strawberry-tree only; the pomegranate on the myrtle and the willow; the laurel on the cherry and the ash; the white peach on the damascene and the almond; the damascene on the wild pear, the quince, and the apple; chestnuts on the walnut, the beech, and the ash; the cherry on the terebinth and the peach; the quince on the oxyacanthus; the myrtle on the willow; and the apricot on the damascene, and the Tharian almond tree. The vine was grafted on the cherry and myrtle, which produced, first, grapes in spring; in the second, mixed fruit between the myrtle berry and the grape. To produce black citrons, the gardener inserted a citron graft into an apple stock. If red were wanted, it was inserted into that of a mulberry.

Though the genial climate of Greece was favourable to the early maturity of fruits, numerous means were resorted to to force them to ripen early. Figs were especially forced. To produce early figs it was customary to spread about the roots of the tree manure composed of doves' dung, with pepper and

oil. So skilful were the ancient Hellenes in this process, that, during a particular festival, the seeds of certain flowers were sown in silver pots, and compelled to bloom within eight days.

The fruit was often compelled by art to assume various fantastic forms—that of the human face, of birds, of animals, and occasionally of a bottle. Sometimes, it is declared by several writers, peaches and almonds were produced, covered with written characters. Stoneless peaches, walnuts without husks, figs white on one side and black on the other, were, *mirabile dictu!* produced, according to the same authority.

So prolific is the soil of Hellas, that when, in the autumn of the year 1830, several young branchless pear-trees were, as we find stated by Thiersch, transplanted from Malta to the neighbourhood of Athens, they were next season literally loaded and bent down with fruit.

All seeds and plants were put into the ground before the moon had risen above the horizon. The trees which were most commonly propagated by seed were the almond, the chestnut, the white beech, the filbert, the pistachio, the damascenē, the edible pine and the pine-tree, the cypress, the laurel, the palm, the maple, the ash and the fig. Those which were raised from suckers were the cherry, the common nut, the rhamnis jujuba, the apple, the medlar, the myrtle, and the dwarf laurel; while those with which the simple and more certain method of producing trees from boughs was adopted, were the olive, the quince, the black and white poplar, the ivy, the vine, the willow, the box, and the cytisus, with many of those with which the other plans were also adopted. The citron was also propagated by this means. Della Rocca says, speaking of this tree and the orange, that they perfumed the surrounding air with the prodigious quantity with which they were loaded, and which bloomed at the first breath of genial heat.

But, as we have said, the Hellenic orchard, since it was not altogether devoted to utility, as shown by the scrupulous manner in which it was swept and adorned with trees which bore no fruit, was not dedicated to the purpose of growing trees alonē. The various beds and borders were often edged with parsley, while the beds themselves produced numerous garden vegetables in the greatest abundance. This fertility was attributed, by the superstitious inhabitants of old Greece, to the practice which prevailed, of burying an ass's head in a deep pit in the centre of the ground, and sprinkling the spot with the juice of the lotus; but Lucian affords a very satisfactory explanation of the fertility of the Hellenic garden, where he mentions the abundant and careful irrigation, and the elaborate modes of tillage which were pursued.* Turnips, cabbages, onions, lettuces,† endive, asparagus, broad beans, kidney beans, peas, and artichokes, grew in well-prepared beds. Near them might be observed boxes for forcing cucumbers, while, if a brook ran through the garden, the finest water-melons in the world often flourished in its neighbourhood. Huge gourds hung amid the branches. To judge by the various arts practised by the ancient Greeks, in order to force such plants as the cucumber and the melon to the most enormous development, it would have been imagined that the gardeners were preparing for a fancy show. The cucumber they especially delighted in producing seedless and of a monstrous shape. One practice was to introduce the young cucumber into a hollow reed, through which it projected itself until it attained an immense length.

The savoy-cabbage, brocoli, and sea-kale, flourished well. One species of this plant was supposed to be endued with the gift of prophecy.

Radishes, according to Theophrastus, were rendered sweet by allowing the seeds to remain for a certain time steeped in wine and honey, or the fresh juice of grapes. The same author says, that to produce large and fine parsley it was customary to wrap the seed in a rag, or a wisp of straw, before putting it into the earth, after which it was well watered. Rue and sweet mint were extensively cultivated.

Two species of cistus were cultivated in the Greek gardens; of the other plants found in them there were the blue eringo, cresses, bastard parsley, anise, pennyroyal, water-mint, sea-onions, monk's rhubarb, coriander; purslane, yellow white and red; hellebore, bush origany, flame-coloured fox-glove, brank ursine, or bear's foot, a plant much admired for the huge pyramid of white flowers which it bears; chervil, starwort, giant fennel, mustard, the cumin, pepperwort, parsnips, garlics and leeks, which were sometimes produced as large as turnips.

Mushrooms were cultivated after a peculiar fashion. A poplar tree was felled and placed in the earth to rot; the spot was constantly watered, and in due time was covered with fine mushrooms; they also sometimes grew spontaneously at the foot of the elm or pine, and were occasionally produced by watering the ground round the foot of a fig tree, after it was well covered with manure, when a colony of them sprang up in a very short time.

* Traité sur les Abeilles, tom. i. p. 5.

† Lettuces were whitened by being tied at top, and partly buried in sand. It was thought that they were improved by being watered over night with a mixture of wine and honey.

"On other occasions," we find in Mr. St. John's description, "they chose a light sandy soil accustomed to produce seeds; then burning brushwood, when the air was in a state indicating rain, this ambiguous species of vegetable started forth with the first shower. The same effect was produced by watering the ground thus prepared, though this species was supposed to be inferior."

Truffles were favourites with the ancient Greeks, though what methods were employed for discovering them have no where been described. They were found chiefly in the sandy plains near Cyrene, and on the elevated hills of Thrace. They were eaten both cooked and raw.

If we have failed, in the course of these rambling remarks, to impart an idea of the manner in which the inhabitants of ancient Greece planned and laid out their gardens, we have nevertheless touched on most of those means and materials by which their gardens and their companion orchards were rendered beautiful and valuable to their owners; and it may well be conceived that if the Hellenes keenly appreciated the delight to be derived from flowers and fruits; if they were acquainted with the method of bringing these flowers and fruits to a high degree of excellence, if not to complete perfection; if they exhibited a continual solicitude to discover new modifications, and new arts by which to render their pleasure grounds yearly more and more beautiful; that they were not insensible to the necessity of preserving an elegant and chaste congruity in the disposal of those gardens. Under whatever aspect it appeared, ancient Hellas was beautiful. Its mountains and its valleys, its hills and plains, its cities and its villages, its meadows, fields, and forests, its farms, its upland pastures, and its gay and brilliant gardens and abundant orchards, all were pervaded by that soft magnificence which was the distinguishing feature of the most favoured country in the world.

The more we study the history of old Greece—not merely the history of her conquests, her glory in war, and her memorable rulers—but also the history of her people, her civilization and her arts, the more do we feel regret for the beauty which has passed away, the prosperity which has deserted her. But with the degeneracy of the race that inhabits her, came the degeneracy of her civilization. She sank, and her arts sank with her. Nature is not now less beautiful, but men know less how to appreciate and improve her gifts. Greece, the country, is the same; but the Greeks have become an enervated, enslaved, and despised race. The results have been felt in each and every branch of her domestic industry.

[Many of the foregoing statements are somewhat of the "fabulous" class.]

CHÆTOGASTRA STRIGOSA.

Chætogastra strigosa, De Candolle (strigose Chætogastra).—Melastomaceæ § Melastomeæ-Osbeckieæ.

The majority of Melastomaceæ are large-growing, and many of them coarse-looking plants, but neither of these qualities is possessed by the present subject. On the contrary, it is dwarf and neat, and bears such a profusion of blossoms as to become a very conspicuous object when in a blooming state.

Many changes have taken place in the nomenclature of this plant, since it first became known to botanists; and besides Chætogastra, it has been referred to Rhexia, Osbeckia, and Melastoma. The younger Linnæus called it *Melastoma strigosa;* while Desroux calls it *M. ciliata. Osbeckia ornata* was a name given to it by Swartz. Sieber called it *Rhexia chamœcistus.* Vahl adopted the name *R. inconstans;* Richard that of *R. strigosa*, and on another occasion *R. ornata.* Finally, the name above adopted was given to it by De Candolle.

The existence of so many names may be thought in some measure a libel on the practice of botanists; but this opinion will for the most part be confined to those who have made little advance in botanical knowledge. A mere name is of little avail in the identification of a plant: a name must be associated with what is called a "character," that is, such a description of its leading features as may lead to its recognition. Now, when a group becomes extensive, or when a revision with a view to precision in this respect is aimed at, in respect to accumulated knowledge, new groups often have to be formed, and these groups must have names by which in future to identify them. This is a justification of many new names, but not of all; sometimes, indeed, they are not quite justifiable, and are not adopted into use. But there is another source of a diversity of names. The same plant is sometimes described by different persons nearly at the same time, unknown to each other; or the first description is imperfect, so that the plant is not recognised, and another name is given; or it may have been published in a medium that has not been generally diffused. These circumstances give rise to synonyms, and as the first published name claims precedence, it is some time before all this gets put to rights, the progressive steps of which are so many changes, and appear to the uninitiated like the imposition of many new names.

Our plant is a dwarf shrub, with slender tetragonal spreading branches, and not growing more than six or eight inches high. The branches are covered with adpressed bristles. The leaves are small, opposite, ovate-acute, entire, with three nerves or ribs, and somewhat ciliated. The flowers grow in axillary and terminal cymes, not many together, but the plant is so full of branches, that the flowers are really numerous; they individually consist of four or five ovate petals, of a rich rosy-purple colour. The flowers are produced at the latter end of summer.

This is a native of Guadaloupe, on the summit of the Sulphur Mountain, where it was originally discovered, growing in beds of sphagnum. It has also been met with on the mountains of Montserrat and Martinique. Messrs Veitch, of Exeter, have been the introducers of it to this country, through the agency of Mr. Thomas Lobb.

In cultivation it requires the shelter of a warm greenhouse. Cuttings of the half-ripened shoots, planted in sand, and covered by a bell-glass, the pots being removed to a gentle bottom heat, will furnish young plants. These may be potted in a mixture of sandy peat and leaf-mould, to which a tenth part of loam may be added. The pots must be well drained, and should be replaced in the hot-bed until the young plants get fresh hold of the soil. They are then to be removed to the greenhouse, where they will grow freely: but at first they must not be much exposed to cold air. The form of the plants should be a consideration from the earliest period of its growth; and to this end, the young shoots should be frequently topped, until the plants reach a flowering size.

STANDARD ORNAMENTAL TREES.

Most of our handsome ornamental flowering trees have a great tendency to grow too much upwards to become elegant in form. The almond tribe will, when it once gets fast hold of the ground, make shoots several feet long, and the only way to prevent this is by early and continuous pruning. When they are procured for planting out, all the small wood should be cut clean out close to the bark, and the main branches should be shortened considerably, the upper eyes be rubbed off, and those under the branches left to grow, but as these trees bloom upon the young wood, the pruning the first year they are planted takes away the flower too much to please every body; nevertheless, it should be done to make the tree more pendulous than its natural habit will allow if undisturbed. We would first take out all the branches that incline to cross each other, leaving some all round, but shorten them to eighteen inches, rubbing off, as we observed, all those buds that are on the upper side of the branch. The second year again cut out all the weakly shoots that come too close together, and bear in mind that the first object is to get a good skeleton formed before the head is allowed to be crowded. The first year after planting, when pruned as we have directed, the head becomes more expanded without running up so much as it would if left alone. In shortening the branches the second year, discretion must be used with regard to the increasing size of the head, and if any branches have shot too much upwards, let them be shortened still. The small lateral shoots, so that they be not too thick or close together, may be now left, for

they will be full of flower buds, which may now develope themselves: this applies to all the tribe of double and single flowering peaches and almonds. It will be well to keep a check upon the too vigorous growth of any shoots, even after the third year, so as to keep the head of something like a uniform shape, and encourage all the branches that are inclined to grow down a little, for all heads of trees are far more elegant for the lower branches being a little pendulous. The double-flowering cherry is more inclined to be short jointed and to grow rather crowded; the only thing to attend to in these, is to thin out the smallest shoots, that they be not too thick, for it is impossible to be graceful if crowded, though the cherry is naturally far more handsome in growth than any of the peach and almond tribe. The varieties of thorn will also naturally form a better head than many trees, and a little judicious thinning and regulating is all that is required. The mountain ash is like the almond, much inclined to grow rapidly upwards, and to push vigorous branches, which should be shortened the first year, whatever may be done to it afterwards; and it may be taken as a general rule, that if a standard tree has not a sufficiency of branches pushing out all ways, it is better to sacrifice one year's beauty altogether by cutting the two or three branches it may have down to three or four eyes. Much has been said, by a somewhat distinguished writer, in behalf of allowing trees to grow as they will, to show their natural habits; but it should be remembered that worked trees are not of their natural form, and the remarks cannot apply until the graft has been made to form a well shaped head, when it may fairly be left to itself. The stock is deprived of its natural head for the purpose of substituting the graft, and we have at least a right to see the graft formed into as good a head as the stock lost before we allow it to grow as it pleases.

THE VEGETABLE MARROW, AND GOURDS IN GENERAL.

Almost all the gourds are eatable while young, as vegetable marrow, but the prevailing sorts are those which are formed like a thick cucumber. They are of easy cultivation, and the principal point to attend to is the right period of cutting. If these productions are taken before the seeds form, they eat tender and rich, but if allowed to swell too much, they become watery and faint. The seeds may be had at any respectable nursery or seed shop, and may be sown on heat and be covered to bring them early, or raised in a pot placed in a common hot-bed in the middle of April, and by the middle of May they will be fit to plant out, and a piece of ground should be selected in a warm situation, and it should be well dunged. When the second pair of rough leaves appear, while the seedlings are in the pots, the tops should be pinched off to induce side shoots. As they grow in the open ground, these shoots should be laid out so as to cover the bed and not to cross each other, and they will soon show fruit. If they come too numerous, let them be thinned a little, but if the fruit is cut before it swells too much, they will bear a great number. The fruiting is hastened a good deal if the plants are placed on ridges of dung, and covered with a hand-glass, after the same manner as cucumbers are ridged. A trench, or if for one patch of plant only, a hole is dug, two feet deep and a yard square. This is filled with hot stable-dung ready prepared, and trod down pretty firmly. On this there must be six inches of soil, good loam and dung well mixed, and the plants put in the middle, two in the patch close together. A hand-glass is placed on the plants, close down at night and tilted a little in the day, but it is very much better to have a glass with a ventilating top, or a top that can be taken off altogether. By means of this glass the plants may be preserved all through April, and during the first fortnight in May, notwithstanding there may be many frosts. As soon as the plants fill the glass, or rather cover the space under the glass, it must be propped up at the four corners with bricks or flower pots, and the plants trained under it; the only object of this dung and glass is to bring the fruit in much sooner, and make them grow much more rapidly. All the gourds, from the monster pumpkin to the smallest orange variety, that will actually train up the front of a house, will succeed with this simple treatment, but with the largest kind, where size is the only object, as soon as any one fruit exhibits a propensity for growing and swelling well, remove all the other fruit from the plant as fast as they appear, but it is of no use to top the plant, because it will not prevent the growing of side shoots. It is far better to let the plant trail on, removing only the fruit as fast as they show, and before they bloom. The large swelling fruit will take all the nourishment the plant can afford, and when it has attained a pretty good size, the plant will not be much inclined to grow, although it may produce many fruit that will require constant watching and removing. The orange gourd may be planted at the foot of a south wall or front, and may be allowed to ramble all over it. The fruit, which is light, will come all over the vine, and upon the wall, making a very

singular appearance if well trained and nailed. The best way to preserve one of the monster gourds is to cut a hole large enough to admit the hand and arm, and take out all the pulp and seeds, for if these are allowed to remain too long, the fruit rots or bursts, and is destroyed.

COTTON-BEARING ARTEMISIAS.

The *Artemisia odoratissima*, (writes M. Guyon,) yields a cottony product, which is used like tinder, and in appearance looks like a small ball of cotton about the size of a filbert; generally several are produced on a plant. On dividing these balls through the middle, there is found at the centre a filiform abnormal prolongation, provided with bark, from which are produced small whitish filaments radiating to the circumference, the agglomeration of which constitutes the entire product. This I take to be only a morbid excrescence, a kind of scab. There is no cavity at its exterior; but on the under surface, or rather at the point of junction with the plant on which it is produced, are windings (anfractuosites,) which are prolonged more or less in the interior, and where I have detected a hymenopteron (insect) about an inch long. The species I found on the *Artemisia odoratissima** has been examined by M. Guénée, who considers it as a new species of the genus Eurytoma. The Arabs know the produce we are speaking of under the name of *Capo*. They use it as an excellent tinder: it takes fire immediately, whatever the state of development may be in which it is found. This readiness to catch fire exists even in its embryo state.† As the plant which furnishes it is very plentiful in the country (Algeria), this tinder is abundant enough, which is fortunate for those inhabitants who have not the choice of other things. The following incident will explain the manner in which I became acquainted with its use in this respect:—I happened to be travelling in Algeria, with some Arabs who formed my guides. When any of them wanted to smoke, they alighted and stopped before the tufts of Artemisia. This manœuvre by its frequency attracted my attention, and I perceived that it was to take some of the cottony substance produced by the plant, which they used in striking the steel. This product of *Artemisia odoratissima* brings to mind that of *Artemisia chinensis*. I observe that the authors who have spoken of it consider it as a natural product, or a sort of down. Very likely the product of *Artemisia Moxa*, or *A. chinensis*, has the same origin as that of *A. odoratissima*; because, apart from the colour, there is a perfect identity in the nature of the two products.

Artemisia Moxa, or *A. chinensis*, grow in a manner very similar to that in which the African Artemisia is found; that is to say, in very high localities.

The *Artemisia vulgaris* of Linnæus, common by our road sides, called *Armoise* in French, and *Byvoet* in Flemish, appears from a statement by Professor Morren to be well known in Belgium, owing to its property of producing cotton, which is frequently used by the peasantry as tinder. At Liège the children amuse themselves in separating the leafy parts, which they form into a kind of packthread. The dry leaves are also sometimes gathered and (in winter) bruised in the hands, by which process the down in which they abound is separated, and used for lighting the pipes, exactly as the Arabs use the fibrous parts of the leaves of *Artemisia odoratissima*. This property of the Artemisia, though not much noticed by botanical authors, is well known among the inhabitants of Liège, and the plant itself is generally spoken of as the "cotton plant." In order to ascertain what this cotton really was, Professor Morren had it prepared in his presence. He states:—

"I was first shown the down as the leaf was rent or pulled to pieces. It is known that the leaves of the Artemisia are white on the under side; and on a superficial inspection of the process, one might think that by the tearing, or rather scalping of the leaves, the veins or tissue are divested of the parenchyma, and that this net-work of veins or tissue worked together forms the cotton. It is well known, also, that the Indians in the same way denude the tissue of the banana trees, and manufacture various sorts of fabrics with it, such as mattresses, bolsters, mats, and the like. But having made a very minute inspection, I am inclined to think that the tissue of the Artemisia does not form a part of the cotton made from it. In order to ascertain the real nature of this substance, I employed a microscope in examining a leaf prepared to that stage in which the cotton appears at the moment it is separated from the plant. This microscopic inspection led me to a very instructive study. The wadding-like tissue appears to be formed of long, slender, smooth, ribbon-like hairs, and of a breadth proportionable to their thickness; these hairs are also considerably long and transparent, running parallel with each other, but somewhat twisted and curved withal. In some points where the fibres of the skeleton of the leaf have been broken, the real veins are perceived, having a somewhat twisted columnar form, very regular, and rather broad in the fibre. These veins

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* The Shée of the Arabs: but they give the same name to many other plants of the same genus.

† The inhabitants of south Spain use as tinder the leaves of *Conyza rupestris* and *C. saxatilis*, after bruising them in their hands.

are generally solitary ; and exactly where the rent or cut is made, some sap vessels are perceived. It seems very evident that the cotton of *Artemisia vulgaris* is a sort of hairy felt, which makes it somewhat analogous to the real Indian cotton, which is also composed, as is well known, by the hairs which cover the seeds of the cotton trees. The similarity between the two products is further increased by the form of the hairs of these two orders of plants being both very long and flat. But the real cotton of the cotton trees is distinguished by the fulness and broadness of the organs, and also by the multiplicity of the cells of which they are composed ; while in the Artemisia these cells are not present, and the breadth of the threads is scarcely more than a tenth part of that of the cotton of the cotton trees. Still the extreme combustibility of the cotton of the Artemisia is a fact which will by and by be turned to some useful account in manufacture. It may be somewhat difficult to say what it might be used for ; but its tenacity is extraordinary, and the length of the thread would allow of its being easily prepared as felt cloth. It would doubtless be worth while to examine it in its relation to the arts, by making a series of experiments, embracing the manufacture of lace, net-work, or thread. In a chemical point of view it would be interesting to have it converted into an inflammable matter, the explosive power of which might not be unworthy of examination. The object of detailing the result of the foregoing investigations, is to direct attention to the facts. The *Artemisia vulgaris* is a plant that grows in stony soils, among rubbish, and in waste ground, and when planted in a rich loamy soil, it grows with extraordinary rapidity. It is herbaceous, and requires almost no attention. It may therefore be cultivated with very little trouble or expense.

LIMNANTHES ROSEA.

Limnanthes rosea, Bentham (rose-coloured Limnanthes).—Tropæolaceæ § Limnantheæ.

We have had for some years in the gardens a species of *Limnanthus* named *Douglasii*, which, though not ranking higher than a second-rate plant in an ornamental point of view, was yet interesting as belonging to a natural order with which its affinity is not very striking. This our readers who are not botanical adepts will readily comprehend when they are requested to compare the accompanying engraving of the new Limnanthes with the familiar garden plant, the common Nasturtium. Thus it is that botanical affinities are little influenced by *prima facie* appearances.

Both the species of Limnanthes are of the same habit of growth. They are prostrate, succulent herbs, of annual duration. In *L. rosea* the leaves are very variable in their form ; they are usually pinnate, or even sometimes bipinnate, with all the parts extremely narrow; but sometimes they have only a pair of side lobes, and sometimes none whatever. The blossoms, consisting of five inversely heart-shaped petals, stand up on stalks much longer than the leaves ; they grow singly from the axils, and are described as being of a "pale, dirty rose-colour." We should, however, imagine, that as the summer of 1848, during which only it has been grown in England, was wet, and unfavourable to the high development of colours, this plant may prove in

brighter seasons better coloured than this description would lead us to expect, especially if it were grown in a warm, dry situation. This seems the more probable, as Mr. Hartweg, the collector who sent it to the Horticultural Society, gave it the name of *pulchella* (pretty), a name which has been rather cava-

lierly and perhaps hastily set aside by Mr. Bentham, as being "only calculated to mislead." It would certainly at least appear, that in the dry warm climate of California the plant was much prettier than it has yet been seen in England.

It is said to have been raised from seeds brought from California by Mr. Hartweg in 1848, who found it growing in swampy places in the Valley of the Sacramento.

It is a hardy annual, requiring the same treatment as other Californian annuals. "Sown in the autumn, it flowers in May; sown in the spring, it flowers during the summer."

SELECT ANNUAL FLOWERS.

The seed-sowing season is a busy one, and especially for the amateur, who is perhaps not perfectly familiar with the little peculiarities of the plants towards which he is just about to perform the first act of culture.

As respects annual flowers, the popular notions perhaps assist to increase the perplexity of the uninitiated. Many popular notions are popular delusions; and so, it must be confessed, are the names and titles bestowed on the different classes into which custom has divided annuals. We hear talk of hardy annuals, of half-hardy annuals, and of tender annuals; but when we look at the plants to which these terms are respectively and by common consent applied, it must be admitted, that there is confusion somewhere, and that the rule by which the hardiness of the plants is estimated—whatever that rule may be: for it does not seem to be very apparent—is arbitrary and unsound.

We are not now about to settle this question, to which allusion has properly been made, but our object is to introduce a description of some of the best annuals that are grown, in order to facilitate selection. We shall say nothing about the hardiness of the several plants enumerated, further than this, that all which occur in this list may be managed in this respect according to the plan of which a sketch follows.

The seeds may be sown in the open ground, either in patches for transplantation, or in the places where they are to bloom, according to the habit of each kind. The ground should be light, and well wrought, so as to be made fine, that it may lie close about the seeds. The first sowing may be made in March, and after that, successional sowings may be made every month up to July; that is, if such a succession of plants and flowers is required. Those sown in July will bloom late in the autumn. An intermediate course is to sow in March, May, and July. In arranging them, due consideration must be paid to the heights attained by the different kinds, so that the taller ones may be ranged behind those of dwarfer stature. Where this is not properly attended to, the flower border must of necessity become very confused and disorderly. If the plants are sown where they are to flower, the patches must be thinned, and this should be done as soon as ever the young plants have any appearance of closeness, or of crowding each other. The best mode of sowing is so that the seeds make a ring, not less than six inches in diameter, the seeds being wholly confined to the circumference. Never sow the seeds too thick: remember that three plants of the larger branching subjects, six of those of moderate size, and a dozen of those small plants that grow upright and close, and require therefore to be in tufts, are quite sufficient; this number will grow stronger, be more healthy, and produce a better display of flowers, than many more would do, because the larger quantity would be much more crowded. Take care therefore to thin well, and to thin early. Such plants as from their habit require any artificial support should have it supplied to them in time, before they actually need it. Delayed attentions of this kind not unfrequently come too late.

To have these annuals in early bloom, you may accelerate them. Sow them in the beginning of March, on a gentle hot-bed, either in pots or boxes, or on a bed of soil. They must in either case be transplanted when they have formed a pair of leaves beside the seed-lobes, and may be put either two, three, or more in a pot, ready to turn out in ready-made patches, or two or three inches asunder on another bed of soil, in either case having a further but very slight degree of bottom heat supplied to them. By this plan the plants may be pushed forward so as to be had in bloom a month earlier than those sown at the same time out of doors. They must be covered at night up to the end of April or later, the time of leaving off covering being entirely dependent on the weather. If they are pricked out on beds to be again transplanted, they will have become rather large by the time the weather will admit of risking them fully exposed; and in this case, they must be got up carefully with a good ball of earth about their roots, and well watered; the transplantation, too, is better done towards evening, or in dull showery weather.

The following is a selection of forty from among the best annual flowers at present grown. We do not offer them as *the best*, because individual tastes often differ in esti-

mates of this kind, but they are certainly *of the best* known. It should be explained that the season of blooming given in the following notes, contemplates successional sowings. Annuals bloom from eight to twelve weeks after sowing :—

Bartonia aurea (golden Bartonia).—Showy in large patches ; habit spreading ; flowers golden yellow ; height two feet ; blooms from June to September ; common soil, not too moist.

Brachycome iberidifolia (iberis-leaved Swan Daisy).—Pretty in patches ; habit branching ; there are many varieties in colour from blue to white ; height one-and-a-half feet ; blooms from June to August ; light sandy soil.

Cacalia aurea (golden Cacalia).—Forms a neat edging ; habit erect ; flowers orange-coloured ; height nine inches ; flowers in July and August ; common soil.

Calliopsis bicolor (two-coloured Calliopsis).—Very showy in large borders ; habit branching ; flowers rich yellow, with dark eye ; height two feet ; blooms from July to September ; common soil.

Calliopsis Drummondii (Drummond's Calliopsis).—Makes a fine bed ; habit branching ; flowers bright deep yellow, with dark centre ; height one foot ; blooms from July to September ; common soil.

Campanula Lorei (Lore's Bell-flower).—Showy in patches ; habit spreading ; flowers blue, in a variety, white ; height one foot ; blooms in July and August ; common soil.

Clintonia pulchella (pretty Clintonia).—Very pretty in patches ; habit spreading ; flowers three colours, blue and yellow conspicuous ; height six inches ; blooms from June to September ; damp peaty soil.

Collinsia grandiflora (large-flowered Collinsia).—Pretty for beds or borders ; habit compact, dwarf ; flowers purple and blue ; height one foot ; blooms from June to September ; common soil.

Collinsia bicolor (two-coloured Collinsia).—Pretty for beds or borders ; habit erect ; flowers lilac and white ; height one foot ; blooms from June to September ; common soil.

Collomia grandiflora (large-flowered Collomia).—Pretty for borders ; distinct colour ; habit erect ; flowers buff-colour ; height one foot ; blooms from June to September ; common soil.

Convolvulus tricolor (Convolvulus minor).—Very showy in patches ; habit spreading ; flowers blue, white, and yellow ; height one foot and a half ; blooms from June to September ; common soil.

Delphinium Ajacis (dwarf Rocket Larkspur).—Very pretty for beds or borders ; habit erect, spiry ; flowers of various colours, blue, slate, rose, white, &c. ; height one foot ; blooms from June to August ; common soil.

Delphinium Consolida (branching Larkspur).—Showy for borders ; cuts to advantage ; habit tall, branching ; flowers various—blue, white, rose, &c. ; height two feet ; blooms from June to August ; common soil.

Escholtzia crocea (orange Escholtzia).—Very showy for beds or borders ; habit spreading ; flowers rich orange-coloured ; height one foot ; blooms from July to September ; common soil.

Gilia achilleæfolia (achillea-leaved Gilia).—Pretty for beds or borders ; habit erect ; flowers blue ; height one foot ; blooms from June to September ; common soil.

Gilia tricolor (three-coloured Gilia).—Very pretty for beds or borders ; flowers three-coloured—lilac, yellow, and black ; height one foot ; blooms from June to September ; common soil.

Godetia lepida (pretty Godetia).—Pretty for beds or borders ; habit erect, branching ; flowers lilac ; height one foot ; blooms from June to September ; common soil.

Godetia Lindleyana (Lindley's Godetia).—Pretty for borders ; habit erect, branching ; flowers pale purple, with rose spots ; height one foot and a half ; blooms from June to September ; common soil.

Godetia tenuifolia (slender-leaved Godetia).—Pretty for beds or borders ; habit erect ; flowers violet ; height one foot ; blooms from June to September ; common soil.

Iberis coronaria (white Candytuft).—Showy in beds or borders ; habit branching ; flowers white, in masses ; height one foot ; blooms from June to September ; common soil.

Iberis umbellata (purple Candytuft).—Showy for beds or borders ; habit branching ; flowers purple, or rose, in masses ; height one foot ; blooms from June to September ; common soil.

Ipomœa purpurea (Convolvulus major).—A showy climber ; flowers various colours ; height six to eight feet ; blooms from July to September ; common soil.

Lathyrus odoratus (Sweet Pea).—Very ornamental in patches ; habit climbing ; flowers various colours ; height three to four feet ; blooms from July to September ; common soil.

Leptosiphon androsaceus (androsace-like Leptosiphon).—Very pretty for beds or borders ; habit compact ; flowers lilac or white ; height nine inches ; blooms from June to September ; sandy soil.

Leptosiphon densiflorus (dense-flowered Leptosiphon).—Very pretty for beds or borders ; habit branching, compact ; flowers light purple ; height one foot ; blooms from June to September ; rich sandy soil.

Lobelia gracilis (slender Lobelia).—Very pretty as an edging ; habit spreading ; flowers blue ; height six inches ; blooms from June to September ; sandy soil.

Lupinus nanus (dwarf Lupine). — Very pretty for beds or borders ; habit spreading ; flowers blue in spikes ; height one foot ; blooms from June to September ; common soil.

Malope trifida (trifid Malope). — Very showy in large borders ; habit branching ; flowers crimson ; height two feet ; blooms from June to September ; common soil.

Matthiola annua (ten-weeks Stock).—Very showy in beds or borders ; habit branching ; flowers scarlet, purple, or white ; height one foot and a half ; blooms from June to September ; rich soil.

Mesembryanthemum pyropæum (three-coloured Fig Marigold). —Very showy on sunny rockwork, or beds ; habit close ; flowers rose, white, and dark ; height six inches ; blooms from June to August ; sandy soil.

Nemophila maculata (spotted-flowered Nemophila).—Very showy ; habit spreading ; flowers white, with five purple spots ; height one foot ; blooms from June to September ; common soil.

Nemophila insignis (beautiful Nemophila). —Very beautiful in beds or patches ; habit spreading ; flowers blue, and white centre ; height nine inches ; blooms from June to September ; common soil.

Phlox Drummondii (Drummond's Phlox). —Beautiful for beds, borders, or pots ; habit spreading ; flowers various—crimson, rose, purple, white, and variegated ; height one foot and a half ; blooms from July to September ; rich light soil.

Reseda odorata (Mignonette). —Deliciously odoriferous ; habit spreading ; flowers greenish ; height nine inches ; blooms from June till October ; common soil, not too rich.

Rhodanthe Manglesii.—Beautiful, but delicate ; suitable for a sheltered border, or pots ; habit erect, branched ; flowers rose ; height one foot to one foot and a half ; blooms from July to September ; light rich soil.

Schizanthus pinnatus (winged-leaved Schizanthus).—Showy for sheltered borders, or pots ; habit erect, branching ; flowers lilac, purple, and yellow, varying in different varieties ; height one foot and a half ; blooms from July to September ; light rich soil.

Silene Armeria (Lobel's Catchfly).—Very showy in borders ; habit erect ; flowers pink ; height one foot and a half ; blooms from July to September ; common soil.

Sphenogyne speciosa (showy Sphenogyne). —Showy for beds or borders ; habit erect, branched ; flowers, orange and black ; height one foot ; blooms from June to September ; common soil.

Tagetes tenuifolia (fine-leaved Marigold). —Pretty for borders ; habit densely branched ; flowers deep yellow ; height one foot and a half ; blooms continuously from June to September or October ; sandy or poor soil.

Tropæolum minus (dwarf Nasturtium).—Showy in patches ; habit climbing and trailing ; flowers orange-coloured ; height two feet ; blooms from July to September.

SWAMMERDAMIA ANTENNARIA.

Swammerdamia antennaria, De Candolle (antennæ-seeded Swammerdamia). — Asteraceæ § Tubulifloreæ-Helichryseæ.

This is a small hardy evergreen shrub, but beyond this, and its neat habit and appearance, it has little to recommend it. It has however some interest, as being an addition to the very few truly shrubby hardy plants of the natural family of Compositæ (Asteraceæ), which exist in English gardens.

It is, as just stated, a shrub. In size it is small, the plants being at present not more than three feet high. In habit it is compact, being thickly set with leaves and small branches, which latter are angular and viscid. The leaves are obovate, sometimes with a little point, and others perfectly blunt ; there

is a little mealiness on the under surface when they are in a young state; at the largest they are not more than an inch in length, and they are usually smaller than this; they are described as being veinless and concave. The flower heads—which individually somewhat resemble those of the groundsel, only of a different colour, being white—are collected together in bunches, at the top of short lateral shoots; botanically speaking, they are said to be collected in little lateral corymbose panicles. These clusters of small flowers add but little to the beauty of the plant, which resides chiefly in the foliage.

The plant is a native of Van Diemen's Land. It there grows on the sides of Mount Wellington, producing its flowers through the first three months of the year. In our gardens its blossoms are produced later, being perfected in the summer season. It is cultivated in the Horticultural Society's garden.

The very simplest culture is all that it requires. The ordinary soil of the garden is sufficiently good for its support. Whenever young plants may be required, they are to be obtained without any difficulty by means of cuttings.

The specific name, *antennaria*, appears to have been given in allusion to some fancied resemblance to the attennæ of an insect discovered in the pappus or appendage to the seed.

THE BOOK OF LIME.*

We have had "The Book of the Farm," and many other works of a practical nature, but nothing more important, more useful, nor more practical than this volume on the use of lime in agriculture. The application of lime has been a sort of mechanical process adopted in many districts, because the predecessors of the present race did so of old; and because it is attended with success in one place, hundreds have followed the example in other places, without the smallest consideration as to whether it was good or bad, or simply useless. It was of the highest consequence, therefore, to be made acquainted with the nature and probable effects of all lime applications, and of the different characters of the land on which such an addition would be profitable or otherwise. The author might have called his book "the natural history of lime," for he describes it in all the varied states of carbonate, sulphate, phosphate, silicate, and nitrate; makes us acquainted with all its varieties and combinations; and instructs us in all the many ways in which it is successfully or otherwise applied; tells us when it ought and ought not to be used, and the best modes of using it, and the effects of an "overdose" of it; and shows us its action as a chemical constituent of the soil; notwithstanding that he says, "I cannot pretend to have cleared up everything in connexion with the use of this valuable fertilizing agent, but I have been able to introduce as much true and plain matter as will, I think, well repay any young farmer who may devote a couple of weeks to the perusal of this little work." It is not a little astounding to read of the universality of this mineral over the surface of the globe, and the thousand and one states in which it is found. We have found it, according to the natural history of crustaceous animals, forming coral mountains, which are gradually built from the bottom of the ocean, until they form the rocks on which the largest vessels are split, exemplifying

"What great events from little causes spring."

But here we have lime in still more minute particles, and still more wondrous forms. In page 17 we read—

"A fine chalky mud collects at the bottom of a lake, and we fancy it must consist of minute particles of carbonate of lime, which have formerly been held in solution by the water, and have been separated from it by some merely mechanical or chemical form of deposition. But put a little of this mud under the microscope, and it is instantly seen to consist of myriads of minute shells, the former residences of creatures far too small for the human eye to perceive. Take up now a drop of the transparent and apparently pure water, and dry it upon a bit of glass, a white stain will be left almost invisible to the naked eye. But examine this stain by the aid of the microscope, and in it will be recognised many of the same forms as were previously discovered in the marl.

"Thus those minute animals still live, still swarm in the waters. It is their invisible shells which, as generation after generation died, have collected in such vast quantities as to form beds of marl of many feet in thickness.

"To these minute creatures the name of *infusorial* animals has been given. Some of them are so minute, that a cubic inch of stone has been calculated to contain the remains of forty-one thousand millions of them—and yet deposits composed almost entirely of such remains have been met with of twenty and thirty feet in thickness. How very striking it is to find the united labours of these invisible creatures capable of producing such extraordinary effects! How very little we really know of what is going on around us!

* "On the Use of Lime in Agriculture." By James F. W. Johnston, M.A., F.R.SS.L. & E., F.G.S. Blackwood & Sons; London and Edinburgh, 1849.

"Thus marl beds of fresh water origin may be produced by mechanical deposition caused by the gradual evaporation of water containing lime,—by chemical deposition when the carbonic acid by which it is held in solution is given off into the air, or decomposed by the sunshine—by the accumulation of the dried shells of visible animals which have lived in the water,—and by the deposition of the minute shields and shells of invisible creatures which float in countless numbers in every stagnant pool. Of these causes the last is probably the most extensively prevalent, and that by which the largest deposits of marl have been produced."

A very interesting chapter forms an answer to the question which precedes it—"*Is lime indispensable to the fertility of the soil?*" A question which there is no difficulty in answering in the affirmative; but to answer it so as to carry conviction to the mind of the inquirer is rendering a double service. As the author says, truly enough, "the practical farmer in nearly all countries has been accustomed to add lime to the soil, but can lime not be dispensed with? Is there no improved mode of culture by which the use of lime may be superseded? There are several considerations from which an answer may be drawn to this question," and we will take the author's words as the best:—

"1°. Extensive and prolonged experience has shown that the fertility of many soils is increased by the regular addition of lime—and that if it be for a series of years withheld, such soils become incapable of producing luxuriant crops.

"2°. All *naturally* fertile soils are found upon analysis to contain a notable proportion of lime; while in many of those which are naturally unproductive, the proportion of lime is comparatively small.

"3°. A naturally productive soil, even though regularly manured, is often found, after long cropping, to become incapable of growing particular crops in an abundant or healthy manner. On analysis, these soils are not unfrequently found to contain only a very small proportion of lime. After an addition of lime to such soils, it is often observed that the diseased or failing crops grow again healthily and in abundance.

"4°. Lime is often added to one part of a farm without producing any visible effect, while upon another it greatly increases the produce. In such cases, a chemical analysis not unfrequently shows that those soils or fields on which it produces no effect already contain a sufficient supply of lime.

"Thus barren sandy soils often admit of profitable cultivation after lime has been added—clay soils in which no lime can be detected are often entirely changed by the addition of lime. So, also, it may be laid with profit upon soils formed from decaying granite, while it is frequently thrown away when applied to soils of decayed trap. This is chiefly because the granite contains little lime naturally, while the trap rocks abound in it.

"These practical considerations all lead to the conclusion that *lime is really indispensable to the fertility of the soil.*"—Pp. 54, 55.

The author next discusses the subject of how much and how little may or ought to be present in the soil, and this is perhaps the most interesting part of the work, for doubtless there has been enormous labour lost in the profitless application of lime where it was not wanting. Upon this subject the author says—

"It is an exceedingly difficult point to determine the limits within which the proportion of lime in a soil ought to be kept in order to maintain the highest degree of fertility. So much depends upon the proportions of the other ingredients of the soil—upon the quantity of sand, of clay, or of vegetable matter it contains—that the peculiar nature of almost every soil would require to be studied in order to know how much lime it ought to contain, or how much may be safely added to it with the hope of a profitable return. Sandy and peaty soils, when dry, require less than such as are naturally heavy or undrained.

"We know that the limits are really very wide within which the proportion of lime in the land may be kept without preventing it from growing good crops. But there are three questions in regard to these limits, to which the practical man is interested in obtaining satisfactory answers. How *much* may be present in the soil, or how *little*, without rendering it unproductive, and what proportion *ought* to be present, in order to make it fertile in the highest degree.

"1°. *How* MUCH *may be present?*—I have already alluded to the practice of deep ploughing in the chalk soils of Surrey and the neighbouring counties. When five to seven inches of pure chalk are brought up and mixed with an upper soil only six inches deep, it is obvious that the quantity of carbonate of lime in the mixed soil must be very great. And if these soils so deepened become, under skilful management, more productive than before, it is obvious that the presence of a very large proportion of carbonate of lime will not prevent a soil from yielding good crops.

"Through the kindness of Mr. Davis, in sending me a portion of the surface soil of such an improved chalk field, near Croydon, I have been enabled to analyze it, and have

found it to contain 41 per cent. of carbonate of lime in the form of crumbled chalk.

"The natural soil of the plains of Athens, lately sent me for analysis, contains also nearly as much lime, as appears in the following results:—

SOIL FROM THE PLAINS OF ATHENS.

Organic matter	5·75
Salts, soluble in water (common salt and sulphate of soda)	0·20
Sulphate of lime (gypsum)	0·18
Oxide of iron	2·91
Alumina (soluble in acids)	2·35
Carbonate of lime	38·08
Carbonate of magnesia	0·73
Phosphate of lime	0·033
Insoluble siliceous matter	50·33
	100·563

"This soil *produces excellent crops of wheat*, but is liable when the dry season comes to be covered over with a crust of saline matter which prevents it from growing grass.

"2°. *How* LITTLE *may be present?*—It is more difficult to say how little lime may be present without materially affecting the fertility of the soil. The nature of the surface and under soil of a field, the circumstances in which the field is placed, and the kind of cropping to which it is subjected, all materially affect this question.

"*a.* If the upper soil abound in vegetable matter, the proportion of lime cannot be diminished to so great a degree without affecting its fertility—while if under the soil abound in lime, so large a proportion may not be absolutely necessary in the surface.

"*b.* The circumstances in which the field is placed will influence the proportion of lime that is absolutely necessary. Thus, if springs arise in it the waters of which contain lime, or if waters impregnated with lime flow from the adjacent rocks or hills, as in the formation of marl beds, or if the yearly rains wash down into it from the higher grounds the lime which they contain—these circumstances may give such a constant supply of lime to the land, as to render unnecessary the permanent presence of a large proportion in the soil of the field itself. It is necessary that the effect of such local circumstances should be, in all cases, taken into account, otherwise analysis might sometimes lead us to suppose, and no doubt has led some to suppose, that a much smaller proportion of lime may be present without injury to the soil, than is really required—where no such supplies are naturally brought into it—to keep it in an average state of fertility.

"Thus, Sprengel found upon analysis that the rich marsh lands of Holstein and East Friesland contained only a minute proportion of carbonate of lime—the marsh lands of Holstein, only 0·2, or one-fifth per cent.; the salt marshes of East Friesland 0·6, or three-fifths per cent.

"But we should be wrong were we to conclude that because these lands bore rich and fattening pastures, therefore, this small proportion of lime is sufficient to make every land bear good grass. The floodings to which these lands are subject, or the supplies of water that are constantly brought into them from beneath, no doubt contribute, in a considerable degree, to the permanent richness of the grass they bear.

"It appears, however, from these analyses that, under certain circumstances, a very small proportion indeed may be sufficient to keep the land in a state of permanent fertility.

"*c.* But something also depends upon the kind of crops we wish or continue to grow. It is possible that grass land may require less lime than arable lands, because the roots of the grasses are small, branch out in every direction, so as to come into contact with a large proportion of the soil, and remain in the land the whole year through, collecting their food from the soil. A field of old grass land in the neighbourhood of Durham, I found to contain 1·3 per cent. of carbonate of lime.

"Yet when such land is ploughed up, though it may give one or more good crops by the aid of the decaying vegetable matter of the turf, it will soon refuse to grow healthy crops of corn or oats, and certainly large green crops, unless lime be added in greater or less proportion. I have already alluded to the fact that crops become diseased—grow up perhaps well at first, but afterwards assume a sickly appearance, or fail altogether—when the proportion of lime in a soil becomes very small. This is true of every kind of soil in almost every part of the world, and in reference to almost every crop. The first of the following soils was sent to me with the statement that for four rotations the turnips had come up well, but in the autumn had always become diseased, rotted, and failed, and a remedy was asked—on the second, barley came up well, but afterwards failed—on the third plantains refused to grow—

	PINKIE.	LYNEDOCH. Soil.	LYNEDOCH. Subsoil.	JAMAICA.
Organic matter	6·69	10·03	2·05	9·59
Salts soluble in water	1·07	trace	trace	1·16
Oxide of iron	6·91	3·02	5·12	3·21
Alumina		2·56	2·23	1·16
Sulphate of lime	—	0·44	0·14	—
Carbonate of lime	0·31	0·30	0·37	0·38
Carbonate of magnesia	trace	trace	trace	trace
Oxide of manganese	0·24	—	—	0·07
Siliceous matter	84·53	83·37	88·20	84·31
	99·80	99·72	98·11	99·88

"In all these soils, and especially in the first and third, the proportion of lime is very

small, and though each case required other special remedies also, I recommended, among the measures to be taken with the view of rendering them productive, the addition of lime in one form or another to them all.

"I consider, therefore, that these soils contained less than arable land which derives no supply from any natural source *ought* to contain, if it is to produce healthy and abundant crops.

"3°. *How much* OUGHT *to be present?*—To maintain a soil in the highest state of fertility, it is not necessary that it should contain so much as was found in the chalk and Athenian soils above described, nor so little as was present on those from Pinkie, Lynedoch, and Jamaica. These soils which are naturally most fertile, in *all* our cultivated crops, usually contain a considerably larger quantity than was present in these latter soils,—while those which naturally contain so small a proportion are almost universally improved by an addition of lime. Still, scarcely any proportion can be stated which will be really the most advantageous for any considerable number of different soils. As a matter of opinion, however, I may state that I believe there are few soils to which lime, in the proportion of, or in quantity equal to, three per cent. of the carbonate will be too much—while, on the other hand, there are not many in which it will be of advantage to increase the proportion of carbonate beyond from six to ten per cent. —*provided this carbonate be in a sufficiently minute state of division.*

"So much, however, as I have already said, depends upon the nature of the soil,—its locality, its stiffness, the state of drainage, the proportion of vegetable matter and of oxide of iron it contains, and upon the state of chemical combination and of mechanical division in which the lime exists in the soil,—that I should consider it necessary to inquire into all these circumstances in each special case before I ventured to give a decided opinion, as to the expenditure of lime and money for which a profitable return was likely to be obtained."—Pp. 55—60.

The mechanical effects of lime upon the land are easily explained, as well also as the chemical changes which it makes. It opens and renders more free all stiff and clayey soils, and consolidates such as are light and sandy, and we are informed by the author, that in some districts it stiffens one half as much as clay would. With regard to its chemical effects, it increases the fertility of all lands in which lime does not already abound, and adds to the productiveness of such as are moist, tenacious, or abound in vegetable matter; and some clays which will not produce without lime, will bring luxuriant crops of wheat with a moderate application. It lessens the cost of manure by rendering the smaller quantity more effective. We are told by the author that land, of the annual value of five shillings per acre has been rendered worth thirty or forty shillings by the application of lime alone. This is mentioned on the authority of a gentleman of considerable practical experience, Sir John Sinclair, who mentions large tracts, on the northern slopes of hill land above the Laigh of Moray, that have been tripled in value by the use of lime. The effects of lime on the crops themselves are explained at some length, and they are so important that we must quote the section whole.

"1°. *It alters the natural produce of the land,* by killing some kinds of plants and favouring the growth of others, the seeds of which had before lain dormant. Thus it destroys the plants which are natural to siliceous soils and to moist and marshy places. From the cornfield it extirpates the corn-marigold (*Chrysanthemum segetum*), while, if added in excess, it encourages the red poppy, the yellow cow-wheat (*Melampyrum pratense*), and the yellow rattle (*Rhinanthus crista galli*), and when it has sunk, favours the growth of the troublesome and deep-rooted coltsfoot.

"Similar effects are produced upon the natural grasses. It kills heath, moss, and sour and benty (*agrostis*) grasses, and brings up a sweet and tender herbage, mixed with white and red clovers, more greedily eaten by, and more nourishing to, the cattle. Indeed all fodder, whether natural or artificial, is said to be sounder and more nourishing when grown upon land to which lime has been abundantly applied.

"On benty grass the richest animal manure often produces little improvement until a dressing of lime has been applied. This is especially the case when lime is laid upon land for the first time. The physical improvement, even, is so marked that in some instances it is said the mere saving of labour in ploughing up would be sufficient to compensate a farmer for liming, were no other benefit derived from the application—from the more perfect and economical manner in which he would be able to work his land.

"It is partly in consequence of the change which it thus produces in the nature of the herbage, that the application of quick lime to old grass lands, sometimes before breaking up, is found to be so useful a practice. The coarse grasses being destroyed, *tough* grass land is opened and softened, and, as I have said, is afterwards more easily worked, while, when turned over by the plough, the sod sooner decays and enriches the soil. It is another advantage of this practice, however, that the lime has time to diffuse itself through the soil,

and to induce some of those mechanical changes by which the succeeding crops of corn are so greatly benefited.

"2°. *It improves the quality of almost every cultivated crop.* Thus, upon limed land—

"*a. The grain* of the corn crops has a thinner skin, is heavier, and yields more flour. This flour is said also to be richer in gluten, a point however which is very doubtful, and requires experimental confirmation. On the other hand, these crops, after lime, run less to straw, and are more seldom laid. In wet seasons (in Ayrshire) wheat preserves its healthy appearance where lime has been applied, while on unlimed land, of equal quality, it is yellow and sickly. A more marked improvement is said also to be produced both in the quantity and in the quality of the spring-sown than of the winter-sown crops (Puvis). It hardens the straw and makes the wheat a finer sample.

"*b. Potatos* grown upon all soils are more agreeable to the taste and more mealy after lime has been applied, and this is especially the case on heavy and wet lands which lie still undrained.

"*c. Turnips* are often improved both in quantity and in quality when it is laid on in preparing the ground for the seed. It is most efficient, and causes the greatest saving of farm-yard manure where it is applied in the compost form, and where the land is already rich in organic matter of various kinds.

"*d. Peas* are grown more pleasant to the taste, and are said to be more easily *boiled soft.* Both beans and peas also yield more grain. (See *Brit. Husb.*, I., p. 217.)

"*e. Rape*, after a *half*-liming and manuring, gives extraordinary crops, and the same is the case with the *colza*, the seed of which is largely raised in France and Holland for the oil which it yields.

"*f.* On *flax* alone it is injurious, diminishing the strength of the fibre. Hence, in Belgium, flax is not grown on limed land till seven years after the lime has been applied. Something, however, depends upon the soil.

"3°. *It hastens the maturity of the crop.*—It is true of nearly all our cultivated crops, but especially of those of corn, that their full growth is attained more speedily when the land is limed, and that they are ready for the harvest from ten to fourteen days earlier. This is the case even with buck-wheat, which becomes sooner ripe, though it yields no larger a return when lime is applied to the land on which it is grown.

"4°. The liming of the land is the harbinger of health as well as of abundance. It salubrifies no less than it enriches the well cultivated district. This is one of the incidental results which also follow the skilful introduction of the drain over large tracts of country. Where the use of lime and of the drain go together, it is difficult to say how much of the increased healthiness of the district is due to the one improvement, and how much to the other. The lime arrests the noxious effluvia which tend to rise more or less from every soil at certain seasons of the year, and decomposes them or causes their elements to assume new forms of chemical combination, in which they no longer exert the same injurious influence upon animal life. How beautiful a consequence of skilful agriculture that the health of the community should be promoted by the same methods which most largely increase the produce of the land! Can we doubt that the All-benevolent places this consequence so plainly before us as a stimulus to further and more general improvement—to the application of other knowledge still to the amelioration of the soil?"—Pp. 109—112.

The entire volume consists of useful lessons, instructing us in the application of lime in all its varied combinations, with and without other manures, and in the effects under varied circumstances, whether pure, or as it exists in various animal and vegetable bodies. Bones and those applications are treated of at considerable length, on account of the large portion of lime in their composition, and all the various soils and dressings that contain lime in any form come in for their share of notice; and certain it is that after reading Mr. Johnston's volume, many will have become "wiser if not better men." No persons who have not studied the subject can form an idea of the value of lime as a fertilizer, nor can they imagine how completely it is identified with all good soils, nor how universally it enters into the composition of vegetables, how insidiously it finds its way naturally to the earth by means of the water that runs over the lands that are flooded, and even in rain water. But it is time we draw our notice to a close, which we do with a strong recommendation to all who till the land, nurserymen as well as husbandmen, to read the book attentively, for it cannot fail to be of the greatest service, however much they may know, or think they know already, of this valuable ingredient in the provision for vegetation of all kinds.

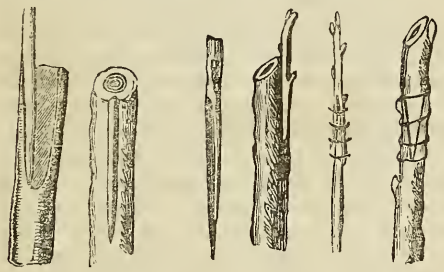
GRAFTING AND INARCHING.

So many books and papers have been written on this subject that it would seem superfluous to take up the subject again at any length; but the short and pithy articles in Glenny's *Garden Almanac* have drawn notices from several practical men, and as they are considered

perfect in their way, we give them with their illustrations. The latter are far more remarkable for their usefulness than for their high finish. Perhaps there has not appeared a more brief and plain matter-of-fact series of instructions on the subject than the papers we allude to contain ; but with the permission of the proprietors, we have copied the illustrations as well as the article, and they must speak for themselves.

GRAFTING.

There are certain trees, belonging to certain families, that grow much stronger than any of the finer sorts. The crab apple, for instance, is more vigorous than the golden pippin ; the almond is more robust than the peach ; the wild plum is stronger than the green gage ; and the same may be observed through all classes of trees. The wild kinds form capital stocks whereon to graft the more delicate. The whole art of grafting consists in making a twig or scion cut off from one tree to fit the wood of another, and that other is always called the stock. If it be very much larger than the scion, there are several ways of grafting ; one is by cutting a flat sloping place in the stock, and a flat place on the scion, and fastening the scion to one side of the slope, so that the barks meet, (No. 1,) and

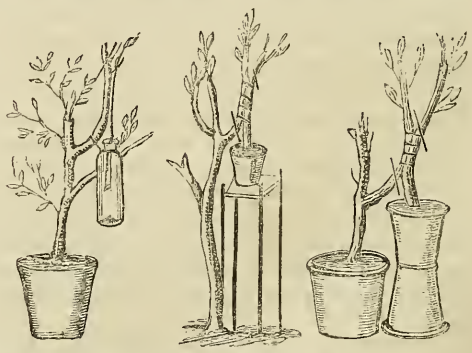


(1) (2) (3) (5) (4)

the union will take place. Another is, to cut the scion to an angle, like two sides of a triangle, and leave the bark on the third side ; then, with a sharp knife, cut an angle in the stock to receive it, (No. 2.) This makes a very complete graft. Instead of sloping, the stock may be cut down straight and a shoulder be left at the bottom, so that the scion may have a resting place, (No. 3.) If the scion and stock are near of a size, one may be cut wedge fashion and the other notched out to receive it, (No. 4,) or the scion may be split and the inside cut sloping both ways, then the stock cut wedge fashion for it to go over, (No. 5.) In short, it matters not how a fit is made, so that it be a good fit. The season for grafting is spring, before the buds start for growth. When the graft is fitted, it should be tied firmly, and then be covered with grafting wax or clay. A bunch of wet moss, loosely tied over the clay, keeps it from drying suddenly and cracking off. Grafting is of great importance in orchards where there are common and worthless sorts of fruit, for by this means we can change them to the best of their kinds ; we have only to cut back the trees to short stumps, and graft each stump either with a different kind, or all of them with one sort. The clay for grafting should be mixed with half its quantity of new cow-dung, and be kneaded together until thoroughly mixed. The tying of grafts should be performed with bass matting soaked in water to make it tough ; after grafting, the work should be examined occasionally to see that the clay is perfect, and when they grow, to prevent any shoots from growing on the stock. Root grafting is performed chiefly with roses ; the suckers that come up from roots are removed in the spring by digging up a portion of root to support them ; cut them down pretty close, make the scion fit the lowest part of the stem next the root, bind them well together, clay them at the join, and plant them out again at proper distances, the graft below the surface of the ground. The lower down towards the root the graft can be put on, the better it will be. The advantage of this sort of grafting is that it can be done at the time you dig between the shrubs ; and therefore take up the suckers, and when you prune the roses, so that you may take a basket of roots and a handful of cuttings, go to work under cover, planting out before they can get dry, and watering them to settle the earth close to their stems.

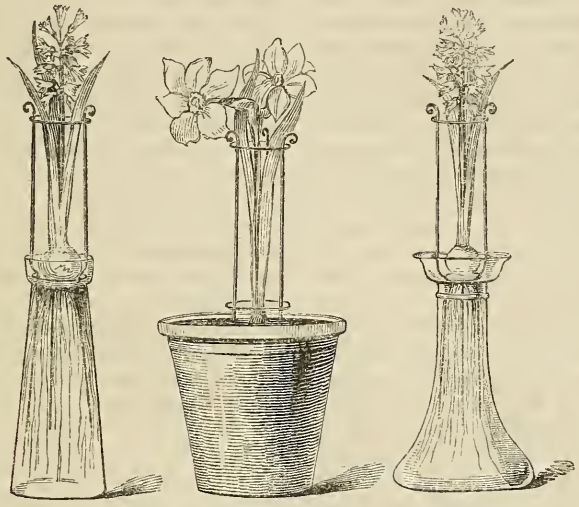
INARCHING.

This is grafting without detaching the scion from its tree until it is united to the stock. The two plants are brought close to each other ; the sides of the parts intended to be united are cut square, the branch is cut quite



half way, the stock also if the same size ; if larger, it need only be cut enough to receive all the flat part of the branch ; these are neatly fitted so that the barks meet on one side at

least, and they are bound in their places. A slight cut is made, sometimes, downwards in the stock and upwards in the branch; these tongues, so made, are tucked into each other. The branch, having lost half its nourishment from the parent plant, by reason of its being cut half-way through, naturally seeks to make up the deficient quantity from the stock; and the flow of the sap in the stock being interrupted by the cutting away of its wood at the place of union, as naturally gives out its juices to the only vessels ready to take them, the vessels of the branch inarched. Hence the union of the two branches in a few weeks. Then comes the separation. The plant from which the scion is taken is separated below the place of union, and all that was growing on the stock beyond the place of union is cut off, so that the entire nourishment from the root is driven to the branch or scion, which, being deprived of its original source of nourishment, is ready to take all that comes. Sometimes a scion is cut off at first with some extra length, and, instead of being able to rely on the parent plant for half its nourishment, is inserted in a vial of water. This keeps up a kind of supply for a while, during which the union takes place.



THE NEW FLOWER SUPPORT.

Mr. Hamilton, the inventor of this very simple contrivance for the support of bulbs in hyacinth glasses, soon discovered that it was as good a support in pots as in water, and has now had a model upon a much larger scale to support flowers in the open air. The above represents the support in glasses and in a pot. The support consists of three wires in a fixed ring to keep them together, and placed about one-third of the distance from the bottom, the ends of the wires forming three feet to go down into the glass or to be thrust into the soil. Above this there is a moveable ring to slide up and down, according to the height at which the plant wants assistance. The same principle applied in the open ground to patches of sweet peas or any other plant that requires stakes or sticks, will be found a neater and very superior mode to any other. How far it may do for common border flowers where a quantity is wanted we hardly know: we should think the cost would be too much; but for specimen plants in pots there can be no doubt of its efficiency, and it would not be so costly as some of the unmeaning trellises that we have seen used with not only climbing but weakly plants, for there are many requiring support that are not climbing plants. Many thousands have been distributed through the country for hyacinths, narcissus, and other bulbs, and we can hardly imagine an improvement, when it is wanted for a support to bulbs grown in moss or sand in shallow dishes. The three feet are spread out so as to lower the ring, which incloses the bulb, and the wider they are spread the better they stand, without the aid of being thrust into the soil of a deeper article.

SEEDLING CROCUSES, &c.

At the Knightsbridge Branch of the Society for the Encouragement of Floriculture and Horticulture, Mr. Lockhart, of Par-

son's Green, exhibited a collection of seedling crocuses raised in England, and presenting vast improvement upon all the known sorts imported. The lovers of the crocus are aware, that the finest in cultivation is the rich purple variety known now as Prince Albert, but formerly sold under the older name of David Rizzio. This kind has smooth, thick, broad petals, exceedingly rich colour, and forms a fair cup. The new ones introduced by Mr. Lockhart suffered nothing by comparison with this beautiful variety, and in some respects they were better. They were not shown for certificates, as it was justly observed, there was no chance of letting them out at present, and therefore certificates will be more useful and appropriate, if in a season or two they may be shown in as fine condition and let out in the autumn. The meeting, however, desired some of them to be named, and six of the number was named accordingly. One variety, numbered 99, was very curious, three of the petals purple and three grey, of very good shape and a striking variety; this was called *Lady Grey*. A second, numbered 66, a very splendid white, was named *Princess Helena*. A third, numbered 113, very fine dark purple, was called *Incomparable Purple*. A fourth, numbered 110, was a fine white with a violet throat, curious as well as beautiful; this was named *Princess Alice Maude*. A fifth, numbered 108, splendid blue, was called the *Prince of Wales;* and the sixth, that was especially noticed, was numbered 74, also a blue but of a different shade, was called *Admiral*. The characteristics of these selected flowers were thickness, breadth, and smoothness of petal, size of the flower, and freedom in opening to a cup. They were far better than the vast majority of those known to the florists, and are a great acquisition. There were two polyanthus, one fuchsia, two or three scillas, and other subjects exhibited, and a collection of noble spikes of hyacinths from bulbs raised from small offsets in England.

THE TEN-WEEKS STOCK.

There is a good deal in the sowing and after-management of simple annuals. The seed shops abound in German varieties, and certainly the Germans do take more pains in saving seed than the people of this country, and are more to be depended on. Stocks, like cabbage plants, should never be trusted to one season of sowing. February is a good month to begin sowing, March excellent, April safe and good, and May the last that there is any hope of. The seeds may, however, be sown in heat in February, in heat and the open air likewise in March. In the open ground only in April and May, unless you have neglected February and March; if so, sow in heat in April as well as in the open air. They should be sown in moderate soil, not rich, and be allowed to grow till they have six leaves, without any more water than will just keep them from actual flagging. Now prepare the richest ground you can command in which to transplant the stocks, and plant them out at the different seasons as the stocks sown at different times come to show six leaves; they ought not to be more than six or eight inches apart if they are to be shown in a mass, but if to show their habits, a foot apart. When once planted out, they must not want for water; they must be regularly supplied with all they require, and be kept clear from weeds. They will succeed each other in blooming, and thus keep up flowering for months; whereas, if they were all sown at once, they would be soon off when they once came on. We have known many of those who grew the German stock well save the seed, as they fancied, true to colour, and when grown, they had no character about them,—all shades, all forms, all sizes; so that we always recommend, as a general rule, a dependence on German seeds if the different colours are wanting. If anybody wishes to shine in stocks, they must not attempt more than the sort they select to shine with; for growing the varieties forbids seed saving with any degree of certainty altogether.

THE AROMATIC REED.

A good repast, a sumptuous feast, or even a comfortable dinner, are excellent lessons in geography. A person is never on safer ground, or where he can be more at home, than when he is dining. It is then that the distant parts of the world, too, are as it were brought *tête-à-tête* before his eye, on a table a few feet square; and the various productions of the globe, in combining to gratify the masterpiece of creation, form a holy alliance, which attests a profound knowledge of the human heart and the palate. In these our banquets the Indies are represented by perfumes, and also by the ginger, so beneficial to the cold stomachs in exciting a good digestion. But it seems there is a plant with similar properties indigenous to Europe. Everybody knows the aromatic reed of our marshes (*Acorus Calamus* of botanists), called by the ancients Acorum, and at present sold under the name of Calamus aromaticus. It is also known by the name of Calmus among the Belgians and the Germans. Most people know that this reed has a long thick stem or rhizome, which is highly aromatic. Those persons who have not, like the Aurora of

M. De Chateaubriand, a mouth which exhales a sweet and perfumed breath, but something which is not perfumed at all, generally have recourse to the Calamus in order to mollify their unpleasant smell. This practice seems to have been borrowed from the Tartars, who were very careful to chew this reed, and hold it in the mouth, when they drank the brackish water, which had a somewhat disagreeable taste. The Calamus is strong enough to have neutralized this bad quality.

But what renders it still more worthy of notice is, the fact that it may be made an excellent dish for tables. In summer, when the reeds are gathered, the rhizomes are taken up and properly cleaned and cut in vertical slices, and put in preserve with sugar *à la plume*. The slices should be placed one on the other in glass jars, such as we used for similar purposes; and when the sugar has crystallized, there will be found one of the most delicious and healthy preserves that can be made. It is an excellent help to the digestive organs, and indeed equal in this respect to the ginger of the Indies. The cholera is now at our doors; and it is agreed among medical men that good food is a great preventive of this Asiatic scourge. Now, in Asia, the Calamus is considered as a sovereign remedy for this epidemic. Prepared in the manner just described, it forms a very dainty and soothing dish for the stomach, which every one should be careful to preserve in a healthy condition.

The Calamus is easily transplanted, and may be grown with perfect ease and success by the banks of running or stagnant waters, or even the tanks or ponds beside our houses. It is a plant which is at once agreeable and useful for the table, the toilette, and the health.—*Translated from the Ghent Annals.*

POTATOS UNDER WALLS.

One of the methods of growing early potatos, which we have recommended more than once, is very applicable to the wants of private families, though by no means profitable to the market gardener. It is a simple and reasonable way of obtaining an advance in the season, but is not so prolific as ordinary planting. Dig up the ground at the foot of a south wall, (which is generally covered, by the by, with trees,) and take it quite level; lay whole potatos a foot apart close to the wall, only omitting them one foot from each stump of a tree as you pass them; then dig a foot from the wall, and lay the soil well bruised in the angle, so as to cover the potatos four inches at least, and this earth so laid is to form a sloping bank. The potatos will come up very early close to the bricks, and even in a hardish frost they will scarcely freeze, but if up too early, throw a little more well bruised soil on them, so that they may be covered a while longer. If they come through that, have some peas haulm or light litter handy to throw over them at night, and you will find this crop precede the other in the open ground full three weeks. The potatos should be Rilott's Flour Ball, Soden's Early Oxford, Ash-leaf Kidney, Early Sonning, or some well known clear early kind, otherwise the advantage gained by the season will be lost by the lateness of the crop, which in like manner will only precede its own sort in the open air. Let the potatos be a middling size, just below the size we should care to see at table, but larger than we would give to the pigs as waste. By missing the trees we prevent any damage to them by earthing up. As the potatos are on a bank, and rain will rarely reach them, they must be watered liberally in hot weather. Next to a wall, the south side of a bank will be good; and next to that, the south side of a wooden paling; but nothing so good as a wall, nor so early.

THE MULBERRY.

This tree, so familiar to the keepers of silkworms and the lovers of the fruit, has been the subject of much speculation. Plantations have been made for the purpose of rivalling India in the production of silk, and private persons have made extraordinary efforts to produce silk in quantity, by placing the eggs or young hatched worms on the trees. Many have wondered how it was the silkworms failed so generally. A friend of ours, who was going to do wonders with a few young mulberry trees and lots of the eggs, watched the progress of his worms with great interest; on a sudden they all, or nearly all, disappeared. Time after time did this destruction overtake him and spoil his stock. The fact is, that his silkworms only served to appease the hunger of sundry birds, who reaped a rich harvest on the mulberry trees. Whether the silk-producing mania has been appeased or not altogether, it is difficult to say, but if ever any of our friends intend to produce what they call native silk, let us recommend them to cover the entire tree with a net, and thus keep off the host of birds which feast upon caterpillars, grubs, and insects generally. The mulberry tree may be produced from the seeds of the fruit, which must be squeezed and the pulp washed, so that the seeds may be cleansed and dried. They may then be sown in the ground in an open situation, and should be raked in. Hand weeding, to prevent them from being

overrun altogether, and the seeds killed, will be found necessary, and when the plants are large enough, they may be planted or rather bedded out six inches apart, and then remain two seasons and be removed to a foot apart every way. Here they may grow till they touch one another, when they may be planted out a yard apart, but they are some years before they bear fruit. We who have no patience to wait for years when we can get what we want in so much less time, should merely cut off a good bearing limb of a mulberry tree, sink the stem two or three feet into the earth, and ram it well, as we would a post, and we should be disappointed if we did not gather fruit the first or second year. Many are the anecdotes of the origin of mulberry trees. We heard of two posts that were put down not far from London; these posts had not a leaf nor a branch to them, but the first season they put forth both, and were actually preserved as two mulberry trees, though originally intended for two pieces of rough carpentry. Mulberry trees are readily raised from cuttings and layers, but as layers must be generally from branches near the bottom, and these are not bearing branches, they would be pretty nearly as long before they bear fruit as seedlings of the same size would be. Therefore cuttings are the best; these should be taken from the bearing branches, and the larger the better, because the tree is formed the sooner. The rule to be observed in this is, that whatever the length of the branch may be, one-third of its length must be inserted in the earth. Some of the best young mulberry trees that we have seen in a bearing state, were in Mr. Sangster's trial ground, Kennington. There were many actually bearing not more than six or eight feet high, and well headed, but it is some time since. We do not even know that the ground exists at the present time, it may have been robbed of its top soil to make room for houses; but the number and condition struck us as remarkable two years ago, and those who cannot get a good branch of a bearing tree to make a tree for themselves, may be glad to know that they can procure such a thing among the seedsmen of London.

FORM OF BEDS.

If beds were to be kept empty or nearly so, the form is better rising than flat; but if to be planted full, they are better flat than rising, because the rain runs all over them evenly, although it may fall only between the trees or shrubs. In fact, beds would always be better level, though when only partially covered, they require to be rising on the surface for the sake of appearance. We speak of beds on lawns; those in geometrical figures cannot be too level, nor the plants that fill them be too dwarf, or too even and level in their mode of growth, in order that the mode of arrangement may be obvious.

REJECTED FLOWERS.

Although hundreds of varieties of different flowers, sent out at good prices, are not worth one farthing, yet it cannot be denied that many very excellent things have been thrown away hastily that have been far better than others that have been retained. Among Dahlias this has been particularly the case. The natural uncertainty of the flower is conspicuous among the flowers of the best properties. A variety has been known to be well exhibited all the season of trial, and although abundant orders have been given and hundreds issued, not a solitary flower has been exhibited the season after; the flower has been thrown away by four-fifths of the growers, nobody being able to account for the disappointment, some suspecting tricks in the original showing, others calculating that it was too uncertain to be worth anything. But how often has the grower seen old and approved flowers fail him altogether in particular seasons? Why, if his new ones failed in the same way they would be condemned altogether. There are many flowers which have stood their ground a long time, and the growers got tired of them, and discarded them for newer but much worse varieties. If Brown's Bridesmaid, the Marchioness of Ormond, the Duchess of Richmond, and a score other flowers that we could mention, were shown in their best state as seedlings, they would beat many that now get certificates; but people soon tire of uncertain flowers; and those which are more to be depended upon, but infinitely worse in their best state than some that are absolutely rejected, are pertinaciously retained. Let us take two rival flowers very much in point, Essex Triumph and Admiral Stopford: there is no comparison between them in the excellence of the flowers when both are at their best; but Admiral Stopford, which is infinitely the best flower, will scarcely yield one perfect to the other's twenty, and it will tire many, and has tired many, till it is fairly driven out of numerous collections. But really, growers ought to be a little considerate before they throw away a flower that is good now and then; we would almost grow a hedge row of an uncertain but good variety of anything, rather than be without it in a show; there is no doubt but that fine blooms of many flowers long since discarded would greatly aid a man who is putting up twenty-four blooms.

TROPÆOLUM DECKERIANUM.

Tropæolum Deckerianum, Karsten (Decker's Indian Cress).—Tropæolaceæ § Tropæoleæ.

This very singular species of Indian cress has been introduced to the gardens of Berlin, by Dr. Karsten, and is one of the subjects recently published in his elegant work on the plants of Venezuela, met with during his travels. We have not seen the plant, but from Dr. Karsten's figure, executed in a way which would lead us to put faith in its details, it appears to be a very distinct species; its flowers very singularly compounded of the colours red, blue, and green.

The slender, compressed, two-furrowed stems and branches of this elegant plant, creep along the surface of the ground, or climb over the bushes and herbaceous plants of a shrubby kind which are found at the outskirts of the woods, and on the banks of streams and rivers, throwing out roots wherever a damp soil is favourable to their nourishment. They are also frequently found with their long white roots floating in the water.

The young branches are of a green colour, hairy at the extremities, and somewhat erect. The leaves, which grow on long foot-stalks, are roundish-triangular, peltate, and from five to seven lobed; these lobes are pointed, entire at the margins, the veins at the under surface have few hairs; the colour of this under-surface is a bluish-green, which is also the colour of the upper surface near the veins, becoming a lively emerald-green at the apex. The flowers are solitary, and issue from the axils of the leaves on a peduncle of about five inches long; slender, or thread-like at the base, twisted and twining near the middle, gradually becoming thicker towards the blossom, where it assumes a reddish colour, and is nearly half a line broad. The calyx is somewhat two-lipped, and consists of five sepals; both the sepals of the under lip are somewhat smaller than the three of the upper lip; they are all lance-shaped, three to four lines long, and two to three lines broad, hairy and of a green colour. The base of the upper lip is extended in the form of a hairy spur, about an inch and a half long, and a quarter of an inch broad at the base, tapering to a blunt point, bright scarlet at the lower part, merging to green towards the apex. Alternating with the sepals of the calyx are five small spatula-shaped petals of unequal size, the two uppermost being larger, nearly three lines long and about one line and a half broad, five-nerved, and at the upper margin seven-toothed, the teeth terminating in short hairs; the under and smaller petals are three-nerved, the upper margin five-toothed, these teeth also ending in a similar manner to the others; they are all of a dark blue colour, becoming somewhat brighter at the margin. Eight

equal stamens as long as the calyx surround the pistil; the filaments are violet blue, the two-lobed anthers are bright blue. The style is yellow, filiform, and three-cleft. The fruit is a three-parted capsule, generally containing a single seed in each of the divisions; the capsules separate on the ripening of the pistils; they have three tubercles at their under side. A brown-coloured seed fills the fruit entirely with its two large fleshy seed-lobes, which also, on the ripening of the fruit, become separated.

M. C. Moritz discovered this species, which is distinguished by its elegant form from all of the beautiful genus to which it belongs.

"We were glad," writes Dr. Karsten, "when, emerging from the thicket of entangled trees and bushes, we approached the open borders of the woods, where the easy winding paths are overhung with melastomes, laurels, and myrtles, which also twine and net themselves together over the running waters, the flowers bending to every passing breeze. The harmonious union of the lively purple on the emerald-green ground-work, with the white and blue of the overhanging flowers, produced a very agreeable effect, and brought to mind the state of rest and motion which here seemed to be expressed in the interesting forms and the calm silence of the situation."

This beautiful species Dr. Karsten has named in honour of an individual who is a distinguished patron and cultivator of the interesting family.

Tropæolum Deckerianum comes near *T. Moritzianum* in regard to the form of the leaves and flowers, together with the absence of the thick tuber-like, or fleshy roots; the leaves, however, are stronger or more vigorous, and seven-lobed, and the flowers are differently coloured. In *T. Deckerianum* the fruits (seed) are more deeply furrowed; it is, moreover, prominently distinguished from all other known species by the peculiar twisting of the flower-stalk. In regard to the form of the leaves, it has something common to *T. crenatiflorum;* but the difference in this respect is less as compared with *T. Moritzianum*. The position of the flowers, and the colouring of the calyx in *T. Deckerianum*, strongly remind us of *Chymocarpus pentaphyllum*.

"We found this plant growing in the colony Tovar, [in Venezuela,] beside the *Schwerinia superba* and *Brückea grandifolia*. I found it blooming during the whole year, which circumstance permits us to hope that it will ornament the conservatory with its brilliant flowers for a considerable time. It likes a damp warm atmosphere about 16°, [=68 Fahr.] and should have partial shade." All the Tropæolums flourish in light rich loamy soil.

A STROLL THROUGH THE GARDEN,

BY A TUTOR AND HIS PUPIL, IN THE MONTH OF MAY.

What can surpass a garden in this cheering month? The hyacinths are hardly out of bloom, and the tulips are gorgeous in the extreme. Observe, although the day is actually sultry, how cool we are under this awning. The sun is no longer permitted to shine on the flowers, which nevertheless open freely and show their magnificent forms and colours to the greatest advantage. When the sun has set, the evening being mild, the cloth will be thrown open, or rather drawn up, so that they may all have a little air. The early-planted ranunculuses are rapidly coming into flower, and, as their blooms increase in size, they want constant attention in watering and shading. The man whom you observe so busy among the pansies is stripping off any small side shoots that can be spared from the plant, on purpose to strike them under a hand glass for the purpose of supplying a succession, to come into flower as the older beds decline; at present they are beautiful. Those vigorous looking plants in the frame are dahlias; a good stock has been struck, so that we need not trouble ourselves about the remainder of the old roots; they may be cut into as many pieces as there are eyes, and these pieces may be planted in the ground. The auriculas have declined blooming, and are placed, as you see, in a situation partially shaded; there they may have the weather as it may choose to come. You see the men trimming off all the side branches from the rose stocks except the top shoot, which will be the stronger for the removal of the rest.

The gravel walks are all fresh turned over, and the gravel rolled smooth; this gives an appearance of freshness that nobody could believe till they saw it. Here are pans of various seeds not long sown; most of these are the fancy kind of pansies, pinks, carnations, picotees, and other perennials. Those stakes, which are firmly driven into the ground at such regular distances, are intended for dahlia supports. The plants will, about the middle of the month, be planted out singly against each post; but these stakes, which are slighter and further apart, are for the seedling dahlias, which are quite large enough to put out now; these will be planted close, and lines from one stake to the other will do to support the whole row. The annuals are

ready to plant out, and should be placed in the borders. Autumn flowering bulbs, such as the colchicums, Guernsey lilies, and such like, should be now removed, and I have no doubt those crocuses are being dug up to make room for them; the crocuses have been in the same place three successive seasons.

The houses look gay as ever; for although some things are going out of bloom, others come in, and they make a very pleasing change. The azaleas have succeeded the *Camellia japonica*, which are just now kept a little wet and warm to make them complete their growth and set their flower buds. That beautiful looking flower, like the gaudy head of some foreign bird, is the *Strelitzia regina;* the flower is very strange, but somewhat lasting, and its richly contrasted orange and purple makes a great show. The scarlet flowers of the *Ixora coccinea* are making their appearance, but they will grow very much longer. Look at the heath house, and see the beauty of these varieties with flowers like wax; they have had very little fire heat to carry them through the winter, and they look as fresh, as green, and well filled with blooms, as if they were artificially made.

The men seem busy; two or three at the wall trees are rubbing off those shoots which are not wanted, and removing any that cross each other, or grow straight out from the wall; they are also thinning some of the fruits, for if all were left on, none would be so fine as when but a moderate number are allowed to perfect themselves. The man who is syringing the trees and the wall with the garden engine and a fine rose is actually washing the insects out of the wall, and destroying them where they have fallen. The vine shoots that are useless have been stopped, but those branches that have fruit on them have to be pinched off at the joint, or, under some circumstances, the second joint beyond the fruit. In the forcing house you may see the strawberries in various stages; they all require watering occasionally as the fruit swells, and nothing can be better than they are doing. If you observe, some have ripe fruit, some have green fruit, and others only flowers.

All seems bustle in the kitchen garden. Sowing beans, peas, endive, pot-herbs, radishes, and all the cabbage tribe that were not sowed last month, is work that seems to be in hand now. The cauliflowers under glass are coming into flower, and young plants kept over are now to be planted out in that rich piece of ground now vacant. Here they are planting scarlet beans a foot apart. There they are planting out cabbage, hoeing turnips, onions, and carrots, and sowing various sorts of brocoli, as well as more turnips, carrots, spinach, and other vegetables. Observe, in one place they are preparing the ground for new crops, and in another they are drawing the earth to the stems of peas and beans well up and advancing, as well as to cabbages and other forward crops. We will just step into the melon ground. The man there has removed all the dung that projected beyond the wood-work of the frame, and even undermined it by pulling out some of the dung from beneath. This is for the purpose of replacing with hot fresh dung, to give it new heat; when he has done this in front, he will do it behind in a similar way, so that the heat will be completely renewed; and this process has to be repeated so long as it is desirable to keep up the heat. A sort of underground hot-beds are made for cucumbers and melons, by burying dung hot from the stable, and properly prepared, in trenches, and the natural soil is thrown back again, so that there is between six and twelve inches thickness of soil on the dung; upon these ridges cucumbers and melons are put out this month, and covered with hand-glasses so long as it is necessary. When the plants more than fill the hand-glasses, they are propped up with bricks or flower pots at the corners, and the plant spreads out all over the bed. Observe, the man is planting a row of scarlet beans along the foot of the high fence that separates the melon ground from the garden; these will form a good blind to the wooden fence, and yield a most useful crop for two or three months. I see nothing else worth particular notice, unless it is the numerous plans for keeping the vermin, birds, &c. off the seed. Those long pieces of worsted, with papers like the tail of a boy's kite, are very effective so far as birds are concerned, for they are constantly on the move, and birds do not like to approach the place; that slight netting that is propped up six inches from the ground is an excellent security; and those pieces of bread and butter that lie about are to kill mice: there is arsenic between two thin pieces; it will kill many.

We will now return to the house, and have a little conversation as we go along. Next month the late-planted ranunculuses will come into flower, and these will be fit for exhibition, because it is the very best that are saved for February planting. Observe, the pinks are spearing up for bloom; they too come into flower in June; they have been top-dressed, as it is called—that is to say, the top of the bed between the rows has been spread with decayed dung; this, as with the pansies, washes down to the roots, and is of great nourishment, as well as helps the colour of the bloom. The early tulips on the borders

that bloomed last month, are getting shabby ; the gardener will take them up by the end of the month, and put them away in a dry place to be taken care of against mice, mildew, and vermin ; they are often preserved, like the late ones, in chests of drawers with wire outside, so that they shall have plenty of air, whilst no vermin get at them. The hyacinths will also require the same care. The beds of single anemones seem to have no positive season for blooming ; some of them appear to be always in flower, and greatly help to enliven the place wherever they are planted in masses. The man appears to be sowing late annuals, or rather, the last season's annuals ; for they are the same kinds as were sown the last two months, and which are up in the borders where they were sown, while others of the same kind, reared in heat and planted out, are quite forward. All the bulbous-rooted plants, such as irises and gladioluses, lilies, and others, have pushed their way into notice, and most of the herbaceous perennials are coming very strong. The borders may now be safely forked again without danger of injuring anything under ground. There are many of the dahlia plants already out—all those intended for the first, or early blooms ; the others will be held back till the middle of next month, to come in succession ; but unless those little flower-pots, which you see on short sticks close by the plants, are examined daily from this time forward, and the earwigs destroyed, with any other living vermin that may be found in them, they will get so much ahead as to destroy some of the finest blooms in spite of all that can be done afterwards, as many who begin later find to their cost. There is a little moss in the bottom of the pot to entice them.

NEW FLOWERS AND PLANTS.

Gloxinia fimbriata, *Hooker* (fimbriated Gloxinia) — Gesneraceæ § Gesnereæ. — A very distinct and rather pretty-looking species, a perennial, with elongated scaly roots, erect herbaceous stems, a foot and a half high, tinged with red, and opposite, ovate, acute, serrated leaves, full green above, paler beneath. The flowers grow from the axils of the leaves ; they are large, declined, oblique, with a somewhat funnel-shaped tube, and a large spreading limb of five rounded lobes, waved and fimbriated on the margin ; the tube is yellow inside, sprinkled with red dots, the rest of the flower white. The plant is altogether taller and more slender than the majority of the species, in these respects according with *G. tubiflora*. Native country not known. Introduced from Paris, in 1848. Flowers in September. *Culture.*—Requires a stove ; complete rest in winter, and excited gradually in spring ; light loam and leaf mould ; propagated by means of the scaly tubers, which admit of division.

Gesnera picta, *Hooker* (painted Gesnera). —Gesneraceæ § Gesnereæ.—A very showy herbaceous plant, having tuberous roots, and growing two, three, or more feet in height. The stems are densely clothed with purple-red down, mingled with long spreading hairs ; these stems support the opposite (or ternate) leaves, which are ovate acuminate, very hairy, crenately serrate, one side of the blade decurrent on the petiole. The flowers grow in long leafy racemes, the leaves in this part of the stem being smaller and of a rich red-purple colour on the under side. In these racemes the flowers are arranged in whorls ; they are tubular, somewhat ventricose on the lower side, with a hairy and velvety surface, contracted at the mouth, where it divides into five short rounded spreading lobes ; the colour is scarlet, yellow beneath. Native of Columbia. Introduced in 1849. Flowers through the summer and autumn. *Culture.* —Requires a stove ; complete rest in winter, and to be gradually excited in spring ; light loam and leaf-mould ; propagated by dividing the tubers when in a state of rest.

Kennedya eximia, *Lindley* (choice Kennedya). — Fabaceæ § Papilionaceæ-Kennedyeæ.—A handsome climbing plant, of evergreen habit, with twining hairy stems, bearing trifoliate leaves of ovate-oblong leaflets, which are slightly hairy, and of a lovely green. The flowers grow in axillary racemes, the calyx green, tinged with reddish brown, the corolla scarlet, with a yellow blotch near the base of the standard, the keel shorter than either the wings or standard. It is a very profuse flowerer, and is, when in bloom, a mass of brilliant scarlet and gold. Native of Australia, in the Swan River colony. Introduced in 1845. Flowers in April and May. It is the *Kennedya tabacina* (Labillardiere). *Culture.* — Requires a greenhouse ; light loamy soil, with heath-soil and sand ; propagated by cuttings of the half-ripe shoots, placed in a gentle bottom heat.

Epidendrum gravidum, *Lindley* (heavy Epidendrum). —Orchidaceæ § Epidendreæ-Læliadæ.—A mere botanical curiosity : certainly as far removed from beautiful as any plant can be. It has a scape nearly six inches high, bearing about four long-stalked, horizontal small green flowers, which never open, but stand on the end of a large lengthened fusiform deep olive-green ovary, covered with pale-green warts. This singular ovary, not

very unlike a green leech, studded with grains of carbonate of lime, has a curious appearance. The plant does not seem to possess the power of opening its flowers, such as they are. Native of Xapatam, in Mexico. Introduced in 1837. Flowers in March. *Culture.*—Requires a stove ; turfy peat soil ; propagated by division.

Zamia Fischeri, *Miquel* (Fischer's Zamia).—Cycadeaceæ.—One of the palm-like order of plants. When young, the stem consists of a few scales, with a narrow terminal downy bud ; subsequently the stem becomes lengthened into a trunk, from two and a half to three inches long, downy when young, and becoming smooth with age ; it is roundish, somewhat flat on one side. The fronds, generally six in number, consist of a semiterete rachis, which is smooth, or nearly so, and from three to five inches long, produced above the leaflets into a downy mucro ; the lower leaflets are alternate, the upper ones opposite ; they are lanceolate, much attenuated, and unequal-sided, the lower margin being convex, and having from ten to twelve serratures, the upper margin being nearly straight, with usually four to seven serratures ; the leaflets converge, so that the inferior margin is directed forwards, and the superior margin backwards. The cones of fructification are unknown. It is supposed to be a native of South America. Introduced to continental gardens before 1845. Flowers ——? It is the *Zamia tenuifolia* (Fischer). *Culture.*—Requires a stove ; free or sandy loamy soil ; propagated by suckers, or scales.

Bejaria coarctata, *Humboldt and Bonpland* (close-flowered Bejaria).—Ericaceæ § Rhododendreæ. — A beautiful low shrub, branching and flowering copiously when quite small. The young branches, pedicels, calyx, petioles, and ribs of the leaves, are furnished with a fuscous woolliness. The leaves are spreading, elliptical-oblong, entire, evergreen, glaucous beneath, and of a compact and brittle texture. The flowers appear in short compact many-flowered racemes, which grow at the ends of the branches ; they consist of seven spreading oblong-lanceolate petals, of a pale rose colour, deepest towards the base, and having two or three darker streaks on each. Young plants a foot high are covered with blossom, under good management. Native of Peru, in very cold situations, near Cascamarcan, at an elevation of from 9,000 to 10,000 feet. Introduced in 1848, by Messrs. Lucombe, Pince & Co. of Exeter. Flowers in January. *Culture.*—Requires a "cool greenhouse and the treatment of Indian Azaleas," according to the experience of Mr. Pince, who uses a compost of sandy peat soil, and some half decayed leaf-mould ; propagated by cuttings, or by seeds when produced.

Cleome bicolor, *var. concolor* (two-coloured Cleome : self-coloured var.).—Capparidaceæ § Cleomeæ.—A handsome annual or biennial plant, of upright graceful habit, bearing numerous white flowers, whose disposition makes them resemble some kind of butterfly. The stems are somewhat prickly and hairy. The leaves consist of five lanceolate attenuated leaflets ; the floral ones simple, sessile cordate-orbicular. The flowers are entirely white, the petals oval-oblong and clawed ; the filaments are of a reddish colour. In the *C. bicolor* the upper part of the limb is purplish. Native of Central America ; growing in stony places. Introduced to Belgium in 1844. Flowers——? *Culture.* —Requires a stove ; sandy loam and leaf-mould ; propagated by seeds, or by cuttings of the non-flowering shoots.

Stifftia chrysantha, *Mikan* (golden-flowered Stifftia).—Asteraceæ § Labiatifloræ-Mutisiaceæ.—A most beautiful shrub, somewhat large-growing, attaining, according to the accounts of those botanists who have seen it wild, the height of eight or ten feet. It is a stout plant, with rough bark, and having alternate lanceolate-acuminate entire shining leaves. The flower heads are solitary at the ends of the branches, each head containing about twenty-five closely set florets or blossoms, which are tubular, nearly two inches long, of a pale orange colour below, becoming darker above, and divided into five narrow segments, which are revolute, and rolled up in a circinate manner ; they are, when unrolled, seen to be about half an inch long ; the pappus, of a beautiful orange colour, is nearly the length of the tube of the flowers, which it surrounds like a fringe of hairs. Native of Brazil. Introduced about 1840. Flowers in February. It is the *Augusta grandiflora* (Leandro) ; *Mocinia mutisioides* (De Candolle) ; and the *Plazia brasiliensis* (Sprengel). *Culture.* — Requires a warm stove ; free loamy soil ; propagated by cuttings under a bell glass in bottom heat.

Callistemon brachyandrum, *Lindley* (short-flowered Callistemon). — Myrtaceæ § Leptospermeæ.—A small handsome stiff growing bush, of branching habit, with round pubescent branches, and narrow linear pungent channelled leaves, having conspicuous dots on the under side. The flowers grow in loose spikes, about two inches long, towards the ends of the branches ; the petals are small and inconspicuous, the showy portion, as in other allied plants, being the stamens, which form little tufts of crimson threads ; in this species, these threads are shorter than in other kinds, being not more than twice as long as

the petals, and quite straight; the anthers are golden yellow, forming a beautiful contrast with their filaments. Native of Australia (north coast). Introduced in 1843. Flowers from July to October. *Culture.*—Requires a greenhouse; sandy loam and peat; propagated by cuttings of the young shoots.

Limnanthes alba, *Hartweg* (white-flowered Limnanthes).—Tropæolaceæ § Limnantheæ.—An annual with the habit of *L. Douglasii*, that is to say, spreading in a straggling manner close to the ground. The leaves of this are elongate pinnate, with sessile ovate, acute, entire, or three-lobed segments. The flowers are on very long stalks, and they are white. Native of California. Introduced in 1848. Flowers in the summer months. The species of Limnanthes are "of interest in gardens chiefly for the decoration of heavy damp places, where better flowers will not grow. In such situations they all thrive and become ornamental, retaining their freshness and flowering incessantly through the whole summer. It may be a question whether they would not be useful salads, as they all possess the agreeable warmth of Tropæolums without being quite so pungent." (*Journ. Hort. Soc.*) *Culture.*—Hardy; common soil, in cool situation; propagated by seeds.

Eriopsis rutidobulbon, *Hooker* (rough-stalked Eriopsis.—Orchidaceæ § Vandeæ-Maxillaridæ.—A showy epiphytal species, with ovate-oblong pseudo-bulbs, of a dark purplish colour, singularly wrinkled on the surface; these bear at their extremities two, or sometimes three broadly lanceolate leaves. From the base of the pseudo-bulbs proceed the drooping racemes of flowers a foot and a half long; the sepals and petals are nearly alike, oblong obtuse, spreading horizontally, dull orange yellow, reddish purple at the margin; the lip is broadly ovate, three-lobed, the lateral lobes involute, the terminal one orbicular, white with dark purple spots, the rest of the lip dull orange red, dotted with dark purple. Native of New Grenada, where it was found by Mr. Purdie growing on the smooth stem of a palm tree fully exposed to the sun, in the temperate region of Antioquia, at an elevation of between 4,000 and 5,000 feet. Introduced in 1847. Flowers in August. *Culture.*—Requires a stove; turfy peat soil; propagated by division.

Mussænda Afzelii, *G. Don* (Afzelius's Mussænda).—Cinchonaceæ § Cinchoneæ-Gardenidæ.—A very ornamental shrub, of an upright habit, profusely studded with pale red hairs. The leaves are opposite, ovate-lanceolate, with short petioles, which as well as the veins beneath are covered with ferrugineous hairs. The flowers are produced in terminal corymbs; they are an inch long, tubular, and of a fine red-orange colour; the calyces on the outer side of the corymb, which are also as much as an inch long, have one of their sepals terminated by a large oval white veiny leaf-like bract, measuring four inches in length by two and a half in breadth. These bracts give the plant a very singular appearance, looking like some of the ordinary leaves changed to a white colour. Native of Sierra Leone. Introduced to continental gardens in 1844. Flowers ——? *Culture.*—Requires a stove; loam and peat; propagated freely by cuttings.

Maxillaria leptosepala, *Hooker* (narrow-sepalled Maxillaria).—Orchidaceæ § Vandeæ-Maxillaridæ.—A handsome epiphytal plant, having clustered pseudo-bulbs, ovate-rotundate, two inches long, and bearing each one oblong-lanceolate obtuse leathery leaf, a foot long and tapering at the base, where it is articulated with the pseudo-bulb. The flower stalks, each bearing one blossom, rise from the base of the pseudo-bulbs; they are large, the sepals yellowish white, two and a half inches long, narrow-lanceolate, and spreading; the petals are rather smaller, but of the same form and colour; the lip is three-lobed, oblong-obovate, the side lobes involute, white veined with purple, the middle lobe long, blunt, waved as well as fringed, and crisped at the margin, white, with a yellow villous disk. Native of New Grenada. Introduced in 1846. Flowers in July. *Culture.*—Requires a stove; turfy peat soil; propagated by division of the root.

Cuphea purpurea, *Paxton* (purple-flowered Cuphea)—Lythraceæ § Lythreæ.—A pretty perennial herbaceous plant, perhaps a variety of *C. miniata*. It grows from a foot and a half to two feet in height, with slender erect leafy stems, bearing opposite, ovate-acuminate leaves, covered with bristly hairs and attached by short petioles. The flowers are solitary from the axils of the leaves, forming a terminal leafy spike; the calyx is tubular, gibbous at the base, bright yellow-green below, tinged with bright rosy-purple above; the petals are six in number, of a deep carmine purple, the two upper ones broad, the others small. History unknown. Introduced before 1848. Flowers through the summer. Cultivated in some gardens as *C. hybrida*, and hence perhaps of hybrid origin. *Culture.*—Half-hardy; light sandy loam; propagated by cuttings.

Lobelia densiflora, *Paxton* (dense-flowered Lobelia).—Lobeliaceæ § Lobeleæ.—A very handsome herbaceous perennial, of dwarf habit, seldom exceeding eight inches in height, half of which height forms a dense pyramidal spike of intense blue flowers. The stem is smooth and obtusely angular; the leaves ovate-oblong, acute, wavy at the mar-

gins; the raceme is terminal, dense, leafy, the lower part usually measuring two inches in diameter, tapering to a point. The flowers are of a cobalt blue, and have a very fine appearance from their aggregate arrangement. Native country not stated. Introduced in 1847. Flowers during the summer months. *Culture.*—Hardy, or nearly so; light rich loamy soil; propagated by division of the roots.

Anemone nivalis, *Maund* (snowy Windflower).—Ranunculaceæ § Anemoneæ.—A very pretty herbaceous perennial, growing about a foot and a half high, with compoundly divided root leaves, and a branching scape bearing numerous snowy-white flowers, which on the outside are tinged with purple. It is a very pretty species, with something the habit of *A. vitifolia*. Native of the northern parts of India. Introduced in 1844. Flowers in June. *Culture.*—Hardy; requires a free and rather dry soil; propagated slowly by division, more readily by seeds.

Curcuma cordata, *Wallich* (heart-leaved Curcuma).—Zinziberaceæ.—A beautiful herbaceous perennial plant, with a short stem-like base formed by the sheathing bases of the leaf-stalks. The leaves are a foot long, arranged in two rows, ovate acuminate, with a heart-shaped base, and of a full green colour. The flower-spike arises from the centre of the plant, erect; it is cylindrical-oblong, and clothed with the bracteas, organs so conspicuous in this genus; these bracts are ovate obtuse, ranged in five rows, green, with the apex reflexed and much darker in colour; within each of these, for three-fourths the height of the spike, is a flower coloured yellow, orange, and pink. The upper part of the spike is barren, and here the bracts are larger, less obtuse, and of a rich violet colour, with a deep purple or blood-coloured spot in the centre of each. These coloured bracts form an elegant crown to the flower spike. Native of the East Indies. Introduced about 1845. Flowers in July. *Culture.*—Requires a moist stove, and a season of repose; light loam and leaf-mould; propagated by dividing the roots.

Navarretia pubescens, *Hooker and Arnott* (pubescent Navarretia).—Polemoniaceæ.—A hardy annual, somewhat showy when seen in masses, but not first-rate. It grows about six inches high, and is dwarf, branching, and hairy, with bipinnatifid leaves, having linear acute somewhat divaricated lobes; the herbage has little smell. The flowers are grayish-blue, with a purple tube less than half an inch long, a dark eye, and prominent white anthers; they are nearly allied to, and somewhat resemble those of the *Gilias*. Native of California in fields about Sonoma. Introduced in 1848. Flowers in June and July. *Culture.*—Hardy; common garden soil; propagated by seeds.

Navarretia cotulæfolia, *Hooker and Arnott* (cotula-leaved Navarretia).—Polemoniaceæ.—A diminutive annual plant, growing about two inches high, and hence fit for scattering on rockwork. The stems are straggling, and reddish, but scarcely hairy, clothed with soft pinnatifid or somewhat bipinnatifid leaves, the lobes of which are linear and acute; the herbage of this species has a disagreeable foxy odour which some others of its congeners possess. The flowers grow in close axillary heads, and are small, white and inconspicuous; the segments of the corolla are linear, and the calyces are very spiny. Native of California, in fields about Sonoma. Introduced in 1847. Flowers in June and July. *Culture.*—Hardy; should be sown in masses; common garden soil; propagated by seeds. This species may be scattered over rockwork.

Eriostemon intermedium, *Hooker* (intermediate Eriostemon).—Rutaceæ § Boronieæ.—A very handsome much branched shrub, clothed with copious scattered spreading leaves, entire and of an oblong-ovate figure, from three quarters of an inch to an inch and a half in length; they are cuspidate and somewhat glaucous, especially beneath, where they have copious glandular reservoirs of oil. The flowers are axillary, and produced freely on all the young branches, so that a vigorous plant becomes loaded with them; they are rather large, starry when the five lance-shaped petals are expanded, white externally tinged with rose-colour, which is especially manifest in the bud state. Native of New Holland. Introduced about 1847. Flowers in April. This plant is sometimes known in gardens as the *E. neriifolium* (Sieber). *Culture.*—Requires a greenhouse; turfy peat soil mixed with sharp white sand; propagated by cuttings, by seeds when they can be had, or by grafting on the *Correa alba*.

Oncidium flabelliferum, *Pinel* (fan-lipped Oncid).—Orchidaceæ § Vandeæ-Brassidæ.—A very beautiful epiphytal plant, the pseudo-bulbs two inches or more long, bearing each from one to three lanceolate leaves. The flower scapes are a foot and a half long, bearing numerous flowers, which are large and very showy, the sepals and petals ovate-lanceolate, waved at the edges, spotted and striped with purplish brown; the lip is large, spreading, fan-shaped, crisped at the margins, bright yellow, with a broad belt of close spots of purple-brown around the lower margin. It is a very ornamental species. Native of Brazil. Introduced in 1846 by M. Pinel, "a botanist and collector of plants residing in the Brazils," to the nursery of

Messrs. Rollisson of Tooting. Flowers in the latter part of summer. *Culture.*—Requires a moist stove ; turfy peat soil ; propagated by division of the plant.

Polygonum Brunonis, *Wallich* (Brown's Polygonum).—Polygonaceæ § Polygoneæ.—A very pretty little half-shrubby dark green leaved trailing plant, with dwarf ascending stems, capable of covering considerable patches with its shoots in the course of a single summer. Its stems are as thick as a goose-quill, bearing long stalked lanceolate leaves, when old marked with prominent veins round the edges, which gives them the appearance of being serrated. The flowers are in little spikes, rosy-coloured, in the way of *P. vacciniifolium*, but larger and paler. Native of the mountains of the northern parts of India. Introduced in 1845, by Capt. W. Munro, to the garden of the Horticultural Society. Flowers in the latter part of summer. *Culture.*—Hardy ; well suited for the decoration of rockwork ; free loamy soil ; propagated by cuttings or transplanting its rooted branches.

Pachystigma pteleoides, *Hooker* (Ptelea-leaved Pachystigma).—Rutaceæ § Eudiosmeæ.—A large shrub, or small tree, possessing more botanical interest than floral beauty. The flowers are, however, rather pretty. In its native country it forms a small tree of slender graceful habit, bearing ternate evergreen dark green leaves, full of pellucid dots. The flowers grow in small trichotomous panicles from the axils of the upper leaves ; they are an inch or more across, buttercup-shaped, cream-coloured, and very fragrant ; "the five-leaved calyx gradually passes into the concave petals." Native of the mountains of Santa Cruz, in Jamaica, where it was discovered by Mr. Purdie. Introduced to the Royal Garden at Kew, in 1844. Flowers in February. *Culture.*—Requires a stove ; free loamy soil ; propagated by cuttings planted in sand, and placed in bottom heat.

Gompholobium hirsutum, *Paxton* (hirsute Gompholobium).—Fabaceæ § Papilionaceæ-Podalyrieæ.—A fine shrubby plant, of the smaller class, with less inclination to twine than many of the Gompholobiums. The plant is covered on every part with fine hairs. The leaves are pinnated, consisting of six or eight pairs of linear obtuse glaucous leaflets fringed with long hairs ; the flowers are corymbose, the calyx tomentose, the corolla deep yellow, paler at the base of the standard, the wings narrow, and the keel bearded. Its bright yellow blossoms are very ornamental when the plant is in good health. Native of Australia, in the Swan River colony. Introduced in 1844. Flowers in May and June. *Culture.*—Requires a greenhouse ; sandy heath-mould and light loam ; propagated by cuttings of the half-ripened shoots placed in bottom heat.

EPIDENDRUM FUNIFERUM.

Epidendrum funiferum, Morren, (thread petalled Epidendrum).—Orchidaceæ § Epidendreæ-Læliadæ.

This pretty Epidendrum was sent with others in a case to M. Alexander Verschaffelt, of Ghent, by his collectors, De Vos and De Rycke, from St. Catherine's, probably some time in 1847.

It may be described as a handsome and very distinct epiphytal species, with a round, straight, erect stem, from eighteen inches to two feet high, on which alternate, oblong, lanceolate, acuminate, striated leaves are borne, enveloping the stem at their base in the manner of a sheath, and also much incurved at the apex. The flowers, which are produced on numerous short pendulous spikes from the joints at the top of the stem, are small, of a rich orange colour, with a white centre ; the sepals are entire, ovate-acuminate, spreading, orange-coloured, tinged with light green and purple on the outside ; the petals are remarkable for their thin thread-like form, they are as long as the sepals, and at first adhere to the sides of the two lateral ones, but separate nearly to the base with the full expansion of the flower, and ultimately assume a corkscrew form ; the labellum is triparted, lengthened, joined to the column, and white at the centre ; the side holes are sinuated, the intermediate lobe is emarginate, the disk marked with three lamellæ or plates.

It is easily distinguished by its singular structure ; its two lateral petals being quite

filiform and attenuated. At the beginning of the anthesis [opening of the flower] these two petals, which in a manner adhere to the two lateral sepals, appear as if they really formed part of them. It is only in the progress of the anthesis that they become separated, and curl up in a corkscrew manner. By this single character this species is easily recognised. Though the flowers are small, it has a very fine effect from the profusion of blossoms on the racemes, which are numerous on the upper part of the stems, which bear in a paniculate manner from four to six and sometimes more of these racemes, whose flowers present an agreeable, rich orange colour. It is easy to perceive the meaning of the name given to this species. The two lateral petals have the form of the ends of thread-ties proceeding from the flower by their sides. Professor Morren observed, that it would be interesting to study this physiological phenomenon of adherence in its deeper relations. From the little attention which he has been able to bestow on the subject, he believes it is a junction of cells analogous to what is observed in the corolla of Phyteuma. What seems to confirm this idea is the separation of these coralline threads, without organic lesion at the end of the anthesis.

This *Epidendrum funiferum* is one of those which grow best in pots—for it is well known that there are several Epidendrums which do better suspended on blocks or in baskets—only the pots require thorough drainage, for in their flowering season these plants require plenty of water. Turfy peat and sphagnum, well mixed together, form the best soil for Epidendrums; and for some kinds, of which this is one, a little garden earth may be very beneficially added, as it is found to induce flowering as well as to keep the moisture about the roots. In its very young state care should be taken not to give it too much water, as that is necessary for it chiefly in its vigorous state. It is propagated by division of the plant; the stems should be severed with a sharp knife some time before they are further disturbed.

THE PINE-APPLE, ITS CULTIVATION.

Among the very numerous writers on the Pine-apple, not one that we have seen seems to have any very direct notions of economy, and perhaps nobody is better able to appreciate a cheap mode of raising and fruiting a pine-apple than those who fancy, from all they have read, that such a costly job is beyond their means. We are quite aware that to do well with pines upon a large scale, provision must be made for a constant supply of artificial heat, and therefore some appropriate building is the first thing thought of; of twenty writers, however, that we have consulted, not two of them agree in the construction of their pine pits, or houses, or stoves. One would imagine that there was a great mystery attached to pine growing, and that success depended on the turn of a flue, six inches of tan room, the shape of a boiler, or the slope of a glass roof, when, in fact, none of these things have comparatively anything to do with the matter. There are some rules better observed than neglected, but they are very simple, and may be carried out in any way that the gardener's means dictate and he decides upon. Now we will endeavour to lay down these rules as plainly as possible, and each rule shall be a text for a few remarks on the various means of carrying out the rule. And be it here mentioned, that the numerous writers down to Hamilton all profess to do things the right way; all condemn their predecessors, and make out that theirs is the plan that answers better than all others. Hamilton seems a rational man, and he gives the main features of all the previous practices before he gives his own; and from the particulars he has given us we will take a few of the contradictions.

First, as to soil:—*Miller* says, "Good rich kitchen-garden soil, with one-third of dung from an old melon bed." *Giles* says, "A rich hazelly loam from a well-pastured common." *Adam Taylor* says, "One load of mould from under the turf of a good pasture, and if light, a fourth part of good mellow loam, but if strong, two or three bushels of sea sand, the fourth part of a load of dung from a cow yard." *Speechly* says, "Turfs cut thin (two inches), carried to the pens in sheep's pastures and laid down, roots upwards, only one course thick; when trampled on and soddened, laid in a heap and often turned over." *Mac Phail* says, "The pine-apple will grow well in any kind of rich soil from the kitchen garden." *Walter Nicol* says, "Vegetable mould, strong brown loam, pigeon's dung, and shell marl." *William Griffin* says, "Four barrows of loam from a pasture, one barrow of sheep's dung, and two barrows of swine's dung; lay together a year." *Baldwin* says, "The top spit of a pasture, and one half rotten dung, to lay a year." *Mr. Gunter* says, "Good garden earth and well-rotted dung." *Oldacre* says, "Good sound loam and dung with a little sand, with powdered bones." *Aiton* says, "Good yellow loam, with a third of rotten dung and some road grit to serve as sand." *Mr. Knight* used "green turfs chopped small and pressed close." At Thornfield, near Stockport, they used "turfs cut two inches thick, one-third decomposed dung, and one-tenth wood ashes, laid a few weeks together."

All these are growers of some fame; and all of them have been writers on the subject. These differences can only be reconciled by the fact, that whatever a plant may be put into, it will only take that which agrees with it; and therefore any kind of compost may be used with success if it contain enough of what a plant requires; but all those composts which are so extremely rich do not seem to have brought fruit a jot better than more simple and natural soil. We could produce quite as many variations in other points of practice; but as, after reading all we have quoted about the soils, it is almost natural to conclude that they will grow in anything, so also should we conclude, after reading all the variations, that it mattered little how they were grown. However, there are certain requisites which must be supplied, as the proper quantity of heat and nourishing matter, air and moisture; beyond this a good deal of the management is according to the fancy of the cultivator. We have seen excellent pines grown in a common dung hot-bed, as simply as cucumbers; and in no one respect did the cultivator attend to the supposed rules of pine growing, except keeping up plenty of heat and the necessary moisture.

We are anxious, therefore, to place before the reader the simplest mode of doing things, and reducing the directions for pine growing to those operations that must be performed, and thereby showing that, except in the time required to produce the fruit, it is not a bit more difficult than growing a cucumber or a melon. We require attention to the following rules:—

1. *Temperature of the atmosphere.*—November, December, and January, 60° to 65°; Febuary, 65° to 70°; March and April, 70° to 80°; hot months, 75° to not exceeding 90° in sunshine; Autumn, 65° to 70°.

2. *Heat of tan or bottom.*—Winter months, 75° to 80°; Summer, 80° to 90°; Spring and Autumn, 70° to 75°.

3. *Soil.*—Turves cut thin and rotted, three parts; dung from an old melon bed, one part.

4. *Routine culture.*—Hamilton's system of fruiting the suckers on the plant by earthing up.

TEMPERATURE AND BOTTOM HEAT.

First then, as to the temperature, much depends on the structure of the medium in which they grow, as to how the temperature shall be kept up; but whether it be by dung or hot water, by pipes or tanks, will not affect the plant. Therefore, whether they are placed in a common hot-bed, formed with wooden back, front, and sides, and in all respects like a cucumber bed or a melon bed, except being deeper, or grown in a regular stove, so that the requisite degree of heat is kept up, it is of no consequence. Perhaps the simplest and best construction is that which has become very general in places of business, where economy is everything, and carried out almost parsimoniously. A plain brick pit three feet deep all over, but sloping at the top and bottom exactly to the slope of the house, and of dimensions to suit the house, is the best medium for holding the tan; and tan is by far the best thing to use for bottom heat. The heating of the atmosphere may be by means of dung or hot water. If the former, the pit must be constructed on purpose; but the cheapest would be hot-water pipes, heated with a conical boiler. Still it is not our purpose to dictate how the heat shall be kept up. According to the construction of the places in command, so may the gardener regulate his measures. We have grown excellent fruit, as good as our neighbours, in an old-fashioned hot-house or stove, with a path all round the tan pit, and the flue in the wall of the tan pit; or rather, forming the wall of it in a great measure. What we say is, that it is the business of the gardener to make the best of the means at hand. We simply want the heat of the atmosphere, in the pit, or house, or hot-bed, to be according to the rule laid down, and we care not how it is managed; and with regard to the bottom heat, we are indifferent as to whether this is produced by a tank of hot water or tan, by leaves, or by any other medium, so that it be produced. We have laid down such rules for the heat at bottom as may be carried out in the best way it can be, under the circumstances. We are not presuming that the pine would not grow and fruit in a higher or lower temperature, because we have seen different persons growing the fruit under different temperatures; but we will go so far as to say, that the degrees of heat we have mentioned are well calculated to answer the best purposes, and keep the fruit healthy and strong. It is of the utmost importance that there be no sudden alternations of heat and cold, and the two degrees mentioned in each case are intended for the difference between night and day, because all plants should be in a lower temperature at night in the dark, than in the day when they have light. In summer time this regulates itself very well, because the sun makes the increase of temperature for daylight; but in winter there is frequently no sensible difference in the atmospheric heat in the division of night and day, and all practice favours the reverse of what should be observed; for the shutting up of houses and making up fires for the night in general increases the temperature when it should be diminished. The nearer, however, that our rules can be maintained, the

better, always remembering that the lowest temperature is for the night, and the highest for the daylight. It is wise to have plenty of heat at command, because it is easy to lower the temperature by giving air; and it may be taken as a general rule in all plant growing, that the more air a plant can get without being in a lower temperature than it requires, the better it succeeds; at the same time, draughts of air are not good. Ventilation should be so given as not to cause a thorough sharp draught, for that is always mischievous. With regard to the bottom-heat, that can only be commanded by means of hot-water tanks, or pipes that can be regulated at pleasure; or by such a body of tan as will not very readily decline. A pot containing three or four feet thickness of tan will supply any required heat, because you can begin with three feet and add fresh tan as it indicates a decline. To show how simply all the conditions of climate can be complied with, we have grown a sucker, or rather a crown of pine-apple in a common hot-bed; and, when it was too big for the height of the frame, which had cucumbers and melons in it, we grew it on in a one-light box that was two feet high behind, and one foot in front, making the dung supply the bottom heat as well as the atmospheric heat, and succeeded in fruiting a handsome queen pine which, under all the manifest disadvantages, nevertheless weighed two pounds four ounces. We had to keep raising the frame, and twice changed the hot-bed altogether; but the fruit was of an exquisite flavour, and very pretty. Mr. Steers, of Teddington, perhaps fruits pines with as little fuss and labour as anybody; and we remember his exhibiting very splendid fruit produced without fire heat. He has adopted hot water as a cheaper method of producing a certain degree of heat.

THE SOIL.

The pine-apple does not require great excitement. Rotted turves, cut two inches thick for turf laying, make a compost of two-thirds loam and one-third vegetable mould, because the decayed grass and grass roots become mould, and shrink into about a third of the bulk; so that when we take three parts of this compost, we take two parts of loam, and one of vegetable mould; and, if we add one part of dung from an old hot-bed, there is no mistaking the mixture. Suppose, then, we could not get the rotted turves, and had to make a compost as near as we could like it, we should have to take two parts of pure loam, one part leaf mould, and one part of decomposed dung. We have already shown, by the numerous different composts recommended by the various writers on the subject, that the pine-apple cannot be a very dainty plant, because nothing can differ much more than the soils recommended by the various cultivators; but, common sense tells us that the soil should be something like that which a plant grows in naturally, and there can be very little chance that pigs' dung and sheep's dung can form three-sevenths of any soil in the pine-apple countries. That certain salts are required, and that these salts are to be found in fifty different substances, is quite likely; but we have no notion of recommending those things which may not be easily got at; and we should, we are quite sure, have no difficulty in growing the pine-apple with nothing more than good loam, and its own weight of vegetable mould, without any dung at all; and we know, from experience, that they will succeed greatly in the compost here mentioned.

ROUTINE CULTURE.

The time at which the crown, or sucker, of a plant will fruit is very uncertain, because they vary a good deal at all times; but now they are brought to a fruiting state much earlier than they used to be. Fill small pots with the crowns; and Mr. Hamilton now recommends that they be plunged over head in the tan, instead of plunging merely to the rims. Again, it should be remarked that, instead of adopting the old practice of leaving the crowns out of ground till they have almost shrivelled, they ought to be planted as soon as the fleshy part that came out of the fruit has dried a little. So, also, with suckers, which may be served in the same way. We give Mr. Hamilton credit for this plunging over head, for we have not tried it: they rooted fast enough with us in the ordinary way of plunging up to the rims; and one season we had them all in a common hot-bed, plunged to their rims, and they struck fast enough. They would begin to grow in three or four months. But there was yet another way in which we succeeded:—we planted them in the tan, instead of potting them; and they all struck well, and pretty soon. Be they struck one way or the other, they were potted in eight-inch pots, and plunged to the rim. Here, as it was April, they had a temperature of 70°, and a little farther advanced, 80° to 90°; syringing them over the foliage, just before the sun went down, and keeping the atmosphere moist by watering the paths in the house. At the end of May they were ready for larger pots. The tan was stirred up, and some fresh added; the plants put into twelve-inch pots, and continued growing. When the sun's heat is violent, and raises the temperature too high, let it be kept down by partial shading: it is better than letting in too much dry air. These plants will be various in size,

but nevertheless will have greatly advanced, and may grow on well till they may have their last shift.

When the plants have advanced enough to have their last shift, let them be removed with their balls whole, and without damaging any of their fibres; and here they may remain till they fruit, simply continuing the heat as directed, the atmosphere moist by the repeated syringing, and the temperature proper for the time of year. When any of the fruit is cut, we now adopt Mr. Hamilton's system, though we had never seen it until after his book was published, when we met a pupil of his, at Manchester, with a specimen grown on his system. It was the practice with pine-growers to take off the suckers, and throw away the old plant; but his plan is to let the best remain on, strip all the leaves off that are below it, and even a part of its own, and then earth it up; that is, put earth sufficient to cover up the lower part of the sucker. He always potted them low down in the pot, to enable him to do this; but this could be more conveniently managed by rims to go on the pot, which might easily be made to slip over the plant, and add two or three or more inches to its height. The sucker not being detached from the old plant, rapidly grows, and strikes roots into the soil; so that it has a double share of nourishment; and the second fruit is often better than the first; but if there be another sucker, the same plan may be continued for a third, or even a fourth. When the sucker is too high up the plant to be earthed up, he shakes the earth from the roots, and cuts off all the old plant close above the sucker, and as much only of the roots as will enable him to pack the old root low enough down into the pot to bring the sucker to its proper place. This fourth sucker from one plant has been known to bring fruit heavier than the third, and the third and second both heavier than the first. This does not always result as a matter of course; but it is certain that the sucker fruits many months sooner, and much better, when not detached from the parent plant.

For those who desire to grow their pines for a particular season, it is well to have particular seasons for all the operations; but for private growers, pines should be always kept going. Crowns should not be saved until there is enough to make up a bed; but as they are ready, let them be struck. Again: when any plant is throwing off two or more suckers, let all but the best be removed, and stuck in the tan, or in pots, to root. It is far better, in supplying a family, to have plants and fruit in all stages, than it would be to have a glut at one time, and a great scarcity, or none, at another. We can speak from experience of the efficacy of Mr. Hamilton's system of continuing to fruit the suckers on old plants, instead of detaching them, and striking them as separate plants. There is very little doubt in our mind that the pine would continue throwing out suckers and fruiting them well, even if the suckers were fruited on the old plant without earthing up, though they might not be so large.

Is has been a practice, by some growers, to turn out fruiting plants into the tan itself, with their balls entire; and they are said to have progressed rapidly and fruited well; but there are two or three points to be attended to in this. At Thornfield, near Stockport, they stirred up and levelled the old tan, trod and pressed it down, and then put ten inches of new tan upon it, and in this new tan planted the balls of earth as they left their pots. It was found, then, that the old tan would not do to grow in, and brought the fruit smaller. They also found foreign tan objectionable, from there being a mixture of the barks of resinous woods in it. It was, however, found very beneficial to put three inches of fresh tan just as the plants began to show their fruit, and to press it down on the roots; and they are said to have not only swelled their fruit better, but also to have thrown such enormous suckers, that it is to be greatly regretted they had not been fruited in the tan, on the old plants. We do not know whether the earthing up to the suckers will be found absolutely necessary; but if it were, what excellent opportunity the planting in tan affords, for there it is only necessary to add to the quantity of tan in the bed, and make it go as high up the plant as we please. Mr. Knight used to plant the suckers sometimes with the old stool attached, but making no practice of it, and not attending to any regular system. Mr. Hamilton recommends those who intend to begin the sucker system to turn out all the fruiting plants into tan, and when the fruit is cut, to add fresh tan, or sink the plants lower; but no plan can be better than adding tan on the surface, because no roots would be disturbed; and it has always been found that the roots run about among the tan very near the surface. Besides, as it has been proved how advantageous it was to add three inches on the surface, when the plants show fruit, there can be little doubt but that the very fact of adding to reach the sucker would have the same effect on the roots of the old stool. We are averse to great checks. We always opposed the disrooting of plants when potted for fruiting, except for market-gardeners; they do not want large fruit, but quickly-grown fruit,—and they want it at particular seasons, which

they sometimes, but not often, miss, and lose their market; but for families where the pines are wanted at any and all seasons, and where they rather pride themselves on large fruit, the disrooting must be wrong.

If we had to re-pot pines as we do all other plants, we should save every fibre, and not disturb the ball in the least. We should carefully grow, without the slightest check, every plant we had. We should decide on adding tan, but not removing nor disturbing a single plant. We are of opinion that there is not half enough done with second growths. It is somewhat descending to go from a pine-apple to a cabbage; but we have seen all the sprouts but one rubbed off the stump of a cabbage-crop, and the whole earthed up well, and hoed between; and, with here and there a miss, a finer second crop than a first has been the result. This is not a common practice; but we were reminded of the cabbages by the fact stated by Mr. Hamilton, namely, that "the pine-apple has been cultivated for a long time in Jamaica and Calcutta, in a manner similar to cabbages in this country;" and seeing the waggon-loads that arrive now, we might almost add, that they are almost sold and eaten like cabbages. We have seen old plants that have for years gone over without, produce enormous fruits when planted out in a prepared pit, with the ordinary soil used for potting; but, until Mr. Hamilton's work appeared in 1844, we were not aware that the plant would luxuriate so much in fresh tan. We have, however, seen a little of this disposition, when the pots have been low in the tan-bed, and the roots have run out in all directions in a short time.

Mr. Hamilton places the qualities of certain varieties of the pine-apple in a different rank to most writers; but, looking at the practical knowledge which he unquestionably possesses, we give them as he places them, and the more readily, because they are differently valued, and because we cannot help looking upon his opinion as an authority. He places them thus:—1, Montserrat; 2, Sierra Leone; 3, Black Jamaica; 4, Black Antigua; 5, Enville; 6, New Providence; 7, White Barbadoes; 8, Old Queen; 9, Ripley Queen; 10, Brown Sugar-loaf; 11, Green Providence; 12, Welbeck Seedling; 13, Globe; 14, Havannah Smooth; 15, King; 16, Brown-striped Sugar-loaf; 17, Blood-red. He says: "I have arranged them according to the estimation each variety is held in. I am aware that it is a far different arrangement from what many talented writers have previously made." However, as talented writers who have preceded Mr. Hamilton are rather conspicuously opposed to each other in very important points, and all cannot be right, we would sooner take Mr. Hamilton's summary of the several qualities than any other. Very few pine-apples are eaten in perfection, compared with the great number consumed; and those only who have had all in perfection, can rightly judge of their several qualities.

ONCIDIUM PAPILIO.

The Butterfly-plant of the Nurseries.

Perhaps among all the extraordinary productions this beautiful plant may be set down as the most splendid, if not the most gaudy; so much is the flower like a golden butterfly with expanded wings, and so naturally does it flutter on the least circulation or admission of air to the house, that a person unacquainted with the plant would fancy at once that it was a gaudy fly hovering over the adjoining plants. It has long wiry stems, standing eighteen inches or more above the plant, and the flower at the smallest distance appears to hover in the air, for the stem can hardly be seen; nevertheless, it is one of the commonest of the orchidaceous plants, and from that circumstance is not held in one half the estimation it deserves. The culture is simple:—it requires moist stove heat, but we have seen it luxuriate in a vinery where grapes are forced, and grown well in a common dung bed with the flower stems held down by hooks to keep the flowers from damage by touching the glass. To those who have a stove kept moderately moist, this plant is one of the most pleasing and gratifying that can be introduced, and we strongly recommend everybody who can procure as many, to grow half-a-dozen plants. It may be grown in pots filled with lumps of turfy peat, one half the pot being occupied with broken potsherds, or crocks; the lumps of peat should be pegged together high above the pot, that is, piled up in the form of a cone. The plant is to be pegged among the top pieces of peat, so that it cannot be tumbled over, but as it lives upon the atmospheric moisture rather than on anything it finds among the peat, it would grow if fastened on the stump of an old tree, or rather a block cut from it, and even on a bit of moss fastened on a wall; the pot is recommended for the convenience of shifting about, and removing it from one place to another.

BEDDING OUT VERBENAS.

The numerous varieties of this constant little flower, however beautiful they appear in the bunches exhibited on a stand, are calculated to defeat the object of the cultivator, from their remarkably different habits, and no one ought to use them for their colour without well knowing their growth. Some creep along the

ground, like *V. Melindres;* others grow strong and compact with long joints, and consequently flowers distinct from each other ; some are shrubby and upright, and are excellent for borders with other flowers, but for bedding out in Dutch gardens with geometrical figures, none are so effective as those of the habit of *V. Melindres*, which creep along the ground with close short joints which strike root as they finish their growth, and form an almost uninterrupted mass of flowers, which scarcely rise six inches from the bed, and whatever figure they are destined to fill up is formed almost as close and compact and comparatively as near the ground as the pattern in a carpet. There are many of different colours that incline to this habit, and if sufficient contrast can be procured, they are without exception the most effective of all subjects to fill up geometrical figures. Plants of the habit we write of may be planted one foot apart, and they will soon meet; when the shoots begin to grow, they should be placed in the position best calculated to fill up vacant spaces, and when they reach the edge of the figure they are to fill, they should be stopped at the ends, and they must never be allowed to get over the edge of the figure. Again, as too vigorous a growth is objectionable, and forms the joints too long, the soil should not be too rich ; half loam and half peat earth will be found conducive to bloom and moderate growth ; the loam, however, ought to be that from rotted turves off a pasture which contains sufficient vegetable matter and dung to answer all the purposes, and it is good for most flowers.

ROSES IN BEDS.

Many of the most beautiful hybrid China roses are not sufficiently hardy to stand a hard winter, and are cut off by the frost if subjected to the open air without assistance. There are, however, various modes of preserving them. Mr. Barnes, in a communication to Glenny's Garden Almanac, describes an ingenious and rather an effective mode of accomplishing this, and at the same time preserving a neat appearance. He plants the dwarf and constantly blooming kinds ; he prepares the bed by securing eighteen inches in depth of good turfy loam and dung from a cucumber frame, in equal quantity and mixed well, filling the bed to that thickness after gently pressing, planting the roses a foot apart all over, and profusely watering them ; then he takes large rough white flints, placing them close together all over the bed, pressing them a little into the soil that they may be firm in their places, but leaving room for the roses, which must not be bruised ; he then places moss very carefully into the interstices and especially round the plants. They bloom profusely all the summer, and a good way into the winter if it be mild. There needs no further protection from the frost, only keep them down to the moss, and in early spring they grow again and flower still more profusely than they did the first season of planting. Another mode of doing this is to place upright stakes in the ground as high as the tops of the roses, and throw mats over them at night, which are not removed in the day if the frost continue. Where roses are in long narrow beds, hoops and mats may be easily placed and removed. Standard roses of the tender kind may be saved by packing moss between the branches of the head, and tying them over with cloth or matting ; the stem, being perfectly hardy, needs no protection, though we have seen them tied round with hay-bands and the heads neglected. But in the colder parts of France the standards are dug up and placed in an out-house with their roots in soil, and are then planted out again in spring.

SKETCH OF THE VEGETATION OF AUSTRALIA.

In a country so immense as Australia, stretching as it does through twenty-eight degrees of latitude, and nearly forty degrees of longitude, considerable variation in the vegetation is to be naturally looked for, especially as the climate is warm even in the most southern parts, while within the tropics the usual alternations of wet and dry seasons, the latter accompanied with great heat, produce a luxuriance of vegetation little inferior to that of the Malay Archipelago. But the wide distribution of a few families of plants, of which the forests and low woods are chiefly composed, gives considerable uniformity to the appearance of the country in widely separated localities, although the plants are seldom the same. Few plants, for instance, are found at Swan River to be identical in species with those growing on the east coast in the neighbourhood of Sydney ; and although in the neighbourhood of the Gulf of Carpentaria and Port Essington the salt creeks are fringed with groves of Mangroves, and large tracts of land are covered with cabbage palms (*Seaforthia sp.* and *Livistona sp.*), yet still the general vegetation bears a strong resemblance to that of the more southern and temperate districts.

The forests of New South Wales contain immense quantities of species of Acacia and

Eucalyptus, which, under various names, are well known to the natives and colonists, and are of considerable value, not only for timber, but various other useful products. Thus, a gum very similar in properties to gum arabic is produced by the Silver Wattle (*Acacia mollissima*), a shrub about eight feet high, with pinnate leaves, and the copious yellow flowers collected in globose heads; also by *Acacia decurrens*, a beautiful shrub, very like the last; and also by the Black Wattle (*A. affinis*), a plant of similar stature to the others, but with shortened flattened leaf-stalks instead of leaves, and heads of yellow flowers. This gum forms a material article of diet to the natives at certain seasons, and is also collected by the colonists. The bark of these and other acacias also yields great quantities of a tanning principle much stronger in its operation on leather than oak bark, which has been imported into England in some quantities in the form of an extract, procured by boiling down the bark. Other sorts of wattles, as the acacias are generally called in New Holland, are among the handsomest of shrubs —as *A. pubescens*, which has a light feathery pinnate foliage, slender, rather drooping habit, and produces a great profusion of spikes of golden-coloured flowers, arranged in little balls; *A. oxycedrus*, also growing to about ten feet high, with an upright rigid habit, sharp spiny leaf-stalks or phyllodia, and dense spikes of rich yellow flowers.

Besides very large and heavy timber, the different species of Eucalypti, which vary from small bushes to more than a hundred feet in height, produce some other substances of considerable utility. Thus the gum-tree (*E. robusta*) secretes in cavities between the annual growth of the wood a rich vermilion-coloured gum, and the ironbark (*E. resinifera*), an astringent subresinous substance resembling gum kino; *E. manifera* produces in the dry season a saccharine substance similar to manna in action and appearance, which is eagerly sought after as an article of food by the natives. Other plants of this family yield a large supply of tannin, which has been extracted in the same way as that of the acacias, and has found a ready sale in the English market.

Eucalypti are stated to form four-fifths of the Australian forests. These plants are remarkable for the vertical instead of horizontal direction of their leaves, which are generally in pairs opposite one another on young plants, but becoming scattered and alternate as the plant grows older; and the form is generally so much changed that an old and a young plant of the same species would hardly be taken for such.

Other useful plants of the same natural order (Myrtaceæ) as the last, are those called by the colonists Tea-trees, being various species of *Leptospermum* and *Melaleuca*, which, as their local name indicates, are used as substitutes for tea. The first-named, as the common tea-tree (*L. scoparium*), and many others—more than thirty species being known in New South Wales alone — are generally noted for their neat bushy growth, small rigid leaves, and numerous pure white flowers. The Melaleucas are also handsome shrubs, with opposite or alternate leaves, and frequently purple or scarlet flowers, arranged in spikes similar in appearance to a bottle-brush. A great number of species are known. Many other beautiful shrubs belonging to this natural order are scattered in profusion all over the country, among which *Callistemon lanceolatus*, with its lance-shaped leaves and spikes of deep crimson flowers, and *Beaufortia decussata*, with dense dark green foliage, and flowers of a deeper crimson than the last, have long been inhabitants of the conservatories of this country.

Plants of the natural order Epacridaceæ form a large portion of the scrub and underwood in New South Wales, occupying to a great degree the place of the Heaths of the Cape of Good Hope and other countries. *Epacris grandiflora*, forming a dense shrub with rigid heart-shaped leaves and numerous axillary tubular crimson flowers with white mouth, and *E. impressa* with a more rigid habit, sharp lance-shaped leaves and rosy tubular flowers, produced in great profusion, are favourites long ago introduced into this country.

But one of the most numerous as well as singular groups of plants, tending particularly to give an appearance so different from the vegetation of Europe, are the Proteaceæ, often growing socially together, adorning large tracts of country with their singular forms and generally showy flowers. The species seem in general confined to rather narrow localities, none of those growing near Sydney or on the east coast being known on the west coast. Of this family the Waratah (*Telopea speciosissima*) has been long in cultivation on account of its stately growth, fine large leaves, and splendid cones of deep crimson flowers. *Banksia latifolia* forms a tree thirty feet high, with broad leathery leaves, and heads of greenish flowers. *B. grandis* forms a bush two or three feet high, with large coriaceous toothed leaves and large conical heads of yellow flowers. *Dryandra floribunda* forms a compact bush, with stiff toothed leaves, the branches terminating in heads of yellow flowers.

In even greater numbers than any of the previous named groups appear the papiliona-

ceous plants, generally in the form of shrubs, with red or yellow, sometimes blue, flowers. These form a considerable portion of the underwood on the edge of the woods, or of the scrubs intervening in the more open parts of the country, especially as the interior of the country is gained. Here *Kennedya rubicunda*, with its brownish leaflets growing in threes, and its large red flowers, may be seen climbing the trees on the margins of the woods, as also does *Hardenbergia monophylla*, with its long twining stems, simple leaves, and fine spikes of small blue flowers. In the same way *Brachysema latifolium* may be found adorning the scrubs with its twining stems, broad heart-shaped leaves, and scarlet flowers. Numerous *Pultenæas* are also to be found, generally forming neat bushes, with rigid leaves and terminal heads of flowers of some shade of yellow. But a mere list of plants with papilionaceous flowers indigenous to New South Wales, would occupy much space. There are the *Hoveas*, the *Bossiæas*, *Platylobiums*, *Chorozemas*, *Dillwynias*, *Podolobiums*, *Burtonias*, *Gompholobiums*, *Mirbelias*, *Gastrolobiums*, *Daviesias*, and many other genera of this family, all well known, and which are almost as conspicuous in our greenhouses as in the woods of Australia.

Turning to the monocotyledonous plants of this country, perhaps no forms give so peculiar an appearance to the vegetation as the grass trees (*Xanthorrhœa hastilis*, and other species), whose stout trunks supporting a dense head of long curved grass-like leaves, surmounted by a tall stem bearing a spike of white flowers, and growing in the most barren places, give a peculiar air to the landscapes in which they occur. Another subject of similar habit, but with a spike of intensely coloured crimson flowers, is the *Doryanthes excelsa*, a plant occurring in greater plenty to the north of Sydney. As an undergrowth to these, plants of a still more herbaceous and dwarf stature are very common; amongst which the *Patersonias* hold a considerable rank. These are plants with a rigid sedgy foliage, and spikes or heads of blue or purple flowers of great beauty, but very short duration. Others of similar habits are also common, as sedges and grasses of various species, but these are seldom found forming anything like a close turf. Among the orchids of this region are a very few of epiphytical habit, but a rather large assortment of terrestrial growth, many of which are very ornamental; as, for instance, *Diuris aurea*, a plant with persistent lanceolate leaves, and a flower-spike attaining a height of eighteen inches, bearing a quantity of singularly formed golden coloured flowers.

Passing towards the interior, the size of the trees and the denseness of the forest increases until the range of the Blue Mountains is passed, when a different vegetation is met with in every direction; not that the families of plants are entirely changed, but because with many new genera, several of which are analogous or identical with European forms, those more peculiarly Australian appear under different conditions. On the Liverpool and other plains of the interior the forest vegetation generally arranges itself in isolated groups, or is scattered about in single plants, so as to give the country quite a park-like appearance, while the lawn is composed of many various grasses and other herbs, among which is generally predominant on tolerable or good soils, the kangaroo grass (*Anthistiria australis*), one of the most generally diffused and most valuable productions of the open woods and downs of the interior, being the grass on which the flock-masters and squatters chiefly depend for food for their herds and flocks. It is in good land a tall strong grass with a compound flower-spike, somewhat resembling the common oat-grass of England.

But it is in or near the water-courses and rivers that the forms occur which most remind the traveller of the European flora, for there he meets with mints, water plantains, sedges, duck-weeds, &c., which forcibly remind him of home. One of the finest plants of this description is the willow-herb (*Lythrum salicaria*), common by our English rivers, and still further remarkable as being the only one of its natural order yet known in New Holland. Another plant, apparently almost universally diffused over the interior of the country, is the *Polygonum junceum*, a trailing matted bramble-like shrub, but valuable as almost always marking the proximity of water.

The valley of the river Lachlan affords a considerable variety of fresh forms of plants, one of the most useful of which to the aborigines is a species of reed or bull-rush, which grows in enormous quantities in the extensive marshes near this river. The roots, or creeping rhizomes, are collected in lengths of about nine inches, peeled and slightly roasted before the fire; they are then twisted so as to loosen the fibres, and a starchy substance closely resembling wheaten flour is shaken out, furnishing a good and wholesome food at all times. This food, which the natives call "*Bàlyan*," is thus always procurable, either as above, or by simply chewing the peeled roots. Among allied plants, several new forms of grasses occur on or near the Lachlan, as *Danthonia pectinata*, with dense long foliage, and simple secund spikes arranged many together in terminal heads. Also *Trichinium nobile*, with broad ovate leaves, and cylindrical spikes of feathery pale

yellow flowers, being a very fine grass, the spikes as much as six inches long; *T. alopecuroideum* has a branching stem with smooth lanceolate leaves, and long cylindrical spikes of flowers; *T. parviflorum* has oval acute leaves, the under sides of which as well as the stems are covered with rusty down, and the flowers are produced in long graceful spikes; and *T. sessilifolium* has oblong blunt leaves, covered, as well as the stems, with rusty down, and bearing oblong downy spikes of flowers. Two of the most valuable grasses in this district appear to be *Agrostis virginea* and a species of *Echinochloa*, both affording rich food for cattle. Among the "lilies of the field" are three beautiful species of *Callostemma*, which occur in great abundance in some districts; *C. candidum* has heads of pretty white fragrant flowers, with an entire crown in the centre of each; *C. carneum* has similar flowers of a pink colour; while those of *C. luteum*, produced in a similar way, are of a clear yellow colour. Of the curious rusty genus *Xerotes* two new species occur: *X. typhina*, having long narrow leaves whose edges are clothed with hairy filaments, and interrupted spikes of fragrant flowers, which are produced from the edges of stems closely resembling the leaves in appearance, and which, drooping outwards while the true leaves retain a rigid upright direction, give the plant a peculiar and elegant appearance; *X. effusa* has hard long rush-like half-round leaves, and panicles of spreading flowers.

A singular plant belonging to the Caprifoils, forming a bush resembling the dwarf elder, also occurs in this district. The leaves are opposite, pinnate of five serrate leaflets, and the flowers and fruit are remarkable for every part being in threes, as three sepals, three petals, three stamens, three stigmas, and three carpels. The flowers of this plant (*Tripetalus australasicus*) are yellow, produced in lax panicles, and are succeeded by fruit with scarcely any pulp upon them. *Jasminum lineare* is also met with, forming a singular upright bush, with short axillary bunches of white blossoms. Among nightshades is one, *Solanum esuriale*, with narrow blunt leaves, which, as well as the branches, are spiny and downy, and small inconspicuous flowers, succeeded by a berry which the natives eat. *S. ferocissimum* is chiefly remarkable for being so totally beset with yellow curved spines as almost to hide its leaves and flowers.

In some districts plains occur, showing their saline nature by the quantities of salsolaceous plants which they produce, among which occurs a Chenopod (*Sclerolæna bicornis*) curious for its woolly branching habit, smooth linear succulent leaves, and solitary calyx with two horns. Of malloworts one or two small species of *Sida* occur. *Sida fibulifera*, a small spreading plant covered with white wool, has ovate notched leaves, and small yellow very fragrant flowers, produced on long foot-stalks. *S. corrugata* is another small plant, with minute yellow flowers without the fragrance of those of the last to recommend them.

Among leguminous plants the wattles (*Acacias*) occur in great numbers, and afford several new forms: *A. leucophylla* is a graceful drooping plant, with thin angular branches, linear sickle-shaped leaves (phyllodia), which, as well as the young branches, are densely clothed with silvery hairs or down; the flowers are produced in bunches in the axils of the leaves. *A. salicina* has the appearance of a graceful drooping willow, with narrow oblong lance-shaped leaves covered with bloom, and bunches of yellow flowers produced on the young shoots from the axils of the leaves. A plant very generally distributed, although perhaps at wide intervals, over this part of Australia, but at any rate occurring in the beds of lagoons and rivers as soon as the floods are off, from the Murray to the Darling, is *Trigonella suavissima*, a species somewhat resembling clover, and singular among Australian vegetables in approaching, in form, those leguminous plants more peculiarly characteristic of the south of Europe. It is a trailing prostrate herb, with trifoliate leaves, the leaflets heart-shaped and toothed; the flowers are produced a few together in heads, and are succeeded by smooth sickle-shaped pods. The plant emits a perfume exactly similar to new-mown hay, and the succulent fresh herbage affords a most grateful vegetable cooked like spinach. The natives call it "*Càlomba*," and use it as an article of food.

Among rueworts, *Correa leucoclada* has the young shoots covered with a white down, oblong oval blunt leaves, and large campanulate flowers; *C. glabra* also has white branches with smooth oval leaves, and small green bell-shaped flowers. Near the Lachlan occurs *Loranthus Quandang*, as a parasite on the *Fusanus acuminatus*: it has opposite narrow blunt white leaves, and flowers growing in sixes from the axils of the leaves, of a bright crimson colour, and produced in such quantities as to be very ornamental. Among beancapers occurs *Röpera aurantiaca*, a beautiful little under-shrub, with narrow blunt fleshy leaves and orange-coloured flowers, succeeded by broad thin-winged fruit. A Sandalwort (*Eucarya Murrayana*) closely allied to the Quandang nut, is also sparingly met with between the Lachlan and the Darling. It forms a handsome small tree, something resembling a weeping willow when in fruit, which latter resemble a pear in shape, and are produced at the ends of the branches. The

enclosed nut closely resembles the Quandang in appearance, although there is no similarity between the trees.

The Quandang nut (*Fusanus acuminatus*) is produced on a bush or small tree widely spread through the country, and occurring in Australia Felix in such abundance as almost to seem worthy of attention in a commercial point of view; the kernels being not inferior to almonds, and affording the natives a large supply of sweet and nutritious food. In sandy ground on the Murray river, and also on the Darling, a tree occurs, generally solitary, which has obtained the name of the horse-radish tree (*Gyrostemon pungens*), from the wood, bark, and leaves tasting strongly as that root. The leaves are rhomb-shaped and glaucous, and the capsules are arranged in a wheel-like manner. In this district also occur many new species of *Acacias*, as *A. sclerophylla*, with angular branches and rigid smooth phyllodia, the heads of flowers sessile, and all parts of the plant perfectly smooth; *A. farinosa* much resembles the last, but has narrow blunt sickle-shaped leaves, with mealy balls of flowers produced two-four together in the axils of the leaves. Near Mount Zero occurs *A. strigosa*, which is clothed with glandular hairs, with oblong narrow leaves, and bearing a profusion of brilliant yellow flowers. Other leguminous plants found near the Murray and its tributaries, of considerable interest, are various species of *Cassia*, *Pultenæa*, *Daviesia*, &c. some of which are described below. *Cassia heteroloba* forms a beautiful shrub, with leaves composed of two pairs of narrow leaflets, among which are produced the brilliant yellow blossoms in great profusion; these are succeeded by curious thin papery pods of various shapes and sizes. *Pultenæa montana* forms a dense hairy bush, with heart-shaped leaves and terminal heads of small yellow flowers. *P. mollis* forms a neat bush, with small narrow leaves densely covered with silky silvery hairs, the branches being terminated by heads of beautiful yellow and brown flowers. *Daviesia pectinata* forms a singular leafless bush, the side branches being green and flattened out into thick vertical plates, spiny on the edges and arranged in a spiral manner; in the axils of these branches the heads of small flowers are produced. *D. brevifolia* forms a stiff furze-like bush, with conical spiny leaves, and spikes of small purple flowers; it occurs on the banks of the Glenelg river. *Dillwynia hispida* forms a neat bush, with hairy heath-like leaves and spikes of plain yellow flowers. Of the family of Myrtle-blooms many species occur, of which a few of the most striking may be mentioned. On the Darling occurs a curious plant (*Bæckia crassifolia*) forming a low shrub, with very small blunt thick leaves, and solitary small white flowers. The range of hills named the Grampians are rich in new plants, among which may be mentioned *B. alpina*, a hairy bush with downy narrow oval leaves and handsome rose-coloured flowers. On the highest parts of these hills also occurs *Eucalyptus alpina*, with short angular rigid warted branches, oval oblong viscid leaves, and heads of a few flowers, produced from the axils of the leaves. Near Lake Bogo occurs a handsome species of Storksbill (*Pelargonium Radeyanum*), remarkable as one of the very few of its genus found away from the Cape of Good Hope; it has a brittle thick fleshy underground stem, with oblong oval leaves bluntly toothed, and heads of from eight to ten handsome flowers borne on a long stalk above the leaves; the roots of this, or allied species, are collected as articles of food by the natives of Western Australia.

On and near the Grampian range Proteads occur in some numbers, among which the following Grevilleas are new: *G. Aquifolium* has holly-like leaves downy on the under side, and hairy racemes of flowers; *G. variabilis* has hoary wedge-shaped lobed leaves, resembling those of the oak, and downy spikes of flowers; *G. alpina* occurs as an upright bush, with long narrow leaves, and also as a dense entangled scrub, with much shorter leaves; the flowers are produced in small spikes, and are of a brownish red colour. Epacrids are also common; and *Epacris tomentosa* is stated to be a much more handsome plant than the well-known *E. grandiflora*; it has sharp oval downy leaves, and large curved purple flowers. *Leucopogon glacialis* forms a small bush, not exceeding a foot in height, with small narrow heath-like leaves, and terminal few-flowered heads of blossoms, expanding in the winter season even when covered with ice on the summits of these hills. *L. cordifolium* also forms a bush with cordate leaves, which are beautifully veined on the lower side, and with solitary sessile axillary flowers. *L. rufus* has the branches and under sides of the leaves covered with rusty down; the latter are oval and spined at the point, with solitary axillary flowers of a cinnamon colour. Among rueworts, *Eriostemon pungens* forms a scrubby spiny bush, with round branches, glandular prickly leaves, and solitary white flowers. *Phebalium bilobum* has woolly branches, with heart-shaped holly-like leaves, and pretty bright red flowers. *Correa rotundifolia* has rusty villous branches, and small roundish rufous leaves, and bears a profusion of pink bell-shaped flowers. A new species of violetwort, *Pigea floribunda*, is also abundant; this has narrow blunt leaves on its upright stems, which are terminated by spikes of white or pale yellow flowers. Of other

plants, *Tetratheca ciliata* is beautiful and new, growing with tufts of slender stems about a foot high, and having oval leaves arranged in whorls, and large rich purple flowers. *Bulbine suavis* has fleshy fascicled roots, and long glaucous narrow leaves, with an upright spike of numerous pale yellow flowers. Near the river Bogan, a new caper tree (*Capparis Mitchellii*) is met with, having oboval leaves and yellow flowers, succeeded by a spherical fruit resembling a small lemon, hairy outside, and filled within with small nuts enveloped in a soft pulp, and having an agreeable perfume. A species of cucumber (*Cucumis pubescens?*) is also found in rich soil near water, having flowers of a purple colour, succeeded by a very bitter fruit about the size of a plum. In other places the ground is almost covered with a small annual mallowort (*Hibiscus tridactylites*) having roundish root-leaves, those of the red stem being digitate, and bearing small flowers. A Cassia (*C. teretifolia*) of great beauty is found on Mount Flinders and near it, the whole plant being covered with a white down, and producing pinnate leaves, having five or six pairs of thin round blunt leaflets; the flowers are produced in spikes of about five each, and make a striking appearance.

The Darling Downs, lying back from Moreton Bay about 150 miles, in the 28° of latitude, are at an elevation of 1,800 to 2,000 feet above the level of the sea; here, in the winter season, the cold is sometimes very severe, considering the low latitude in which they are situate. A similar vegetation to that of the other interior downs obtains here, accompanied in many cases with a greater luxuriance and development of the various plants forming the flora of the district. This is peculiarly visible on descending from the downs to Moreton Bay, a very sharp fall, especially on entering the valley of the Brisbane River, or any of its tributaries, where the trees acquire a much larger size, and also stand at much wider intervals. Here the Moreton Bay pine (*Araucaria Cunninghami*) attains a very large size, its fine crown of dense branches and awl-shaped leaves rising far above all its neighbours. At least two other species of pine are said to be found in the neighbourhood; besides the *Bunya bunya* (*Araucaria Bidwilli*), a tree of most magnificent dimensions, with a head of spreading branches densely covered with dark green lance-shaped leaves, ending in a sharp point, and arranged in a somewhat two-ranked manner. The cones are filled with large eatable seeds, somewhat resembling the almond in flavour, and to collect and feast upon which large congregations of the natives take place every year, lasting in general two or three months, from January to March. The principal forest of these trees lies about seventy-five miles in a north-west direction from Moreton Bay. In the neighbourhood of this bay other species of gum trees (*Eucalypti*) yield a manna similar to that previously mentioned. In the forests on the banks of the rivers also occurs the Moreton Bay Chestnut (*Castanospermum australe*), a tree rising to the height of one hundred feet, with pinnate leaves resembling those of the walnut, appearing from the tips of the branches at the same time that the small bunches of red and yellow pea-shaped flowers are produced from the old wood, and which are succeeded by pods containing from two to four seeds as big as ordinary chestnuts, which also afford food for the natives. With it also grows the Silver Oak (*Grevillea robusta*) with its ornamental fern-like leaves. This, with *Stenocarpus Cunninghami*, are two of the very few Proteads to be found in the immediate vicinity of the Bay. The latter is a stiff-growing plant, with large leaves resembling those of the common oak in outline, and bearing clusters of singular scarlet flowers arranged in a wheel-like form at the extremity of long flower-stalks. Altogether the plants of Moreton Bay indicate a near approach to a tropical vegetation, although on the elevated downs of the interior comparatively little of this character is to be traced.

Turning into the interior, and approaching the tropic of Capricorn, many new species of plants are met with, the most singular of which is the bottle-tree (*Delabechea rupestris*), which has singular gouty stems, so soft and full of mucilage as to be capable of being easily cut, and to furnish a large proportion of human subsistence. One of the most valuable plants of this district is doubtless the millet-grass (*Panicum lævinode*), called by the natives "coolly," having a compound contracted spike of flowers, with a smooth stem, and leaves reaching a height of three feet. The seeds of this grass are large enough, and produced in sufficient abundance, to form an extensive article of diet for the natives, who collect it in great quantities, and, pounding the seeds with water, manufacture a kind of bread; being one of the rare instances in which the seeds of a cereal are produced freely enough in a wild state to become of importance to man as a bread-stuff. This grass occurs over a large tract of country, being found as far south as the Darling River. A curious plant found in this district is a coral tree (*Erythrina vespertilio*), with a stem as much as a foot thick, and thorny, the leaflets in threes, having a strong resemblance to the extended wings of a bat; the flowers are succeeded by pods, each containing two scarlet seeds about the size of French beans. The poplar-leaved gum-tree (*Eucalyptus populi-*

folia) also occurs, with bluntly triangular leaves, the branches producing curious angular woody galls. Other species of gum-trees are found; among them two, remarkable for the strong and agreeable perfume which they exhale. *E. melissiodora* forms a bush about five feet high, with rough branches and narrow oblong leaves, giving off a powerful scent of balm; and *E. citriodora* is also a bush with angular rough branches, and green lance-shaped leaves, exhaling a strong, grateful, lemon-like odour. So copious are the scents given off by these bushes, that they perfume the air to a considerable distance. A beautiful new bottle-brush (*Callistemon nervosum*) also occurs, forming a large tree, in dry open forest-land, having pale-coloured branches, ovate lance-shaped leaves, and rich crimson flowers.

Among numerous species of Acacia, is a small bush of considerable beauty (*A. Victoriæ*), with round branches, narrow, blunt, sickle-shaped leaves, and slender spikes of small flowers. Another, growing to the height of five feet, is *A. uncifera*, having roundish, softly downy branches, oblique oblong leaves, or phyllodia, and spikes composed of flowers crowded into downy balls. A new plant belonging to a small natural order (*Goodeniaceæ*), the greater number of species belonging to which are natives of New Holland, is *Linschotenia discolor*, which occurs in the valley of the Salvator River. It is a round-stemmed sub-shrub, with entire oblong acute leaves, densely woolly on their under sides, and branching spikes of brilliantly blue flowers. But it is impossible to particularize all the new forms found in these little known regions.

The general character of the country up to the parallel of the 22° of latitude, is very similar, in general, to that of the Darling downs, consisting of fine open plains, or downs, covered with rich pasturage, and thinly sprinkled with clumps of trees, which, however, generally grow much thicker on the banks of the numerous rivers, lining their banks with a belt of forest. Generally facing these, towards the open country, occurs a dense scrub, often composed almost entirely of a peculiar sort of acacia, known to the squatters on the Darling by the name of "*brigalow*," or "*bricklow*," but also frequently formed of many other plants, some of them unknown. These scrubs are a great hindrance in travelling, as where they happen to be some miles in breadth, as often occurs, a long detour has to be made, rather than attempt to force a way through such an obstacle. Again: the occurrence of good land is commonly marked by quantities of the "*Myal*" (*Acacia pendula*), the drooping branches and profusion of rich yellow flowers of which render it a great ornament at its flowering season, which appears to last several months. The occurrence of saline ground is marked by a peculiar vegetation of Chenopods and allied plants. On the parallel of the 25° of latitude, a much more mountainous tract of country exists, elevated above two thousand feet; and in this region rise rivers flowing to the east, north-west, and south-west. Here the vegetation is more varied than on the plains, and of greater luxuriance, owing to the more constant supply of water falling in such districts; while the lower country, into which these rivers flow, shows a variation of vegetation corresponding with the supply of moisture. About this latitude, in fact, appears to take place, as far as yet known, the strike of the rivers, on this side of Australia, for the different seas, the shorter ones flowing to the east or north-east, while the grand streams seem to flow towards the Gulf of Carpentaria; and the head waters of the drainages for the Darling and its tributaries in the south-west seem to reach very nearly, or quite, to this latitude. Here, at any rate, appears to be the ridge from which the waters are turned towards the Gulf of Carpentaria. After passing this ridge, a change of vegetation might be looked for, but none can be noticed so readily as when, advancing some five or six degrees nearer to the equator, on the shores of the Gulf, the screw-pine (*Pandanus spiralis*) begins to appear. But low under this, and at a long distance from the coast, a palm (*Corypha sp.*) is found on the Dawson River, in 25° latitude. The undeveloped top, or bud, of this palm—that is, the young leaves before expansion—is good as food, if not eaten in too great quantities, being used either raw, or baked in hot ashes. Another plant affording great nutriment to the aborigines of the northern parts of New Holland is a species of water-lily (*Nymphæa*), the seed-vessels of which are collected and roasted whole, after which the seeds are taken out, and the parched albumen is found to be sweet, palatable, and nutritious. Water-plants, indeed, are abundant in all the lagoons and rivers of this district, and every bit of permanent water or bog is covered with *Nymphæas*, *Villarsias*, *Potamogetons*, and other water-plants, from many of which the natives obtain some addition to their fare as the seasons come round. Nor is it from the seeds of the *Nymphæa* alone that they derive a part of their sustenance, but also from their roots, which are sought after and dug up when the lagoons and streams are nearly dry, in the cool season, when they are out of flower. Species of *Nelumbiums* also afford a valuable supply of food in their seeds; and

when roasted, they have been found to be a good substitute for coffee. Other trees, besides the gum-trees before mentioned, here produce a gum, valuable as an article of diet; in particular one or two species of *Terminalia*, whose gum is generally found to act as a slight purgative. Another preparation the natives have is to soak the flowers of the drooping tea-tree (*Melaleuca sp. ?*) in water, to which they impart a sweet and agreeable flavour, from the quantity of nectar which they contain; a plan which the natives of the eastern coast adopt with the flowers of several species of Banksia. The natives draw a considerable supply of food from the screw-pine (*Pandanus spiralis*), whose fruit are first roasted, then soaked in water, and the detached seed-vessels then again roasted, in order to obtain the kernels. When the perfectly ripe fruit are treated in this manner, the nuts are very palatable. The seeds of a species of *Cycas*, which appears to be almost confined within the influence of salt water in the Gulf of Carpentaria, also affords an article of diet to the aborigines; the nuts are cut into thin slices, dried, soaked for several days, and then tied up in tea-tree (*Melaleuca*) bark, to undergo a peculiar species of fermentation, before they are fit for use. This species of cycas attains a height of from thirty to fifty feet, with a stem thick below, gradually tapering upwards, and occasionally separating into two or three branches. Another plant, producing a seed valuable for its economical properties, is a species of *Sterculia* (*S. heterophylla?*), the slightly-roasted seeds of which being pounded and boiled for a short time, form a good and nourishing dish. A further article of diet is afforded by the bull-rush (*Typha latifolia ?*), the base of the young shoots of which are used by the natives of Australia, as well as by the Cossacks of the Don. The little gooseberry-tree (*Coniogeton arborescens*) affords a fruit much esteemed by the natives; it tastes something like a gooseberry, when ripe, and imparts an agreeable acidity to water when boiled in an unripe state. The aborigines of this part of Australia use the cabbage of at least three sorts of palm, as articles of food—*Livistona inermis*, *Seaforthia sp.*, and *Corypha sp.*,—whose forms so materially assist in giving a tropical cast to the vegetation of this part of New Holland, notwithstanding the predominance of more southern and peculiar forms of plants in the same districts. Under the name of "*Allamurr*," they also largely use the nut-like swelling, or tuber, of a sedge, which is very sweet, mealy, and nourishing.

In addition to the native productions, at Port Essington, the cocoa-nut palm (*Cocos nucifera*) has been introduced, and succeeds remarkably well; and nearly all the other chief vegetable productions of the tropics flourish in great perfection, as the cotton, the indigo, the banana, the arrow-root, the sweet potato, the bread-fruit, the jack-fruit, the sour-sop, the pine-apple, the mango, and the mangosteen; and there appears little doubt that the swamps and low grounds lying along the banks of the numerous rivers, will be found well fitted for the extensive cultivation of rice.

The vegetation of the north-west coast of Australia, with many peculiarities of species, still presents the same likeness to the general character of the flora of this extensive country which has been before mentioned. At Hanover Bay, the most striking object in the forest is a giant species of gum-tree (*Eucalyptus*) with a bark resembling coarse white paper, and a drooping and graceful foliage. Beneath these Titans of the forest the scrub (in comparison) is chiefly composed of screw pines (*Pandanus*) and wild nutmeg (*Myristica sp.*), the intervals being filled up with various rich grasses and climbing plants. But the most singular production hereabouts is a gouty-stemmed tree (*Capparis sp.?*), almost identical in properties with the bottle-tree (*Delabechea rupestris*) of the east coast. This tree does not rise to a great height in proportion to the bulk of its stem, which often measures twenty-nine feet in circumference at a little distance from the ground. Below the spreading of the branches, the main stem contracts to about two-thirds the diameter of the gouty part below, and the branches are rather short, spreading, with a light and graceful foliage. The fruit is of an elliptical form, about the size of a cocoa-nut, with a rind similar to that of the almond, enclosing a shell, which contains a large quantity of almond-like seeds embedded in a white pulp. The bark of the tree on being wounded yields a small quantity of a nutritious white gum, resembling maccaroni in taste and appearance; soaked in hot water the bark yields an agreeable mucilaginous drink. This tree is an important object to the natives, who appear to use the nuts as a substitute for bread.

To the south of Hanover Bay, on the rich lands near the Glenelg River, the vegetation is peculiarly luxuriant, with *Casuarinas*, *Eucalypti*, and similar forms, mixed up with bamboos, and other more strictly tropical forms; while in the more open country the grasses are of the most luxuriant description. Among them is one which has been called the Australian oat, a plant growing to the height of five or six feet, and bearing a general resemblance to the European oat, but that this sort has a beard resembling barley. The seeds are nutritious, and the plant often occurs

in very large quantities together. Several species of wild grapes (*Cissus*) also occur, one in particular, producing a berry like a small black grape in size and flavour, affording a grateful refreshment in that sultry climate. A rattan (*Calamus*), cabbage palm, many species of fig (*Ficus*), screw pine (*Pandanus*), cypress pine (*Callitris*), *Araucaria excelsa* (?), a *Banksia*, and many *Leguminosæ*, form prominent objects in the landscape in these districts. The mangroves descend along the coast to the south as low as the 26° of latitude, forming very dense jungles along the banks of the sluggish streams which fall into Shark's Bay. But on passing the 28°, a species of grass tree (*Xanthorrhœa*) makes its appearance, indicating the transition to the extra-tropical vegetation of the Swan River; as is still further indicated about a degree lower by the appearance of southern forms of *Zamiæ*, whose nuts, when thoroughly ripe and dry, are used as an article of food by the natives, who call them "*By-yu*."

Perhaps the whole of the rest of Australia, singular and beautiful as its vegetation is, must yield to the Swan River flora the palm of elegance and gorgeous colouring. This spot, probably, has also been as well examined as any part of the country, and many of its most interesting plants have been introduced to this country; but still many remain to be introduced, and fresh additions are made every day as the country is further explored. One of the natural features of this part of Australia, which no doubt has an effect on this beautiful vegetation, is the almost universal presence of water, generally within two feet of the surface, if not breaking out in natural springs. The country is generally of an open undulating character, the forests being composed of about three-fourths gum-trees (*Eucalypti*). The principal rise in the country is the range of the Darling, rising to a height of two thousand feet, and composed of limestone, covered with evergreen woods. The large plants giving the peculiar aspect to the country are, chiefly, the grass-tree (*Xanthorrhœa*), often associated with a very large Banksia (*B. grandis*) and with *Zamia spiralis*, which, like it, often attains a height of thirty feet. Others are the cypress pine (*Callitris*), two species of *Casuarina*, and the fire-tree (*Nuytsia floribunda*), a plant attaining the height of a small tree, and in its season so densely covered with spikes of orange flowers, that the above popular name has been bestowed on it by the colonists of King George's Sound from the appearance which it makes in the landscape. With these are associated an immense variety of bushes, many of extremely neat and graceful habit, and producing a profusion of the most splendid flowers. By far the greater proportion of the vegetation is different in species from the other parts of Australia, especially from that of the neighbourhood of Sydney. Of the natural order Myrtaceæ many beautiful forms are found, among which *Calytrix aurea*, with oval leaves growing in an imbricated manner, and producing heads of bright yellow flowers, and *C. sappharina*, with rough heath-like leaves and round heads of very deep violet-coloured flowers, are very striking. But a much finer bush is *Chrysorrhoë nitens*, with heath-like leaves and spreading yellow flowers, produced in such profusion as to give the plant the appearance of being covered with gold leaf. Two or three species of *Hedaroma*, bushes of low growth, are so deliciously fragrant in their leaves and half-ripe fruit, that it is a point worth consideration whether they would not pay to collect and import into Europe for the use of perfumers.

The Leguminosæ are equally abundant in this colony, as already noticed of the other districts, and equally remarkable as being, in the species, almost all peculiar to the district. Wattles (*Acacia*) occur in plenty, and some of very beautiful forms. Among the Papilionaceæ, or butterfly-flowers of this order, occur many most striking plants, as various *Hoveas*, *Mirbelias*, *Hardenbergias*, *&c.*, remarkable in many cases for the intense blue or purple of their flowers; and other genera, as *Oxylobium*, *Chorozema*, *Gompholobium*, *Zichya*, *&c.*, equally gay, with flowers varying from pure yellow to every shade of yellow and crimson mixed. The Swan River colony appears rather bare of Rutaceous plants, an order very abundant on the east side of the continent; but among those peculiar to the west coast is *Diplolæna Dampieri*, a hoary looking spreading shrub, with oblong rusty leaves, and curious nodding heads of flowers with long protruding pink stamens. Nearly twenty species of Lasiopetaleæ are known to exist here, among which *Corethrostylis bracteata* forms a downy shrub with heart-shaped leaves, and bears a profusion of forked racemes of pink flowers growing from coloured bracts, and forming an elegant plant. Another is *Sarotes ledifolia*, a stiff growing shrub, with narrow leaves arranged in whorls of threes, and producing corymbs of large light blue flowers.

Plants with composite flowers are numerous, and some of them are very beautiful; none perhaps more so than the now common *Rhodanthe Manglesii*, with its copious heads of decurved delicate pink flowers on the slender stems. *Lawrencella rosea* (like the last, an annual) is said to be even more handsome, having blunt linear leaves with terminal heads of rosy flowers. The greater part of the order

is, however, inconspicuous or weedy. Of Epacridaceæ many species exist, but very few of much interest, and those chiefly belonging to genera well known in other parts of the country. Goodeniaceæ are numerous, and comprise several fine *Leschenaultias*. *Dampiera cuneata* is a dwarf herbaceous plant, with leathery leaves and terminal flowers of a bright blue. A great number of species of the curious genus *Stylidium* are found in the colony, nearly all of which are worthy of cultivation, their flowers varying from pink to yellow and many shades of purple. Of the equally neat genus of sun-dews (*Drosera*) several species of great interest are found, not only on account of their flowers, but from the bulbs of some of the sorts being said to afford an article of food to the natives, as well as to give promise of being valuable for dying purposes. One of these, *D. erythrorhiza*, has bluntly-ovate leaves, fringed and in whorls, with a terminal bunch of flowers, and bulbs of a bright scarlet colour the size of large hazel-nuts. One of the most numerous orders is Proteaceæ, whose varying forms are so abundant as to stamp the Australian character on the whole country. They occur of all sizes, from bushes of humble growth to trees of the height of fifty feet.

Upwards of sixty species of orchids have been detected, many of them very handsome, and all interesting from the singular structure of the flower, and frequently from the different methods in which the bulbs are formed. These plants are also worthy of notice from the roots of several species affording a considerable amount of food, at certain seasons, to the aborigines. Many other species of monocotyledonous plants are to be found, of great interest; and among the grasses a common one here, as well as nearly all over New Holland, is the Kangaroo-grass (*Anthistiria australis*), a plant of invaluable utility in all the grazing districts.

The natives of the Swan River are known to use at least sixty different vegetable productions as articles of food, among which are about thirty sorts of roots, and at least seven kinds of fungus. Among the roots are two yams (*Dioscorea*), several geraniums, two species of bull-rushes (*Typha*), and several terrestrial species of orchids. Among the fungus tribe, that called "native bread" by the colonists ("*marrin*" or "*quannert*" of the natives) is a gigantic truffle, often weighing as much as two pounds. This, as well as the others, are favourite articles of food with the opossums and other marsupial animals, by whom they are as greedily devoured as by the natives. The common mushroom of England (*Agaricus campestris*), if not truly indigenous, is now extensively introduced, and occurs in many parts of the colony in a wild state. The spawn of a large variety of it, said to be far superior to our own, has been introduced from the colony to this country. Among other vegetable articles of diet are four sorts of gum, and two of manna, obtained from *Acacias* or *Eucalypti;* and the fruits of two species of *Zamia*. From the flowers of various species of *Banksia* the natives take the honey by soaking them in water, thus obtaining a favourite beverage.

King George's Sound, a part of western Australia, and too nigh Swan River to offer many peculiarities in vegetation, is yet worthy of note as the originally discovered station of the New Holland Pitcher-plant (*Cephalotus follicularis*), where it occurs in marshes, and from whence it was introduced to England. The flora appears to become gradually poorer as the head of the great Australian bight is approached, from whence to Spencer Gulf and the Gulf of St. Vincent is to be found the poorest coast vegetation in New Holland, hardly exceeded in poverty by that of the barren islands of Dampier's Archipelago, on the north-west coast, which places possessing some of the plants in common, as *Clianthus Dampieri* and *Jasminum lineare*, would almost indicate an extension of the great central desert to the coast in both directions. This desert has been traced as far to the north as twenty-four degrees on the parallel of one hundred and forty east longitude; but barren and stony as it is, it has afforded nearly a hundred new genera and species to the flora of New Holland. This sterile country is also remarkable for the almost total absence of many of the peculiar families of Australian plants; epacrids, styleworts, papilionaceous leguminous plants, and cordleafs, are hardly to be found, and even proteads are reduced to a few species of *Grevillea*, *Hakea*, &c. The gum trees (*Eucalypti*) are reduced in number of species, but the leafless wattles (*Acaciæ*) and *Casuarinas* and *Callitris* occur in about their usual proportions. From Spencer's Gulf, following the coast to the eastward and southward, the vegetation gradually becomes richer, until it is almost identical with that of the east coast which was first described.

Such is a slight outline of the vegetation of this enormous country, of which about 7000 species are known; which, in its northern parts, is capable of producing all the most choice spices and fruits of the east, as has been tried and satisfactorily proved at Port Essington. Even as low as Sydney on the east, and Swan River on the west coast, the temperature is high enough to ripen the pine-apple; while the orange and similar fruits thrive alongside the common culinary vegetables and farm crops of our northern latitude.

FLOWERS AND PLANTS OF SCRIPTURE.

THE POMEGRANATE.

In the sacred text the pomegranate is generally believed to be indicated by the Hebrew word *Rimmon*,* which is not unfrequent in the Old Testament. From the passages in which it is mentioned, it may be clearly seen that the pomegranate has, from the remotest historical ages, been held in very high esteem. It was one of the luxuries of Egypt, of the loss of which the murmuring Israelites complained in their wandering through the wilderness, which was "no place," they said, "of seed, or of figs, or of vines, or of pomegranates." (*Numb.* xx. 5.) Antecedently to this, however, the pomegranate is mentioned as a decorative object, it being directed that the priest's robe should have "pomegranates of blue, and of purple, and of scarlet," worked round about the hem thereof. (*Exod.* xxviii. 33.) Subsequently the same object is employed in the decoration of the temple as an ornament to the pillars: "four hundred pomegranates on the two wreaths, two rows on each wreath" (2 *Chron.* iv. 13); "he made chains, and put them on the heads of the pillars, and made an hundred pomegranates, and put them on the chains." (2 *Chron.* iii. 16.)

It is not at all surprising, when the beauty and utility as well as the familiarity of the pomegranate are taken into consideration, that it should be thus prominently employed among the Israelites. Their land was one "of vines and fig-trees and pomegranates," of which took the spies who "came unto the brook of Eshcol." In Egypt it is probable that they made acquaintance with the plant in a cultivated state, and there, no doubt, they had learned to know its virtues and its uses; but in their own land the tree must have been indigenous, so pointed are the allusions to the vine, the fig-tree, the palm-tree, the pomegranate, and the olive-tree, as the glory and riches of the land. Saul, the first king of Israel, tarried "under a pomegranate-tree in Gibeah" (1 *Sam.* xiv. 2), while his more active son smote the Philistines' garrison. En Rimmon, the fountain of the pomegranate, is mentioned by more than one prophet. (*Nehem.* xi. 29; *Zech.* xiv. 10.)

Solomon, in the book of *Canticles*, makes frequent allusion to the beauty and grateful qualities of this fruit. The beauty of the bursting fruit, when displaying the delicate colours of the pulpy grains, is doubtless referred to in the passage: "As a piece of pomegranate are thy cheeks (temples) within thy locks" (*Cant.* vii. 7); and that of the flower-buds is present to the writer, when he says, "I went . . . to see whether the pomegranates budded" (vii. 11); and again, "Let us get up early to the vineyards; let us see . . . whether the tender grape appear, and the pomegranates bud forth." (vii. 12.) Allusion is made to its cultivation: "Thy plants are an orchard of pomegranates, with pleasant fruits" (iv. 13); and apparently to the ancient custom of pressing out the juice for wine or sherbet: "I would cause thee to drink of spiced wine, of the juice of my pomegranate." (viii. 2.) This wine of the pomegranate has been held to have been real wine. Indeed, it is stated that the art of making wine from the pomegranate is still practised in Persia, and according to Chardin, great quantities of it were made in his time, in that kingdom, both for home consumption and for exportation.

Rimmon, the Hebrew name of the pomegranate, is mentioned as the title of a Syrian god. (2 *Kings* v. 18.) It has been conjectured that this Rimmon is Bacchus; for the poet priests of the Ionian Greeks feign that the pomegranate sprang from the blood-drops of Bacchus; and Plutarch, describing the feasts of the Jews, imagines they were celebrated in honour of Bacchus, an opinion perhaps strengthened by the offerings of pomegranates and other fruits. Tacitus fancied that the Jews worshipped Bacchus, which error probably arose from finding Bacchus Rimmon really a Syrian deity. Many of the heathen deities have been represented as holding the pomegranate.

The pomegranate is called *Punica granatum* by botanists. It is widely distributed in an indigenous state, being a native of

* The Arabic name is *Rooman*.

Asia, from Syria through Persia to the mountains of northern India. The pomegranate forests of Mazenderan, in Persia, furnish great part of the dried seeds, so favourite a medicine in the East; and the late Sir A. Burnes states, that the famous pomegranates without seeds are grown in gardens under the snowy hills near the River Cabul. On the Himalaya mountains, there is a small wild sort, whose root is especially esteemed in medicine. It is common to northern Africa, and according to Pliny especially in the neighbourhood of Carthage; in fact, the name Punica indicates whence the pomegranate was first brought to Europe by the Romans. If not indigenous to, it is at least naturalized in the south of Europe. The English name of pomegranate is derived from the *pomum granatum* (grained apple) of the Romans.

In favourable climates the pomegranate forms a handsome small tree of from fifteen to thirty feet high, bearing some resemblance in its ligneous character to the common hawthorn. In less favourable localities it forms a thorny bush. In England, it is usually trained against a wall, where it covers, under favourable conditions, a considerable space, and has a very beautiful appearance during the summer season. It is a deciduous tree, with oblong or lance-shaped bright green shining foliage, and conspiuous blossoms of a crimson hue, the succulent fleshy calyx having a turbinate tube, forming as it were a "solid crimson cup;" the petals are of the same rich colour, but more fugitive, membranous, and much crumpled. These flowers are succeeded by large spherical fruit, which are crowned by the prominent hardened tube of the calyx, and are in the interior divided horizontally into two compartments, forming several irregular cells, enclosing numerous seeds covered with pellucid pleasant tasted grain-like pulp. Its flowers and foliage render it an object of attraction in gardens, and its fruit imparts to it a still higher value in those temperate climates where it thrives and is productive. The pulpy grains of the fruit are sometimes eaten alone, sometimes with sugar; or the juice is pressed out, as already alluded to, and made into wine or one of the esteemed sherbets of the East.

In medicine various parts of the plants are employed. The bark of the root is powerfully anthelmintic; the flowers are tonic and astringent, as also especially is the bark of the fruit, which is useful in diarrhœa and advanced stages of dysentery. The juice of the interior of the fruit is useful in bilous fevers, the pulp being sub-acid and gently laxative, allaying heat, and quenching thirst. In the arts, besides its early employment as a model for the carver, the sculptor, and the decorator, the pomegranate has furnished in the rind of its fruit a material preferred to any other substance for tanning and preparing the finer kinds of leather. This part is also used as a dye. The fruit of the pomegranate is agreeable, and wholesome if taken in moderation, the pulpy interior being the part chiefly eaten.

The pomegranate will grow in any good garden soil; but for the production either of blossoms, or fruit, it should have a rich loamy compost. It should be planted and trained against a wall, of which the south and west aspects are preferable. The plant is propagated by cuttings or layers; the choicer varieties by grafting on the common sort, which causes them to flower better than when growing on their own roots. The varieties are the single red, which is the hardiest; the double red (*rubrum flore-pleno*), and the white (*albescens*), which are more tender; the double white (*albescens flore-pleno*), which is tenderest of all; and the yellow (*flavum*), a very rare kind. The tender varieties require some protection. The double red is the handsomest variety for cultivation.

VEGETABLE FIBRE.

We quote the following interesting account of certain kinds of vegetable fibre from the *Journal of Botany*, edited by Sir W. J. Hooker. This work has recently assumed a new form, coincident with a reduction of its price, and may now be classed among the number of those which are labouring to popularize science. We are gratified in being able to speak of it in terms of approbation. The extracts which follow will give some idea of the nature of its contents. Interesting in itself, the subject is rendered still more so by the association of the facts, which show that families of plants exceedingly different are rendered subservient to the wants of mankind in the manufacture of textile fabrics.

"Jute: Fibres of Corchorus capsularis.—Time was, when hemp and flax yielded almost, if not altogether, the only vegetable fibre largely manufactured in Great Britain into cloth, cordage, &c. It would be interesting to give a list of the various kinds that are now in use, and still more interesting to speculate on the numerous kinds which may yet be added to that list from various parts of the world, the introduction of which does not appear in any way to diminish the consumption of the original kinds, hemp and flax. A few of these we shall at present take occasion to mention.

"One compartment of a glazed case in the Botanical Museum [in the Royal Garden of Kew] is occupied by specimens of an exceedingly long, glossy Indian fibre, named '*Jute*,'

together with a very rudely prepared native fabric called *gunny* (rice) *bag*, and other specimens, from the Heathfield factory at Dundee, to the proprietors of which we are indebted for these samples. They came, accompanied by a note, stating that 'ten years ago the use of this fibre was unknown in Europe; but that now it is imported to Great Britain to the pecuniary amount of 300,000*l.* annually.' A dried specimen of the plant itself is placed with the above sample. This was raised in our stove from seeds sent by the same gentlemen, and is the *Corchorus capsularis* of Willdenow. This *Corchorus* has nothing to do with the favourite Japanese yellow-flowered shrub, incorrectly called *Corchorus* in our gardens, (one of the *Rosaceæ*,) but belongs to the natural family of *Tiliaceæ*, the various genera and species of which abound in useful fibre, from the gigantic lime-tree (*Tilia*) to the herbaceous annual here noticed.

"Chinese Grass Cloth.—Under this name we have received from Mr. Joseph Woods, jun., a very beautiful fabric manufactured in China, first imported under the form of handkerchiefs, and more lately to a considerable extent as superior to any other kind of fabric for shirts. By the kind help of Dr. Wallich and Sir George Staunton, we think it may be safely asserted that the '*Chinese Grass*' is the fibre of *Boehmeria nivea* (*Urtica nivea*, *L.*), a plant belonging to the Urticaceous (Nettle) family. And here again we see how the same tenacity of fibre exists in the several members of this vegetable group, as exhibited in the common stinging nettle, and still more remarkably in the *Urtica camabina*, *U. heterophylla*, and another species of *Boehmeria* which we have next to speak of, namely, the

"Pooah or Puya fibre of Nepal and Sikkim.—For our knowledge and for our possession of specimens of this, we are indebted to Dr. Campbell, the Hon. E. I. C.'s Political Resident at Darjeeling in Sikkim. That gentleman has kindly presented them and an interesting pamphlet he has lately published on the subject, to Dr. Hooker, who forwarded them to the Royal Gardens' Museum. Specimens of the plant prove it to be derived from the *Boehmeria Puya*, Wall. Cat. (*Urtica frutescens*, Roxb. not Thunb.); a species botanically very closely allied to the preceding, *B. nivea*. It has been long and extensively used in India for various purposes, and when properly dressed is said to be quite equal to the best European flax; while it makes better sail-cloth than other vegetable fibre produced in India. Rope formed of it has been tested in the Arsenal and Government dockyards, and found perfectly equal to any and all purposes for which cordage made of Russian hemp has hitherto been employed. In preparing this fibre, however, the natives unfortunately use mud, which clogs it and renders it difficult to spin, and spoils the colour, as is evident from the sample sent. Mr. William Rownee, superintendent to Capt. A. Thompson, (whose report on the quality, &c. of this fibre is quoted by Dr. Campbell,) observes, that, if potash were used in the preparation, which is invariably done with Russian hemp and flax, instead of mud or clay, the colour would be improved, the substance rendered easy to dress, and it would not undergo so much waste in manufacturing. Now, since we can assure these gentlemen, that the plant yielding this fibre is a *Boehmeria* (Urtica of Linnæus), so closely allied in botanical characters to the '*Chinese Grass*' as to be identical with it, there can be no doubt, that if it underwent the same process of preparation and fabrication as is employed by the very ingenious artificers of the Celestial Empire, the quality would be the same, and it might be made to compete with their article in the market. Both species are remarkable for the pure snowy white down of the under-side of the leaves, and for the dense clusters of flowers seated upon the stems.

"Oadal: Fibre of Sterculia villosa.—The genus *Sterculia* belongs to a family (*Sterculiaceæ*), which, like its near neighbours *Malvaceæ* on the one hand, and *Tiliaceæ* on the other, abounds in tenacious fibre. I mention the 'Oadal' here, though not possessing any of it at the Museum, because it finds a place in Dr. Campbell's pamphlet above quoted, and because it is now for the first time, so far as I know, brought to the notice of Europeans. This, however, is never manufactured into cloth; its use in India is confined to ropes, which, when well prepared, are equal in strength to the best Coir. The tree is very common in eastern India, and the rope is readily made; for 'the bark, or rather all the layers, can be stripped off from the bottom to the top of the tree with the greatest facility, and fine pliable ropes may be obtained from the inner layers of the bark, whilst the outer yields coarse ropes. The rope is very strong and lasting: wet does it little injury. It is the common rope used by all elephant-hunters in the jungles.

"Fibre of Sterculia guttata, *Roxb.*—From the bark of another species of *Sterculia* (*S. guttata*, Roxb.), we may here mention that cloth is made; and the process is thus described in *Roxburgh's Flora*. 'The bark of this tree the Malabars convert into a flaxy substance, of which the natives of the lower coasts of Wynaad contrive to make a sort of clothing. The tree is felled, the branches

lopped off, and the trunk cut into pieces of six feet long, a perpendicular incision being made in each piece ; the bark is opened and taken off whole, chopped, washed, and dried in the sun. By these means, and without any further process, it becomes fit for the purpose of clothing.'

"Musa Textilis : Fibre of the Manilla Hemp.—We again direct attention to this fibre, because of the prevailing error, repeated by almost every one, that the beautiful kind of muslin called 'Manilla handkerchiefs' and 'Manilla scarfs,' is made of 'Pine-apple fibre,' (by the term Pine-apple is here meant plants of the *Bromelia* family,) whereas it is unquestionably made of the far more delicate thread of a species of Banana, common in the Philippine Islands, and first clearly defined by Don Luis Nee, in the *Annales de Ciencias Naturales*, IV. 123, as *Musa textilis*. The inner portion of the plant yields, perhaps, the most delicate of all vegetable fibres ; and beautiful samples may be seen in the Museum, as well as a valuable scarf made from it, presented by Mrs. Bates."

The additional particulars respecting this Musa, which follow, are from a translation of Don Luis Nee's account above referred to, published many years since in the *Annals of Botany* (I. 200) :—

"*Abaca* is a name which the natives of the Philippine Islands apply both to the vegetable fibres of which they make their cordage, and the plant that yields them. This is a species of plantain tree, the same which is called by Rumphius *Musa sylvestris*, and in the Malay language *Pissang Utan*. It is found wild on the Philippine and Mendanao isles, and is also most carefully cultivated, on account of the singular advantages which the inhabitants have learned to derive from it. Extensive plantations of it are to be met with on the island of Luzon, in the provinces of Albay, Laguna, and Camarines, but particularly in the vicinity of Mount Mayong, the base of which is about fifteen leagues in circumference. The soil of this extensive tract and that in the neighbourhood of another considerable mountain called Isaróg, is very well adapted to the cultivation of the Abaca, which thrives only in moist, shady, and fertile ground. In such situations thickets are formed by their trunks and young suckers, which last are sheltered from the intense heat of the sun by the beautiful and wide-spreading foliage with which the full-grown trees are crowned. The stems issue from a sort of tuber furnished with fibres, and grow in less than eighteen months to the height of seven feet, their thickness being that of a man's thigh. They contain a column of white and delicate pith, very like a white wax, of the thickness of a man's arm, and covered with several coats of fibrous membranes, the remains of former leaves. The leaves forming the crown of the tree are from ten to twelve in number, of which the outer ones spread horizontally, while those in the centre are divergently erect. They are five feet or more in length, one and a half broad, and supported by a stalk about a foot in length, which is prolonged on the under surface of the leaves into a thick longitudinal rib, with which many small ramifications communicate. When this herbaceous plant (for such, notwithstanding its size, it really is) has attained its greatest state of perfection, which it acquires in less than two years, a thick peduncle issues from the centre of the leaves, covered with partial, concave, ovate, acute spathes, which are developed in proportion to the growth of the peduncle. When they have acquired the length of three or four feet, the flowers appear, from nine to fourteen in each spathe, and are followed by green hard fruit, one and a half or two inches long, disagreeable to the taste, and applied to no use whatever.

" When the fruit is ripe, the stem perishes, as in other herbaceous plants, but a progeny survives in the suckers, which by this time have made their appearance. As the old trunks are not proper for use, the natives usually cut them down when a year and a half old, at which age this may be done with advantage. The stems being cut off near the roots, and at the upper extremity a little below the leaves, are slit open longitudinally, in order to separate the medullary substance from the fibrous strata, of which the outer are harder and stronger, forming the *bandalá* used in the fabrication of cordage ; the inner consists of finer fibres and yields the *lupís*, used for weaving the *nipis* and other more delicate fabrics, and the intermediate layers are converted into what is called *tupóz*, of which the *guinarras* are made.

" All these layers of fibres are saturated with a thickish fluid, to clear them from which they are cut into shreds two or three inches wide, and dressed like flax in a sort of heckle, or long piece of wood furnished with three narrow knives, which being held in the right hand, the shreds are managed with the left, and thus reduced to fibres, and are, by this process, cleared from the fluid with which they were impregnated. In this state they are dried in the sun, picked and applied to different uses according to their different qualities. Those intended for cordage, &c. undergo no further process ; but the others are rendered more soft and pliable by beating them with a wooden mallet ; they are then fastened to each other by means of almost invisible knots, wound into balls, and committed to the loom.

"The guinarras are four yards (*varas*) long, half a yard wide, and differ in fineness and value. The coarsest sell for the eighth part of a Spanish dollar; but others are so superior in quality as to bring five dollars: a shirt made of this fine sort may be inclosed in the hollow of the hand.

"The stuffs when woven are soaked in warm water for twenty-four hours, after which they are washed in cold clear water; then put, for the same space of time, in rice-water, and lastly washed as at first, by which means they acquire lustre, softness, and a white colour; which last, however, the natives do not understand how to preserve, for by dint of time and frequent washing the cloth becomes of a reddish hue.

"The cultivators of the abaca bind up the fibres as the Spanish peasants do hemp. Each of the bundles generally weighs one *arroba:* if they are *bandalá* they sell at the rate of the forth part of a dollar a piece, the bunches of *tupóz* at three-eighths, and those of *lupís* at five-eighths each. These bundles are brought to market, and sold to the women who manufacture them. I had an opportunity of seeing the looms of Nabua, where I was told that a woman cannot weave more than one piece of stuff in seven days. Those of the coarsest sort, called *tinagsad*, sell at the rate of one-fifth of a dollar the piece; they are four yards (*varas*) long, and made use of by the rather superior quality, called *handoy*, are likewise used for garments, and are sold for the fourth part of a dollar when plain; the dyed ones are somewhat dearer. The sort called *mabao*, requiring more labour to be worked in stripes, is still more expensive. Two other sorts of superior quality are *binatol* and *piring-pitting*, the latter of which sells for a dollar. Other stuffs, of fine colours and exquisite quality, called *cambayes*, I saw manufactured at New Caceres, that are made use of by very rich ladies for shifts; in these cotton and silk are mixed in certain proportions with the Abaca.

"They manufacture several patterns of the abaca, different in design and colour according to the different uses for which they are destined, such as for dresses, shirts, curtains, table-cloths, sofas, &c. The abundance is so considerable, that, as I am credibly informed, the villages Cagsava, Camalig, Guinapatan, and Legáo furnish yearly 1,500 arrobas each. In this district of Camarines they manufacture 1,200 arrobas of cordage annually, and nearly the like quantity in the district of Albay, all which the king receives for one dollar and a half the arroba. With these the natives pay their tribute, parish due, &c.; they clothe themselves, and purchase necessaries of life. In the manufactories of New Caceres, an astonishing quantity of cordage is produced.

"It is a matter of surprise that neither Linnæus, nor subsequent botanists [published 1805] have mentioned a plant which is so very well known and used in the Philippine Islands, though Rumphius, in the *Herbarum Amboinense*, gives some account of it: he mentions its fruit as being very small, hard, and useless, and says that at Mandanao they are skilled at manufacturing ropes of the outer, and clothes of the inner fibres of its trunk. This author gives to our tree the name of *sylvestris*, from a supposition that it is neither cultivated at Mindanao nor Luzon; but as the fact is quite otherwise, at least at the present time, I thought it proper to alter the name, and to call this species of plantain *Musa textilis*, especially as it is the only one of which the fibres are converted into such exquisite articles of manufacture."

BULBS GROWN IN MOSS.

In the *Garden Almanack* this was recommended some years ago, and practice has reconciled many persons to it, as a clean and pretty mode of bringing forward the beauties of the spring, such as hyacinths, narcissus, and early tulips. Unless, however, the vessels were deep enough to hold the roots pretty firm, they were apt to fall over, and we are not sorry that this fact has brought forth a very useful kind of stand or support for bulbous plants. Whether they are grown in water, sand, or moss, the stands are equally applicable, and as the price is too small to be any object, they are becoming very general. They are formed of three thin brass wires fastened in a ring about one-third of their length from one end, and two-thirds from the other. The short ends form legs, and the long ones supporting the long ends are bent outwards, and then upwards again, so that the bulbs rest in a kind of cradle; but another ring larger than the bottom one is fastened two inches above the small one, and a third ring slips up and down the uprights, so as to confine the flowers and leaves in an upright position. When used in hyacinth glasses, the short ends of the wires go down into the water; when used in sand or in moss, they form legs for the support to stand on, so that in any case they are really simple, valuable, and ornamental. If the vessel is shallow, the legs may be bent outwards to any extent, so as to bring the seat of the bulb lower—indeed, as low as you please. With the help of these stands we have seen hyacinths well flowered in a moderate sized breakfast saucer, and several of them in a shallow dish; but it is

particularly well adapted for growing bulbs in moss, or, which is still better, moss and sand; for the sand forms a sort of ballast to keep the vessels steady, and the moss hides the sand, which is not so sightly alone; and beside this, the sand holds water enough to keep them nourished without so much attention as is required by the moss alone. The practice is becoming very general. The stand was invented by Hamilton, of Cheapside, and has been often advertised.

THE VIOLET AND ITS VARIETIES.

The Russian violet is certainly one of the most delightful little flowers, and often comes at the most unpromising time of the year, but those who want to be always plucking violets should have all the leading varieties. The Neapolitan, the double purple, the tree violet, (so called, but we could never see why, unless a strawberry can be called a tree,) and the Russian, are leading sorts; and although any one of them may be sufficient for some people, the whole and even more should be grown, because some one or other of the sorts may be brought to flower at all times. The violet loves the shade, but it wants air and its share of water. It can be forced without difficulty in a one-light box, either planted or in pots; and we prefer pots, because they can be regulated in quantity and as to season by bringing in a few at a time, or at all events by a supply from out of doors. As soon as one lot goes out of bloom, they can be removed to make way for others. One box full may have slight bottom heat, another may have none, but the sort which is best worth keeping in succession is the Neapolitan, because its blooms are pale blue and very handsome, and there should be always a few of these to bunch up with the darker varieties and with the white. There is no flower more manageable. It is not difficult to keep up a bloom from November to the spring under protection, and the natural ground will supply a succession until the assemblage of more gaudy flowers eclipses it in the general garden, but if watered and shaded, their bloom hardly ceases among some variety or other the whole year round. A garden ought in some shady place to have a carpet of violets, and always near the house or some favourite seat or arbour, for its perfume is unequalled for delicacy, whether in or out of doors, and it can hardly be grown too plentifully.

BEJARIA COARCTATA.

Bejaria coarctata (Humboldt and Bonpland).—Ericaceæ § Rhododendreæ.—Humboldt and Bonpland describe this plant as a charming evergreen shrub, which, in reality, it proves to be. The Bejarias have long been known to botanists, and have been looked on as desiderata in European botany. The present is apparently the first which has been induced to bloom in this country, though some others are known to be in cultivation. It appears that all the known species of Bejaria, excepting *B. racemosa*, which is North American, are native of South America, in the Andes, of which Bejaria holds the rank which its ally the Rhododendron does in the great mountain chain of India, where several remarkably fine and very distinct species have recently been found by Dr. Hooker.

The subject of these remarks, represented in the accompanying wood-cut, from the figure published in the *Botanical Magazine*, forms a low shrub, attaining from four to five feet

in height, but flowering copiously when less than a foot high. It is considerably branched, the branches being pubescent, and rather densely leafy. The leaves, which are evergreen, are of an elliptic-oblong form, somewhat acute, entire on the margin, nearly sessile, glaucous beneath when mature, smooth and shining above, and of a compact and brittle texture. The flowers grow in dense racemes from the ends of the branches, and consist of a seven-lobed woolly calyx, and a corolla of seven oblong-lanceolate spreading petals, of a pale rose colour with dark streaks; they are produced in the early months of the year, and so profusely, that a plant a foot high is said to have been covered with blossoms.

Messrs. Lucombe, Pince & Co. of Exeter, have been thus successful in first blooming the *Bejaria coarctata*, which is a native of Peru, growing at a considerable elevation (9,000 to 10,000 feet) according to Humboldt, who describes the locality as being "frigidissimus." It has hence been conjectured that the plant may be found to succeed with us in the open air, but on this point direct experiment is necessary. Mr. Pince has found it to do well in a cool greenhouse. The locality in Peru where Humboldt found it was near Cascamarcan. It was introduced to England in 1847.

Till experience shall have decided the question of the supposed hardihood of this plant, it must be kept in a greenhouse. Mr. Pince's plants, which have done well, were placed close to the glass in a cool airy greenhouse, along with Chinese azaleas, receiving, in fact, the treatment given to those well-known subjects. It has been potted in a compost of sandy peat soil, with a small portion of half-decayed leaf-mould. Mr. Smith of Kew writes :—"On account of its exceedingly neat habit, and flowering in a dwarf state, it cannot fail to become a favourite with cultivators. Being a native of the elevated parts of tropical America, in a climate where the cold is (to our feelings) severe, it is expected that it will prove tolerably hardy in our climate. It may possibly endure the mild winters of Devonshire, but we have our doubts on that point; for although it may sustain in its native elevated region a certain number of degrees of cold below the freezing point, yet we must bear in mind that, on account of elevation, the air is lighter, and water freezes at a higher temperature than it does at our level above the sea. Any specific number of degrees of frost at a high elevation, is not, therefore, equivalent in intensity to the same number of degrees with us. This circumstance and our humid atmosphere in winter, are much against our success in the cultivation of plants from elevated regions."

There is no doubt that this species, from its charming evergreen habit and its numerous gay flowers, will come into general cultivation for greenhouse and conservatory decoration, for which its early flowering habit will still further adapt it. The treatment given to the Indian Azaleas appears to agree with it. Propagation is effected by cuttings, or by inarching on stocks of the common kinds of Indian Azalea; the plants are, moreover, expected to ripen seeds, which must be managed in the same way as the seeds of Azalea and Rhododendron, and other plants of the same natural family.

THE LATHYRUS TUBEROSUS AS AN ESCULENT.

The culture of *Lathyrus tuberosus* as a wholesome and nutritious article of food, though not much attended to, is not altogether undeserving of consideration. In Holland, Belgium, and France, as well as many parts of Germany, this root is well known and somewhat extensively used, especially in the rural districts. The small tubers which grow under ground may not unaptly be compared to what are commonly understood as the roots of Pæonia, and it is a curious circumstance, that in various countries we find it designated by names which, though different, are all expressive of the same thing, namely, *earth-nut.* Thus in Dutch it is commonly called *Aardaker* (earth-nut); in German, *Erd-nuss;* in French, *Noix de terre;* in Flemish, *Aerdnote.* It has also received other names, but that which signifies *mice with tails* appears to be the most common, besides the above. Thus, in Brabant, *Muyseen met steerten,* and in several places of France, *Souris à queues.*

Lathyrus tuberosus grows with a slender straggling stem, three feet high, slightly winged and much branched. The leaves consist of two obtuse oval leaflets, ending in a sharp point, and terminating in the centre in long tendrils (generally from two to three); these tendrils, as in the common pea, clasp and twine round the branches of other plants that happen to be near them; the leaves are furnished with two stipules, about half an inch long. The flowers, which resemble those of the pea in general form, are of a deep rose-colour, sometimes assuming a flesh hue, and even becoming nearly white; they are borne on peduncles five to six inches long, and generally from five to six together. In general appearance they are somewhat pretty, have an agreeable odour, and though not to be compared to some of our florists' flowers, would not disgrace a parterre in making up the complementary colours.

The small tubercles which are used as an article of consumption are produced at the ends of the roots. They are of an oval or oblong shape, and when well cultivated, attain from two to three inches in length and an inch in diameter. The inside consists of a white substance having a firm texture, and when raw the flavour is something like that of unboiled peas. This taste is not perceptible when the tubers are cooked, and the flesh becomes similar to that of a chestnut. When properly cultivated the average number of tubercles to each plant is about thirty. When between two and three inches long they become fit for use. They are taken up and boiled from two to three hours,

or till a fork will pass through them with the same ease as in boiled potatoes. When properly boiled, they are dried and laid in a cloth, which is placed in a covered dish and sent to table. In this way they are considered as superior to cooked chestnuts, forming a palatable and wholesome article of food, and in a medical point of view being eminently soothing and conducive to the healthy action of the digestive functions. One advantage they possess as an article of cookery is, that they cannot be overdone. When boiled they may be pounded with sugar, when they serve as an excellent dessert. In Holland they are eaten with fresh butter at the second course.

The best mode of cultivating them is to plant the tubers in April, in a good substantial rich soil, in rows a foot apart. They require little farther care or attention except an occasional weeding. Each tuber will produce a plant. They may be taken up after summer, and stored away in pits to be used at convenience. They could certainly be left in the open ground, were it not that there they are very apt to be eaten by vermin; and therefore they had better be removed to some safe place. The seeds ripen in July or August, and may be sown the following spring for a fresh crop, but the quicker and more usual method of propagating or growing them is to plant the tubercles, as with potatoes. It has sometimes been urged that the roots are small, and not likely to compensate for the trouble of growing them; but it should be remembered that those of the wild plants are of course very different from such as are cultivated. The same objection might, with as good show of reason, be raised to the cultivation of several other things. The wild carrot, for instance, has not roots like the cultivated sorts; the wild potato is a very different article from what is served at our tables; and no two things can be more dissimilar in respect to size than the *Viola tricolor* of our fields and by-ways, and the pansy, which attracts its crowd of admirers at all our floricultural exhibitions. As an economical article of food, the *Lathyrus tuberosus* is well deserving the attention of the cottager. Not only are the roots wholesome and nourishing, while they can be grown with little care or trouble, but the plant itself is eaten with avidity by cattle, and might be profitably grown as fodder.

SHALLOTS.

Few vegetables are more neglected in private families than shallots, few are more valuable, few more wholesome; and none of the bulbous tribes yield a larger increase. It would be unprofitable to describe the various uses of the shallots. There is, however, no use to which the onion can be applied that the subject under notice may not be appropriated to with advantage. It is superior in flavour, much more potent in strength, keeps better, and as a pickle is infinitely superior to the best onion we can find. A few rows of this bulb will always yield from four to eight times its bulk in a season, and therefore retaining the same quantity for plants season after season, there would be abundant produce for use. There is no fancy in the flavour. It is not, like garlic, peculiar, and to anybody unpleasant; but so sure as an onion is acceptable, the shallot will be more so. It is true that if bulk be required, the onion affords it cheaper, but if flavour alone be regarded in compounding soups and made dishes, the shallot is far preferable. The cultivation is very simple. Dig your ground, and dress it with decayed nightsoil, if it can be had, if not, a good supply of rotten horsedung; let it be well mixed with the soil. Procure strong bulbs, which have always a large portion of embryo offsets; plant these, by dibbling one foot apart and four inches deep, in rows eighteen inches from each other; when once planted, they require no further attention than keeping clear of weeds; but when they come up, it does them great service to stir the surface of the soil. They give no further trouble than weeding until the leaves turn yellow and die down to the ground, when they are to be taken up. A small fork is the best instrument for this purpose. They may be thrown together in a basket, and when all taken up, they should be placed in an outhouse, or under cover, to dry. When perfectly dry—which drying is hastened by speading them out a little—they have to be cleared of the earth that is about them, and all the loose offsets should be taken off. Take for use those bulbs which are the most single and clear—that is, those which do not indicate the presence of offsets by the bumps in the skin which encloses them; and having secured these for consumption, lay the others and all the offsets by in the seed-room. Towards the autumn, plant all the large ones as before, one foot apart, in ground previously prepared as directed, but not on the same spot as the last years' were grown on. Let the small offsets be planted six inches apart, or if there be any very small, draw a drill three inches deep, and place them at the bottom pretty close, say two or three inches apart, and cover them three inches with the stuff drawn out of the drill; keep them clean, stir the surface, and in other respects treat them as before. When the leaves have died down, take them up, dry them, and clean them after they are sorted, as before, and the bulbs intended for planting have to wait their time in the seed-room. All

the moderate sized offsets will grow to full roots; all the small ones will have increased greatly in size, though not perhaps large enough to use. The beginning of the culture is the only time you have to buy, for your stock will increase almost beyond expectation. We have known a pound to produce eight pounds, though they were in very rich ground.

CHINESE TREE-PÆONIAS.

Among all the vegetables introduced from foreign countries, perhaps there are none more worthy than the arborescent Pæonias of China of the eulogiums passed on them, whether as regards beauty of foliage, richness of flowers, earliness and brilliancy, their grateful odour, or the ease with which they may be cultivated.

The Chinese Pæonia was discovered in the fourteenth century by a traveller of the celestial empire in the mountains of Ho-nou, who was so well pleased with it that he afterwards made a fresh search to procure it; but it was only in the eighteenth century that this plant was appreciated in China, when the admiration of the Chinese for it was so great that it ultimately came to be patronised by the emperor himself. The price of it was so high that for some time it was known under the name of "one hundred ounces of gold."

Subsequently the ceilings, the wainscots, the vases, and furniture of the Chinese were decorated with the figures of this plant, which even now attracts our admiration, as exhibited on the various articles which are imported from that country. It is customary with the Chinese, at the present day, to present their emperor at certain seasons with the tree Pæonia, which is cultivated by the people as the king of flowers, and consecrated with them by pompous inscriptions, in the places of honour in the imperial palace, as well as in the private houses. It is said by missionaries that this plant is frequently seen twenty-five feet high; but that is scarcely probable. Trees from twelve to fifteen feet would indeed be very remarkable. The Chinese train them in the espalier form, and in this way, from their brilliancy, the flowers must present considerable effect. It is said they have two hundred and forty varieties, from the white to the black and the blue; but there would be greater variety still were the mixed kinds not rejected. These mixed kinds are regarded as the produce of diseased trees, by the Chinese.

The Tree Pæonia was brought to Europe about fifty years ago, and was accompanied by the Hortensia (Hydrangea Hortensia); The *Pæonia Moutan* is a shrub with tuberous, napiform, unique roots, and a woody stem; growing in our gardens from two to four feet high. The leaves are petiolate, bi-ternate, the folioles being oblong-oval, green above, glaucous and pubescent beneath, entire or parted in three lobes. The flowers are bright red, pale or bright rose-colour, whitish, and violet, solitary at the summit of the branches, from nine to eleven inches broad, very handsome, and having a fine odour. It flowers at the end of April or beginning of May.

The Chinese Pæonia is grown either in a cool greenhouse, or in the open ground, with occasional shelter in severe weather. In China it is grown in the open ground, and from some prejudice, the Chinese believe it will not grow well in any other way, and that it may be transplanted into pots only with the greatest care, and when it is in bud. They shelter it under tents formed of reed with great skill, and spare no trouble to obtain large and well-flowered plants. It grows best in free light soil, mixed with some rotten dung and peat. It requires plenty of water when growing, and especially when in flower. It may be grown in the open ground, in a situation exposed to the south, and sheltered from the early frosts. In winter it is desirable to cover the trunk with dry leaves or straw; this precaution induces it to flower early. It is also proper to shelter it from cold currents of wind.

It is propagated by seed, and sometimes this process produces fine varieties; also by the young tubers. Grafting and budding is likewise practised effectively, as also layering of the young branches, which are fixed in the soil by pegs, or in pots filled with good soil. It is also propagated by pinching or bruising the stems at the junction of the old wood with the young. Varieties are obtained in the open ground, by crossing the different sorts. There is no end to the effects of this operation.

MODERN FLOWER-GARDENING.

THE BEDDING-OUT SYSTEM.

The term "bedding-out," as applied to flower-garden plants, has reference to the style, which is now prevalent, of planting the subjects in masses, each composed of one kind. The object is to produce a mass of colour, and the subjects and flower-beds are, or should be, so arranged, that these separate masses of colour may tell one upon the other, producing contrasts or combinations, the effect of which, as a whole, is much more striking and beautiful than can ever be produced by a general and miscellaneous admixture of individual plants, however well they may be disposed. Hence it is that modern flower-gardens are

made to consist of a series of beds, separated from each other by strips or pathways of gravel, or green-sward turf, as the case may be. In the summer planting, each of these beds is filled with one particular kind of plant, whose qualifications for admission to such a position are, or should be, these :—dwarfness and compactness of habit, relatively to the position of the beds ; freedom and permanency of flowering ; distinct and brilliant colouring, and facility of propagation. It is this adaptation of certain plants in flower-gardening which is technically called "bedding-out ;" and the plants so treated for this purpose are familiarly spoken of in the horticultural world as "bedding-out plants."

Though annuals are sometimes used to fill out beds under this system of flower-gardening, yet the plants under notice are not of this class. Neither are they the hardy perennials, which permanently decorate a miscellaneous border. But they belong to a set of subjects which, while they flourish in our climate during summer, will not survive if exposed to the vicissitudes of winter ; and which having at the same time a shrubby, or at least branching habit, can be made to form close and densely branched masses, and thus also, in due season, close masses of bloom. Unless a dense and also an even growth is secured, the effect is marred.

The following list indicates some of the best materials which are available for this style of gardening :—

Ageratum Mexicanum (Mexican Ageratum).—Habit erect branching compact, height two-and-a-half feet ; flowers pale or greyish blue ; comes into bloom in June, lasts about four months ; common soil.

Anagallis Phillipsii (Phillips's Anagallis).—Habit spreading compact, height one foot ; flowers blue ; comes into bloom in June, lasts about four months ; common light soil.

Bouvardia triphylla, var. splendens (splendid Bouvardia).—Habit erect branching compact, height a foot and a half ; flowers scarlet, tubular ; comes into bloom in June, lasts four months ; peat soil, with a little loam.

Campanula Carpatica (Carpathian Bell-flower).—Habit spreading compact, height one foot ; flowers blue, bell-shaped ; comes into bloom in June, lasts about four months ; common soil.

Campanula Carpatica : var. alba (white Carpathian Bell-flower).—Differs from the last only in the colour of the flowers, which in the variety are white.

Cuphea platycentra (broad-spurred Cuphea).—Habit spreading compact, height one foot ; flowers scarlet and black ; comes into bloom in June, lasts five months ; common light soil.

Calceolaria integrifolia, var. angustifolia (narrow-leaved Slipperwort).—Habit erect branching compact, height one foot ; flowers lemon yellow ; comes into bloom in June, lasts four months ; common soil.

Calceolaria integrifolia, var. viscosissima (clammy Slipperwort).—Habit erect branching compact, height two feet ; flowers deep yellow ; comes into bloom in June, lasts about four months ; common soil.

Calceolaria : var. Kayana (Kay's Slipperwort).—Habit erect branching compact, height one foot ; comes into bloom in June, lasts nearly four months ; common soil.

Calceolaria alba (white-flowered Slipperwort).—Habit erect branching, height two feet ; comes into bloom in June, lasts four months ; common soil.

Calceolaria : var. Polyphemus.—Habit erect branching compact, height one foot ; comes into bloom in June, lasts four months ; common soil.

Calceolaria amplexicaulis (stem-clasping Slipperwort).—Habit erect, very compact, height two feet ; flowers pale yellow ; comes into bloom in July, lasts three months ; common soil.

Fuchsia globosa (globe-flowered Fuchsia).—Habit branching compact, height one foot and a half ; flowers crimson and purple ; comes into bloom in June, lasts four months ; common soil.

Fuchsia microphylla (small-leaved Fuchsia).—Habit branching compact, height one foot ; flowers rose ; comes into bloom in June, lasts four months ; common soil.

Fuchsia : var. corallina. — Habit erect branching, height several feet ; flowers crimson and purple ; comes into bloom in July, lasts three months ; common soil.

Gazania uniflora (one-flowered Gazania).—Habit spreading compact, height one foot ; flowers lemon yellow ; comes into bloom in June, lasts four months ; common soil.

Isotoma axillaris (axillary-flowered Isotoma).—Habit erect compact, height one foot ; flowers pale blue ; comes into bloom in June, lasts three months ; light sandy soil.

Lantana Sellowii (Sellow's Lantana).—Habit spreading, height nine inches ; flowers purple ; comes into bloom in June, lasts four months ; sandy peat soil.

Lantana crocea (orange Lantana).—Habit spreading, height one foot and a half ; flowers orange-coloured ; comes into bloom in July, lasts three months ; common soil.

Lobelia Erinus, var. grandiflora (large-flowered Lobelia).—Habit compact, height nine inches ; flowers blue ; comes into bloom in June, lasts four months ; common soil.

Lobelia Erinus, var. compacta (compact Lobelia).—Habit very compact, height six

inches; flowers blue; comes into bloom in June, lasts four months; common soil.

Lobelia, var. compacta alba (white-flowered compact Lobelia).—Exactly like the last, except in respect to colour.

Linum flavum (yellow Flax).—Habit spreading compact, height one foot; flowers yellow; comes into bloom in June, lasts two months; light sandy soil.

Matricaria grandiflora (double-flowered Matricaria).—Habit erect, branched, compact, height a foot and a half; flowers white; comes into bloom in June, lasts four months; common soil.

Nierembergia gracilis (slender Nierembergia).—Habit spreading compact, height six inches; flowers white; comes into bloom in June, lasts four months; light sandy soil.

Nierembergia filicaulis (thread-stemmed Nierembergia).—Habit spreading, height one foot; flowers greyish; comes into bloom in June, lasts three months; light sandy soil.

Nierembergia intermedia (intermediate Nierembergia).—Habit compact, height nine inches; flowers deep purple, with yellow centre; comes into bloom in June, lasts three months; light sandy soil.

Œnothera macrocarpa (large-fruited Œnothera).—Habit spreading, height six inches; flowers large, yellow; comes into bloom in June, lasts four months; light sandy soil.

Oxalis floribunda (many-flowered Oxalis).—Habit tufted, height nine inches; flowers bright pink; comes into bloom in June, lasts four months; peat and loam in equal proportions.

Pelargonium: var. Tom Thumb.—Habit spreading compact, height one foot; flowers bright scarlet; comes into bloom in June, lasts four months; common soil.

Pelargonium: var. Prize-fighter.—Habit compact, height a foot and a half; flowers rich scarlet; comes into bloom in June, lasts four months; common soil.

Pelargonium: var. Lucia-rosea. — Habit spreading compact, height a foot and a half; flowers delicate rose pink; comes into bloom in June, lasts four months; common soil.

Pelargonium: var. Lee's Variegated. — Habit compact, height one foot and a half; leaves variegated with white; flowers scarlet; comes into bloom in June, lasts four months; common soil.

Pelargonium: var. Brookland's Seedling. —Habit compact, height a foot and a half; flowers scarlet, with white centre; comes into bloom in June, lasts four months; common soil.

Pelargonium: var. Unique. — Habit spreading, height a foot and a half; flowers purple, with black spots; comes into bloom in June, lasts four months; common soil.

Pelargonium: var. Moore's Victory. — Habit compact, height one foot; flowers crimson scarlet, with black spots; comes into bloom in June, lasts three months; common soil.

Pelargonium: var. Sidonia.—Habit compact, height one foot and a half; flowers pink, spotted, with white centre; comes into bloom in June, lasts four months; common soil.

Pentstemon Hartwegii: var. albus (white Hartweg's Pentstemon).—Habit erect branching, height two feet; flowers white; comes into bloom in July, lasts four months; common soil.

Pentstemon Hartwegii: var. coccineus (scarlet Hartweg's Pentstemon).—Habit erect branching, height two feet; flowers crimson scarlet; comes into bloom in July, lasts four months; common soil.

Petunia: var. Model.—Habit spreading, height a foot and a half; flowers purple; comes into bloom in June, lasts four months; common soil.

Petunia: var. Bright Venus. — Habit spreading, height a foot and a half; flowers rosy pink; comes into bloom in June, lasts four months; common soil.

Petunia: var. Favourite.—Habit spreading, height a foot and a half; flowers white and purple; comes into bloom in June, lasts four months; common soil.

Salvia patens (spreading Sage). — Habit spreading, height two feet; flowers blue; comes into bloom in June, lasts four months; common soil.

Salvia patens: var. alba (white spreading Sage).—Habit spreading, height two feet; flowers white; comes into bloom in June, lasts four months; common soil.

Salvia fulgens (fulgent Sage). — Habit branching spreading, height two feet; flowers scarlet; comes into bloom in July, lasts three months.

Tropæolum minus flore-pleno (double small Indian Cress).—Habit spreading, height nine inches; flowers scarlet; comes into bloom in June, lasts three months; poor soil, sunny situation.

Tropæolum majus flore-pleno (double Indian Cress).—Habit spreading, height nine inches; flowers orange-coloured; comes into bloom in June, lasts three months; poor soil, sunny situation.

Verbena: var. Tweediana.—Habit spreading compact, height nine inches; flowers rose crimson; comes into bloom in May, lasts six months; common soil.

Verbena: var. Princess Royal. — Habit spreading, height one foot; flowers white; comes into bloom in June, lasts four months; common soil.

Verbena: var. Duke of Cornwall.—Habit

spreading, height one foot; flowers crimson scarlet; comes into bloom in June, lasts four months; common soil.

Verbena: var. Blue Queen.—Habit spreading, height one foot; flowers blue lilac; comes into bloom in June, lasts four months; common soil.

Verbena: var. Melindres major.—Habit spreading, height six inches; flowers scarlet; comes into bloom in June, lasts five months; common soil.

Verbena: var. Stewartii.—Habit spreading, height six inches; flowers purple crimson; comes into bloom in June, lasts four months; common soil.

Verbena: var. Emperor of China.—Habit spreading, height nine inches; flowers bright scarlet; comes into bloom in June, lasts four months; common soil.

Verbena: var. Valentine de Savoye.—Habit spreading, height nine inches; flowers dark purple; comes into bloom in June, lasts four months; common soil.

These plants, or a selection from them, will afford the means of rendering a flower garden permanently ornamental through the summer season. In the preceding notes, the commencement and duration of the blooming season is computed on the supposition that the plants are properly prepared, and planted out, with all needful precautions, during the earlier part of the month of May. Young plants should be raised annually during the latter part of the summer, and kept through the winter in dry airy pits, or light greenhouses, secure from frosts. These in the spring should, if needful, be re-potted into larger pots, and kept in a free-growing state, thoroughly hardened by gradual exposure in a cold frame through the month of April, and finally planted out as soon in May as the weather promises to be genial. If cold winds or frosts subsequently occur, some protection is essential: it is generally afforded by sticking evergreen boughs more or less thickly among the plants, unless they are few and compact enough to be covered at night by inverted flower-pots. Some of the very free plants, such as Verbenas, are quite as well, perhaps better, propagated in spring (February), if there is the convenience of a warm situation to excite the growth of shoots to form cuttings, of a hot-bed frame in which to strike the cuttings, and of frames with a slight warmth to grow in, and subsequently to harden them. Others, as the Pelargoniums, are better raised early the preceding summer, and somewhat stunted till the spring, and then got into a free state of growth by planting-out time. The Calceolarias should always be struck *late* in autumn, for the early cuttings never root freely.

CLEMATIS INDIVISA.

Clematis indivisa, Willdenow (undivided-leaved Virgin's Bower).—Ranunculaceæ § Clemateæ.

The accompanying engraving represents a variety of the *Clematis indivisa* to which the name *lobata* is applied, in consequence of the leaves being lobed, or divided, in which respect only it differs from the species. It is a very ornamental plant, in consequence of the large size, the profusion, and the pure white of its blossoms.

Like the majority of the species of Clematis, or Virgin's Bower, the present is a free-growing climbing plant, extending its long slender branches over a considerable space. These are furnished with ternate (three-cleft) leaves, the bases of whose stalks are connate, that is to say, the bases meet, and are, as it were, continued around the stem, as if the stem had pierced through the united stalks of each pair of leaves; the leaflets are ovate, and of a leathery texture, quite undivided in the original species, but divided into small lobes in the present variety. The flowers grow in panicles, which are often a foot long, from the axils of the leaves: they are large and copious, making a very conspicuous show; they are, moreover, diœcious, and consist of spreading oblong segments, which are, in fact, the divisions of the calyx, the flowers of the clematises not having petals; the surface of these segments is covered with short silky

hairs. The number of segments is variable, but usually from five to seven, forming large showy blossoms. These are produced in April, and doubtless for some time in succession.

This species of clematis is a native of New Zealand, where it appears to have been first met with by Forster, who calls it *C. integrifolia;* that name had, however, been already applied by Linnæus to a totally different species. The variety *lobata* is a native of the same country, and was introduced to England in or about 1846. Gmelin has called the species *C. paniculata,* from its panicled inflorescence.

This species requires to be grown in the greenhouse, where it attains to considerable perfection when planted out, and covers a large space with its leaves and branches. In such situations, it is likely to enjoy a prominent place. Whether grown in pots or planted out, it requires a substantial loamy soil, rich in dung, and to be kept generally moist. It also requires plenty of light to aid the development of its numerous flowers. It is propagated by seeds, or cuttings of the ripe wood, which strike very easily under bell-glasses. In most gardens there are but few of the different sorts of clematis grown. At the present day, there are about twenty species with white, blue, rose, violet, or purple coloured flowers; and they are particularly well adapted for the decoration of arbours. Professor Morren states, that at the *Chateau de Lacken,* M. Forkel trains them on the fruit trees, which they entwine in every kind of manner, so that the fruits hang amidst a profusion of flowers. In the spring, when the fruit trees are in full bloom, the clematises are only beginning to bud, so that they do not prevent the formation of the fruit.

FLORICULTURE OF THE MONTH.

BY GEORGE GLENNY.

We have never seen exhibited publicly so many Hyacinths and early Tulips as have been shown the past month at the meetings of the Society for the Promotion of Floriculture. Mr. Lockhart, of Parson's Green, has exhibited, at four different weekly meetings, no less than one hundred and twenty sorts of Hyacinths, including the finest varieties in cultivation. At Watson's Hotel, Salisbury Square, the head quarters of the Society, there were thirty noble spikes of Hyacinths, several Scillas, Cinerarias, and Fuchsias. At the Trevor Arms, Knightsbridge, there were twenty varieties of early Tulips, a Hybrid Rhododendron not very different from Russellianum, thirty varieties of Hyacinths grown in the open ground, raised in this country from small offsets, which, with care and three years' growth, will equal the finest Dutch bulbs. Mr. Robinson showed several very interesting blooms of Cineraria, and Mr. Ambrose exhibited a plant of Cineraria with a fine white flower slightly edged with lilac. The Society is, however, very shy of giving certificates without there is some very decided advance. At the North-East branch, at Kingsland, there were forty-three members present, and nearly sixty specimens. A fine seedling Auricula was shown, but not forward enough to judge its real merits; and a plant of Cineraria, very showy, but not half bloomed, was produced with an intention of introducing it in several different stages of bloom. It was stated at this meeting, that by growing hyacinth offsets in rich light earth, planting them three inches deep, and picking off the pips, all but the top one, and taking them up when the leaves began to turn yellow, three seasons in succession, they will become as fine as imported Dutch bulbs; but there are two or three little points to be attended to in preserving them, and in the mode of taking them up. They should be dug up, the foliage twisted off, and the bulbs, with their roots, laid in rows on the surface, covered with three inches of soil; after lying three weeks, they may be taken up, and the roots will come off freely, almost without pulling; they must then be taken into a shady dry room, where it is not too light, and laid out singly, so that the draught of air may go through them. In a few days they will be quite dry, the earth may be cleaned off, and the skins will be fine and clean. The third year most of them will be as fine as Dutch bulbs, but those which are not large enough may be set another year; the others will be fit to glass, or grow in the open ground or in pots, by the side of imported bulbs, without losing by the comparison. The meeting at the Fishmonger's Arms was not so numerously attended as the others, but there were quite as many specimens exhibited, comprising the chief bulbous plants in flower, and seedling croeuses, not so fine as those which were named at a previous meeting. We are glad to see an indisposition to recognise the new things too hastily. There has been so much harm done by indiscreet praise, that we shall have the greatest confidence in the proceedings of the Society for the promotion of Florieulture and Horticulture; and, in proportion as they

are cautious, so will the public value their certificates. The western, or rather north-western division is to be held at the Goat Inn, Fitzroy Street, Fitzroy Square, being within a hundred yards of the main Tottenham-court Road and Hampstead Road, that place having been appointed by the Paddington and Hampstead florists. These details may seem uninteresting to some of the country florists, but they belong to the movement that will place floriculture on its proper footing. There are are at these meetings able discussions on the growth and properties of flowers, such as will form the subjects of separate papers.

The Auriculas this season have been subjected to so many checks that the general bloom may be considered below the average, where these flowers are most grown ; but the flower is on the advance, and the number of cultivators on the increase. It is a great pity that they are not in every florist's garden, because they are undoubtedly high on the list of florists' flowers ; but we have few dealers round London, indeed we hardly know of one who keeps a collection of any extent. Mr. Groom keeps a few, and James Dickson has nearly got up his stock again—a stock which, before the unfortunate hail storm that crushed them, was unequalled.

The florists are abandoning the Journal which has made itself conspicuous by offensive allusions to individuals, who, with all their faults, have done great service to floriculture ; and, as they are enthusiasts in the cause, and have many friends who feel great disappointment at the general tone of a paper they patronized rather extensively, they pursue the very quiet retaliation of changing it for the rival paper, in which most of the florists now advertize, and which the amateurs are disposed to support. It is not our business to notice offensive articles, but we do rejoice at the determination of the respectable cultivators to separate themselves from a journal pretending to advocate Floristry by abusing its best friends, attacking, without sense, talent, or reasonable grounds, the only newspaper that now remains for the votaries of Horticulture and Floriculture. There is but one opinion on the subject, and we state it to account for the increased virulence with which gentlemen are attacked, and the amazing folly of permitting it in a work professing to be carried on for the benefit of a class that has been seriously injured by the manner in which their best friends have been treated.

We have been paying flying visits to several nurseries at this inviting time of year. The two which have been subject to great change, are rapidly recovering from the neglected state in which they were placed by circumstances over which the present owners had no control. The Royal Nursery at Slough is converted from a bear-garden to something like the state in which it was in the days of Charles Brown, and it will be strange if it do not contribute nobly to the exhibitions of the year. Mr. Turner has accomplished great things in a short time. The Danecroft Nursery, under Mr. Barnes, is also assuming a very different appearance from what it had when half denuded of its stock ; the Dahlias there will be a little forest of flowers. Ambrose's nursery at Battersea is rather famed for its immense stock of the fancy Geraniums ; not the florists' flowers, but the little French kind. Some of the specimens getting up for the shows have five or six hundred trusses of bloom coming forward, and there are two large houses full of seedlings promising great things in that way—not that we have any particular affection for fancy Geraniums. There are, however, some splendid Cinerarias, comprising some of Henderson's, and indeed all the other first-rate varieties, with some hundred seedlings. Low's nursery is not famed for specimens, but for novelties of every description from strange lands. It is worth any one's while to visit the place, if they take any interest in rare plants. We shall go the rounds during the year. For show, however, there is nothing near London equal to Henderson's, at Pine-apple-place, where there is a blaze of flowers, and this is no distance from town. The people in the country are up and stirring. Leamington has already advertised its first grand show, with prizes as liberal as our London societies, and some of our usual exhibitors at Chiswick Gardens and Regent's Park will be there, for it is a very capital season between the two, the last day of May, after the others have done and before they begin again. We have not had time to give our notes on Auriculas at the shows of April, but we shall notice all the novelties. The same may be said of the South-London Shows ; we have made our notes, but cannot find space for them this month. We are glad to see a disposition to lower the price of new flowers. The finest Verbena of the season is advertised at five shillings ; we have seen very different prices. The Hollyhock seems in request, and probably the present year's shows will make many new cultivators. As a border flower it is very noble, and, if they are exhibited as they should be, they will have many admirers. We have seen many collections, and a great number honoured with names, but there are too many that the true florist would not look at ; those with thick petals, full flowers, and good colours, will hardly fail to please any one, but there must be no judging from single flowers. From the preparations we have

seen for the Geranium shows, there will be plenty of sticks again, for some specimens have more than two hundred, and the very objections we made to sticks years ago are now made excuses for using them. We always stated that they caused a number of weakly things to be let out that would not support themselves, and which ought on that account to be condemned; and, on objecting to sticks the other day, we were told that it was impossible to show some varieties without them, because they were so weak on their stems. Of course, having foreseen all this, we were quite prepared for the answer; but we recommend Societies to begin at the right end, to make people show seedlings without sticks, and instruct the judges to consider weakly stems a disqualification: this would alter the breed from this time, and we should soon have the day arrive when the Societies would give prizes for Geraniums without supporters. The specimens look too mechanical on these arrangements. They are not like single plants, but like fifty little plants in a pot, all mechanically arranged, gay but formal; and if half-sieve baskets, with half-a-dozen well-grown plants in small pots, were exhibited, instead of these great staring specimens, the show would be infinitely more brilliant. Messrs. Rollisson, of Tooting, once showed Heaths that way, and we never saw a prettier exhibition. There is a growing objection to these supports, and it only wants some of the Societies to take up the subject, and they would be banished.

The growers of American plants have, as we think, fallen into a trap; they are going to exhibit at the Regent's Park Botanic Gardens, where nobody can see the plants without paying 5*s.* for tickets, and these can only be had of members, or by their order. The thousands who have seen Mr. Waterer's plants in the King's Road for one shilling, will not like this. It may answer the Society's purpose, but a more injudicious thing on the part of the growers can hardly be conceived.

At the South London Floricultural Show there was an interesting assemblage of plants, and a goodly show of florists' flowers. First, there was a Chinese plant called *Dielytra spectabilis*, the flowers of the most singular heart-shape, hanging gracefully in a row along the bending ends of the branches, and with foliage very like that of some Pæonias; *Gesnera purpurea macrantha* was a brilliant scarlet, very large, the texture like rough woollen cloth; *Rhododendron punctatum*, very ill-grown, but pleasing rose-colour with dark spots; *R. delicatissima*, pale and pretty, but truss not full. Of Cinerarias there were many, too many, for the judges in consequence gave too many certificates; *One in the Ring* had a certificate, but ought not; *Modesta*, ditto, ditto; *Alba purpurea*, ditto, ditto; *Perode*, ditto, ditto; *Adela Villiers* was better than the foregoing, but even that, as times go, was barely good enough; *Pauline* the same; *Carlotta Grisi* was a white, tipped prettily with blue, and deserved its certificate; *Madlle. Rosalie*, beautiful blue edge, fine dwarf habit, the best thing in the room, had no certificate; *Ivanhoe*, blue with bronze centre, rather better than average; *Richard Cobden*, good close blue flower, had a certificate and deserved it; *Lilac perfection*, a very compact plant and good close flower, richly deserved a certificate, but did not have one; *Abdalonymus*, a dark blue, was a good average flower, and had a certificate. Among the very best of the flowers that were already out was *Cerito*. The censors appeared to have overlooked one serious fault in some of the flowers that were fairish in their individual pips, namely, the uneven bloom, some up, some down, all straggling, instead of being of a level, or rather even surface, flowers side by side. Of Polyanthuses there were but few, and these very bad; the four which won the prize were very bad of their kind, and had been potted up; the trusses had lost their form altogether, and ought to have disqualified them. The seedlings were very bad, and several too diminutive to be worth notice; a certificate was granted to one named *Congener*, that was so deficient that even the lacing did not reach down to the eye. In Auriculas a self, with a deep notch in each petal, had a certificate; this was exhibited the evening before at the meeting of the Society for the Encouragement of Floriculture and Horticulture, but had not the approval of the judges there; and the same may be said of another fortunate flower, *Alba purpurea* (Cineraria), which was not considered worth a certificate at Knightsbridge, but which obtained one at Kennington. Two seedling Auriculas obtained certificates—*Sir C. Napier*, tolerably good black and green, rather crumpled, (but so were most of the narrow ones, so that this must not be considered permanent,) colour well divided and paste fair, an excellent trusser; and *Dickson's Freedom*, completely between Booth's Freedom and Colonel Taylor, a very promising flower. The named Auriculas were plentiful, and, considering the weather, they were good; for one collection contained all the leading kinds, and especially two of the largest in cultivation, *Ne plus ultra* and *Conqueror of Europe*, both coarse flowers, but sometimes making a noble pair. The plants were for the most part well grown. The Queen's Cup was won by Mr. Bruce, among whose plants were *Erica Petiveriana*, a very curious style of flower, but splendidly grown; *Æschynanthus ramosissimus*, grown very well; *Azalea splen-*

dens, shown as *speciosissimus*, *A. pulcherrima*, and *A. rubra plena*. All the Hoveas in the room were grown and trained unnaturally, long ill-grown gawky plants, bent down and twisted about to appear dwarf; there were no exceptions; the winner's specimen was the best looking, but equally improperly trained. It was announced in the meeting that the United Gardeners' paper had involved the managers to the extent of a thousand pounds, and that it had been sold to an utter stranger to the gardening interests, and many of the parties present attributed it to the manner in which the Floral part had been misconducted; nor did there appear the slightest sympathy on the part of the numerous gardeners and amateurs present, and they were very numerous. It seemed the unanimous opinion that two papers were necessary, and that the Journal had long ceased to be useful in any way, while the Midland Florist, the Horticultural Magazine, the Cabinet, and the Florist, were said to have contributed to the failure of the Journal. Some of the country growers were up, and seemed quite gratified with the flowers and plants.

STANNIA FORMOSA.

Stannia formosa, Karsten (beautiful Stannia). — Cinchonaceæ § Cinchoneæ-Gardenideæ. This beautiful tree, which belongs to the group of Gardenias, grows from twelve to twenty feet high. When full grown, it has a roundish head, with a slender stem, having the bark whitish; and at the time of the ripening of its fruit, by the form and size of the latter, it may not inaptly be compared to one of our apple trees. When in flower, however, it looks like nothing which we had in Europe, from the brilliancy and size of the corymbs of snow-white flowers, which admirably contrast with the fresh smooth green around them. The branches are nearly four-sided, or quadrilateral; the leaves are opposite, shortly petioled, from four to six inches long, oval, and sometimes elliptical in form, of a stiff and somewhat coriaceous texture, entire, and of a shining green colour. Between the petioles are the stipules, which are of a longish triangular form, rounded at the apex, and fall off at the same time as the leaves. The flowers are developed at the extremities of the branches, and grow in clusters of ten or twelve, forming a small compact trichotomous head. The calyx, which adheres to the ovary, is proportionably small, from one to two lines in diameter; its "free border" is five-parted, the lobes obtuse. The flowers consist of a slender tube, about four inches long, terminating in a flat limb nearly two inches in diameter; the tube of the corolla is cylindrical, smooth on the exterior, and within furrowed, through the adhering stamens; these become free near the mouth of the tube, and between them are some unequal callosities, which, with the base of the interior, are studded with hairs. The stamens alternate with the parts of the limb, which latter are longish-oval, rounded or obtuse at the points, smooth and entire. The free ends of the filaments are of unequal length; the anthers are from three to four lines long, longish-obtuse, two-celled; before their opening they all hang together in an ellipsoid-like body, but subsequently they are bent back. The two-celled fruit has a fleshy circular scar at the apex; each cell contains numerous small rough ovules.

The Stannia belongs to the group of true Gardenideæ, and is allied to the Gynopachys of Blüme, a Java sumach-tree, whose seeds, nevertheless, are quite differently formed; it also comes near the Burchellia of R. Brown, an African shrub, in which the anthers are almost sessile; while it is connected with Posoqueria of Aublet, a shrub found growing in Guiana, the fruit of which is a fleshy berry. From these, and all the other Gardenias, Stannia is distinguished by the unequal length of the stamens.

Dr. Karsten found this magnificent plant on the mountains of Tovar, in the district of Caracas, where it was growing at an altitude of from 5,000 to 6,000 (German) feet above the level of the sea. It was growing in an

open situation on the slope of the mountain, where the soil, and likewise the position of the roots, ensured it from too great moisture. Its flowering time was in June, on till September, and the fruit ripened in February. It begins to bud at the commencement of the rainy season ; while the heat of the sun and the dry atmosphere are favourable to the development of the fruit and the ripening of the seed.

The difference in the average heat during the dry winters and the wet summers amounts only to 1° 5′ Reaum. The greatest difference perceived in the day temperature during a fortnight was only an increase of half a degree ; while, in the month of January, Dr. Karsten observed the temperature to be 13° 12′ Reaum. (63° Fahr.), and, in September, 15° 12′ Reaum. (67° Fahr.) The plant may, therefore, be grown artificially with a like temperature. It ought to be observed, however, that it may be as successfully treated if the condition of the soil in connexion with the atmosphere is attended to. "The temperature of the atmosphere," writes Dr. Karsten, "admits of a certain variation, if only the average minimum of the night-heat is in keeping with the maximum heat during the day, supposing the situation to be somewhat shaded. In the month of March I observed the first to be 8° 1′ Reaum. (50° Fahr.), and the latter, in July, was 22° 75′ Reaum. (83° Fahr.) This difference, however, is virtually considerably increased by the direct rays of the sun, while the heat of the ground in the tropics is generally greater than the average heat of the atmosphere. It is of the greatest importance to know the proper treatment of plants that have their roots deep in the ground. The decrease in the temperature of the atmosphere regularly ensues at the period when the heat of the day is greatest ; and the temperature of leaves, as well as of the soil, is not lessened though immersed in water. The greatest care is necessary in the treatment of the roots ; indeed they ought to receive as much attention as those parts which are above ground. The points of the roots, or spongioles, are those parts which claim the chief consideration, as they are eminently essential to the health and general well-being of the plant. They consist of a substance with the softest texture, and are almost unprotected from external influences ; they gather from the heat and moisture around them the nourishment necessary for the life of the plant ; and the slightest interruption to the healthy play of this important organ is prejudicial to the plant. In a natural condition, one plant grows with a long tap-root, while the next to it may have fibrous, tufted, or matted roots, which spread far out and keep near the surface. But, grown in pots, they must adapt themselves to the surrounding circumstances, and must be supplied with those materials most suitable for them. Those which are of a firm and upright form, spread their roots in the soil in a similar manner ; projecting and spreading in all directions, even beyond the limits of the pot in which they are placed, in quest of moisture and the nourishing gases which are essential to them."

The plant under notice has been named by Dr. Karsten in honour of Dr. Stannius, a German professor of anatomy and physiology.

POPULAR FIELD BOTANY.*

We have here a volume that may be profitably consulted by every child, and the subjects they are called upon to contemplate may be found in the highways and hedges. To those who do not travel hoodwinked, but examine the natural beauties that spring up in their paths, this book will form a pleasing companion. It contains between seventy and eighty coloured plates, which represent many of the leading British plants ; and it would be an excellent task for youth to find, by means of these plates and the descriptions attached to them, specimens to form a complete *Hortus siccus*. The following passage from the Introductory Chapter is quite true, and may be impressed upon the young mind with advantage :—

"If a science is worth learning, it is wise to begin properly, and study the alphabet as it may be called ; and although I have said there is no 'royal road' to Botany, I have endeavoured to render all as easy and simple as possible in this little treatise on the subject, by using English words instead of the technical terms wherever it is practicable.

"No one must expect, if they pursue Botany merely as a relaxation from more important studies, to be acquainted with it in a season. Botanists have been pursuing it for years, and if asked, would say they knew but little compared to what they wished to know : it would therefore be presumptuous in the young to expect that after a few trials only they are to understand the subject thoroughly ; for as it is impossible to arrive at a knowledge of any science or art without great pains and considerable industry, (and Botany is not an exception,) the learner must be resolved to meet and overcome obstructions, which at the commencement appear rather alarming ; but with a little attention the first

* "Popular Field Botany." By Agnes Catlow, Author of "Popular Conchology." London : Reeve, Benham & Reeve.

difficulties will be found to vanish, for every step will smooth the way for another. When a little knowledge is obtained, the study becomes more and more interesting every day; each new plant is examined with eagerness, and the investigation is no longer toil, but positive pleasure.

"If the possessor of this book will therefore at once follow the plan laid down, considerable improvement may be attained in a short time. Botany is easily pursued by those living in the country, and is not an expensive pleasure, whilst the thoughts connected with it are pure and refreshing, forming a delightful relaxation from more serious duties. It has the advantage of healthiness, for plants must be searched for out of doors; exercise is therefore united with study, which is an object in the present state of education. All children are fond of flowers, and one-half the design of teaching them Botany is that of exercising their understandings, accustoming them to attention, and giving them fresh instances of the wisdom and goodness of God. If the minds of children were more turned to these pursuits, and that curiosity about the things of nature which is implanted in their dispositions gratified, there would be less complaint amongst young people of the dullness of a few weeks' sojourn in the country than is now too frequently the case. The close examination necessary to discover the genus and species of a plant, makes us acquainted with many beauties concealed from general observation, either by their situation or minuteness. We cannot pursue knowledge of any kind without enlarging our views, as well as acquiring new ideas; and Botany has the great advantage of elevating the mind whilst it improves and cultivates the intellect.

"What can add so much to the pleasure of a ride or walk in the country, as a knowledge of the plants seen in the woods and hedges? or what more instructive to a child when it has gathered a pretty bunch of flowers, than to point out to it the extraordinary beauty of the minute parts, the contrivances for the ripening or preservation of the seed, or the uses of its roots or juices? Many useful moral lessons may be given to the young in a country walk if this pursuit is understood and appreciated. Some persons are disposed to think it a useless study, and to laugh at those who pursue it zealously, and ridicule them for showing great delight at the discovery of a new plant they have not before met with; but if they will compare this enthusiasm with their own in any favourite study, they will find the feeling similar. Unfortunately, it is the custom to look on weeds with contempt, and to forget that they are equally the work of God with the planets or suns, and that every insignificant herb is a fresh proof of the wisdom and goodness of God in the creation. As this little book is only intended for those who really wish to know something of this part of the works of nature, I need say no more by way of inducement, but turn to the object of the work."

As a fair sample of the book, we give the following extracts:—

"Lichenes. *Lichens.* The characters of the order are as follows. Aërial plants (not deriving nourishment from the soil). Leaves and stem combined, and spreading either horizontally in the form of a lobed irregular plate, or rising erect with irregular branches, having discs or shields which produce the seeds.

"Lichens are very valuable in preparing the ground for more important vegetables; they retain much moisture, and even on the bare rock, upon which they are often fixed, will enable a few seeds of grass and other small plants to grow. These wither, and in their turn afford nourishment to larger kinds, and thus a soil is formed by degrees on these otherwise barren spots. They themselves require no other nourishment than the moisture of the atmosphere; so that the root fixes them to the rock, but is of no further use. They grow almost everywhere, on stone and wood, as well as on the soil. Some few are eatable, as the *Cladonia rangiferina*, or Rein-deer *Moss*, as it is erroneously called, which not only forms the food of the useful animal from which it derives its name, but is used in this country medicinally. It has white stems, looking like wire, and forming a mass, which is seen on heaths amongst the green Moss. Others are used by the dyer. Various species appear as the weather-stains on old walls, and many beautiful kinds grow on rocks and stones. One found on the latter substance, of a green and yellow colour, is the *Opegrapha saxatilis*, or Map Lichen, as it resembles the marks used in delineating geographical plans. These are nearly flat on the surface of the stone, but others curl up curiously at the edges, and are of a bright orange, sulphur, or ashy grey colour, constituting the genus *Parmelia*. Others cover the trunks of trees in winter, and are often called 'Grey Moss,' but they are of the Lichen family; the principal is *Lichen fastigiatus*. There are several hundred species of this order found in the British Isles.

"Fungi. *Funguses.* Aërial plants. No leaves or stem, but formed of a cap, the under side of which is either divided into lamellæ (thin plates), or a substance resembling sponge.

"A curious tribe of plants, of the same use as Lichens in preparing the ground for larger

vegetable productions. They are parasitic, growing principally on dead wood, leaves, and decaying animal matter, reducing these substances to dust, and forming rich soils for the use of other plants, besides clearing away what is useless, or might be injurious if the process of decay were very slow.

"Some species are quite minute, others of large size. Of the former the mould on cheese is an example; also the rust in wheat, which is a fungus growing on the inside of the grains. The dry-rot in wood is also a species of this family. It is very destructive to ships and the timber of houses. A few are good for food, as Mushrooms, Truffles, and Morels: the former is well known; the two latter grow underground, and dogs are taught to hunt for them by the smell, which is powerful. When thoroughly made to understand the scent, they will scratch on the ground underneath which they grow, and thus bring their situation to light. The Mushroom may be distinguished from the Toadstool by the lamellæ, or divisions on the under side of the cap, being pink when young, and becoming brown in an old state. There is an immense variety of Fungi, many very handsome in appearance, being crimson, bright orange, or the most delicate dove colour, and of all shades. A few have an exceedingly unpleasant smell, and may be discovered by this means in the woods where they grow. In form they differ much; many are very elegant, being like a miniature parasol; others much thicker and rounder at the top; some appearing to have no stalk, a mere round ball. The interior of some genera is divided into lamellæ, or thin plates, as in the Mushroom; in others it has many pores, and forms a substance like sponge.

"Algæ. *Sea-weeds.* Plants growing under water, both fresh and salt, with the stem and leaves combined into lobed divisions, some so fine as to resemble hair.

"A few of the plants of this order are found in fresh water, as the green slimy matter in ponds. *Ulva thermalis* grows in hot springs also; but the Sea-weeds are much more interesting, and we will confine our attention to them. They are often passed over as of little importance, but many are distinguished for their beauty as well as their utility. Algæ exist in all parts of the ocean, but they vary in different regions. They are in general attached to various substances, such as stones, rocks, shells, &c., though some are always free and floating. The usual colour is olive-brown, or green, but many are of a brilliant red, and others nearly black. They differ as much in size as terrestrial plants, some attaining a great length. The *Chorda filum*, found in bays of the Orkney Islands, is occasionally thirty or forty feet long, often impeding the passage of the fishermen's boats. An American species has been procured which measured a thousand or fifteen hundred feet. They must grow with great rapidity, for rocks that have been completely cleared are found again covered in six months, and some of the specimens had grown six feet long during that period.

"From several species of Sea-weeds *Kelp* is derived, which is of such use in the manufacture of glass and soap. They are reduced to ashes by burning, and this gave formerly to very many poor people an employment, which was the principal means of support in the Hebrides; but lately a superior kind, procured from a plant growing on the coast, has been brought from Spain, and the demand for kelp has much decreased.

"Many Sea-weeds are used for food; the *Rhodomenia palmata* is called *Dulse* by the Scotch, and *Dillesk* by the Irish, and is eaten in both countries. One or two species of *Porphyra* and *Ulva* are brought to table under the name of *Laver;* also *Alaria esculenta*, known in Scotland by the name of *badderlocks* or *honey-ware*. In Ireland the *Chondrus crispus*, called Irish Moss, is an article of food. It forms a kind of *blanc-mange*, which is very strengthening. The *Fucus vesiculosus*, which is so very common on all our coasts, produces, by burning, the valuable medicine called Iodine, which can also be procured from sea-water. All Sea-weeds are useful as manure, and are, therefore, extensively gathered for that purpose.

"I will close this account with a description of an easy method of preserving Sea-weeds, particularly the delicate kinds; and a collection nicely preserved and arranged is very interesting. The specimens being brought home, (and it is of no consequence if they have shrivelled or become dry, as they soon expand again when placed in water,) must be put one by one into a large basin of clean water. Have ready writing paper divided into pieces, (a quarter of a sheet is a convenient size;) then, when the weed is nicely expanded, and the dirt washed from it, place under it the piece of paper, and when arranged as required, raise them both out of the water; then drain off the wet, and place them between two dry sheets of common paper, subjecting them to a slight pressure. The Sea-weed will adhere to the paper, causing no further trouble, and the specimens may be arranged in a book of blank leaves, the name being procured, if possible."

CONTEMPORARY WRITINGS, AND ORIGINAL NOTES.

Slugs are the most destructive vermin in a garden, and there are many ways of getting rid of them, but all require perseverance, and if they have been neglected long, the work will be the more troublesome. One of the most rapid modes of destroying is, to lay cabbage-leaves every yard all over the borders and beds, and at daylight to examine every leaf, and put the slugs into salt and water, in a pail, or old garden-pot. The number that will be taken by this means is incredible. The leaves must be renewed over and over again, if the slugs continue to find them. Lime sown on the ground when the slugs are on the move, is another effective mode of destroying; but it looks so untidy and offensive to the eye, that it can scarcely be done in a flower-garden. A slight sprinkle of salt will also destroy all it comes in contact with; but these should only be applied when the slugs are abroad.—G.

Wire-worm.—We have never known any remedy but catching and killing this pest. We have covered them with salt for twenty-four hours, and they have been none the worse. The best way is, to make holes and plant carrots, to be drawn up every morning, and put down again. The worms work their way into the carrot half-way, and stick there, so that a score may be sometimes pulled out of a single carrot; and this continued, not only diverts them from the other crop, but lures them to their destruction.—G.

Snails hide in old walls, and especially at the foot, and among ivy, and in all kinds of arbours. They must be hunted and destroyed, or they will be ten times as numerous before the summer is over. They may be traced by their slimy track, but nothing should be left undone to clear them away.—G.

Wasps.—Every wasp killed this month is better than many at a later period. In fact, the earlier a wasp is killed, the better. A very sharp look-out in time, will prevent whole swarms from infesting fruit; and it is impossible to be too vigilant.—G.

Butterflies.—By killing one of these, we destroy an entire future colony; for if the fly once lays the eggs, the sun does the rest, and our crops are damaged, if not destroyed, by their ravages.—G.

The Holly.—Too little use is now made of hollies in all our ornamental plantations, for they are, in fact, the jewels of the shrubbery; none so brilliant, none so glittering, as the holly; and that not for a season only, but in winter as in summer, in one age as in another, for it lives for centuries. Pliny mentions one at Rome, 800 years old. If variety be coveted, it is freely given in the peculiarities of the spiny green leaves, in numerous variegations, and in differences of fruit. More attention appears to have been paid to these varieties, a century ago, than at present; for Miller enumerates many, some of which glory in names full of the gallantry of the age, as Phyllis, Painted Lady, Milk-maid, &c. As some guide to persons collecting different sorts, we will enumerate a few of the most distinct. These are, the Laurel-leaved—small leaves, without prickles; Thick margin-leaved—broad leaves, without prickles, with a thickened margin; Ciliated-leaved—with very fine prickles on the edges; Serrated-leaved, or saw-edged; Hedgehog, or very prickly; the Spineless; White-margined-leaved; White-spotted-leaved; Gold-edged; Gold-spotted; Silver-blotched Hedgehog; Gold-blotched Hedgehog; White-fruited; Yellow-fruited; and of common variegations, of different markings, twenty varieties may be had in any extensive nursery. As regards the cultivation of the holly, no shrub can be more inviting. The only care required, is in transplanting; and this, if done but with common attention, is sure to be successful. It has been recommended by some, that holly be removed at Midsummer; by others, in April. With due precaution it may be removed at any time; but when there is the choice of time, and a desire to avoid subsequent labour, transplant in November. The soil is of some importance. It should be light and dry. This may always be obtained by shallow planting, and by mixing sand with the broken earth.—*Maund's Botanic Garden.*

Cheap Flower Gardening.—Those who do not possess a sufficient extent of glass frames for the propagation of Verbenas, Calceolarias, and other half-hardy bedding plants, may make a splendid display by filling some of the beds with masses of the more durable annuals sown in the places in which they are to remain. It is not to be expected that the duration of these will be equal to the plants for which they are substitutes, but with a proper exercise of taste in arranging them, the result will be much more satisfactory than many suppose. For white beds use *Clarkia pulchella alba*, *Nemophila atomaria*, or White Virginian Stock; for pink or rose colour, *Clarkia p. rosea*, *Saponaria calabrica*, or Rose Virginian Stock; few things make a more splendid yellow or orange bed than *Eschscholtzia*, and for a dwarf very compact bed of the same colour the common *Mimulus moschatus* is well adapted, if the situation is not too shady; for blue beds *Nemophila insignis*,

Lupinus nanus, the late blue Forget-me-not, or the beautiful but rather scarce *Centaurea depressa;* for dwarf scarlet beds Verbenas or Geraniums are indispensable, but a taller bed may be made of *Pentstemon gentianoides;* the different varieties of *Antirrhinum majus* are also very useful, particularly the dwarf double white variety; the taller kinds may easily be made dwarfer by pegging them down; for a purple bed, nothing surpasses the purple branching Larkspur, if raised from seed on a warm border, planted out eight inches apart, and pegged down twice during the growing season. The rest of the annuals in the above list may be sown at once in their places, and thinned out to proper distances. The Musk and Forget-me-not are hardy perennial plants, as are also the Antirrhinums and Pentstemons. The time for sowing annuals must be regulated by the period at which the greatest display will be most useful; and as this will generally vary from the middle of July to the middle of September, the seeds should be sown from the beginning of April to the end of June. The little *Chœnostoma polyantha* makes a very pretty dwarf bed; it should be sown in March, in a warm frame, pricked out into boxes as soon as it is up, and planted out at the usual time; the young plants will require stopping, in order to induce a bushy habit. *Lobelia Erinus grandiflora*, is known in the seed-shops as *L. e. compacta grandiflora*. This, and all the other varieties of *L. Erinus* or *L. gracilis*, although called greenhouse plants in catalogues, are excellently adapted for flower-garden decoration; they may be propagated in early spring, either by seeds or cuttings, and with proper attention to potting or transplanting them into frames as they require it, will be ready for bedding out by the middle of May. They will commence flowering immediately, and unless the ground is very poor, will continue till the end of September.—*Gardeners' Chronicle.*

Grafting Grasses.—The *Gardeners' Chronicle* directs attention to this, and shows from the experiments of Sig. Calderini, of Milan, that grasses have at each knot a shoot within the sheath of the leaf, which can be easily drawn out while the plant is young. These can be changed, that is, the shoot of a robust growing plant removed, and the shoot of a weaker growing plant placed there. The result has been an improved growth of the introduced plant, and a more vigorous-growing seed. Grafting of the grasses is something like bottling the Atlantic. The only point that can be practically useful, is that of improving the seed; and if this improvement in the first year's seed be not carried through in future years, the experiment is petty and useless.

Indian Bread or Tuckahoe.—An odd something between a fungus and a tuber, described by different writers as each. It is observed that, "It has by some been considered as the root of some phænogam, by others it has been described, under the generic names of Lycoperdon and Pachime, as a fungus." We are told that it differs totally from the native bread of Van Diemen's Land, which is nearly allied to the common Truffle.

Potatoes.—Mr. Cuthill, in the *Gardeners' Chronicle*, writes over again the reiterated lessons on planting potatoes. "Farmers," he says, "should keep their small potatoes for seed and plant them whole;" but he says "the only difference between planting a potato of half an ounce and one weighing three ounces is, that the heavy one will be ripe ten days before the light one." He advises tying up the plant and taking off all the lower leaves for at least nine inches from the ground, to let in the sun and keep out the disease. We regard this as mere nonsense. Millions of acres of potatoes have been grown, with all their foliage, without the disease affecting them, which is a proof that the leaves do not cause it; and we regard the speculation as a most futile one. We say nothing of the trifling job of tying up 1,500 to 2,000 plants in a single acre, and taking off all the leaves to nine inches above the ground; but some people would think a couple of thousand sticks and ties, and the gathering of the lower leaves, a good deal of trouble. Another writer communicates a fact worth notice, and suggests that it may be a means of preventing the disease. Eight potatoes in a whole piece were accidentally smeared with tar, and as accidentally the haulm was trodden down flat to the ground, so as to be almost separated; while the other portion was diseased, these eight were not. This being attributed to the tar, it was applied on purpose the last season, but did not save the potatoes; the next year the treading down the haulm is to be tried. Truly the potato disease has been a puzzler. The Rev. E. Hoblyn is to tread the haulm down flat, and Mr. Cuthill is to put sticks to keep it upright, and strip the lower part of the leaves. There is some rational hope of Mr. Hoblyn's experiment, inasmuch as flattened vegetation may be less subject to electric influence; but there is none of Mr. Cuthill's; for if it escape the disease, there will be no proof of its efficacy; and were it possible to prove its efficacy, the thing is impracticable.—G.

Botanical Expedition into Wales in 1639.—The review of a book under this title gives a curious account of journeying, when the means of transit were not quite so rapid as they are now, and when our commonest

weeds were almost unknown, at least botanically, and when there were but miserable originals of our splendid florist's flowers. "A great variety of Heartsease," says the author, "adorned the sterile plain." If the writer could peep out from his grave and see the great variety of Heartsease that adorn our gardens, great would be his astonishment. The book must be amusing in the present day.

PYRUS NEPALENSIS.—The fruit of this is said to be good when baked, though in a raw state only fit for pigs.

RAIN.—The rain during the last year doubled in quantity the fall of 1847—viz. the year to December, 1847, 21 in. $\frac{99}{100}$, the year ending December, 1848, 45 in. $\frac{74}{100}$.

EXPERIMENT ON GRAPES.—An anonymous correspondent says that a gentleman, in the neighbourhood of Oporto, split a vine-shoot (white grapes) very carefully down the middle, cutting the bud in half, and then split a corresponding shoot on a black vine, and united them as in common grafting, and the produce of the vine was white and black grapes on the same *bunch*, and on others variegated fruit. It is a curious experiment, and we should blame nobody for trying it.

FRUIT UNDER GLASS.—A novel plan of treating fruit-trees consists of growing on a trellis, under glass. The novelty consists of making the trellis of rough wood, merely crossed and fastened, without mitreing or carpentry, but with a top and bottom rail. These trellises are not to be upright, but sloping from the ground in front, to two feet or two feet six inches at the back; upon this a rough, heavy frame, that will hold glasses a foot from the trellis, is placed, and lights or sashes, made in the roughest possible manner, and glazed, complete the affair. By keeping the wet off after the fruit is gathered, the wood ripens better, and by the preservation of the tree from frosts, they bear better than when exposed, or at least ripen the fruit better.

PENTSTEMON SPECIOSUM.—A writer says:—"Nothing can be more charming in the flower-garden than a bed well filled with this plant, properly treated and in full bloom." The seed is to be sowed in sandy loam in the autumn, and placed in a cold frame; in March to be removed to the greenhouse, where they may remain till May; then potted singly in 60-sized pots, in soil of three parts loam and one part cow-dung; to be shifted and shaded occasionally till October, and then planted in a bed of rich compost. Protect them in the winter, and they will bloom abundantly in the spring.

PLANTS FROM LEAVES.—In the striking of leaves of the Lemon-tree, we are told that "the leaf must be the produce of the same spring, and be healthy and full-grown when detached from the branch, and particular attention must be paid that not the least sign of an eye or bud is perceptible on the angle formed by the stalk of the leaf and the branch, in which case the leaf is perfectly useless for propagation. If a leaf of the above description is obtained, it is put into a flower-pot, and a slow heat and continual and even moisture supported." It is added that, "when due attention is paid to the above, you may be sure of success." It is inferred from this that the bud at the base of a leaf is formed by the leaf and from the leaf, and that if the bud has begun to form the leaf will not strike.

INDIAN AZALEAS.—To propagate these, strike cuttings when the plant is in the most vigorous growth, re-pot them after blooming, when they begin to make their growth, and keep them warm and moist under glass until the growth is completed, when they may be placed on an east or west border till the autumn.

VEGETABLES.—The following have been recommended:—BEANS, early Mazagan, long pod, and broad Windsor; PEAS, early Kent, early Charlton, Fairbeard's Champion, Auvergne, Woodford's Green Marrow, Knight's Dwarf Marrow, and Tall Marrow; CABBAGES, early York, Vanack, Pomeranian; *For Pickling*, the small dark red; BROCOLI, Grange's early cauliflower, Hammond's fine white Cape, Knight's Protecting, Walcheren, and Snow's superb white; LETTUCES, white Paris Cos, green ditto, brown Dutch, Malta and Versailles, the artichoke-leaved lettuce; KIDNEY BEANS, Wilmot's true forcing, cream-speckled, early Dutch, black Belgian, or the Negro, and Shilling's new French bean; ONIONS, Deptford, Reading, yellow Spanish, Strasburg, blood-red, and James's keeping; the Nocera for pickling.

WINTER TEMPERATURE FOR STOVE PLANTS. Mr. Spencer says that he keeps the winter temperature of his stove from 40° to 50° by fire heat, and the plants grow all the better for it in the spring. There is no doubt of this. But the real use of stoves is to supply us with flowers in winter, as well as to preserve the tender plants that require protection, because we have abundance of our own flowers for the spring and summer.

HORSE-CHESTNUTS AS FOOD.—The discovery of the fact that horse-chestnuts may be applied as human food is claimed for Madame Bernhardt, who discovered what is called "the secret" before M. Flandin, who communicated it to the Academy of Sciences at Paris.

ICE-HOUSE.—Oak slabs are recommended for the sides of the well rather than bricks, it having been found that the ice had disappeared in one with brick sides, while it was preserved in one with oak sides and puddled outside.

It is asserted that it is a common error, also, to dig them too deep. Eleven feet is said to be deep enough, and two feet of this should be drainage.

Horticultural Society's Garden.—The orchids, we are informed, are kept comparatively dry and cool, instead of warm and moist, and they flourish more under such treatment. We are glad of this, for there has, in days gone by, been sad bungling with the orchideous plants.

Potato Disease.—There is a plan of management, proposed by Mr. H. L. Meyer, which deserves to be made generally known. In a paper read to the Royal Agricultural Society, he made the following recommendation:—"I propose a method of protection, which, I think, may be equally effective against any one of the above-mentioned causes of the disease, whether animal, vegetable, atmospheric, or electric. I propose to cover up the plant with the readiest material at hand—namely, the soil it grows in. The manner in which this must be done is, by laying down the haulm, and covering it over with earth from the root to within a few inches of the extremity, leaving only the tips of the plant exposed to the benefits of light and air. A field, when thus treated, presents to view a succession of ridges of earth and valleys; the ridges contain the potatos and the stems of the plants earthed over, and in the valleys or furrows lie securely the tips of the foliage. Should the injurious blight occur while the field remains in this state, the tops of the plants are greatly sheltered from its influence by the ridges of earth they lie between. Nothing further will be required but to watch the field, and continue to cover up the haulms from time to time, so as to keep only the tips exposed. The process thus described should be immediately put in practice, instead of the usual method of 'earthing up,' and while the stems of the plant are still pliant and manageable. This simple process will not require any outlay, and in point of labour only stands in the place of the usual method of earthing up. . . . The best way of putting this mode in practice is, by laying down the haulms with the hand, and afterwards covering them with the earth that lies between the rows. The earlier the plant can be attended to as I have proposed, the less it is liable to receive the germ or inoculation of the infection; but owing to the present advanced state of the plant, it may be advisable to administer lime or some other purifying substance before covering the haulm. It is desirable to lay the stems down in a direction away from the east, as much towards the south-west as possible, because it is from the east that blights of all descriptions appear to originate. The usual manner of planting potatos being in rows only sufficiently apart to allow room for the underground shoots and tubers to vegetate, it will be found necessary to lay the haulms of the plant down in a slanting or oblique direction, so as to let the exposed tops of the haulm reach only to the centre of the valley or furrow, thereby gaining the double advantage of room and protection." This experiment was carefully tried in the Garden of the Horticultural Society in 1848, and with success; for although, as was to be expected, the amount of produce was diminished, (not, however, to the extent of more than 3 cwt. per acre), the proportional quantity of sound potatos obtained was more than seven times that of the rows on each side. We regard this as an artificial method of curbing the luxuriance of the potato, which it does very effectually: but whether that be so or not, it will be well to repeat the trial under varied circumstances, in order that its true value may be ascertained. The plan has this merit, that it seems incapable of doing any harm.—*Gard. Chron.*

Watering large Plants in Tubs.—It is well known that when large masses of soil, like that in which Camellias are grown, get dry, it is difficult to water them all through, on account of the water passing off speedily by the sides of the tubs. To prevent this, Mr. Allnut, of Clapham, sinks (slightly) into the surface of the ball, some two or three inches from the side of the pot or tub, a hoop of zinc or some such metal, which compels the water to pass down through the mass of soil instead of escaping by its side. He practises this plan with all his large specimens, and with advantage, not only to the plant, but with regard to saving time and labour.

Araucaria imbricata.—There was planted in a park in the south of England, in the autumn of 1845, a number of good sized plants of *Araucaria imbricata*, in various soils and situations, all considered more or less good, with one exception. This latter plant was placed in what might be considered a disadvantageous site in all respects; when planted it was looked upon as certain not to do well, being in a low valley where fogs appear earliest and leave latest, and where the most powerful winds sweep along more destructively than in the exposed places, at the foot of a hill facing the north, and shaded by large trees during the whole winter season, and where six inches below the turf there is a hard bed of stones; yet this tree looks most luxuriantly, and has made growth in the proportion of three to one more than any of its contemporaries. There is no doubt that the sweeping winds, the bed of stones, and the entire absence of sun for several months, have all proved favourable to it.—*Gard. Chron.*

MANURING THE ATMOSPHERE OF HOT-HOUSES.—The collection of orchidaceous plants in the garden of the Horticultural Society are in the best possible health; the foliage being of a remarkably deep green colour. This circumstance Mr. Gordon, the superintendent, ascribes to his supplying ammonia occasionally to the atmosphere of the house. Having first wetted a bit of pure carbonate of ammonia, about the size of a bean, he rubs it on the hot water pipes, waves his hand backwards and forwards once or twice, to disperse the fumes, and the work is done. Besides adding to their green colour, he is of opinion that this important manuring principle otherwise acts beneficially on the plants. It must, however, be used with caution, or it may do more harm than good. Mr. Gordon applies it in the evening, just before the house is steamed.—*Gard. Chron.*

VEGETABLE POISONS.—It so happens that all the most virulent poisons are of vegetable origin. There is the deadly aconite, which kills in small fractions of a grain; and strychnia, a fourth part of a grain of which has killed a wild boar in a few seconds; and prussic acid, so prevalent in many botanical tribes. Then there are the deadly alkalis of hemlock and tobacco, and oxalic acid of treacherous fame, all derived from the vegetable kingdom! And yet the empiric physicmonger, forsooth, imposes on the credulity of an ignorant community by vaunting the innocence of vegetable medicines! Why, before the rapidly mortal action of some of the vegetable educts we have mentioned, arsenic, that terror of the mineral kingdom, is innocence itself, and sublimate is impotent.—*Chemical Times.*

ERICA CARNEA.—This is certainly the most valuable and interesting of hardy Heaths. It flowers early, is compact and dwarf in habit, and, when grown in quantity, enlivens the American borders and beds at a season when ornament is most required. This species is well adapted for a bed or group. It also succeeds in large pots or vases, if kept cool and moist at the roots and replaced early. It is valuable for replenishing winter bouquets, especially in cool rooms. It may not, perhaps, be generally known that if half the plant or plants be covered with soil (or probably with any other light material), for a period before the flowers attain their colour, it will blanch them to such a degree as to present the appearance of a distinct pale or white variety, forming a lively contrast with the rosy-pink hue of the unblanched plants. This Heath may be planted in the ordinary flower borders, using as a substitute for peat or heath-mould, one-half finely sifted pure unfermented leaf-mould (divested of its earthy matter), the remainder equal portions of fine river or white sand and sandy loam, well mixed. This compost should be well pressed previous to the plants being firmly planted in it.—*Gard. Chron.*

NEW SYSTEM OF VINE CULTURE.—The following is a translation of a paper on this subject, lately read to the Academy of Sciences of Paris, by M. Persoz:—"The new process which I propose for cultivating the vine, inasmuch as it enables us to make use of half of the land for growing nutritive plants, may at first sight appear to differ completely from the plans now adopted in vineyards. Such, however, is not the case, and as those who have studied the various methods pursued in different countries will see, several of the recommendations here made have been already followed in practice; I acknowledge this the more readily, as it enables me to appeal, as a proof of their usefulness, to results obtained by long experience. In one respect, my plan differs from every other; for I propose that all the vine stocks in a certain space of ground should be brought together in a trench, where by one chemical action the wood, and by another the fruit, may be induced to form. This I propose in consequence of having, by direct experiment, satisfied myself that, of the manures which are fit for the culture of the vine, some serve exclusively for the increase of cells, *i. e.* of wood, and that others cause the development of the flower bud (fruit or grape); and the actions of these substances, instead of both going on at the same time, ought to be successive. By the application of these principles, the growth of the wood can be stopped at pleasure, whilst, by the ordinary methods, the same effect can only be produced by artificial and empirical means. When it is wished that wood should be developed, the vines must be placed in a trench and covered with three or four inches of earth, with which have been mixed, for every square yard of the surface of the trench, 8 lbs. of pulverised bone, 4 lbs. of pieces of skin, leather, horns, tanners' refuse, &c., and $1\frac{1}{2}$ lb. of gypsum. When the wood is sufficiently formed, which will be in a year or two, according to circumstances, the roots must be supplied with salts of potash, in order that the fruit may be produced. For this purpose it is necessary to spread over the trench, at a distance of three or four inches from the buried wood, for every square yard of surface, $5\frac{1}{2}$ lbs. of a mixture formed of 8 lbs. of silicate of potash, and $2\frac{5}{4}$ lbs. of double phosphate of potash and lime. The trench is then to be filled up, and the roots have as much potash as they will want for a long time. To prevent, however, the exhaustion of the potash, it is as well to spread every year at the foot of the stools a certain quantity of the marc of grapes; this marc, containing 2.5 per cent. of carbon-

ate of potash, will restore annually a large proportion of the potash which may have disappeared from the trench. Hitherto the success of a vintage depended, *cæteris paribus*, in a great measure on the influence of the atmosphere. Thus, suppose a vine stock required ten parts of potash to be enabled to bear fruit, if the action of heat and rain on the stones and earth in a state of decomposition could only furnish five, the vintage would be bad. This danger will be avoided by the above system of culture, in which the vine must always have suitable food; but it is not to be forgotten that, although I promise the grape growers who shall follow the above plan an abundance of produce, I can by no means ensure the quality of that produce, for quality must always depend on the temperature."

Vine Culture.—A very remarkable result in the culture of vines has been observed during the early part of the present year, in the garden of Mr. Wilmot, of Isleworth. We find the following statement of the general facts in the *Gardeners' Chronicle*:—"In July, 1846, Mr. Wilmot planted in the footpath, at the back of some pine-pits, a number of young black Hamburgh vines, and introduced them into the houses by knocking a brick out of the back wall next the ground. These vines, planted in the footpath, made of materials to walk upon, on the *north side* of a pine stove, grew the first year twenty feet long. On the 16th of January of the present year a leaf from one of them, measuring twenty-one inches the one way, and eighteen inches the other, was exhibited to the Horticultural Society, and on the 6th of March a dish of ripe grapes from a part of these vines obtained a Silver Knightian Medal. The bunches were small, as all Mr. Wilmot's are, heavy bunches of grapes not answering the purpose of growers for market; but they were well swelled, covered with bloom, and perfectly well coloured. When the vines were planted, holes were made in the footpath with a pick-axe, and about a couple of quarts of soil in which pine-apples had been grown was added to each hole, the crocks having been first sifted out. This was done for the purpose of forming a bed in which the young roots might lie, the soil of the footpath being too rough and coarse for them. As to the footpath itself, in order that there might be no mistake upon that point, we have examined it, and we can state that the soil of which it is composed becomes, when dry, as hard as the high road. This is owing to the presence of a large quantity of red brick earth, of which Mr. Wilmot's market garden naturally consisted; with this is mixed a large quantity of pounded clinkers from the stoke-holes where coke or coal are burnt, some loam, and a quantity of the ordinary well tilled soil of the garden. Next the walk where the vines grow, whose leaves have been just described, there is, within four feet, the trench of a Macphail pit filled with long litter, for heating a pine bed. The other footpath, where similar vines are growing, is a mere space lying between two pine houses. In both cases these borders or footpaths are, as has been already stated, on the north side of the wall of the pine house, and can receive no direct heat from the sun, even in summer. To what cause, then, may we assign this extraordinary growth, so wholly unexpected by everybody? It cannot be to the marvellous richness of soil, that is evident. It cannot be to high temperature; for although the footpath in one case was on the edge of a trench for dung, yet Mr. Wilmot states that that trench was not worked till long after the vines had made their first growth. But although a very high temperature of the soil can hardly be taken as the cause, we are by no means sure that temperature may not have something to do with this unusual growth. The vines were planted in July; and in gardens so much worked, and so much enclosed, and so traversed by hothouses in all directions as Mr. Wilmot's is, the heat of the soil may have been higher than is imagined, even although the sun could not directly shine upon it. But there was another cause in operation. The pine-houses in question should rather be called pits; for they are sunk from two to three feet below the level of the soil; being almost constantly heated by hot water pipes, the warm air of the pit must communicate some part of its heat to the surrounding soil—to what extent we have no means of ascertaining. The soil too is by no means poor; the path in which grew the vines with large leaves must be greatly enriched with the soakage from the Macphail pits; and although it becomes as hard as a brick, it is not, therefore, compact; on the contrary, the fragments of clinkers maintain its porosity effectually, and permit a ready passage to any heat that may be communicated to it. These observations are intentionally limited to the first year's growth; that of a later period can hardly be made the subject of speculation; for it is impossible to say where the roots of the vines in question may now be. In whatever way the point is regarded, it is highly curious and instructive.

Azalea alta-clerense.

THE HARDY AZALEA, ITS VARIETIES AND CULTIVATION.

It is a curious fact, that in ground which suits this hardy American plant, the seedlings may be seen coming up from the seeds scattered by the plants in such quantities as to be like so many weeds, while in ordinary soil it is not only a rare thing to see one, but it is difficult to get them up even when sown. The natural situation for this family seems to have been the ordinary reclaimed or dried bogs, where the earth is one close mass of half-decayed vegetables and their roots; and if one could judge from the plan of culture which succeeds best, we should be inclined to fancy that the roots had not far to go for actual water, for certain it is, that when it is making its growth it does require a good deal of moisture. The peat earth of our commons, such as the whole family of Erica are grown in, agrees with the Azalea well; and in every place where we have observed the plant really flourishing, it has been in a natural turfy peat, or ground made up of that peculiar soil.

The Azalea is a deciduous plant, which may be called hard-wooded, for all the shoots of the summer in a healthy plant ripen into wood as hard as that of a gooseberry or currant-tree, and bloom buds set at the end of every branch. The hardest of our ordinary frosts take no effect upon the incipient flowers, though seemingly so much exposed all the winter.

The species of Azalea from America were always in great repute; but seedlings raised from these have far excelled the originals in beauty and variety. The Belgian nurserymen have produced some of the best of these improved ones. The great fault of the originals, or, at least, many of them, was, that the flowers were small, the divisions of their corollas narrow, and therefore there was a comparative meanness in their general appearance. Some of the improved varieties have very large flowers, with broad segments, and are altogether as imposing as the others were mean and common-place. There appears to be a family link between the purple Rhododendron and the yellow Azalea; for the late Dean of Manchester and others have succeeded in breeding complete crosses or hybrid varieties, by impregnating the Rhododendron with the yellow Azalea; and, although it appeared a most extraordinary fact, Mr. Smith, of Norbiton, produced the yellow colour on a perfect evergreen Rhododendron, which at once proved that the cross was complete. Notwithstanding this, there appears hardly one striking similitude in the two plants, except their being of the same class and order. The Rhododendron is a perfect evergreen, the Azalea is deciduous; the bloom of the Rhododendron comes in a short spike or cone, the Azalea presents no such form. However, that it is of the same family cannot be doubted; for not only do they breed together, but the produce, namely, a

yellow Rhododendron, seeds freely, so that the popular notion of its being a mule, and therefore not yielding seed, is exploded altogether. That they flourish in the same soil and situation is certain ; and that, when once planted and growing, they do well under the same treatment, is equally true : therefore, the same means that will serve to raise the one will do to grow the other.

The varieties of hardy Azalea which are cultivated in gardens, have chiefly, though not exclusively, sprung from three species introduced from North America, namely, *Azalea pontica*, *nudiflora*, and *viscosa*, the former of which is by some botanists called *Rhododendron flavum*, the next *R. nudiflorum*, and the latter *R. viscosum*. Botanically speaking, those who place these plants in the genus Rhododendron are probably correct, as the differences between the Rhododendrons and Azaleas are too slight for generic distinction.

The *Azalea pontica* (*R. flavum*), is a large yellow-flowered kind, blooming in May and June ; it has given rise to a numerous progeny of varieties, of almost all shades of colouring, from yellow to orange, and white, and striped.

The *Azalea nudiflora* (*R. nudiflorum*), is smaller than the last, and much more various in its sportive qualities ; the varieties which flower from April to June include scarlet, pink, red, purple, white, striped, and various combinations of these and the intermediate tints.

The *Azalea viscosa* (*R. viscosum*) is a later kind, flowering in the latter end of June and in July ; the blossoms are strongly fragrant, and clammy. This, too, has given rise to numerous varieties, of various colours.

Besides the varieties which have naturally sprung from these species, very many others, some of very distinct characters, have been produced by hybridizing, or cross-breeding, between them, and also between them and some of the evergreen Rhododendrons, and also of the other species of Azalea which have been introduced. These are now so numerous, and so much intermixed, that it is useless to separate them ; neither, as new varieties are constantly being produced, would a list of their names, or of a selection from them, be of any material use. They should be seen when in flower, and the varieties then selected. The great American nurseries in the neighbourhood of Bagshot and Woking, in Surrey, afford a rich floral treat through the blooming months ; and the inhabitants of the metropolis and other parts will also have an opportunity of witnessing a magnificent display of them in the gardens of the Royal Botanic Society in the Regent's Park, where an exhibition of them on an extensive scale is to take place during the blooming season, namely, in May and June.

FORMING THE BEDS.

The space to be occupied by the Azalea, whether in its young or matured state, must be well drained ; experience has proved this over and over again, although they want plenty of moisture while blooming and growing. But drained ground is not necessarily dried ground ; for the very fact of giving the water a free current instead of allowing it to be stagnant, increases the fertilizing qualities of land instead of taking anything away. The land being drained, dig out the whole space two feet deep, or at least eighteen inches. The best plan is to do this in four feet widths the whole length of the ground, leaving the natural soil eighteen inches wide between these beds or slips. These spaces are to be filled with three parts turfy peat from a common, full of the fibrous half-decomposed vegetation, broken into small pieces, and one part loam from rotted turves off a meadow. This compost is to be well mixed together, and the beds filled with it and six inches above the surface, left to settle down, as it will naturally lay light at first. The beds thus made up are to be allowed to settle down tolerably solid.

PLANTING THE AZALEA.

According to the size of the plants you must manage your distances from each other. When collections are purchased, they are generally one year old from the layers ; and as we propose to give directions for raising young plants, we may as well treat these in the same way. Small plants, then, may be placed a foot apart, that is, four in a row across these beds, the outside ones being six inches from the path, and the others a foot distant from the outside ones ; they will have plenty of room for a year or two to come ; the rows may also be a foot from each other. These plants must be well watered in, and the earth settled about their roots. When they begin to grow in spring, unless there is plenty of rain, let the beds be liberally watered ; and this must be attended to until they make all their growth and set for bloom, which they will always do from the first year, after being separated from the parent plant. When the bloom is set, they may have the chance of rain, but no more watering. In this way the plants may remain until they touch each other, when they must be removed to a greater distance, by placing them two across the bed, or even three across, instead of four. Whenever these plants are removed, they ought to be taken up with all

their roots about them, and without disturbing the earth that is about their fibres. The holes, therefore, for their reception must be large enough to take in the ball of earth and all the fibres without disturbing them ; and they must, after being trodden in well, be well watered, to close the earth about their roots.

When the plants are to be placed in a mixed plantation where they are to remain, there must be spots prepared in the same way as the beds ; that is to say, holes eighteen inches deep must be dug out, as large in diameter as the plant is supposed to require, namely, from two to three feet, and filled up with the compost already mentioned for the beds. Into these holes the peat soil is to be conveyed, and, besides being filled to the surface, must be watered in, to settle it down solid, so that, after planting, the soil may be above the surface in a sort of hillock. Here the plants, of the size required, are to be planted and well trodden in, in the usual way, so that the collar of the plant shall be close to the surface of the peat soil, which must be some inches higher than the surrounding surface of other soil, to allow for sinking down, which it will after a few slight showers. The peat must be well watered, to close the earth about its roots, and here it will grow for years in health and strength, until its roots have completely filled the portion of made ground, when it will be somewhat checked in its exuberance by the nature of the soil which its fibres will then reach.

RAISING THE AZALEA BY LAYERING.

The only mode of propagating the Azalea profitably is by layering. For this purpose, plants must be placed in the centre of the regularly formed beds, four feet apart, down the length of bed required according to the number. These plants should be selected with plenty of branches coming from near the ground. These branches have to be bent downwards, so that a portion may be pegged down from one to two inches below the surface. Let this be done in autumn ; and as growth is the object while young, pick off all the bloom buds. You may either slightly notch or slit the branch just where it is to be pegged, or you may trust to the bending down alone to cause the roots to push out ; let the head of the branch be above ground, and when all the branches round the plant (which is called the stool when thus appropriated) are pegged down, and their growing ends are as firmly held above ground, the whole may be watered, to settle the earth close about them. When their growing time comes, the branches thus pegged down all round will send forth their leaves and new branches, whether they strike root or not ; but if the weather prove warm and dry, let the whole bed be watered ; and this must be repeated occasionally until the growth of the branches be completed. They may then be examined by turning the soil aside carefully, and if they are well rooted, they may be cut off close to their roots ; if not, they must go over another season before they are separated from the stool, or mother plant. Many layer the Azalea without cutting at all, but the slitting of the stem, that is, cutting a slice nearly half way through and an inch or two long, promotes the rooting ; whether this is by preventing the return of the sap, or by any of the other means that the writers on the subject pretend, is quite immaterial. It is one way of half cutting off the supplies from the root, and therefore inducing the half-separated branch to make an effort to supply the deficiency. The effect is the growing of roots at the place where the interruption is created.

PROPAGATION BY EARTHING UP THE PLANT.

If a plant of Azalea be put in the ground so deep as to earth up the branches two or three inches, it is found in the course of a season or two that all the branches that have been sunk, have freely rooted the whole distance they have been under ground. This has been found the case in old plantations, where, in the course of time, the earth has been raised ; and an old plant of Azalea is frequently found so much sunk in the ground, and so fully rooted where the base of the branches have been below, that every branch formed a plant, on pulling the old stool to pieces. It is quite certain that deep planting is injurious to all those subjects which do not strike root freely ; but it is equally certain, that if others are buried to all but the tips of their branches, all the parts within a given distance of the surface will strike out fresh roots, and maintain themselves independent of the old root. The willow is of this description, as is the common laurel ; so also are cabbages and cauliflowers, and all the cabbage tribe ; hence that practice of earthing up so generally and beneficially practised. The same principle no doubt governs, that operates in half cutting away the supply by notching; that is, by sinking the old root deep enough to lose the influence of the air, which is necessary to all roots, the means of supplying the branches are lessened, and the branches make the effort to make up the deficiency by forming roots of their own. It is therefore certain, that if the old plant of Azalea be sunk so that the base of the branches shall be a few inches under the soil, they will emit roots,

and may be separated ; still it is not so good a method as layering, because, whatever be the length of the branch, it can be pegged down within a few inches of the top, and thus the most handsome dwarf heads will be formed, and the rooted part be close up to them.

RAISING THE AZALEA FROM SEED.

Select seed from the largest flowering kinds only, for the others are not worth the trouble. Fill wide-mouthed pots with the proper soil, shake it down solid by striking the bottom of the pots on the table or potting-bench; level the surface, and on this sprinkle the seed thinly over, and sift through a fine sieve enough of the soil to just cover the seed well, and no more. Let this be done in March, and place the pots in the greenhouse, or in a garden frame which can be covered completely against frost; because, in a very young state, these seedlings, or even the seed itself, after it has begun to swell, will be damaged by even a slight frost. The soil must not be permitted at any time to get quite dry, because the seed is very small, and when once it begins to swell, and to dry after it, the vital spark will have been extinguished. Water by means of the fruit syringe, or a wet brush, or, for want of anything better, let the pot stand in water a few minutes, so as to moisten the main body; but if the soil is properly damp when the seed is sown, and an occasional moisture be given in drops so fine as not to disturb the dust-like seeds, they will in due course come up, when they must be protected from the sun by a piece of white paper, or a thin cloth, as the direct rays would burn the plants up. They must be occasionally moistened, and be suffered to grow until they are large enough to handle with care, when fresh pots may be prepared, and the young plants be pricked out in them half an inch, or at most, an inch apart. They may be replaced in the frame, and, except being protected from the mid-day sun, they will require but little attention until they have made that season's growth, and dropped their leaves. While in that state of rest, they may be shifted to seed-pans, or flat boxes, at two inches distance from each other; or, which will be better still, cover an old melon or cucumber bed with six inches of peat earth and loam, such as the bed for Azaleas is composed of, and the surface will be thus raised half way up the wood frame; when this has been properly levelled, the little plants may be planted out three inches apart all over the surface; and the advantage of this will be, that they can be effectually covered against frost all through the winter, and when they commence their spring growth, which will be earlier than those out of doors altogether; and they can also be shaded, if necessary, from the mid-day sun when the season advances. Here they may have their second season's growth, and towards the autumn the glass may be taken off, and they may have all the weather, heat, wet, and whatever little cold there may be. The plants will drop their leaves; and now, any time before Christmas, they may be removed from this bed with all the earth about their roots that they can be taken up with, and planted out in one of the regular beds, in the open air, six inches apart all over; or, if further removal is to be avoided, they may be placed nine inches or a foot apart at once. But these plants are none the worse for an annual or biennial remove, and therefore we should plant them only six inches apart all over the bed.

It has been the common practice among even large growers to let seedlings remain in a crowded state until they exhibited their bloom, because, unless they were very good, they would not be worth naming or propagating; but as all seedlings would be saleable as common plants when grown handsome, they should remain six inches apart only one year, or season; they may even then be only thinned instead of removed, and so only so many taken away as would leave them a foot apart, while those removed might be planted a foot apart in other beds. Here they may grow till they bloom, when those which are superior should be carefully marked with labels and descriptions of their qualities, while those which present nothing particularly striking may be given away, or sold, as common things for common planting; or if there be any distant borders or plantations where they can be planted out to ornament the place for a season or two, and take their chance, be it so. At all events, remove them from the beds provided for Azaleas, and with these, which may be called worthless ones, strike out every bit of peat mould hanging about their roots, for they would otherwise greatly lessen the quantity by its clinging about them. The selected ones may now be submitted to the process of layering, and be propagated for the purpose of perpetuating the new varieties so distinguished.

GENERAL REMARKS ON THE FUTURE MANAGEMENT.

The Azalea is very apt to grow into an ugly form if not restrained, because a branch will every now and then take the lead so completely as to stagnate the growth of the rest of the plant. Hence we find among plantations at all neglected, the most straggling and uncouth forms imaginable; naked stems at the bottom; no bloom, except at the ends of long branches; plants grown all on one side,

and every way but handsome. This can only be prevented by attention while young. If a branch shoots out more vigorously than the rest, pinch out the end at once, and stop its career. At the end of every season cut out all the pimping little shoots that grow sometimes like so much brushwood, to the injury of the plant; and after the bloom has begun to decay, and before the fresh growth is made, cut back any branch that spoils the general form of the shrub, so that the new growth may have every chance of being handsome and effective. One or two examinations while the growth is propagating, will enable you to check anything that is growing too exuberantly; and when a plant has been kept within bounds a few seasons, it may be fairly left to itself, and will not grow very wrong. It is only while young that they want control, because the branch that grows vigorously stops the growth of the other portion of the plant, and having got the lead, keeps it, to the detriment of all that was handsome, and of the general form of the plant. Nothing is more neglected than this at the great Azalea nurseries. There are too many to attend to properly, and it is the most difficult thing imaginable to select a few handsomely-formed plants, well set for bloom, out of hundreds, and we may say thousands. We cannot too strongly urge upon the growers of this family to be liberal with water while the plants are making their growth, for unless this goes on without check, they do not perfect their growth, and, consequently, do not set for bloom.

FORMING STANDARD TREES.

In going over a piece of Azaleas, mark those which have been sending forth long vigorous branches, whether upright or sideways; they will always be found straight, and generally long. Cut away every bit of the plant but this strong branch; dig up the root, and in replacing it there or elsewhere, set the roots so as to bring this long shoot exactly upright. Here you have a standard Azalea at once; but as the branch will retain all its vigorous character, and be even strengthened by the removal of all the rest of the plant, it may be stopped at the height it already is, by taking off the top of the leader; or it may be encouraged to grow taller by keeping on the leader, and when it commences its growth, cutting off all other branches. Whenever the leader is stopped, the lateral shoots are encouraged; and you must promote growth where you want it, and stop it where you wish to get rid of it, until you have got the general form of the head to what you please; when, like any other subject that is all you want, it may be moved to its final destination. Here it may require a little watchfulness, because all growth below the head must be checked at once; every bud that appears must be rubbed off before it can rob the head of its proper nourishment. No branches should be permitted to spring up from the ground like suckers; in short, as the great feature of these subjects is the head, nothing must be allowed that will detract from its growth, or interfere with its beauty. In plantations of old Azaleas which have been crowded, it is very easy to find many that will cut up to standards of first-rate form; and this is especially worth the notice of those who take to old gardens which they wish to modernize. Many plants, of various descriptions, neglected and grown out of all decent form and character as shrubs, may be well cut up into standards; and nurserymen who have many subjects grown uncouth, and "out of money," as it is called when they are too big and too ugly to sell, might advantageously turn them to standards; for it is rare to find any shrub that has outgrown its beauty, but what may be easily converted to a standard of some height, either a dwarf standard, a half standard, or a whole one. This does not apply to Azaleas only, but to many other shrubs not usually grown otherwise; but not the less desirable nor the less effective for being grown as trees instead of keeping to their natural habit.

A STROLL THROUGH THE GARDEN,

BY A TUTOR AND HIS PUPIL, IN THE MONTH OF JUNE.

We will begin our rambles early this month, and, as the weather is hot, take the early morning in preference to a later period of the day. We do not see such a marked difference in the houses as we observed in the earlier months; some flowers have disappeared and others come forward. The azaleas are quite as full of flower as they were last month, to all appearance, but the fact is, they are quite another set of plants; those which were so splendid a month ago have passed their bloom, and are in the pits making their new growth. As soon as their bloom declines, they are examined, and pruned where it is necessary; that is, their straggling branches are cut in a little, and where they are too crowded, the weaker branches are removed; so if you wish a plant to be more dwarf, you may cut it down. All this being done before they make their new growth, they are greatly

improved by it. The rhododendrons in the house have been kept back so as to make two complete seasons of flowering, and before the month is out, those in the open air will be ready to succeed the last of those in the house. The camellias are growing fast, and it is an interesting time; for if they have been shaped a little with the pruning-knife, a year's growth wonderfully improves a plant. The geraniums have now shown what they can do, and are rapidly coming to perfection; a geranium-house like this, well filled, well assorted, and well grown, is a very noble sight. This light shade that draws down inside the roof is to prolong the bloom, but I do not approve of it so much as a rolling thin cloth outside the roof: the latter may not last so long, but it does not draw the plants so much. Observe how much more noble those flowers which are nearly round and close appear, than those in which the petals are parted from one another so as to show the division.

That large patch of upright briers was planted for the purpose of making into tree-roses by budding with the better kinds: they have been trimmed up to two shoots near the top, and when they have grown enough to undergo the operation, a bud will be put into the two stems, as near to the main trunk as possible, and the shoots will be shortened.

In the potting-shed we shall see the gardener at work in preparing for propagation. Observe, he has large bundles of fuchsias, heliotropes, geraniums, and other plants which are struck, and have good roots: these he is going to plant out in the clumps; he has taken them out of those pans which they occupied, and will dibble them in pretty closely together, to form masses of flowers. The cuttings, of which there are so many by his side, will be prepared for striking by cutting the bottom parts close up to the under side of a joint, and taking off two or three of the lower leaves; these will be put in separate pans filled with compost, and be covered over with one of the bell glasses, well watered, and set in the propagating-house or the stove, to get a slight bottom heat. The cuttings first dry at the bottom, then swell to a sort of lumpy callus, and lastly emit roots. It is necessary to wipe the glasses dry every day or two, and to keep the soil moist.

The picotees and carnations in these large pots are coming up a little in the centre, indicating their disposition to bloom. These will all be removed under the awning of the tulip bed and the hyacinth bed at the end of the month, but the awning will not be let down until they show colour. The pinks have thrown up their flower stems; the youth is removing all the stems but one to each plant, and as the buds grow distinct he will pick off all but two or three buds to a stem. The same work will be done with picotees and carnations next month. As the pink buds begin to fill out, and are near bursting into bloom, a piece of bass matting will be tied round the middle of the bud, and the calyx or green covering will be torn down at each division to reach the tie, so that the pip or bloom will open all round alike; whereas if this had not been done, they would very likely burst on one side. As the petals develope themselves, they should be put in their places, the outer ones to form a circular dish, as it were; the next size to form another row covering the places where the outer petals lap over each other; the next row to imbricate in the same way, and the remainder to form a good top or crown; the whole to be of the shape of half a ball. There is a good deal of trouble with pinks, carnations, and picotees, because the petals do not naturally fall into their places; the largest petals often come in the middle. Dahlias have to be fastened to their stakes as they grow, or the wind would break them off. If you notice these, the man is tying them with bass, but rather loosely, that they may not be cut by their own growth; the numbers are painted on these large stakes, which is a far better plan than using labels, which often get raked away, or trodden down.

The auriculas seem altogether discarded. There they are, in a wooden frame, but the lights taken off; if, however, there were a wet season to set in, the lights would be put on, and all excess of wet would be avoided. The pansy beds you see are shaded, so also are the ranunculus beds, and necessarily so, for if the sun were allowed to rest on them, their colours would be damaged, and the blooms checked in their growth. All flowers damage by sun, and therefore shading prolongs their blooming season, even if the plants would stand the heat. The leaves of some of the bulbs that have done flowering in the border decay and begin to look untidy; they will be soon taken up. Many of the roses are bursting their buds, and before the month is out will look noble.

Observe how the roses are infested with the green fly, which covers the young stems so that they cannot be seen. The gardener will syringe these as soon as he sees them, by which they will be nearly all washed off and destroyed; by following it up a few days they will be cleared, but these in pots in the house are as bad; these must be shut up very close, and the house filled with tobacco smoke, which will kill everything in the shape of vermin. There are many ways of doing this, such as using a pan of hot coals, and putting half a pound, or any other proper quantity, of tobacco on them, and shutting it all in. A fumi-

gating bellows, however, is the best ; here the lighted tobacco is put into a canister, which is in the spout or nozzle of the bellows, and by the ordinary blowing through a hole into the house, it is soon filled with the smoke, which is left all night. The smoke, however, always rises, and if the house is not completely filled, all the upper portions are effectively cleared, while the lower ones, and especially any on the ground, are hardly affected ; this, however, is an oversight, and must be guarded against.

See how carefully the man feels the soil of every pot in the heath-house, greenhouse, and stove ; he knows he watered all that required it yesterday, but twenty-four hours make a good deal of difference, yet it would not do to water all alike, for it would do harm to those wet enough already.

This place, which has a hard paved bottom, and is very nearly shaded by the distant tall trees, is selected for placing the greenhouse plants in when they have done blooming, and have made their growth ; it is less exciting than the sun, and enables the gardener to be sparing of water, whereas if the sun reached the pots, they would require watering every day, and would start off to a second growth, which would greatly spoil their appearance now and their bloom hereafter.

The last of the annuals should be planted out this month, though china asters and stocks are often planted out as late as July, because in a mild autumn they will last until the frost cuts them off.

The fruit garden looks well, there is every appearance of crops too abundant, and the men are thinning the fruit even on the standard trees, as well as the wall-fruit trees. The strawberries look well ; these stones laid down at the joint of the runner are to promote its rooting, and the portion beyond the joint has been taken off, to throw all the strength into the joint ; the sort is choice, and the gardener evidently wants young plants ; the trees on the walls, besides being thinned of fruit, have had their useless shoots rubbed off. The tree on which they are using the syringe is infested with grubs, and they are projecting tobacco-water all over the foliage ; this will clear it, and an immediate washing with pure water will remove all the ill effects of the tobacco. These standard fruit-trees must undergo the same discipline as the wall-trees, so far as the regulating of the quantity of fruit and removing useless shoots are concerned.

In the kitchen garden there is a sort of routine business going on. They are pricking out small plants of cauliflower, brocoli, cabbage, and other greens, from the seed bed, a few inches apart to grow stronger, and planting out some of the strongest where they are to stand ; hoeing and thinning onions, turnips, carrots, beetroot, parsnips, and spinach, to give the rest room ; sowing further crops of salads, and successive crops of peas and beans, French as well as broad sorts ; earthing up the forward crops ; and generally clearing all the quarters of weeds. Here they are planting some of the strongest celery plants in deep trenches, well dunged at bottom, and forked a few inches deep. There is great sameness in the work of the kitchen garden.

The conservatory is now at its very best : with the last of the plants brought forward out of their season, we have the first of the plants that have been left their natural time. Nothing can be more gorgeous than the rhododendrons and azaleas, nothing more pleasing to the senses than the exquisite perfume of the violets, mignonette, early stocks, pinks, and other scented beauties; but there is a good deal of labour required now to keep the beds and paths clean. The dropping of the petals of flowers declining bloom requires the rake every morning, and the paths want regular sweeping, to prevent the decayed leaves and petals from being trodden about ; the shelves too must be cleared, for the water that runs through the pots washes the mould with it a good deal, and unless constantly attended to, would make the principal show house look very bad.

Here we are approaching the end of the month—the pinks and ranunculuses in high perfection, the pansies not less so, for although the earliest bed is not so good as it was, the succession bed is splendid. The tulips are taken up, and their places occupied by rows of carnations and picotees on shelves, which bring their flowers near the eye, but as yet they are only showing their buds, which have been reduced to three on each stem, and in some cases to two ; some three weeks hence they will make a very different appearance. The roses are much more fully blown, and more of them opened : the dahlias have begun to grow and look healthy ; the little bits of plants that hardly showed in the kitchen garden now begin to hide the ground, and they are as busy gathering peas, as they were some time ago sowing them.

HARDY CONIFEROUS PLANTS.

THE TAXODIUM, OR DECIDUOUS CYPRESS.

Taxodium, *Richard* (the Deciduous Cypress).—Coniferæ § Cupressinæ.—The name of this genus is derived from *Taxus*, the yew, and *eidos*, resembling,—its appearance being like that of the yew tree.

1. *Taxodium distichum*, Richard (Deciduous Cypress).—Leaves deciduous, flat, in

two rows, of a light green, and about half an inch in length. Cones almost as large as walnuts, uneven, with short, obtuse scales. Seeds small, irregular, enclosed in a cylindrical kernel.

One of the greatest trees in North America, affecting low swampy lands, and growing in such situations to the height of 120 feet. It is not often that a tree of such bulk and stature is clad in the particularly elegant foliage which characterises this object. In the oak we have the roughened and hard foliage which bespeaks the mountaineer. In the pine there is the same rigidity of leaf and limb ; but here all is soft green verdure, beautifully pinnate, and so minutely divided that one might reckon the foliage, at first sight, to belong to our mosses or ferns. The situations in which this tree rises in its native country point clearly to the treatment it should have in Britain. In rich marshy lands, by the sides of rivers and ponds, and wherever there is continual moisture, it may be planted with every prospect of success. In a great many districts throughout England the young shoots are killed by frosts, a fact which should have led planters long ere now to try it in suitable situations by the sea-side, where frosts have little or no influence. The species is propagated by seeds imported in the cones from America. They should be sown in the latter part of April in very moist soil, and covered to the depth of a quarter of an inch. When two years old, they may be transplanted into nursery lines : they thrive best in a mixture of peat and leaves, so situated that no drought affects them during summer. Plants two feet high are 1*s.* each (1849).

Varieties :—These are chiefly *T. d. nutans*, which has the leaves curled and tortuous ; *T. d. sinense*, of which one of the finest specimens is in Mr. Moore's nursery, East Dereham ; *T. d. patens*, which appears to have the leaves less expanded than in the species ; and *T. d. excelsa*, a continental variety, differing but little from the original.

2. *Taxodium sempervirens*, Lambert (Evergreen Taxodium). — Leaves flat, yew-like, dagger-shaped, having beneath a green midrib, with silver line on each side. Bark reddish-brown : young bark striped with brown.

A lofty tree, growing on the mountains of the north-west coast of America, to the height of 200 feet, with boles six to eight feet in diameter at the surface of the ground. The bark in old trees is six to twelve inches thick, red and smooth ; the timber is beautiful, close-grained, light, but somewhat brittle. It is quite hardy in England, though liable to have its foliage turned brown by severe frosts ; it promises, however, to become a valuable timber tree in this country. Plants one foot high, 7*s.* 6*d.* each (1848).

THE HORTICULTURAL SOCIETY OF LONDON.

One of the most elaborate Reports that has ever appeared was laid before the Fellows of this Society at their Anniversary Meeting on the 1st of May, and judging from the manner in which it was received, we are warranted in saying that there has been enormous labour expended satisfactorily, and the result is highly promising as to the future progress of the establishment. The Council have applied themselves vigorously to the alteration of the old bye-laws, and have so modified them as to go with the times in all manner of improvement, instead of clinging with pertinacity to rules no longer suited to the age. The Report has left nothing to desire, no questions to be asked ; the detail of expenses is elaborate, every item tells for itself ; whether it be the purchase of a tent, the payment of a bond, or the price of printing, there it stands ; and we have no longer to see the cost of the Shows in a single item, and be left to guess at the details. Everybody knows that two more awful days than the first two Shows were held on last year have hardly been known. The 10th of June was certainly alone ; nobody can remember such an unceasing rain in June as devastated the pleasure-gardens at Chiswick ; and on that day, although the Fellows alone amount to a thousand, (in round numbers,) who are allowed to go in free, there were but eight hundred and seventy visitors in all. We were prepared, and we believe the Fellows in general were, to see an awful falling off in the receipts, and a loss upon the year's transactions ; we were, however, agreeably surprised to find, that notwithstanding the untoward weather and the depression of the times, the Society has not only paid its expenses, but reduced a standing debt above three hundred pounds. The first point to which attention is drawn in the Report is the power that was given at the last Anniversary Meeting to the Council, "to prepare for the approval of the Society a set of amended bye-laws," upon which the Council acted forthwith ; and after bestowing more than ordinary pains in the examination of those which worked well in other Societies, they produced

a code that was universally approved; and pursuant to the directions of the Charter, the old bye-laws were repealed, and the new ones passed on the 16th of January. These rules and regulations are of the utmost importance, and cannot fail to place the Society upon a much better footing than it ever could have been under the antiquated laws, which hung like a mill-stone round its neck, and a log at its heels. Among the prominent features embodied in the new bye-laws is a power vested in the Council of creating a new class of Associates, with fewer privileges than Fellows, and paying a smaller subscription. Thousands of persons who wish well to the Society, and who can never, from distance or other circumstances, use half the privileges, will be glad, nevertheless, to enrol themselves as Associates, but would hesitate at paying four guineas a-year. This, therefore, is likely to produce a revenue of some importance. The next point worthy of notice is a change in the prizes for fruit. We have always regretted, in common with many others, the award of prizes in May and June for fruit. Forced fruit at any time is the result of some skill, but it is rarely produced in May and June at exhibitions in that perfection which alone warrants the award of a prize; yet such has been the disposition to encourage it that prizes have been awarded, and the Society has made a sacrifice without being able to command such a show as they had a right to hope for. The change is excellent; the large prizes are withdrawn for May and June, and additions are made to the fruit prizes in July. Fruits, therefore, are not excluded in May and June, but the judges will not be called upon to award any prizes unless they deem an exhibition to be out of the common way. There are also some judicious changes in the schedule of prizes for Flowers and Plants. The Report goes on to notice the very poor attendances and the paucity of flowers at the Society's rooms in May, June, and July, arising no doubt from the attention being fastened on the Garden Meetings; the Council have wisely discontinued them in the usual form, and substituted six Lectures on Horticulture, two in each month, Dr. Lindley having consented to give them on the 15th and 22d of May, the 12th and 26th of June, and the 3d and 17th of July; "and in order to enable those who may wish it, to exhibit on those days flowers and fruit which cannot be received at the Garden Meetings, the Council have availed themselves of the power given them by the bye-laws, to constitute such lectures Ordinary General Meetings." We next come to the finances, and which, although the Report is rich in detail, we shall shorten very much.

RECEIPTS.	£	s.	d.
Life subscriptions	294	0	0
Annual ditto	3,023	10	0
Admission fees, 34 at 6 guineas	214	4	0
Sale of Society's Works	113	12	3
Rent of apartments let	150	0	0
Garden produce sold	24	8	5
Received of Members for Garden charges	47	4	6
Miscellaneous receipts	4	5	7
Garden Exhibitions, 1848	3,867	14	0
Ditto, 1849	302	12	0
Profit on Exchequer Bills	9	3	4
Borrowed cash to pay off Loan Notes	1,500	0	0
Balance at the Banker's at commencement of the Finance Year, April 1st	570	12	7
Ditto, Vice-Secretary	16	2	8
	£10,137	9	4

EXPENSES.	PAYMENTS. £	s.	d.		LIABILITIES. £	s.	d.
Interest on Loan Notes	334	7	10				
Rent, taxes, and rates, Regent-street, and Chiswick	174	8	10	...	488	17	3
Repairs and furniture, Regent-st.	24	12	2	...	7	19	9
Housekeeping expenses	36	0	6				
Salaries, Collector's poundage, &c.	855	0	4	...	247	15	10
Cost of Society's Works	270	17	0	...	154	17	9
Library charges, printing, and stationery	89	12	9	...	17	3	6
Foreign Missions and imports	73	11	7				
Expense of Meetings, Porters, Carriage, &c.	156	13	3				
Garden labour	1,024	6	10				
Implements, mats, seeds, tan, dung, &c.	104	9	9	...	56	13	6
Coals and coke at garden	...			...	89	10	0
Miscellaneous expenses, garden repairs, &c.	454	15	2	...	101	19	8
Distributors' expenses	144	1	6	...	97	18	6
Exhibition expenses, 1848	1,291	7	11	...	48	15	11
Ditto, 1849	40	9	6				
	£5,074	14	11				
Outstanding debts, 1848 ..... £1,324 16 6 paid	1,191	16	6	unpaid	133	0	0
					£1,444	11	8
Medals' account	1,097	13	0	...	690	5	0
Paid off Creditors on Loan Notes	2,200	0	0				
Cost of 3 per cent. Consols	126	0	0				
Balance in hand	447	4	11				
	£10,137	9	4		£2,134	16	8

So far for the Dr. and Cr. account for the year,—now for the general affairs; for the Report comprehends everything material to know; there appears to be still due to the holders of loan-notes 5,400*l.*, and a debt due to Sir Wm. Call, the banker, of 1,500*l.*; to this add the above 2,134*l.* 16*s.* 8*d.* of liabilities, and the total debt is 9,034*l.* 16*s.* 8*d.*, from which, however, we have to deduct the balance in hand, which is 447*l.* 4*s.* 11*d.*, and 336*l.*, the cost of 3 per cent. consols, and this will leave the present debt 8,251*l.* 11*s.* 9*d.*, which is 359*l.* 0*s.* 9*d.* less than it was on the 1st of May, 1848. Considering, therefore, the great depression in trade, the difficulty of collecting rents, and the many calls of the needy upon the liberality of the better classes, we may fairly congratulate the Council upon the healthy state of the Society, and the prospect of great advancement. Against this debt of 8,251*l.* 11*s.* 9*d.* we have to set off the property of the Society, comprising the house,

library, furniture, effects at the garden, their stock of Transactions, Journals, and Catalogues, wood blocks, copper plates, 18,148*l.*; good debts and subscriptions for the year, 3,531*l.* 19*s.* 6*d.*; in all 21,679*l.* 19*s.* 6*d.*, more than 13,000*l.* above sufficient to pay the debt. The Report informs us that Mr. Hartweg has returned from California, and his engagement brought to a close, and that the Council do not propose at present to send out another collector. A pair of new boilers has been placed in the conservatory, and the Council report very favourably of their capacity to heat the building, while a most important feature in their management is that they can be maintained forty-eight hours without additional fuel. We are further informed of the good effects of the reading-room at the gardens, and the close attendance of many of the gardeners; this must have the best effect on the minds of the men, and their progress in other studies is favourably mentioned, Dr. Lindley occasionally lecturing on subjects pertaining to their studies, and giving prizes for their advancement. In short, there appears to have been a new life infused into the executive, a seeming determination to carry out the objects of the Society, and advance the science; this will not fail to produce emulation among the Fellows to second the efforts of the Council. As our readers may be interested in seeing the novelties introduced by their collector, we insert from the Report a list of the seeds, which have been distributed among the Fellows as far as they would go.

Novelties introduced by the Society's collector (Mr. Hartweg) from California:—

Ceanothus dentatus. A shrub 3 feet high. In open places near Monterey.

Ceanothus rigidus. An evergreen shrub 4—5 feet high. In open places near Monterey.

Ceanothus papillosus. A shrub 10 feet high. Mountains of Santa Cruz.

Ceanothus cuneatus. A shrub 6—8 feet high. Sacramento Mountains.

Ceanothus integerrimus? An evergreen shrub 10 feet high. Santa Cruz Mountains.

Abronia sp., with purple flowers. A perennial. In the sands near the sea-shore, San Luis Obispo.

Cercocarpus sp. An evergreen shrub 10 feet high. Carmel Mountains. Very curious.

Monardella undulata. An annual. In fields near Monterey.

Lupinus affinis. An annual. In woods near Monterey.

Pentstemon cordifolius. A shrub 4 feet high. Mountains of Santa Ines.

Pentstemon heterophyllus. From the Sacramento Valley.

Pentstemon azureus. On a dry ferruginous clay. Mountains of Santa Ines.

Cerasus ilicifolia, called "Islay." An evergreen shrub or small tree. Mountains of San Antonio and San Luis Obispo.

Ribes ferox. A shrub 4—5 feet high. On sand-hills near San Francisco; in damp and shady places near San Luis Obispo.

Limnanthes rosea. In swampy places of the Sacramento Valley.

Limnanthes alba. From the plains of the Sacramento Valley; in moist places.

Castanea chrysophylla. The evergreen chestnut.

Nemophila maculata. From the Sacramento Mountains.

Collinsia tinctoria. An annual from the Sacramento Mountains.

Diervilla sp. A half-climbing shrub 6—12 feet high. In woods near Carmel Bay, Monterey.

Pinus tuberculata. A tree 15—20 feet high. Mountains of Santa Cruz.

Pinus radiata. From near the sea-shore, near San Luis Obispo.

Pinus muricata. Woods near Monterey.

Pinus Fremontiana, or Nut Pine.

Cupressus Goveniana. A shrub 6—10 feet high. On decomposed granite in the woods near Monterey.

Adenostoma fasciculata. A shrub 3 feet high. In open places near Monterey.

Echeveria pulverulenta. From the Mountains of Santa Ines.

Rhamnus sp. A dwarf evergreen shrub, found near the sea-shore, Monterey.

Laurus regalis. A large tree. Mountains of Santa Cruz and Sonoma.

Rhamnus oleæfolius. A shrub 6—8 feet high. Woods near Monterey.

Nuttallia cerasiformis. A shrub 2 feet high. Woods near Monterey.

Cyclobothra monophylla. A bulb from the Sacramento Mountains.

Brodiæa californica. Plains of the Sacramento Valley.

Jatropha podagrica, called "Ruibarbo," from Nicaragua. "The thick part of the stem is used by the inhabitants of Nicaragua instead of Rhubarb."

Leptosiphon aureus. An annual. From the Sacramento Valley.

Mimulus tricolor. From the plains of the Sacramento Valley.

DOUBLE SWEET-WILLIAMS.

The visitors to Hampton-Court Gardens, who take an interest in such things, will not have failed to observe a bed of double Sweet-Williams, saved at different times from seed, and when once saved, piped, or layered, or slipped, to propagate the sort, that it might not be lost. In a large quantity of seedlings there may be,

and sometimes are, several double and remarkable. When this is the case, they should be carefully removed to a place far away from the single ones, and the seed saved, for in that case the next year's produce would consist of more double ones in proportion than there were before; but if we are growing them really for the sake of improving, the best plan is to mow down all the single ones directly, except only any that may happen to be remarkable for colour or size, or smooth edges, because, by destroying the bad we leave the good undisturbed; whereas, if the best are removed, there is some chance of their being damaged, however careful we may be. Having, however, obtained something that we are pleased with, the next thing to consider is, how are we to propagate it? The safest way is to layer it, the same as we should a carnation; notch the under side of the shoot a little, and peg it down just under the surface of the earth, and, when all the shoots are so pegged down, let them be gently watered and left to root. In September they will be found rooted well, and may be cut off with their roots to them, and be numbered and planted out in proper beds to bloom the next season; but omit not to sow the seed saved from these best sorts, for when once you pass a certain point in the way of improvement, you keep going ahead until you are tired, or careless, or indifferent. The best month for sowing seed is June; they then come to a good size for planting out, so as to get well established before the winter sets in, and do not get too forward to flower well in their season. It is worth any one asking to see the double Sweet-Williams at Hampton Court, unless they have got tired of propagating them.

THE GRATIFICATION DERIVED FROM RAISING SEEDLINGS.

All nature has an inclination to vary; even the acorn from the evergreen oak, which we shall take for our first subject, yields us fifty differently formed leaves, although we could see no difference in the seed. If we sow a thousand acorns from the evergreen oak, we shall not have two plants with foliage strictly alike, but many will differ so much that they far more nearly resemble holly than oak; we have seen a number of varieties so striking, that we have determined on working each distinctly and separately, and so perpetuating about ten of the oddest-looking leaves we ever saw. There is hardly anything more gratifying, certainly nothing more interesting, than the sowing of seeds, if we but take the pains to examine the results. We have seen a seedling oak with round leaves, with prickles all round, like those of the holly, but in form, the leaf is as unlike both oak and holly as if it were a separate genus. In a quantity of seedling berberries there is a most extraordinary diversity of form and colour. In a patch of laburnums some of the racemes of flowers are as long again as others; in half a dozen walnut trees not two bear nuts alike; and if we were to watch any thing that comes from seed, we should often discover a thing worth saving, but which, for want of observation, is lost altogether. Nobody ought to be careless about things raised from seed; we once picked out half a dozen Rhododendrons from a lot of seedling Catawbiense, and they proved to be worth grafting, and are now figuring among the most popular by some half-dozen names. We have not alluded to seed raised by crossing or artificial impregnation, but raised in the ordinary way; and if that will, as we know it will, yield great variety occasionally, how much more would seed do so when saved from particular sorts associated together for the purpose, and those of so opposite a character as to present every charm? We wish all who sow seed would look more to the result.

GUNNERA SCABRA.

When M. Feuillée, sen.,* at the beginning of the 18th century, proclaimed the pharmaceutic, economical, and culinary qualities of a plant, called Panké, which the Chilians used in these three respects, he did not doubt but that his voice would not be heard, and that his efforts to introduce the culture of so valuable a plant into his country would not be successful. Such has been the fate of all the great men who have made known their inventions to the world. Inattention and disregard were, for some time at least, the rewards of Watt, Fulton, and a hundred more; and Parmentier himself was unheeded when he made known the potato. Thanks to the efforts of one of the principal horticulturists of the Continent, the Panké is at length introduced and cultivated in Europe, and society will be able to derive the benefits which the Chilians themselves obtained from it.

Gunnera chilensis, or *G. scabra*, is a plant which, although stemless, grows to a great size. In general, its habit is that of *Rheum palmatum*, but it is much fuller and larger, and would make a very ornamental plant for the flower-garden or pleasure-ground. It grows with a roundish, very thick rhizoma, the petioles of the leaves being about four feet

* Louis Feuillée, a monk, was sent by the order of Louis XIV. several voyages to the Antilles, Chili, Peru, &c. He discovered a great many useful plants. He was born in 1660, and died in 1732.

and a half long, nearly the thickness of a child's arm, cylindrical, dilated, amplexicaule, commonly purplish, and, as well as the leaves and flower-scapes, covered with short conic herbaceous spines. This stalk is terminated by the leaf, which is about three feet across; it is very thick, coriaceous, somewhat palmate, heart-shaped, or notched at the base, five-nerved or veined, and five-lobed; the veins are dichotomous or forked, and the lobes bi-lobed, being doubly dentated at the margins. The young leaves are all of a fine purple red colour, which partially disappears as they get older. The floral scapes are short, (from 10 to 15 inches,) and issue from the axils of the leaves. From the middle to the summit they are studded with hermaphrodite sessile flowers; they are not conspicuous, but from their number and mode of insertion have rather a fine effect, when in bloom.

In its native country, Chili and Peru, it is found growing in humid places, and the natives are said to drink a decoction of its leaves. After having taken off the thick epidermis, they eat the leaf-stalks, both raw and cooked. Dyers [in Chili and Peru?] cut the roots in slices, and, after boiling them a certain time, obtain a fine and lasting black colour. Tanners also use them very extensively in dressing hides, to which they impart a degree of flexibility not obtained by any other means. When it is considered that the temperature of Chili and Peru is somewhat similar to that of the centre of Europe, there can be little doubt that *Gunnera scabra* will be best placed in the open air, especially in maritime countries, such as England; or in warm and humid places in Germany or France, but particularly in Italy and Spain. It is the *Gunnera chilensis* of Lamarck.

RHYNCOPERA PUNCTATA.

Rhyncopera punctata, Karsten (spotted-flowered Rhyncopera).—Orchidaceæ § Malaxeæ-Pleurothallidæ.

The numerous blossoms of this curious orchid look almost as much like little spotted flies crawling up the thread-like stalks, as they do like flowers; the dull tints of their colouring in some degree favour the deceptive appearance. Nothwithstanding this comparison, it may be called a pretty little plant, for its slender flower spikes hang in very graceful curves around the tufted masses in which the species naturally grows. Its height is not more than five or six inches. The simple, white, small roots, spread and adhere to the bark of trees. The stems, which are from two to three inches long, are round, smooth, of a fine green colour, and issue from a long tubular brownish membranaceous sheath. They bear at their summits each a fleshy or somewhat leathery elliptical flexuose leaf, which is notched or bidentate at the apex, flatly keeled underneath, from an inch to an inch and a half broad, and from two to three inches long. At the bases of these sessile leaves issue leafy linear lanceolate sheaths, an inch long, at the axils of which are produced simple many-flowered racemes of flowers, on slender, pendent, smooth peduncles. The flowers have a reddish white ground-colour, and are spotted with purple; the sepals and petals are small and narrow; the labellum is rather shorter than the sepals, yellowish-red and red spotted, ligulate, and turned in or enveloping the

column, which is short, cylindrical, a little bent, smooth, and of a yellow colour.

Rhyncopera punctata is the second species of the genus that has been discovered. It differs from *R. pedunculata* by its smaller stems and leaves, and by the greater number, as well as the more delicate colouring, of the flowers.

The habitat of *Rhyncopera punctata* is on the branches of various forest-trees in the province of Caraccas, in which situations it forms massy tufts of considerable size. The elevation of the district in which it was found is stated to be from 5,000 to 7,000 feet. It flowers from August till October.

It likes a dryish moderate temperature, which in its native habitat it obtains through the uninterrupted gentle east wind during the rainy winter season. In the culture of those tropical plants which grow in a shady situation, great care must be observed to avoid sudden transitions in the moisture of the atmosphere. The difference in the temperature which they require for their perfect and uniform development is less definite. The shade which is formed by the foliage of the trees in the forests not only produces a reflection of the light beneficial to the growing plants, but produces a more uniform warmth, while it lessens the excessive action of the direct rays of the sun and the evaporation. This is, therefore, the more to be borne in mind with those plants not having their roots in the soil, but growing on the surface of other substances. The effects of the direct rays of the mid-day sun for a few minutes, or the cold condensation of one night, may be fatal to, or at least very prejudicial to the health of, the plants. So also is extreme dryness very injurious. It happens that orchids, and epiphytes in general, are not uniformly (commonly) found on the smooth-barked plants, though the stem of a palm or other monocotyledonous kinds affords them such a position. For the most part, they prefer a stem (or branch) the bark of which is rough and cracked. in which the necessary moisture for the roots is retained, but which affords them greater facilities for being nourished by the condensation of the atmosphere.

ON SHOWING SEEDLINGS IN STANDS OF NAMED FLOWERS.

As there seems to be a growing disposition to upset laws in Societies as well as governments, and that, too, by parties who have not given themselves the trouble of considering, but who jump at conclusions of their own, and would mould everything to their own fancy, we think it nothing more than right to show now and then how very much they lose sight of one side of a question while they stare fully at the other. It has been suggested in a cavalier sort of tone, that there is no objection, or rather there should be no objection, to a man showing a flower of his own raising in his own stand; and then, as if there were but one point on which the objection has been founded, it is rather vauntingly remarked, that with regard to the objection that a seedling known to be in only one person's hands marks a stand so that the judges would know it, it does not hold good; and then there is a good deal about the honesty of judges, and men of honour, and gentlemen. The less that is said on that score, the better. We have known gentlemen, to whom prizes were no pecuniary object, do very shabby things to get them —for instance, drive round among their acquaintance to pick up fine blooms, and show them as their own; and plant judges at exhibitions, to be appointed as if by accident, that they may secure prizes; and there are many other things that give us a very poor opinion of the natural honour and honesty of a good many florists and amateurs. Therefore we must be pardoned if, in the face of these facts of dishonesty, we repudiate the twaddle about honour and honesty. This was only one of the objections, and there are many, but one of these is overwhelming. The very first object, and it is of the greatest importance, is the raising of new flowers, not to give the man who raises them the means of beating all others with them, for that would be destructive of all the best feelings among florists, but to generally advance the flower. The second, and it is as important as the first, is the dissemination of the flower among florists; and the wisest and best rule that ever emanated from a Society of Florists was that of the Metropolitan Society, which shut out seedlings from being exhibited in stands until they were fairly sold among all who chose to buy. The proposition that a man who raised a flower, besides the credit of approval while a seedling, should be able to show it in a stand among named flowers, while nobody else could get at it—the selfishness and cupidity of one capable of keeping in really good flowers instead of letting other people have them, that he might enjoy the monopoly of his own luck—could not be better met than by the sweeping law which generally and judiciously prevails, that seedlings not let out to the public should not compete in stands of named flowers that were let out. We feel ashamed that anybody should be mean enough and selfish enough to wish to keep in his own hand a flower which is a decided advance upon what other people had got; but we rejoice that there is a law to prevent the success of a

narrow-minded selfish policy, that if a man had more than his share of good luck might make him almost a pensioner on the respectable Floral Societies but for the wholesome law which precludes a man from profiting by ill-nature and monopoly. There was a time when a carnation called the Queen of Hearts was monopolized. Its immediate effect was to mark a stand of carnations, and enable the judges to know as well as if the name had been on it who the stand belonged to; but another effect was, that those who fancied it a great flower, and would have bought it at a high price, were unable to procure it, and half inclined to leave off showing. The Metropolitan Society soon spoiled the speculation in monopoly, and decided that no flower of any description should be shown in a stand of named varieties, unless it were regularly sold out to anybody who would buy it. The effect was excellent; the Queen of Hearts was soon among the florists: and that is how it should be. The proposition to keep all the advantages in the raiser's hands, that he might beat everybody until some one raised a flower as good, is unworthy of any true friend of society, and could only be expected from a selfish school-boy.—G.

VEGETATION OF CEYLON.

Ceylon, which has been denominated the Malta of the Indian ocean, is among the richest islands of the world, with regard to vegetation. We sometimes find that the value of a region is deteriorated by the beautiful forms into which nature has there moulded herself, and that a country presenting nothing but monotony to the eye is more desirable for the settler than one offering attraction to the traveller, the painter, and those who enjoy the prospect of varied and magnificent scenery. This is not the case in Ceylon, whose natural wealth is as great as its beauty is rare. The lofty ridges which cover one of its divisions, the hilly country which forms another, and the level region which constitutes a third, are all covered, more or less luxuriantly, with vegetation which, whether it assumes the form of a forest, or of a meadow, or of crops, or coffee gardens, or cinnamon plantations, or orchards, or wild jungle, or cultivated fields, or even the turfy banks of a stream, contributes to enhance the value, as well as the beauty, of this island, which, containing a superficial area of nearly twenty-five thousand miles, possessing a salubrious climate, many natural advantages for commerce and agriculture, and gradually rising in prosperity as it is, may be numbered among the finest colonies of England.

If we count the various indigenous plants which flourish in Ceylon, their variety and number will at once prevent the reader from expecting a full description in detail of the vegetation of this island. It will be sufficient here to indicate the abundance of the different species, the luxuriant plenty in which they grow, to point out a few peculiar kinds, and some remarkable features in their cultivation, and to afford a general idea of the aspect of Ceylon, considered with regard to this subject.

Of the first class, *Monandria*, we reckon, according to the Linnæan arrangement, twenty-two indigenous plants, among which the Alugas (*Globba racemosa*) is distinguished by its fine yellow flowers, which glitter like gold from amid the mass of green in which they are often found. This is a deciduous, herbaceous plant, perennial, and serving as a striking adornment to the garden.

Of the second class, *Diandria*, we count more than fifty, among which the *Jasminum zeylanicum* is remarkable. It differs from its English relative in the disposition of its leaves and flowers. The deep green which hangs about its light climbing stems, which attain a height of six feet, and the pure white of its blossoms, render it exceedingly pretty. But if we were to attempt selecting any from these numerous plants for particular remark, it would be difficult to avoid passing beyond our limits, especially as our object is now merely to call attention to the *number* of the indigenous plants.

Of the third class, *Triandria*, there are nearly a hundred, some of which have as many as five varieties. The native names are mostly as uncouth as can be imagined. Some of these plants are interesting and beautiful, whilst others present little attraction.

Of the fourth class, *Tetrandria*, we find about seventy, the native names of some of which we cannot determine.

Of the fifth class, *Pentandria*, there exist about a hundred and ninety, among which several are very curious and beautiful. Among these are the Heen-wel-Kudalu, whose many-flowered peduncles are singularly refreshing to look upon: *Lahaya corymbosa*, a curious shrub, with delicate white flowers; and a plant, eight feet in height, with curious *green* flowers, which flourishes in abundance, but of which we do not know the native name. There is another plant of this class, the *Tamarix indica*, very beautiful, but with roots from which a deadly poison is prepared.

Of the sixth class, *Hexandria*, we cannot exactly define the number, since their variety

is so great and complicated that it has hitherto been difficult to assign its place to every plant, especially as many have not come under the eye of the botanist, but are known only by their native appellations. If glittering hues, elegant flowers, abundant florescence, and wild profusion, constitute beauty, there is sufficient of it to please the eye of the traveller in Ceylon.

Of the seventh class, *Heptandria*, we find only four in the native list.

Of the eighth class, *Octandria*, there are about thirty-five, of which two are medicinal evergreen trees, the one twenty, and the other thirty feet high.

Of the ninth class, *Enneandria*, we reckon seven plants.

Of the tenth class, *Decandria*, there are between seventy and eighty. Among them is an evergreen plant (*Gomphia zeylanica*), four feet in height, with bright yellow flowers. The satin wood, included in this list, is found chiefly in the eastern province. In appearance its trunk is similar to that of the teak. The wood is much used for ornamental purposes. It is of a beautiful colour, rather yellow, and takes a fine polish.

Of the eleventh class, *Dodecandria*, there are some thirty, the most remarkable among which is the Kokatiya, an aquatic perennial, with white flowers.

Of the twelfth, class, *Icosandria*, we count about seven or eight-and-twenty.

Of the thirteenth class, *Polyandria*, there are nearly forty: remarkable among which are three varieties of lotus, known by the name of Ætolu by the natives. The leaves are of a deep rose-colour; the roots are eaten, and the seeds chewed by children. There is also an ornamental, evergreen tree, twenty feet high, with flowers of a bright golden colour.

Of the fourteenth class, *Didynamia*, we find as many as seventy, of which some have not been examined botanically, and placed under their exact headings.

Of the fifteenth class, *Tetradynamia*, there are but four.

Of the sixteenth class, *Monadelphia*, there are fifty, among which we may mention an evergreen shrub, eight feet high, with pale red flowers (*Omphalobium indicum*); as also a perennial trailer, with orange-coloured blossoms; and a curious annual with bright yellow flowers.

Of the seventeenth class, *Diadelphia*, there are about sixty, among which the *Desmodium capitatum*, a shrub with rich purple flowers, is distinguished by its rare beauty.

Of the nineteenth class, *Syngenesia*, there are nearly thirty.

Of the twentieth class there are thirteen, of which the only particular one is a luxuriant-growing parasite, with *green* flowers, which trails over the ground, up the trunks of trees, or winds among the branches and foliage of stronger plants.

Of the twenty-first class, *Monœcia*, there are about a hundred, among which are several ornamental plants, of great size, such as the *Stillingia populnea*, fourteen feet high, with yellow flowers, very handsome.

Of the twenty-second class, *Diœcia*, we find some seventy.

Of the twenty-third class, *Polygamia*, there are about forty-five; and of the twenty-fourth, about forty-seven, among which is included a very beautiful kind of fern, of a distinct species.

An old writer, in describing Ceylon, says that the flowering shrubs, with which the whole island is covered, send forth a most delightful fragrance with the first breath of the morning and the breezes of evening. This language, though somewhat poetical, conveys nothing more than the truth; for from the eastern to the western extremity of Ceylon, a constant succession of land covered with vegetation meets the eye, whilst the odour of flowers, and that still sweeter fragrance of harvests, cinnamon gardens, and coffee plantations, mingles with those light gales which constantly breathe over the island from the mountains or the sea. But it is the hand of nature which is chiefly discernible in the adornment of Ceylon, for gardening and the cultivation of ornamental plants is scarcely known among the Singhalese as a specific branch of industry. They adorn the ground immediately surrounding their houses with picturesque clusters of palm and fruit trees, whose luxuriance shades and imparts beauty to the spot. Flowering shrubs are also planted about their temples and other sacred places; and these are attended with considerable care, whilst much interest is shown in their flourishing. They also cultivate a few vegetables, such as yams, sweet potatoes, and onions, in their fields; but the occupation is far from a national one. Plots of ground, enclosed and prepared for this particular purpose, after the English manner, are indeed almost unknown, except in those few localities where English manners, habits, practices, and tastes, have begun to take root in the soil of that magnificent island.

Perhaps a slight description of the coffee-grounds, which form one among the greatest beauties, and the valuable features of the island, viewed in an ornamental point of view, may not be uninteresting. The plant was first introduced from Java, where it was planted in 1723, by Zwaardenkroom, who procured the seeds from Mocha. It was once most commonly propagated through the agency of birds and jackals, who ate the fruit: but

in 1820 its regular cultivation commenced. Sixteen years saw it flourishing in great abundance, and it is now considered as of superior quality. A story was once in circulation to account for the inferiority of the Ceylon coffee, which was in reality attributable to the practice of pulling the fruit before it was sufficiently ripe, but which may nevertheless have had some foundation in truth. It was said that the native collectors were in the habit of dipping the fruit in the boiling water before it was perfectly dry; probably with the view of enlarging its bulk, and thus deriving a larger profit from its culture. At present this species of cultivation is not pursued with the same energy as formerly, a fact attributable to the depressed condition of the English market.

The coffee-planter, having chosen a spot adapted for this species of culture, which is generally in a sheltered situation, employs coolies to clear away the jungle. A large number of these labour for some time at this task, and, to the uninitiated stranger, leave no result of their toil. Those versed in the operation, however, know that the plantation being almost invariably situated on a piece of sloping land, all the trees standing in a line are cut nearly through, so that when the tree standing at the summit is at length felled, all those below it give way, and the immense mass of foliage bends, and sinks beneath the last stroke of the axe. A tremendous crash succeeds the preparation of each of these lines of trees, as a vast quantity of timber is from time to time added to the wreck of the jungle.

The ground, being laid bare, is weeded and cleared of stones; when the young shrubs transported from the nursery are planted somewhat closely, and watered by the rains which fall during this season. When they flower, a most beautiful appearance presents itself over the face of the tract of land so cultivated. A mass of silver flowers covers every branch and twig, glittering from amid the dark green and glossy foliage. When ripe, the fruit, of a rich red colour, weighs down the bough, whilst a delightful fragrance exhales itself above the plantation. The appearance of a country so planted has been described by a writer of the present day, as that of a vast park covered with silver-flowered laurels, mixed with great forest-trees, as, in clearing the jungle, a portion of the shade is reserved for the protection of the plants from the power of the sun in dry seasons: and water is conducted to the roots of the plants; for at certain seasons they require a constant supply of moisture.*

The cinnamon gardens of Ceylon have long been celebrated for their beauty. They lie scattered over the face of the country at intervals, and sometimes extend over several thousands of acres. They appear like masses of laurel, or, rather, plants having leaves shaped like the laurel, with stems about the thickness of hazel. Occasionally a plant may be seen, which, having been allowed to grow for seed, has attained a height of forty or even fifty feet, from the summit of which a view may be obtained over the whole surface of the cinnamon gardens, dotted with myriads of pure white blossoms, which contrast brightly with the flame-coloured extremities of the upper, and the dark green of the inferior foliage. Among this the climbing monkey, or pitcher plant (*Nepenthes distillatoria*), in company with the flame-coloured *Gloriosa superba*, entwines its tendrils around the umbrageous and spicy laurel, beneath whose shade also the scarlet-flowered *Ixora coccinea*, and pink-petalled *Vinca rosea*, grow in wild luxuriance. A good anecdote is told by Mr. Pridham, in refutation of the idea which seems to have long existed among the vulgar errors of this country.

"Strangers cruising along the western coasts of Ceylon have conjured up the notion of cinnamon breezes which they have professed to inhale many leagues at sea. This is a mere fancy; for if all the cinnamon trees in the island were barked simultaneously, the odour would not be perceived at the distance of a mile from the shore, being far from diffusive; whereas that operation now takes place in particular spots, as the cinnamon becomes fit for the purpose, over an extensive surface, at uncertain periods, and in small quantities. The fragrance in question, unless altogether ideal, must therefore arise from the immense variety of odoriferous blossoms and flowers of the white orange, lime, shaddock, white and yellow jasmine, and not least, *Pandanus odoratissimus*. Mr. Bennet mentions, as a proof of the slight foundation for the superstition alluded to, that on one occasion, when the wind *blew dead upon the land*, the surgeon of an East-Indiaman, standing off the island, having chanced to rub a little oil of cinnamon on the weather-hammock nettings, the griffins, or strangers, were so convinced of the reality of the cinnamon breeze, that one of them actually published an account of it, from his own experience, of its fragrance when many leagues at sea."

We have said that the people of Ceylon have not progressed far in the practice of gardening. Nature is, indeed, the most tasteful gardener there, for her plantations, un-

* "England's Colonial Empire.—Ceylon." By Charles Pridham. T. & W. Boone. An excellent book, somewhat faulty in arrangement, but full of interesting and valuable information.

altered by the hand of man, are scattered over the island in the most beautiful forms, wilder, indeed, but not less lovely, than the most elaborate arrangements of the artistic gardener. The rich varieties of the vegetable kingdom which exist in Ceylon are not, however, neglected by the natives, who, though they pay little attention to gardening as a means of adornment, have cultivated to a high degree the knowledge of plants and flowers. The object which is supposed to have led, at the first, to the collection of information of this kind, was the medicinal virtue possessed by many of the plants, which has had the effect of inducing every Singhalese to become acquainted to a certain degree with the botanical theories of his country. Native authors, in every species of composition, have illustrated their writings by constant allusions to the beauty, value, and variety of the flowery treasures of Ceylon. It is supposed that the people once possessed a complete system of botanical arrangement; but this no longer exists among them. All the knowledge that remains is that of the uses of the different parts of a flower. The flowers of monœcious plants they divide into *Nihan-mal*, or useless flower, and *Gedi-mal*, or fruit-flower; and diœcious plants into *Mal-gaha*, or flower-tree, and *Gedi-gaha*, or fruit-tree. Grasses are included under the term *Tana;* esculent greens under *Pala;* mosses under *Pari;* edible roots under *Ala.* The Singhalese names of plants generally indicate their qualities; thus *Patmul* means red-root; *Kirwoel*, milky-creeper; with others, as the jug-flower, from the resemblance of its corolla to a jug; and a plant which is called the marsh or tank flower, because it particularly delights in such situations.

We have mentioned the beautiful scenery of the island, as it appears with reference to the variety and loveliness of its vegetation. There are some spots which possess peculiar attractions of this nature; and among them is the country round about Kallaar, where enormous trees, heavy with foliage, glitter with a variety of the brightest colours, whilst flowering shrubs bloom beneath in all directions. Far superior to this, however, is the valley of Hahgalla, which, fringed with berberry bushes, and framed amid hills and hoary forests, is dotted with countless clumps and single trees of the magnificent *Rhododendron arboreum*, which impart to the landscape an appearance of the utmost beauty. Around the trunks of the trees and over the stems is wrapped a mossy verdure, whilst above this climbs the tender parasite, whose flowers seem too heavy for the parent stem: in other spots, a level sweep of park-like grounds, whose flats are clothed with lemon-coloured grass or flowery jungle, which present, as Mr. Pridham tells us, a landscape equalled in few other parts of the world. Indeed, if richness of vegetation constitutes beauty of scenery, we have it in Ceylon. The grass is of the most brilliant green. Plantations of pepper, indigo, cardamoms, coffee, cotton, ginger, and sugar plantations, alternate with rice fields, cocoa-nut groves, and wild jungle, with onion gardens, fields of hemp, and orchards.

The road along the coast towards Colombo drives principally through cinnamon gardens and plantations, which supply the town with a vast quantity of vegetables and fruit. The brilliant crimson *Clerodendron infortunatum*, *Coffea triflora*, *Ixora coccinea*, *Nepenthes distillatoria*, of the climbing and dwarf varieties (*scandens* and *nana*), the former clinging to the cinnamon bushes, whose strong stems support it, and displaying its pitchers, some with the lid closed, others open and full of water; the latter shrinking into the shade of the overhanging trees or abundant grass. Groves of the wild orange, lime, and shaddock trees, heavy with fruit or covered with blossoms, throw a most delicious odour around. The valley of Matale is covered with beautiful jungles, with orchards of citrons, limes, oranges, mangoes, custard apples, and jack-fruit trees; whilst plaintains and cardamoms, with tulip-trees and huge ornamental bushes, flourish wild in the forest, and coffee also grows among the underwood. But if we proceed to instance examples of the luxury of the vegetation of Ceylon, we should far exceed our limits. It will therefore be only necessary to indicate to what extent the cultivation of such plants as are ornamental is practised. In Colombo, where European manners and customs, habits and tastes, have been grafted on the native stock, we find neat gardens stretching along the fronts of many of the houses, planted with the tulip and bread-fruit tree, and with a variety of shrubs and flowers, and cultivated with a degree of taste, neatness, and skill, which, considering the general inaptitude of the natives for such occupation, cannot fail to surprise the traveller who, having made the tour of the island, and observed the countless instances where Nature revels in luxurious, but neglected beauty, arrives at this pretty town, to find it full of these marks of civilization and refinement. At Dondra Head, also, at the southernmost point of Ceylon, the spot which during the seventh century formed the site of the Singhalese capital, there are numerous gardens interspersed with the rude native huts; at this place the sacred pillars are also adorned with flowers and ornamental or odoriferous shrubs.

At Ratnapoora also, a town built on a green hill-side, the rich emerald turf is literally spangled with gorgeous flowers and blossoming bushes, which, mingling with the bright colours of the houses, present a singular and attractive aspect. This part of the island, indeed, is famous for its verdure. The roads are bordered sometimes for miles together with jasmine, orange, citron, lime, and arecas, which, when in full blossom, and with the dew upon them, breathe forth the sweetest of odours, which perfume the soft breezes of Ceylon, whilst an immense variety of flowering trees dot the fields and hill-slopes. The native houses in this district are surrounded by beautiful gardens, whilst the branches of the sacred bo-tree are hung with garlands, and surrounded by little altars, which are piled with the flowers brought by the piety of the natives to testify their devotion to the great god, Gautama Buddha.

Indeed, as we have mentioned before, all temples and sacred places are sweetened with the fragrance of flowers, earth's richest incense, which the poorest peasant may enjoy with as much pleasure as the most favoured son of fortune. In the grounds which surround the ancient and massive sacred structure of Bentotte, the tall palm-trees cast their shadow upon masses of flowers, which, watered by a clear and sunny rivulet, bloom in a luxury of perfection, and impart loveliness to the spot consecrated to the religion of the Indian races.

The temple built on the rock upon which Siva is said in the Hindoo mythology to have left the impress of his sacred foot, is constantly decorated with the rarest and most beautiful flowers. Flowers indeed seem, in all ages and among all races, to have been looked upon as the fittest offerings of piety, the most delicate gift of affection, the sweetest tokens of love, the crown of innocence, the adornments of the marriage festival, and the emblematical decorations of the tomb. The truth of this is illustrated in Ceylon as in most other regions. We have but glanced briefly at the subject in connexion with that verdant island; but may perhaps return to it again hereafter, in order to indicate more particularly a few points which the general nature of the present sketch forbade us to touch upon.

NEW FLOWERS AND PLANTS.

Cyrtanthera catalpæfolia, *Nees von Esenbeck* (catalpa-leaved Cyrtanthera).—Acanthaceæ.—A novel and very handsome shrubby plant, growing from five to six feet in height, somewhat branched, but naturally of an erect habit of growth. The leaves, which are opposite, are large cordate-acuminate, and are attached by rather long stalks; the uppermost pair, beneath the flowers, is much smaller, and of an ovate figure. The flowers grow in dense compact terminal panicles, or thyrsi; they are large, deep yellow, tubular, cut nearly half way down into two gaping segments, of which the upper is erect and entire, and the lower reflexed, spathulate, and three-toothed at the apex. Native of Honduras. Introduced in 1847 to the Royal Garden at Kew. Flowers during the summer months. *Culture.*—Requires a stove; rich light loamy soil, and to be closely stopped while young, to produce bushiness; propagated by cuttings, placed in a slight heat.

Tropæolum Deckerianum, *Karsten* (Decker's Indian Cress).—Tropæolaceæ § Tropæoleæ.—A curious and ornamental species, climbing extensively. The leaves are roundish-triangular, peltate, and obscurely five or seven-lobed. The flowers grow singly from the axils of the leaves, on longish slender thread-like peduncles, which are twisted and twining near the middle, and gradually become thickened towards the blossom, where they are of a reddish colour; the sepals are lance-shaped, green, extended behind into a hairy spur, about an inch and a half long, bright scarlet at the lower part, and green at the apex; the petals, which alternate with the sepals, are spatula-shaped, the two uppermost longest; they are nerved and toothed, the teeth ending in short hairs, and their colour is dark blue, brightest at the margin. Native of Venezuela. Introduced to Berlin in 1845. Flowers at various seasons. *Culture.*—Requires a stove, 68° Fahr., with partial shade; light rich loam; propagated by cuttings, or seeds.

Mucuna macrocarpa, *Wallich* (large fruited Mucuna).—Fabaceæ § Papilionaceæ-Phaseoleæ.—An exceedingly vigorous growing climbing shrub, the twining stems of which extend forty or fifty feet in length; the leaves are large, trifoliate, with cordate leaflets, and somewhat hairy. The flowers come in pendulous axillary racemes, a foot and a half or more in length; the flowers large, curiously formed and coloured; the standard is light green, and assurgent, shorter than the wings and keel; the wings are oblong-lanceolate, and rich deep purple; and the keel longer than the wings, sword-shaped, and of a light purplish brown. It is the *Dolichos*

macrocarpus of some authors. Native of the mountains of Nepal; "Myrung, on the Khoseea hills." Introduced in 1837 by the Duke of Devonshire to Chatsworth. Flowers from December to March. *Culture.*—Requires a cool stove; light rich loam; propagated by cuttings, placed in a gentle heat.

Heintzia tigrina, *Karsten* (spotted Heintzia).—Gesneraceæ § Gesnereæ.—A large-growing soft-stemmed plant, growing from four to five feet high, branching, bearing opposite leaves, which are nearly a foot in length, lanceolate, attenuated at the base, obtusely acuminate at the apex, and serrated at the margins; the upper surface is dark green, and the under side blueish green, with prominent brownish veins. The flowers grow from the axils of the leaves, in a kind of cyme, supported by rose-coloured bracts, each blossom having a large five-parted rose-coloured calyx; the blossoms are slightly curved, an inch long, funnel-shaped, and expanding into an unequal five-lobed limb, of nearly an inch in diameter; the surface has a satiny gloss, imparted by numerous short soft hairs; the colour of the tube is snow-white, of the face of the limb white, with purple spots and freckles. The flowers are succeeded by nearly globular fruit, about the size of a hazel nut, surrounded by the persistent calyx. Native of Venezuela, in moist shady places, at an elevation of 5,000 feet. Introduced to Berlin in 1845. Flowers in the summer. *Culture.*—Requires a stove, with a moist atmosphere, and shaded from the sun; light open soil; propagated by cuttings, or leaves planted as cuttings.

Cœlogyne fuliginosa, *Loddiges* (dark-flowered Cœlogyne).—Orchidaceæ § Epidendreæ-Cœlogynidæ.—A dwarf, and rather pretty epiphyte. It has an elongated creeping caudex, from which, at intervals, grow the oblong compressed pseudo-bulbs, bearing each a pair of broadly lance-shaped wavy leaves, between membranaceous, and leathery in texture. The flowers grow in an erect secund raceme; they are large, handsome, of an ochrey-yellow, with the central lobe of the lip dark purple-brown; the sepals are oval-oblong, the petals shorter than the sepals, the lip oblong-spathulate, three-lobed. Native of India. Introduced in 1838. Flowers in the spring. *Culture.*—Requires a warm moist stove; to be attached to a block of wood, and kept shaded from strong sun-rays; propagated by division of the plant.

Stannia formosa, *Karsten* (beautiful Stannia).—Cinchonaceæ § Cinchoneæ-Gardenideæ.—This is a large shrub, or small tree, in its native state very beautiful. It forms a roundish head, of four-angled branches, bearing opposite leaves, which are from four to six inches long, oval, somewhat coriaceous, and of a shining green. The intra-petiolar stipules are elongate-triangular. The flowers grow at the ends of the branches, in clusters of ten or twelve together, forming a small compact trichotomous head; the monopetalous corolla consists of a slender, nearly cylindrical, tube, about four inches long, terminating in a flat limb, about two inches in diameter; the flowers are pure white. Native of Venezuela, on the mountains of Tovar, 5,000 to 6,000 feet (German) above the sea-level, in open and rather dry situations. Introduced to Berlin in 1845. Flowers from June till September. *Culture.*—Requires a stove; peat and loam; propagated by cuttings of the half-ripened wood, planted in sand under bell-glasses.

Aristolochia picta, *Karsten* (painted flowered Aristolochia).—Aristolochiaceæ.—A slender and highly curious climbing plant, remarkable, as is the whole of its family, for the odd shape of its blossoms. The young branches are smooth and shining. The leaves are cordato-sagittate, or between arrow-shaped and heart-shaped, bright green on the upper side, and fainter and bluish on the under surface. The flowers grow single from the axils of the leaves. The corolla, which is monopetalous, assumes at the base the form of a large swollen tube, the upper part of which is abruptly turned like a hook; it then takes an inflated bladder-like form, then suddenly becomes contracted, and at last expanded into a broad limb of an oblong heart-shaped outline, terminating at the apex in a short hair-like appendage; the interior and mouth of the tube is an ochreous yellow, which colour is also continued in a dense series of net-like veins over the dark violet limb. Native of Venezuela, in the province of Caracas; somewhat extensively distributed. Introduced to Belgium in 1845. Flowers in the summer months. *Culture.*—Requires the temperature of the stove; dryish rest in winter; peat and loam; propagated by cuttings.

Thyrscanthus bracteolatus, *Nees von Esenbeck* (bracteolated Thyrscanthus).—Acanthaceæ § Echmatacantheæ-Gendarusseæ.—A showy suffruticose plant, growing from two to three feet high, with opposite, nearly sessile, lance-shaped entire leaves, and a terminal obtuse thyrse-like panicle of bright scarlet blossoms; these blossoms are an inch and a half long, with a slender tube, bent in the middle, and above divided into an unequal two-lipped limb of five long narrow spreading segments. It is the *Justicia bracteolata* of Jacquin, and was formerly called *Odontonema lucidum* by Nees. Native of New Granada, and the West Indian Islands. Introduced originally in 1824: re-introduced about 1847. Flowers in the autumn and winter. *Culture.*—Requires a stove; loam

and peat; propagated by cuttings planted in sand, and placed within the influence of a slight bottom heat.

Bruckea grandifolia, *Klotzsch and Karsten* (large-leaved Bruckea).—?Verbenaceæ.—A large shrub, or small tree, with a roundish pyramidal head of branches, the bark ash-grey, and the young branches studded with warts. The leaves are opposite, lance-shaped, from three to five inches long, coriaceous, and deep shining green. The flowers grow in little cymes from the axils of the leaves; they are white, with a short cylindrical tube, dividing into a regular limb of five oblong obtuse lobes; the flowers are about half an inch in diameter. Native of Venezuela, on the mountains of the province of Caracas, at an elevation of from 5,000 to 6,000 feet. Introduced to Belgium in 1845. Flowers in January and February. *Culture.*—Requires a stove, with a damp atmosphere, and exposed to the sun; peat and loam; propagated by cuttings. It was found blooming both in the wet and dry seasons, and grew in damp places in the vicinity of brooks on open and sunny slopes.

Cereus reductus, *Link* (dingy Cereus).—Cactaceæ § Cereidæ.—A dingy looking species, with a stem three feet high or more, cylindrical, four or five inches broad, deeply furrowed with fourteen or fifteen furrows; the colour is dull glaucous green. The ridges of the stem have large mammillæ, which are near together, and bear a tuft of about eleven large tawny divergent spines of unequal size. The flowers appear, two or three at the top of the plant; the calyx-tube dark green, with remote scales gradually passing into the oblong sepals with white margins, these again merging into the petals, which are white tinged with rose colour. It is the *Cactus nobilis* (Haworth; not of Aiton). Native of South America, supposed to be from Mexico. Introduced to Kew "many years" before 1848. Flowers——? *Culture.*—Requires a warm greenhouse, and a little extra heat while growing; loam and lime rubbish; propagated (very rarely) by offshoots planted as cuttings.

Rhyncopera punctata, *Karsten* (spotted-flowered Rhyncopera).—Orchidaceæ § Malaxeæ-Pleurothallidæ.—A curious little epiphyte, bearing elegantly drooping racemes of small somewhat dull-coloured blossoms, which look like rows of flies settled on the stalks. The plant grows in dense tufts, its height being about six inches. The stems are simple, round, and smooth, bearing each an elliptical somewhat leathery leaf, which is notched at the apex, and flatly keeled on the under side. The racemes of flowers proceed from the base of the leaves. The individual blossoms are small, and have a reddish-white ground colour, spotted with purple, the sepals and petals being small and narrow, and the lip yellowish-red spotted with red; the colours are not, however, very bright. Native of Venezuela, in the province of Caracas, where it was found by Dr. Karsten, growing on the branches of forest trees, the locality being at an elevation of 5,000 to 7,000 feet. Introduced to Berlin in 1845. Flowers in the autumn. *Culture.*—Requires a stove temperature, and a moderately damp atmosphere; turfy peat soil; propagated by division of the tufted plant.

Pesomeria tetragona, *Lindley* (square-stalked Pesomeria).—Orchidaceæ § Epidendreæ-Bletidæ.—A curious terrestrial orchidaceous plant, with an erect four-angled stem, having ovate lanceolate plaited leaves, and a loose spike of flowers on a peduncle a foot high, arising from the inner base of a lateral leaf. The flowers are rather large, the sepals and petals uniform, oblong acute, red-brown tinged with green; the lip convolute crisped, and terminating in a mucro, the colour yellow with streaks of orange-red. It is the *Epidendrum tetragonum* (Thouars). Native of the Isle of Bourbon. Introduced by Messrs. Loddiges in 1837. Flowers in December. *Culture.*—Requires a hot moist stove; turfy peat soil; propagated by division of the plant.

ARISTOLOCHIA PICTA.

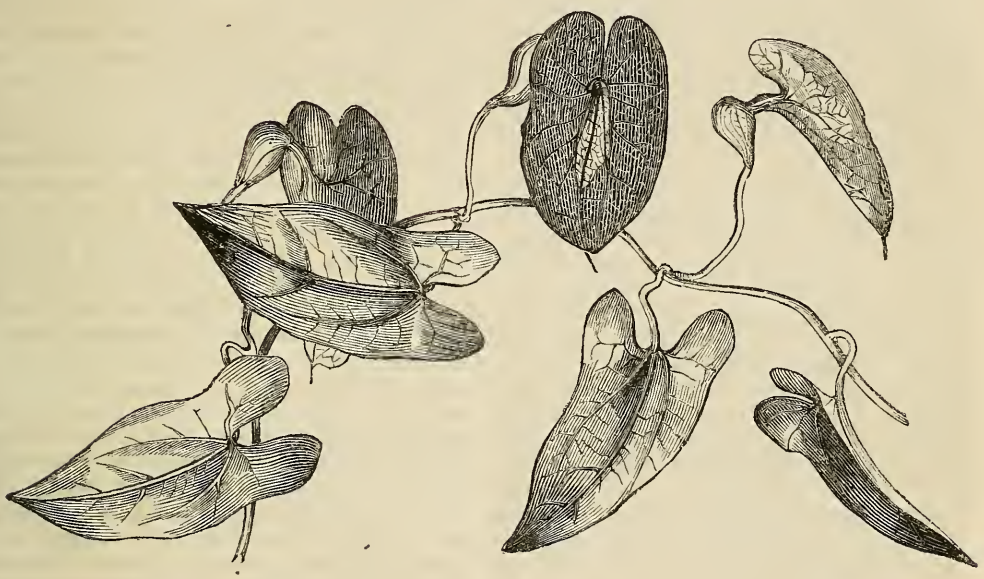
Aristolochia picta, Karsten (painted-flowered Aristolochia).—Aristolochiaceæ.

This species of birth-wort was introduced from South America to the gardens of Prussia, by Dr. Karsten, by whom it has been recently described in the *Auswahl Gewächse Venezuelas*, published in Berlin. From this source we have obtained our figure and the particulars which follow.

"The mature stems and branches of this plant sometimes creep a considerable distance over the ground, here and there spreading and twining over and round bushes and brushwood in damp grassy places. The young branches are round, smooth, and of a shining green colour. The leaves, which are nearly sagittate, or cordate, and grow on peduncles from an inch to an inch and a half long, are of a like breadth, and from three to three and a half inches long, sharply pointed at the apex, and deeply cordate at the base. The fresh bright green colour of the upper surface of the leaf becomes fainter and bluish on the under side. The flowers, which are solitary, issue from the axils of the leaves, and are borne on peduncles of nearly twice the length of the leaf-stalks. They consist of a single beautifully coloured monopetalous

corolla, which at the base assumes the form of a large swollen tube, the upper part of which is abruptly turned in the manner of a hook, where it takes an inflated bladder-like form, then suddenly becoming contracted; and at last expanding in a large broad limb, having the tube connected with it at one side, and terminating at the apex in a long hairy appendage. The upper cylinder-like part of the flower tube hangs or grows downwards, and near the middle of the bladder-like expansion it is contracted and turned upwards; the interior of the part of this tube thus turned up is of an ochre-yellow colour, slightly tinged with dark violet; the net-like veining, which extends to the margin, is also yellow. Six stamens are inserted at the base of the style, by means of a sort of glandular ring, and united to it at their inner side. The fruit is from three to four inches long, six-celled. The seeds are nearly triangular, oblique, heart-shaped, and placed in a row together, but divided from each other by a leafy or nearly fleshy membrane, in which the seeds are clothed. In the middle line of the fleshy albumen is a very small cylinder-like radicle, with thick, fleshy, unequal cotyledons, lying on each other.

"*Aristolochia picta* belongs to the group Clematites of Endlicher, the species of which



have a tongue-formed border to the corolla. It differs from those hitherto described, particularly such as have the flower bilabiate, which Endlicher includes in the group Pistolochia. It comes near to *A. glaucescens* (Kunth), to which the resemblance in the flower is considerable. The leaves in *A. glaucescens*, however, are not only larger, but also oval, and deeply cordate at the base. It comes still nearer to *A. Ottonis* (Klotzsch), not only in the form of the leaves, but also in respect to the position of the flower. *A. Ottonis* was discovered by Mr. Edward Otto in a locality near to that where *A. picta* was found growing, and is distinguished in particular by the prominence of the stipules: the border of the corolla is also somewhat longer, particularly at the cordate end.

"*Aristolochia picta* is found in the province of Caracas, and appears to be somewhat extensively distributed in the neighbourhood. I found it at first in the district of Puerto Cabello, in the valley of the river Esteban, and subsequently near the Araqua, the Guaire, the Tuy, and the Tacarigua sea, and in other places; and generally in such places as are covered with water in the rainy season, and which become so parched in the dry time, that the roots can scarcely obtain nourishment.

"This plant requires for its full development the entire influence of the sun, including both light and heat. In the tropics it is exposed to the full action of the atmosphere. During the day, the influence of the sun's rays raises the temperature of the soil in which it grows to 60° Réaum. (167° Fahr.) and during night, under a cloudless sky, it becomes so cool, that the thermometer sometimes falls below + 12° Réaum. (59° Fahr.) But the roots do not throw off their heat so rapidly, since the ground is covered with bushes, which considerably modify the abstraction of the

heat, and even render the direct rays of the sun less powerful ; they are therefore for the most part surrounded by an uniform temperature, which is not much lessened even in the rainy season, as in the more northern zones the rains always convey to them the heat of the higher atmosphere. I found, for instance, in the district of Puerto Cabello, during one rainy day (Dec. 4), about half-past six in the evening, that the rain was of the temperature of 19.7° Réaum. (76° Fahr.), while the mercury in the air showed only 19.2° Réaum. (75° Fahr.) Even in the middle of the day the temperature of the rain had always been somewhat higher than that of the atmosphere. The former about twelve o'clock was 20.2° and the latter at 19.9°. About half-past eight on the morning of the following day, also, after it had rained during the whole night, the temperature of the rain was at 19.5°, while the thermometer in the air showed only 19.4°. These observations should have some weight with those engaged in the cultivation of tropical plants.

" I found all the Aristolochias in the district of Caracas in flower during the summer months ; the fruit ripens in the dry season. The above-mentioned rains, though incessant in December, are somewhat extraordinary, since the hilly parts of the coast continue dry from November till May, when it rains incessantly from fourteen to twenty days, and the dormant vegetation soon again becomes excited. Owing to the effects of the north wind and the damp cool sea breeze, the valleys become loaded with an almost saturated or humid atmosphere, which induces a development of the flowers of the leguminous plants, which soon bestrew the barren ground with their beautiful colours. It is said that with the north wind the spring commences, when the yellow flowering cassias, together with the combretums and the odoriferous crotons, convert the sandy sterile plains into a flower garden ; while the beautiful coral-like Erythrinas, with the canopy of the coffees and cocoas, and their brilliant flowers concealing the naked branches, cover the banks of the streams and rivers with a gorgeous carpet. About Christmas time the acacias produce a brilliant effect on all the hill sides near the coast."

THE IRIS FROM SEED.

The Iris is one of the most numerous families of hardy and beautiful flowers, comprising a few bulbous kinds, but consisting in general of herbaceous perennials. There are some, but very few, that are not perfectly hardy, but they are the exceptions—three or four in a hundred, and hardly so many. They bloom at different times, some in May, others in June and July, and a few as early as April. The culture is so very simple, that all gardens should have a collection of the leading sorts. As to colours, there is no end to them —blue, lilac, violet, purple, yellow, white, and some with all these colours varied. Once planted, they stand for years, spreading wider and wider in the borders. Many persons who pretend to cultivate a few, merely take off from the patch some pieces, to reduce it to a proper size, and these pieces put in the ground at any other place will grow as if they had been there for years, and in their turn become large patches, to be reduced as those they come from were. The cultivation, therefore, is not more difficult than that of a cabbage.

The most interesting part of their culture is, however, the raising them from seed, as all the kinds seed freely, and produce extraordinary crosses and changes. The seed may be sown in shallow pans, or, if the ground be very clear of weeds, in the open border, but pans are the best. These may be placed in a cold frame, for as autumn is the best time for sowing, if the young plants can be protected, they may be placed in a cold frame, and there must be constant attention to keep them clear of weeds. The young plants will appear in spring, and must be regularly watered and shaded, for the burning sun would destroy them. They may be placed in the open air as soon as they are well established, and in a south border, so that they may not have too much sun. They will continue growing until the autumn, when their leaves will turn yellowish, and, at all events, they will have grown all they can grow; they must now be placed in the cold frame again, and a bed must be prepared as long as is necessary, and four feet wide. Let the plants now be taken from the soil in the pans. If the leaves have died down, the bulbs, tubers, or roots, will be there. Draw from one end of the bed to the other seven drills, about two inches deep, and place the roots therein, at the most six inches apart, and draw in the mould upon them. If a severe winter sets in, there may be litter placed over the bed, the same as for young radishes and salads, and this litter must be off in mild weather; as the spring advances, the plants will grow, and must be kept very clear, the earth occasionally stirred, and not a weed allowed to grow. Here they may be continued, with no other attention than frequent watering in hot weather, occasional stirring of the earth when rain has closed the surface, and weeding when necessary. They will continue to grow until they bloom, at which time you will observe many curious sorts, unlike the present, and some of them much better, that is, unless you

have been very unlucky. When they bloom, you must go round and examine them, making your remarks upon such as appear worthy of extra care, and describing them exactly upon your books or labels. The best way is to have a number on the label, and let the corresponding number in a book have the description attached, so that, by referring, you may tell what every remarkable one may be. There will be many like the old ones, scarcely to be distinguished or particularized from one another. The sorts that are numbered and described as good, should be removed from the bed to the places they are in future to flower in, directly the bloom has gone, and all that are not worthy should be given away, thrown away, or destroyed. The selected seedling Irises should be named, and not one, nor a bit of one should be parted with, unless the name by which it is to go, goes with it. The bulbous Iris has been cultivated some time by many persons, and Mr. Salter, of Shepherd's Bush, used to grow a splendid collection; but raising from seed applies to all alike, tuberous, fibrous, and bulbous.

FRENCH MODE OF CULTIVATING THE MUSHROOM.

This subject is by no means new. We cannot, therefore, say much that is not already well known, but can only state that which many people are ignorant of. Our object is simply that of rendering the culture of mushrooms popular. In doing this, we shall be as lucid as possible, keeping in mind the most successful and complete practice.

Choice of the Dung for the Mushroom Bed.—Horse-dung, particularly from hotels or livery stables, is preferable to any other, as being more strongly impregnated with urine. Some people believe that the dung of mules yields the finest productions and the greatest quantity. Everything in the shape of hay, moss, leaves, or cloth-cuttings, must be carefully excluded from the dung about to be used. This precaution is very necessary if we would avoid failures. The beds may be made either in the autumn or the spring.

Preparation of the Dung.—After being freed from everything likely to form an impediment to success, the dung is properly turned with a fork, leaving it in a heap of an oblong form; then the heap is tramped with the feet, and watered more or less, according to its condition and temperature, and finished by being beaten with a wooden shovel. Eight or ten days afterwards, according to the fermentation, the same process must be gone through, carefully mixing the dung as it is turned. After lying a few days more, it must have a third turning, in which the same care must be observed; and at every turning, the heap ought to have a fresh place. When the dung has become *sweet*, and is soft to the touch, neither too dry nor too moist, it is in a fit condition to form the bed.

Construction of the Bed for the open air.—The dung having all the qualities necessary to success, may be removed to the place allotted for the bed, and lifting it with the fork, must be placed so that the bed may have the form of a span-roof, the sides sloping considerably. If it is required to make several beside each other, a space must be left between as working room. The length of the bed can be determined by the produce required. The dung must be laid on, and placed so that there may be no cavities throughout the whole; and when the bed has been so far made, it must be finished by being combed with the fork or the hand, both sides beaten with the shovel to make them even, and the whole left in this state during from five to eight days. A stick is thrust into the centre, so that when drawn out, the heat may be ascertained, and when a proper, that is to say, a gentle heat, is obtained, the operation of *spawning* may be proceeded with.

Construction of the Mushroom Bed in vaults or cellars.—The dung is prepared outside, as in erecting the beds in the open air, and the turning and mixing being finished, it is removed to the cellars. The bed must be carefully constructed along the wall, and so as to have only one of the sides previously described, unless it is preferred to build it in the centre of the vault, when it must have two sides; however, the situation is optional. But, as in the case of the first, the same relative form should be observed. Beds may also be made on shelves. All outlets from the vault must be carefully closed up, and the absence of light and air will make up for any want of rough litter, which material is necessary for the beds outside. These beds are longer productive than those constructed in the open air; of the latter, however, we are chiefly about to speak at present.

Choice of Mushroom-spawn.—Of all things essential to success in growing mushrooms, the most important is, without doubt, the choice of the spawn. The pieces of cake coming from old beds, or those which have not been entirely exhausted by production, ought to be employed. Mushroom spawn can be kept for more than ten years in a healthy place—that is, one which is neither too dry nor too damp. The cakes, to be good, ought to be ramified and covered with little white fibres, and have a particular smell, which, with a little practice, will be very easily known.

The manner of spawning.—Spawning a bed is the act of introducing small pieces of the spawn cake into the bed, at certain distances, with a wooden dibble, or with the hand, the pieces being of equal sizes. The distance of the holes from each other may be six or eight inches, and their disposition after the manner of a chess-board. Immediately the spawn is introduced, the dung must be pressed with the hand, so that the holes may be well covered. This done, the bed is covered with some long rough litter about four inches thick.

In order to ascertain that the spawn has "taken," the litter is removed, and if small whitish filaments are seen at the surface, and which appear to be growing, it is a certain indication that the operation has been successful. The bed is then covered with earth from two to three inches thick, slightly damped if necessary, and then gently beaten with the back of the shovel to keep it firm. This finished, the rough litter which was previously taken off, is again laid over the whole.

If, on visiting the bed, no trace of filaments is visible outside, it may be taken as a proof that the spawn has not *taken;* in this case it will be necessary to put in more, but not in the same holes. If at a second, or even a third visit, nothing is seen to indicate a favourable result, it may be safely inferred that the bed has been ill-constructed, the dung ill-prepared, or some unforeseen cause has formed an obstacle to the success of the undertaking, and nothing remains but to submit to go through the labour again.

A bed of from eight to ten yards long, well constructed, of good dung, will yield a return sufficient for the wants of a family of eight or ten persons, though gathering every other day for more than three months.

Conclusion.—Gathering mushrooms on the bed involves no liability to mistakes likely to lead to serious consequences. There is nothing in general found among the good sorts, but a few *coprinus* (coprini), which may be easily distinguished by their conical form, their feeble stalks (stipes), the slightness of the gills (lamellæ), and the readiness with which they turn into a dark-coloured water. But if mushrooms are gathered in the woods, mistakes may prove mortal, as there is found in the same places the clammy mushroom (*Agaricus illinitus*), with pink gills, but no ring; the *A. pontherinus*, with the ring present, but whose gills are always *white;* and especially the terrible bulbous mushroom (*A. muscarius* ?), which has the same distinctive character. In order, therefore, to be sure of the true mushroom (*A. campestris*), we must discover, first, pink *gills*, passing to the black, and liable to turn into water; second, a *ring* (under the crown); third, a stalk without an envelope (volva) at the base; fourth, the flesh somewhat thick, firm, and of an agreeable smell. But it is always safe not to take those which are too far advanced, that is to say, those whose gills have become black and the cap much notched, as they are indigestible and very exciting.

After eating mushrooms, should any unfavourable symptom occur, such as indigestion, oppression at the stomach, nausea, or a desire to vomit, it will be sufficient to drink a little hot tea, or brandy in hot water, or water in which balm or mint has been infused, and not to sleep less than six or eight hours after taking the draught. If it is apprehended that some of the bad kinds have been eaten, no time ought to be lost in submitting to a course of vomiting by means of tepid water, or by tickling the throat with a greased feather.

IVY AND OTHER UNDERWOOD.

Ivy may be considered a very curious kind of underwood, seeing that it is a most vigorous climber, but it is also one of the best possible carpets for the ground under large trees. We recommended it years ago, but saw its failure more complete than any other failure that we ever witnessed, and that entirely through the worst mismanagement. All gardeners should know, that close to the stump of a tree there can be no nourishment for anything, yet a score vigorous plants were placed as near the stem of a large tree as depth of soil to hide the roots could be got, and then were trailed along the ground, but in some years had made no progress worth mentioning. The only way to make Ivy a good carpet is to plant it outside, instead of inside, and train it along the ground inwards towards the stump. Say a cedar has neither grass nor any other vegetation under it for a circumference of thirty feet distance, or one hundred and eighty feet. Thirty plants of Ivy would reach all round at six feet apart, but as the sooner the ground is covered the better, use sixty plants three feet apart, and let these plants be well grown, with six feet of growth already. Plant the Ivy all round at these distances, and peg the branches inwards towards the tree, but spreading them wide enough apart to cover the ground as well as you can so far as they go. These plants derive their nourishment from a part of the ground where the rain and air reach them partially, and where the influence of the roots of the tree does not reach them. Their growth is rapid, and is to be constantly directed inwards, and will reach in an incredibly short time the stump of the tree itself, the ground

being closely covered with Ivy as if it were a mat of it. Nothing is so sure as its growth, for no matter how barren the ground under the tree, it will progress so that the roots are but well provided for. It has another good effect; it kills all sorts of weeds and other vegetation wherever it assumes the lead, and when thoroughly established, begins to grow upwards, that is, assumes a shrubby habit at the joints. It has this great advantage over other underwood, it derives its chief nourishment far from the barren place which it covers, and other underwood has to live on the place it has to cover. The Berberis Aquifolium and varieties will live almost on nothing, and under the most impenetrable shade. The St. John's Wort, common Laurel, and some other subjects, will exist in bad soil, but the Ivy grows vigorously and healthily even if the ground it has to pass along and cover were solid stone. It is worth any body's while to try the experiment in any barren place; but let the root be at the edge of the starvation space, and so get the nourishment it requires, while its branches will fare as well on a surface of hard gravel as it would on a brick wall; and we have all seen Ivy many feet from its ground root, wandering over all sorts of surfaces, from the rough bark of a tree, to the hard smooth surface of a stone wall. There is not a more obedient servant than Ivy, but he is a bad master; he will conquer whatever he lays hold of, if it be an oak or a stone wall; nothing can resist his grasp. The roots will insinuate themselves into crevices of stone, and raise a ton weight by the mere operation of swelling; but nothing was ever more completely under control. It may be directed any where, and be made to cling to any thing. It may be grown up a stump, to form its own head like a tree, or be made to cover a wall like a curtain, or the earth like a carpet. In short, it is a magnificent evergreen, adapted for a thousand purposes, trainable in any shape, and not half valued, because its worth is not half known. Nothing was ever more true than the line of the song,—

"A rare old plant is the Ivy green."

THE POTENTILLA.

This is one of those plants which do not attract much attention in their original state, but which have been rendered desirable by the improvements that have been made by seeding. The best of the family was the *Potentilla Hopwoodiana*, which was originally found in a bed of stools, and was supposed by some to have been a sporting branch of one of the best old ones, but by others far more likely to be right, it was considered to be a self-sown seedling, a natural cross between a light and a scarlet. It is, as growers well know, a rich salmon-coloured flower, and very pretty in form and habit.

This flower, to be perfect, should be completely circular and slightly cupped, blooming abundantly, completely above the foliage, on very thin but stiff wiry branches. The colour, as in all other flowers, is purely a matter of taste, but the most in repute are the most brilliant. Each bloom should be the size of a half-crown piece.

The culture of the Potentilla has been quite neglected, except that it is found among the collections of herbaceous plants, and merely one of a hundred subjects thought but little of by gardeners. A collection of them in a bed, with the flowers well contrasted, would be a very showy object, and the following selection has been recommended.

Atrosanguinea, deep crimson.
Thomasii, rich yellow, large.
Insignis, bright yellow.
Russelliana, crimson scarlet.
Formosa, rose.
Menziesii, rich crimson.
M'Nabiana, crimson and white.
O'Brienii, orange.
Rubra-Aurantia, red and orange.
Hopwoodiana, pink and white, (salmon, &c.)
Brilliant, rich bright scarlet.
Plantii, yellow centre, scarlet border.

These are calculated to make a pretty little collection to begin with, and contrast one with the other well for colour. This plant, like many others, would grow best in good rich loam, without any other dung than had fallen to its share when it was in pasture land; and as a general rule, nothing beats this soil for flowers. Beds should be formed four feet wide, and any length the number may require. They should be planted in three rows down the bed; the rows should be nine inches from the side, and the same from row to row. There are few subjects that look more pleasing or more showy. They will do three years without replanting, but when done, the roots should be parted, so that there be a good heart and a bit of root to each. After watering them in, to settle the earth about the roots, they may be left to take care of themselves, all but cleaning; they must be weeded from time to time, but that is all they require. It is a plant well worth growing from seed for the chance of a new variety, and if the before-mentioned varieties were placed in one bed, all the seed saved from the bed must afford the very best chance of novelty, because all the colours, being placed to grow in one bed, will be crossed by the insects, and no two can be crossed without making very singular combinations. When

these flowers are shown for prizes, they must be shown on a single flower stem, and all the blooms and branches on it. They might be shown in stands or tubes of half-a-dozen varieties, and would make a very pleasing change in the tables of flowers. Like most herbaceous perennials which increase rapidly by the spreading of the roots, seedlings have been neglected, but it is not too late to begin.

GLENNY'S HAND-BOOK TO THE FLOWER-GARDEN.*

SUPPOSE it possible that every writer had written for himself, and had given us his own sentiments in his own language, the multiplicity of works on gardening would seem prodigious, and there would seem no excuse for adding one to the number. But as a multitude of books is not necessarily like a "multitude of council," so we cannot say there is always wisdom. The truth is, and it cannot be gainsaid, that it is now possible to take up twenty works on gardening without discovering in the most modern one new idea. Old Abercrombie, in his popular volume, "Every Man his own Gardener," has furnished the writers of the last half century with all their material, and the fact will be apparent to any one who will take the trouble to read the original work; and all the small fry of garden literature that followed him will be found very poor imitators. This can hardly be said of a writer who struck out into a new line; who begun by treating of flowers not previously mentioned; who adopted a style of his own, not always admired for its elegance, but generally approved for its clearness. Mr. Glenny is an original writer. He can have copied from nobody, for he writes like nobody. Get him into a controversy, and he is abusive; read him on a matter of garden practice, and where there is nobody to quarrel with, and you have more in one page than any other writer gives in half-a-dozen. The work now submitted to the gardening public is a very plain-dealing affair. The notes of Mr. Glenny's own practice are reduced to plain reading; they are guaranteed as the result, or perhaps the origin, of successful practice; they are neither borrowed nor compiled from other authors, but form the groundwork of a very successful horticultural career. They have at different times been enlarged upon, and elaborate Treatises published. Wherever this has been the case, the identical number of the work in which it appeared is appended to the end of the article; so that the work will form a very excellent instructor on the science of Floriculture and Gardening, and supersede nine-tenths of the works at present published. We select an example by way of illustration of the style and matter of the book :—

"LILIUM (Lily).—Many of these are familiar plants in all gardens. It is a genus of bulbous-rooted perennials, containing many distinct species, nearly, perhaps quite, all of them perfectly hardy, or sufficiently so to admit of their being cultivated in the open garden. The common lily, *L. candidum*, with white flowers in June; the orange lily, *L. bulbiferum*, with rich orange flowers in June; the Turk's-cap lily, *L. Martagon*, flowering in July, with purple or white varieties; the scarlet Martagon, *L. chalcedonicum*, with rich vermilion blossoms in July; and the tiger lily, *L. tigrinum*, with pale red flowers, spotted with black, produced in July, are among the best of the older sorts, and are all very handsome garden flowers. These merely require to be planted in good garden soil. The most beautiful of all the kinds, however, are the more recently introduced, such as *Lilium speciosum*, or *lancifolium*, and its superb varieties, *punctatum*, *roseum*, *rubrum*, *album*, &c. The plants grow from eighteen inches to three feet high, and bear five or six flowers, (sometimes many more,) some variegated, as if rubies were stuck all over their petals, and their petals were formed of pearl. The varieties are striking, and the flowers are much more noble in size than any of the ordinary lilies. Loam, from rotted turves cut thin and laid together, two-thirds; dung, one-sixth; turfy peat, one-sixth, well incorporated, is a fine compost for them; and the principal thing to look to is the health of the root, the size of the pot, and the drainage. There should be plenty of pot-room. Let them be placed in a cold frame, and be covered in bad or cold weather; they will grow without any difficulty; and as they rise too high for the frame, remove them to the greenhouse, where they will flower in great perfection, and retain their beauty a long time if shaded from the heat of the sun. They will seed freely, and plants are easily raised from seed. The seeds may be placed an inch apart, in pans, and placed in heat. When up, let them be removed to the greenhouse, and be undisturbed two seasons. They may then be placed in sixty-sized pots (three inches across), and grown until they are filled with roots; then removed to larger, until they flower. They are multiplied by offsets, which form round the old roots. These varieties are, however, sufficiently hardy to grow in the open air, if the beds are covered with some light compost in winter; and,

* "Glenny's Hand-Book to the Flower-Garden, Shrubbery, and Greenhouse." London: C. Cox, 12, King William Street, Strand.

grown in the open air, they form fine autumn blooming subjects."

"HOVEA.—A handsome family of greenhouse evergreen shrubs, comprising a considerable number of species, among which there is proportionate variety, in size and habit: they are free-growing subjects. The flowers of all are of some shade of purple or blue, and of the shape of those of the pea, which form is called butterfly-shaped; and hence, papilionaceous, from *papilio*, a name given to butterflies. The most beautiful of the whole family is *Hovea ilicifolia*, the leaves of which are bright, and something like those of a small holly. This family of plants requires a light fresh soil, but not a rich one: one-third loam and two-thirds peat will answer well. The drainage must be good; as much as one-third of the ordinary-formed pots should be filled with crocks, and they should be watered with clean rain-water, if possible. Cuttings will strike in sand upon the ordinary compost; an inch of sand, well saturated with water, should be prepared on a level surface of the compost. The cuttings, which should be the tips of unblooming shoots, should be taken two inches long, the leaves cut off the lower inch, without bruising or touching the bark; and these should be stuck in the sand, and covered with a bell-glass. A slight bottom heat contributes to facilitate the striking. During the time the cuttings are striking, the glass should be taken off daily, and wiped dry inside; and they must on no account lack moisture. When they have begun to grow, the glass may be left off an hour every day. During the whole time they must be shaded by putting a paper cap over the sunny side of the glass. When they have struck, they must be potted into the smallest-sized pots (three-inch, or sixties), and kept the same depth that they were in the cutting-pot;—on no account must they be sunk deeper. They may now be placed near the glass in the greenhouse, merely protected from the scorching mid-day sun, and watered daily as to their moisture, which must be on no account neglected. Their tops may be pinched out as soon as they are fairly established, and this will encourage lateral shoots. As soon as the pots fill with roots, let them be changed for a size larger, keeping to the same compost, and taking care not to bruise the fibres which are exposed outside the ball of earth. They may be allowed as much air as possible in mild weather; and if any of the lateral shoots are growing too vigorously, let them be topped, for, excepting *H. ilicifolia*, they all incline to make long shoots. In this way may the plants be grown from pot to pot, until they form, first, handsome little, and ultimately handsome large plants. Those who are anxious to form large specimens in a short time, will pick off the buds of flowers while the plants are small. It is far better to let them take their natural chance, and bloom in season. When the flowers decay, by all means remove the decaying flowers; because the formation of seed-pods would retard the growth, and prevent them from growing handsome. To raise them from seed, sow in pans, or wide-mouthed pots, and place them in the greenhouse, where, as soon as they are up, they must be kept clear of weeds, and be occasionally watered, until they are large enough to prick out in other pans, an inch and a half apart. Here they may grow till they are large enough to pot singly, when they must be treated exactly like cuttings. The *Hovea ilicifolia* has purple flowers. Other handsome kinds are *H. Celsii*, blue; *H. pungens*, blue; and *H. splendens*, blue: they bloom in April and May."

LOASA PICTA.

Loasa picta, Hooker (painted flowered Loasa).—Loasaceæ.

This is a very pretty annual, and is likely to prove useful for the flower garden, as a bedding plant. The Loasas, however, are furnished with stinging hairs, which is some objection to them, as they are in consequence not at all fit for bouquets, or, in fact, for placing in any position where they are likely to be "handled." The flowers are, however, extremely pretty, and being quite unlike those of any other plants, they may be fitly introduced to situations where they may only be "looked at."

Several species have been introduced, but these have, from the reason just pointed out, been in great measure neglected, with the exception of one or two climbing species, *L. lateritia*, and *L. Herbertii*, which have orange-red flowers, and are very useful as well as ornamental climbers, both for the flower garden and greenhouse. The former is the larger growing of the two.

Loasa picta is an annual. The stems grow about a foot high, nearly erect, but slender, and branched. The alternately-placed lower leaves are rhomb-ovate, pointed, acutely lobed, and serrated; they are attached by stalks, and are from two to three inches long. The leaves on the upper part of the plant are not stalked, and are lance-shaped in outline, the margins being coarsely serrate. The numerous branches terminate in somewhat leafy racemes of flowers; these are attached by long peduncles, and are turned downwards; they are also large for the size of the plant, being nearly an inch and a half in ex-

pansion. The corolla consists of five obovate cucullate petals, which are reflexed; these are hairy at the back, and the lower half of them is bright yellow, the rest white. The clusters of numerous stamens project considerably from the point of the insertion of the petals. Enveloping the base of the stamens, is a series of five petaloid scales or nectaries; these are white, beautifully mottled with red; their form is ovate-acuminate, cucullate at the base, and bifid at the apex. The flowers, which are numerous, are produced for a considerable time in succession through the summer months, in season depending upon the period of sowing. The branches, stems, and leaves, are clothed with stinging hairs.

The species is a native of Chacapoyas, in the Andes of South America. It was sent to England by Mr. W. Lobb, by whom seeds were forwarded to Messrs. Veitch of Exeter. From these seeds, plants were raised, which came into bloom in December, 1848.

This plant may be grown as a half-hardy annual; that is to say, it should be sown in April, in a frame or pit, and by the end of May, planted out in the flower garden. There is reason to believe, that it will make a pretty plant for bedding. The gracefully disposed blossoms, yellow and white with a red eye, make it very attractive, when there is a profusion of them together.

Of course, such a plant is increased by the seeds, which in these Loasas are generally produced very abundantly.

There is one peculiarity in many, perhaps all, of these Loasas, which is worth pointing out. The stamens, which are usually seen to be standing together in a bundle, projecting from the centre of the blossoms, at first lie in five sets along the hollow of each petal. When the stigma has about attained maturity, the stamens spring up erect, each set in its turn, in order to fertilize the stigma, and when this is completed, they relapse again into their former position.

Rhododendron Dalhousiæ.

THE RHODODENDRONS OF SIKKIM-HIMALAYA.*

The kingdom of Rhododendrons, has, so to speak, not escaped intact in these days of commotion and revolution; at least, this may be said to be the case in respect to the popular notions respecting it. A few years since, the horticulturist, not being also a botanist,

* "The Rhododendrons of Sikkim-Himalaya; being an Account, Botanical and Geographical, of the Rhododendrons recently discovered in the Mountains of Eastern Himalaya, &c." By J. D. Hooker, R.N., M.D., F.R.S., &c. Edited by Sir W. J. Hooker, K.H., D.C.L., &c. &c. London: Reeve, Benham & Reeve.

and amateur cultivators of every grade, knew nothing of Rhododendrons, except as a race of evergreen shrubs, requiring to be planted in what is called peat earth. The Rhododendrons were, in fact, looked on as being, what indeed they are, the leading family of the "American" plants, growing like ordinary shrubs, with their roots planted in the earth. To botanists, however, it was known that there existed a race in the Eastern Islands, which, instead of growing in the soil, like the majority of plants, fixed themselves by means of their rootlets to the trunks and branches of trees, deriving their nourishment from the warmth and moisture of the atmosphere. Some species having this habit were formerly made known by Blume, as inhabitants of the island of Java, where it appears there are several kinds of this habit. Three or four other species, of the same manner of growth, were introduced to public notice about twelve months since, on the return of Mr. Low, jun., from the isle of Borneo; and these being published in the "*Journal of the Horticultural Society*," the gardening community were, in some degree, prepared for the necessity which now exists of abandoning the former notions as to habit and form, at least, of what constitutes a Rhododendron.

But this is not all. Dr. Hooker, now employed in a government botanical mission among the mountains of India, has discovered several very distinct species, and among them the noblest of the whole race yet known, whether it be in respect to the size, form, fragrance, or delicate colouring of its blossoms; and this, too, of epiphytal habits, growing entirely on the trunks of immense forest trees, its roots ramifying among the mosses and lichens which clothe their enormous trunks.

"Thus," writes Dr. Lindley, "with four species from Borneo, one from Java, and one from Sikkim, we have now no fewer than six epiphytes in a genus which, a few years since, was not known to contain one. This is not, perhaps, a very surprising thing, for, after all, the only difference between an epiphyte and a terrestrial plant is one of drainage; the former grows in soil, on the branches of trees, where no water can lodge, though much may fall, and the latter in soil which is liable to becoming water-logged. It would be a curious experiment to try how the common Indian Rhododendrons would succeed as epiphytes in damp greenhouses."

Of eleven species obtained by Dr. Hooker on the Sikkim-Himalaya, nine were found to be previously unknown to science; and the work whose title is quoted at the commencement of these remarks, consists of admirable representations and descriptions of these novel and splendid shrubs, from materials obtained on the spot, and transmitted to England for publication.

This work on the Rhododendrons of Sikkim-Himalaya, is published in imperial folio, with beautiful coloured representations of ten out of the eleven species discovered in the region, the eleventh not being found in flower. It contains some prefatory observations on the locality, and an historical sketch of the genus, by the Editor, Sir W. J. Hooker; with remarks on the distribution of the new species, and detailed descriptions accompanying the plates, from the pen of Dr. Hooker. Both the author and editor, as well as the engravers, printers, and publishers, have "well done" what they have done in this matter.

Darjeeling, the locality of the country in which these Rhododendrons were found, lies, we are told, in the Sikkim portion of the Himalaya; and is situated in lat. 27° N., and long. the same as Calcutta, from which it is distant about 380 miles. Its elevation above the sea is 7,200 feet. The mean temperature of the year is about 55° Fahr.; and that of each month is given in the following Table, in which, for the sake of comparison, we have added that of London, the mean temperature of which for the year is 49° 3′:—

London.		Darjeeling.
37° 8′	January	41°
37° 1′	February	43°
42° 2′	March	53° 50′
47° 1′	April	57°
53° 6′	May	59°
61° 1′	June	64°
61° 5′	July	65°
61 2′	August	65°
57°	September	61° 50′
49° 3′	October	58° 50′
44 6′	November	48°
40°	December	44°

"The mountain Sinchul, upon a spur of which, looking north, Darjeeling stands, attains an elevation of 9,000 feet; and to the west of it, next Nepal, rises another conspicuous mountain, Tonglo, reaching a height of 10,000 feet. Due north of Darjeeling, at a distance of only 60 miles, the horizon is bounded by the great snowy range, having for its principal feature the peak of Kinchin-junga, which has lately been ascertained to be 28,172 feet in elevation, the loftiest mountain yet known in the world. Dr. Hooker thus describes his first impressions of this scene:—'Much as I had heard and read of the magnificence and beauty of Himalayan scenery, my highest expectations have been surpassed! I arrived at Darjeeling on a rainy misty day, which did not allow me to see ten yards in any direction, much less to descry the snowy range, distant 60 miles in a straight line. Early next morning, I caught my first view; and I literally held my breath in awe and admi-

ration. Six or seven successive ranges of forest-clad mountains, as high as that whereon I stood, (8,000 feet,) intervened between me and a dazzling white pile of snow-clad mountains, among which the giant peak of Kinchin-junga rose 20,000 feet *above* the lofty point from which I gazed! The heaven-ward outline was projected against a pale blue sky, while little detached patches of mist clung here and there to the highest peaks, and were tinged golden-yellow, or rosy-red, by the rising sun, which touched those elevated points long before it reached the lower position which I occupied.

" ' Such is the aspect of the Himalayan range at early morning. As the sun's rays dart into the many valleys which lie between the snowy mountains and Darjeeling, the stagnant air contained in the low recesses becomes quickly heated; heavy masses of vapour, dense, white, and keenly defined, arise from the hollows, meet over the crests of the hills, cling to the forests on their summits, enlarge, unite and ascend rapidly to the rarefied regions above; a phenomenon so suddenly developed, that the consequent withdrawal from the spectator's gaze of the stupendous scenery beyond, looks like the work of magic.' Such is the region of the Indian Rhododendrons."

" The maximum of Rhododendrons appears to be in Asia, and their head-quarters are on the lofty ranges of the eastern Himalaya, where the mild and moist atmosphere is eminently suited to their habit."

It would thus appear that a warm and damp climate is that naturally afforded to these fine shrubs; and what is most significant as regards the probability of cultivating them in the open air in England, is this fact, that the winters they have naturally to bear are mild winters. " A certain degree of winter cold and perpetual humidity is necessary, but the summer heat is quite tropical where some of the genus prevail, and snow rarely falls, and never rests on several of those peculiar to Sikkim." In the case of *R. Falconeri*, which grows on the summit of Tonglo, at an elevation of 10,000 feet, Dr. Hooker remarks, that the temperature of the earth in which it grew was, in the middle of May, at 27 inches below the surface, where the roots are chiefly developed, 49° 5′ at all hours of the day; that of the air varied from 50° to 60°.

These observations, and the mean temperatures previously quoted, show, as is well remarked in the *Gardener's Journal*, that spring and not mid-winter is the season of trial, not only in the case of the Indian Rhododendrons, but in that of very many other half-hardy plants from various parts of the world, especially from the mountain regions of India and South America. Comparing the figures just referred to, it will be seen that during the months of November, December, and January, the difference in the mean temperatures of London and Darjeeling is about 4° only, and the same difference is indicated for the months of July, August, and September. On the other hand, February and May, the transition months between winter and spring, and spring and summer, show a difference of 6°; the spring months of March and April, a difference of 11° and 10° respectively; and in autumn, too, as shown in October, the difference is 9°. " Here," as the journal above referred to observes, " we have a solution of the cause of our want of success in cultivating tender plants in the variable climate of Great Britain: our springs are late, and cold, and changeable; and while the winters and summers of Darjeeling and London differ but 3° or 4°, the springs and autumns show a difference of 10° and 12°. This accounts for the excitable nature and early growth of many of our half-hardy Indian plants, as well as the tendency of many such to grow to a late period of the autumn."

But though we cannot hope to grow these fine things, except in some of the most favoured parts of England and Ireland, yet the discovery, and the probable speedy introduction of them, are matters of great horticultural interest. " It is true that plants originally tender will always remain tender; and there is, therefore, but small hope that we can ever accustom these glorious tree Rhododendrons to forget the earlier springs and autumns of Sikkim-Himalaya, and so perform all the necessary functions of growth within our four or five summer months, instead of extending it, as in India, over eight or nine; but, nevertheless, the skill of the cultivator has already turned to his use the valuable property of colour in the tree Rhododendron of Nepal; and he will assuredly try, nor is he likely to fail, to extract from these tender kinds a still richer product."

The distribution of the Rhododendrons is thus sketched by Dr. Hooker:—" The sub-Himalayan mountains are surely the *centrum* of this truly fine genus, distinguished by the number and variety of its species and groups, by the great size and eminent beauty of several, which form conspicuous features in the landscape over many degrees of longitude, through a great variety of elevations, and clothe a vast amount of surface. The Neelgherries, Ceylon, and the Malay Archipelago, contain each some species which prove the affinity of their floras to that of the Himalaya. The same is the case with the great mountains of Northern Asia, Central, Southern, and especially Eastern Europe, the Ural, and Pontus. The genus

extends even to the Polar regions, diminishing in the size of the species and number as we recede from the Himalaya. In North America they appear again, though under a very different aspect from that they present on the sub-tropical mountains of Asia. * * * In north-west India the genus Rhododendron is first seen on the Kunawar hills, and, advancing east, follows the sub-Himalayan range for its whole length, the species increasing in number as far as Sikkim and Bootan; thence the genus is continued to the Mishmee hills, the eastern extremity of the range, crossing the Brahmaputra to that lofty range which divides the water-shed of the Irawaddi from that of the Brahmaputra. Though scarcely found throughout this long line of upwards of 1,200 miles, below 4,000 feet, the Rhododendrons still affect a warm damp climate, where the winters are mild. The English naturalist, who is only familiar with the comparatively small hardy American and European species, would scarcely expect this. * * * *R. arboreum*, according to Captain Madden, inhabits various localities between 3,000 and 10,000 feet: this is in Kamaoon, where, of course, the genus would descend lowest, and the range is incomparably greater than that of any other species, at least of those found in Sikkim. Dr. Griffith, after extensive wanderings in Bootan, gives the limits of the genus in that country as between 4,292 and 12,478 feet, which is a lower level by 3,000 feet than they are known to descend to in Sikkim. In the extreme east of Assam, where the Himalaya itself diverges, or sends lofty spurs to stem the Brahmaputra, on the Phien pass to Ava, Rhododrendrons ascend from 5,400 to 12,000 feet, to the upper limit of arboreous vegetation.

"Westward again, as far indeed as the western termination of the Himalaya, the species descend lower than in Bootan: an anomalous fact, for which, in our ignorance of the contrasting features which may distinguish the Eastern from the Central Himalaya, I can only assign conjectural causes. Among these may be the proximity of the ocean to the Sikkim portion of the range, and the presence of heavy mountain masses, covered with winter, and even perpetual snow, to the south and east of the upper extremity of the Brahmaputra, whereas the genus is found nearly 2,000 feet lower than in Sikkim. The descent of the snow line in Upper Assam to 14,000 or 15,000 feet, is no doubt due to the same causes, and this is a most remarkable fact. Uniformity of temperature, excessive humidity, and a broken surface, produce the same effect here as in the high southern and antarctic latitudes—favouring the formation of snow and its permanence, and also extending the range of tropical forms upwards to a greater elevation, and the descent of temperate or arctic forms to a lower one. * * *

"Only four species, *R. Dalhousiæ*, *R. Campbelliæ*, *R. argenteum*, and *R. arboreum*, grow near Darjeeling. The second and fourth form scattered bushes at 7,500 and 8,000 feet; the *R. argenteum* is a small tree, at 8,000 or 9,000 feet.

"It was on the ascent of Tonglo, a mountain on the Nepalese frontier, that I beheld the Rhododendrons in all their magnificence and luxuriance. At 7,000 feet, where the woods were still dense and sub-tropical, mingling with ferns, pothos, peppers, and figs, the ground was strewed with the large lily-like flowers of *R. Dalhousiæ*, dropping from the epiphytal plants, or the enormous oaks overhead, and mixed with the egg-like flowers of a new Magnoliaceous tree, which fall before expanding, and diffuse a powerful aromatic odour, more strong but far less sweet than that of the Rhododendron. So conspicuous were these two blossoms, that my rude guides called out, 'Here are lilies and eggs, sir, growing out of the ground!' No bad comparison. [Above this occurs *R. arboreum*]. Along the flat ridges, towards the top, the Yew appears with scattered trees of *R. argenteum*, succeeded by *R. Campbelliæ*. At the very summit, the majority of the wood consists of this last species, amongst which, and next in abundance, occurs the *R. barbatum*, with here and there, especially on the eastern slopes, *R. Falconeri*.

"The habits of the species of Rhododendron differ considerably; and confined as I was to one favourable spot by a deluge of rain, I had ample time to observe four of them. *R. Campbelliæ*, the only one in full flower early in May, is the most prevalent. Some were a mass of scarlet blossom, displaying a sylvan scene of the most gorgeous description. Many of their trunks spread from the centre thirty or forty feet every way, and together form a hemispherical mass often forty yards across, and from twenty to twenty-five feet in height! The stems and branches of these aged trees, gnarled and rugged, the bark dark coloured, and clothed with spongy moss, often bend down and touch the ground: the foliage, moreover, is scanty, dark green, and far from graceful, so that, notwithstanding the gorgeous colouring of the blossoms, the trees when out of flower, like the Fuchsias of Cape Horn, are the gloomy denizens of a most gloomy region. *R. Campbelliæ* and *R. barbatum* I observed to fringe a little swampy tarn on the summit of the mountain—a peculiarly chilly-looking small lake, bordered with sphagnum, and half-choked with Carices and other sedges: the atmosphere was loaded with mist, and the

place seemed as if it would be aguish if it could, but was checked by the cold climate. *R. barbatum* had almost passed its flowering season; it is a less abundant and smaller tree than the last mentioned, but more beautiful, with brighter green and denser foliage, clear papery light-coloured bark, the whole forming a more picturesque mass.

"Along the north-east and exposed ridges only grow the *R. Falconeri*, in foliage incomparably the finest."

We shall now pass on to notice the new species of Rhododendron, which this portion of the Himalayas has afforded. Dr. Hooker found eleven kinds in the district which he explored, but of these, one was the *R. barbatum* of Wallich, a species already known and introduced to England, and proved to be capable of bearing our ordinary winters in the climate of Chester; and another was the original *R. arboreum* of Smith, a kind so mixed up in our gardens with the various hybrid or cross-bred races to which it has given rise, as to be now seldom recognised. The remaining species were the following, of which the descriptive particulars are abbreviated from Dr. Hooker's more detailed and ample account.

Rhododendron Dalhousiæ, Hooker fil. (Lady Dalhousie's Rhododendron).—A shrub six to eight feet high, growing on the trunks of large trees. The branches bear leaves and flowers only at their extremities. The leaves are few, four to five inches long, elliptic-obovate, somewhat leathery, and of a darkish green colour, paler beneath. The flowers grow from three to seven, in terminal umbellate heads, which spread wider than the leaves. The blossoms are bell-shaped, very large, three inches and a half to four and a half long, and as much across the mouth, white, with an occasional tinge of rose, very fragrant, the odour partaking of that of the lemon. The flowers in age become more roseate, and are sometimes spotted with orange. This is the noblest of the Rhododendrons. Native of Sikkim-Himalaya, at an elevation of from 7,000 to 9,000 feet; growing on the trunks of large trees. Flowers from April to July.

Rhododendron lancifolium, Hooker fil. (lance-leaved Rhododendron).—A shrub six to eight feet high, with spreading tortuous branches. The leaves are produced chiefly at the ends of the branches; they are three to four inches long, oblong lance-shaped, very pointed, and of leathery texture, green above, tawny beneath. The flowers grown in dense heads at the ends of the branches; they are of moderate size, bell-shaped, distinctly net-veined, and of a rich puce colour. Native of the interior: Sikkim-Himalaya. Flowers in May.

Rhododendron Wallichii, Hooker fil. (Dr. Wallich's Rhododendron).—A shrub growing from eight to ten feet high, with rugged tortuous branches. The leaves are mostly confined to the apex of the ultimate branches; they are three to four inches long, almost exactly elliptical, full green and glabrous above, paler beneath, and having a remarkably neat appearance. The flowers are large and handsome, growing in terminal heads, having six to eight in each; they are rosy lilac with deeper rose-coloured dots within the base of the upper lobe; they are bell-shaped, with a spreading five-lobed limb. Native of the interior of Sikkim-Himalaya. Flowers ——?

Rhododendron Campbelliæ, Hooker fil. (Mrs. Campbell's Rhododendron).—A tree growing frequently to the height of forty feet, forming a large spreading mass. The leaves are oblong-lanceolate, acuminate, leathery, green and smooth on the upper surface, and clothed beneath with a more or less deeply rufous or ferrugineous tomentum. The flowers grow in dense compact heads, and are of a rich rosy-scarlet colour, spotted at the base of the upper lobe with dark spots, and around the bases of the remaining lobes with paler rosy spots. Native of Sikkim-Himalaya, frequent, growing at an elevation of from 9,000 to 10,000 feet. Flowers in April and May.

Rhododendron Roylii, Hooker fil. (Dr.

Royle's Rhododendron).—A small shrub with oval or elliptic leaves, three to four inches

long, clothed beneath with an ochraceous-brown pulverulent substance. The flowers grow from four to eight in a loose head ; they are campanulate, with a slightly spreading limb of five rounded lobes, ending in an acute point ; the colour is brownish red, the lobes of the limb just tipped with bluish green ; in its unexpanded state the corolla is iridescent with blue ; the tube of the corolla is striated within. Native of Sikkim-Himalaya, on the mountains of the interior. Flowers in April and May.

Rhododendron cinnabarinum, Hooker fil. (cinnabar-leaved Rhododendron).—A small shrub with slender tortuous branches, bearing leaves from two to three inches long, of an acutely ovate-lanceolate form, green and glabrous above, and beneath often reddish and dotted with little scales. The flowers are small, funnel-shaped, with five spreading rounded acute lobes ; they grow in small compact heads, and are of a cinnabar colour. Native of the " Sub-Himalaya mountains, interior of Sikkim." Flowers in April and May.

Rhododendron elæagnoides, Hooker fil. (oleaster-leaved Rhododendron). — A small much-branched shrub, with small obovate-trapezoid leaves, covered with minute silvery leprous scales ; these leaves are a quarter of an inch long, plane, leathery. No examples of this curious little species were found in flower. It is a little alpine, growing in the vicinity of the snow ; and is " apparently single flowered, and calyculate." Native of the mountains of Sikkim-Himalaya, at an elevation of from 14,000 to 15,000 feet.

Rhododendron argenteum, Hooker fil. (silvery Rhododendron).— A fine tree growing thirty feet high, with spreading branched trunks. The leaves are very beautiful in the young state, enveloped at first in pinkish-brown scales, which are so large and closely imbricated as to resemble the cones of some species of pine ; at first the leaves are erect and silky ; when mature they are very large, six inches to a foot long, obovate-oblong, leathery, green above and silvery-white beneath. The flowers grow in large terminal heads ; they are broadly campanulate, two to three inches long, with a limb of five short bilobed segments, spreading, two to two and a half inches in diameter ; they are always white, unspotted, very handsome, and only second in size to *R. Dalhousiæ*. Native of Sikkim-Himalaya : summit of Sinchul, Sirradah, and Tonglo, at an elevation of from 8,000 to 10,000 feet. " On Sinchul, the higher parts of the mountain, at from 8,000 to 9,000 feet of elevation, are more or less clothed with it : on Tonglo, as it approaches 10,000 it is suddenly replaced by *R. Falconeri*."

Rhododendron Falconeri, Hooker fil. (Dr. Falconer's Rhododendron.)—A fine tree growing thirty feet in height, the trunks often two feet in diameter, the branches few and spreading. The young leaves are clothed with velvety down, and when in the bud are concealed by downy glutinous scales. When perfect, they are from eight inches to a foot in length, obovate-elliptic and obtuse, very coriaceous, glossy green above, and beneath, except on the thickly-netted veins, clothed with a dense pale-ferruginous down. The flowers grow in heads of moderate size, but composed of numerous rather small but densely placed flowers, which are white, bell-shaped, with a limb of ten rounded lobes. One of the most striking and distinct of the genus. Native of Sikkim-Himalaya; summit of Tonglo, at an elevation of 10,000 feet. Flowers —— ?

Beyond what we have already said in commendation of this beautiful portfolio of drawings, we can only add that such of our readers as may take any interest in the particular subject, or who can admire perfect representations of splendid vegetable forms, would be delighted to possess it.

MODERN FLOWER-GARDENING.

MANAGEMENT OF BEDDED-OUT PLANTS.

Much of the effect of modern flower-gardens—by which is intended, those which are managed on the grouping system—depends on the arrangement of the plants. The best materials untastefully arranged will fail to produce the effect which they are capable of producing under a better mode of disposition. In this style of gardening, the effect is brought out by colour, that is to say, by conspicuous masses of colour, such as single plants seldom afford. This being so, it will be obvious that the general effect of a " grouped " flower-garden will depend on a selection of plants exhibiting in their blossoms certain tints and hues, and on the harmonious blending of these colours with the general design.

This style of flower gardening has been condemned in a contemporary publication ;* but we think, that although in some instances great want of taste is exhibited in the distribution of the plants, a good reason has not been made out for returning, in all cases, to the practice of our forefathers, and adopting, as there suggested, the purely miscellaneous, instead of the grouping system of planting. It is urged that the favourite flowers " of our grandfathers are abandoned for a new and a gayer race. Dahlias, pelargoniums, pansies,

* The Gardeners' Chronicle.

petunias, and verbenas, have expelled hollyhocks, china asters, stocks, annuals, and 'herbaceous plants;' the fashionable world prefers gaudy tints to varied forms; mere colour has driven away beauty; and who shall venture to doubt whether the fashionable world is right, or that the change in taste is permanent? Nevertheless, the lookers-on, who speculate upon the vagaries of the changeable crowd, sometimes inquire whether a red cloak is really so beautiful as an embroidered shawl; or a floor of coloured drugget in all respects as fit an ornament of a drawing-room as a carpet of a rich and varied pattern. To us they say, 'How happens it that those who so much delight in rich brocades, gay tartans, and many-coloured muslins, are now content in their gardens with a few staring ill-blended colours; variety being the object in one, and bald uniformity in the other?' Our reply may be unexpected, but its justice will be acknowledged. 'All that change arose out of bad gardening. A race of unskilful gardeners rendered hideous what should have been beautiful, and drove their employers to adopt the present style, which their successors have seldom thought of abandoning.' That a flower-garden containing a gay mixture of all manner of flowers, of all forms, colours, sizes, and appearances, will be more permanently interesting than one decorated, here with a yard of red verbenas, there succeeded by a yard of white verbenas, interrupted by a couple of yards of scarlet pelargoniums, followed by a patch of white petunias, will probably not be denied. But such plants are preferred in practice because nothing can be easier than to maintain the gaudy appearance which they produce, while to preserve the former in a state of beauty demands great skill, watchfulness, and forethought, and is far more expensive. A verbena or a pelargonium once planted, the work for the summer is at an end; the branches of such plants fall over the ground as they advance, a few pegs keep them in their places, and there's an end—till the frost comes and converts the garden into a wilderness."

We, however, fail to see that the grouping system involves "bald uniformity." In a geometrical garden, indeed, where all is regularity, some kind of uniformity should prevail; but there is no reason why, so to speak, the "red cloak" should take precedence of the "embroidered shawl" as a pattern of taste. To be effective, the pattern of the shawl must be distinct and striking; the colours, too, must not be mixed up too closely in too small proportions, or they blend with and destroy the tints of each other. So it is in flower-gardening. The whole arrangement, not a detached fragment, represents the embroidered shawl, and if the parts are not too large, and the colours are well disposed and sufficiently numerous and diverse, a rich embroidered pattern is produced. It is obvious, however, that the masses of colour ought not to be over large, or there will not, in that case, be secured the requisite variety within a moderate space.

There is no reason why the principle of embroidery should not be carried to a much greater extent than it is, in planting flower-gardens. If the effect of well-disposed masses of colour be good, the effect of producing these masses by a judicious combination of colours is also good, so long as the affair is not frittered away by an overstrained attempt at the production of variety,—so long as the parts are definite and the colours distinguishable. Only be it remembered, that when this is attempted, the arrangement becomes compound, and the difficulty of a tasteful combination is greatly increased as compared with the common, or, as it may be termed, simple mode of arranging colours in whole or uniform masses.

Such a compound arrangement of colours would open the way for the introduction of a far greater variety of subjects in choice flower-gardens than at present find a place there; and in so far, at least, it would tend to an improvement of the present plan. The scope for the exercise of taste in the matter of arrangement would also be indefinitely extended, and in consequence, flower-gardens as compared with each other would exhibit much greater variety than at present.

There are of course many ways in which such a principle might be reduced to practice; we shall mention one or two by way of illustration. The mode of planting the subjects in zones or belts was long ago recommended, but has not been extensively practised, although it may be made conducive to a very high effect. Suppose a circular bed of seven feet in diameter were to be planted, this would take three subjects, allowing the space of a foot next the margin for a circle of dwarf plants, a foot and a half within this for a circle of plants somewhat taller, and a space two feet in diameter in the centre for a third and taller subject, which should be, in most cases, a single plant. It is obvious that there would be more variety in such an arrangement, than if the entire bed had been filled with one kind of plant. Smaller beds might be filled in the same way with two kinds of plants; and provided the different beds are filled in a way to harmonize with each other, the general effect would be rather improved than otherwise by the avoiding of larger masses entirely of one colour. By this mode of planting, however, a decided preponderance is necessarily given to the marginal colour,

unless it is reduced in width, which renders it less effective.

Again, supposing such a bed to be quartered, and each portion devoted to one colour; this arrangement would be a very pretty one, and would admit of a still greater variety of colour than the preceding.

A different effect would result from the planting three plants of each of three different subjects to form a centre of, as it were, three triangles, with the points turned outwards. Projecting inwards between these, the points of other angles, of different, but complementary colours, may be inserted, and if this did not fill out the bed, several distinct colours might alternate, to form a margin. It is useless to enumerate other examples, as they may be varied *ad infinitum*.

The half-hardy plants usually employed for the decoration of flower gardens on the grouping, or "bedding-out" system, require some care in their management. The general plan is to propagate them from cuttings during the latter part of the summer, to preserve them through the winter either in a greenhouse or in pits, secure against frosts and damps, and in spring, as the mild weather comes on, to harden them very gradually to bear full exposure to the ordinary atmosphere by the middle or end of May, or at least as soon as the weather is sufficiently mild to render them safe when exposed.

Young healthy plants are always to be preferred for the flower garden before those which are older, and at the same time straggling and stunted, except in peculiar cases. Such plants as the verbenas should always be young, free, and vigorous, for plants in this condition are always the most ready to spread, and cover the surface quickly and effectually. It is the same with all the very free-growing subjects. Some plants, however, are the more effective for having attained some size and substance before planting. Of this nature is the whole race of scarlet and other pelargoniums, though even here free-grown young plants are preferable to starved and stunted ones of greater age.

One of the most material points towards success, especially as regards the effect to be produced during the earlier part of the summer, lies in the due preparation of the plants, previous to their being planted out. The kind of preparation alluded to is called "hardening," which is, in fact, nothing more nor less than inuring the plants to bear exposure to our climate without protection. This must be a work of time. The plants are necessarily kept during winter and early spring in a more or less artificial climate, under more favourable conditions than our climate affords; and if the amount of protection to which they have been accustomed is withdrawn at once, the plants become paralysed, growth is arrested, and if the trial is too severe, they perish. Hence, with all that class of tender subjects which require nursing in spring, the process of hardening is essential previous to planting them out in the open air.

The process of hardening is thus carried out: from a position in which a certain amount of heat is afforded to the plants, they are, when in an established condition as regards their roots, to be removed to another, in which there is little or no heat artificially afforded; this depends on the amount of heat they had been previously subjected to; if they had had but a slight degree of heat, the change may be to a position where there is none. In any case, however, it is judicious, on placing them in the cooler position, to keep them shut up closer than usual for two or three days; then they may be opened, and exposed during the day to that degree which the weather each day will admit. In the course of a couple of weeks, if the weather is favourable, a further stage is advanced by leaving the coverings, whether mats, sashes, or other covers, partially open or off during the night. The next stage is to remove them entirely day and night; and in this case, as it is presumed that they are in a sheltered situation, it becomes still a further change to plant them out in the exposed parts of the garden. All these progressive changes should be made, as far as possible, at intervals when the weather is rather favourable than otherwise, if such a time can be taken advantage of; if not, they must be made with the greater caution. Of course, the final planting out can only be done when the weather has become settled favourable for the growth of tender plants.

When the plants are planted out, the course of treatment, which should have been commenced during their probationary period, must be carried on and perfected. That treatment consists in the frequent "stopping" or topping of the young shoots; the object being to secure a bushy, dwarf, and compact habit of growth. If this was commenced when the plants were first raised, they ought when planted out to have several branches, and these, previous to planting, may have been allowed to grow to the length of six or eight inches; the object of this growth is to produce shoots long enough to cover at once a certain portion of the surface. These branches, then, are to be spread out horizontally by means of little wooden pegs, or some substitute for them, and their points are then to be nipped off. The young shoots produced are again, when long enough, to be fastened down, and again topped, and this is to be continued until the surface of the bed is covered,

in the case of all those subjects which it is required should thus fill out a given space. Verbenas, petunias, dwarf salvias, and other plants which have a kind of trailing habit, are those to which this course of management is most suited. All other subjects used in flower-gardening, however, even those of erect habit, may, if required, be similarly treated, only they want more watchfulness in order to get the whole surface covered. When the surface is covered over with horizontal branches, upright shoots are produced, which grow, with a little regulation, to equal height, and produce a continuous mass of flowers.

It is well in arranging flower-beds to use plants enough, in order to get the surface perfectly and speedily covered. With this view, all the subjects employed, but especially free-growing and trailing plants, are usually planted much closer than would seem necessary for the ultimate covering of the ground. In this case, however, the sacrifice as regards the number of plants employed is not without its advantage. The actual distances at which the plants should be put, must always be determined by the actual size and strength of the plants employed; that is, if they are planted with the view of getting the surface covered as speedily as possible. Thus, if one bed of verbenas were planted with strong branching plants at two feet apart, it would soon be covered; whereas, if small single-stemmed plants—weak withal—were planted out at the same distances, they would be more than twice as long in covering the surface, although if they prospered they would certainly do so ultimately. Compact bushy plants, like the old-fashioned shrubby calceolarias and the fine scarlet pelargoniums, require especially to be planted with reference to the habit of the individual kinds used, so that when they have formed a moderate growth, their sides may nearly touch. In the case of plants, however, having this habit, it is by no means essential that they should at an early period, or indeed at all, actually intermingle, as in the case of verbenas and other straggling plants. Every plant forming a neat and compact object, and the plants being, as they should be, of uniform size, the effect is good: equally good before the space is actually closed, and while the outline of every plant is evident, as afterwards when they have grown together into one mass.

For fastening the branches to the ground small hooked pegs are most generally employed, and perhaps they are at least as little troublesome as any of the substitutes which have been proposed in their stead; and as to efficiency. there is perhaps hardly a choice between the various plans. When wooden pegs are used, they are formed of any slender branching spray from which they may be readily cut. In regular gardens old worn birch brooms are frequently used to furnish what hooked pegs are required for various purposes; and there is no better material than birch twigs, as they are tough and yet slender. In making them, a straight portion of the twig, about three inches, more or less, in length, having a side branch at its thickest end, is cut to a point at the small end; any knots, or buds, or inequalities, are pared off, the top is cut off close beyond the branch, and then the branch—the side branch—is cut off at about an inch from the main stalk; and thus the hooked peg is formed. Sometimes, to economise materials, if the side branches are strong enough to form the stalk of the peg, these are cut at the length required, and then a portion of the stem whence they spring is split off with them to form the hook. Wherever there are asparagus beds, a large number of pegs may be made in this latter way from the branching stems of the asparagus plant, and these are quite strong enough for flower gardening purposes, as well as for the layering of all kinds of flower roots, for which purpose similar pegs are employed.

One substitute, which has been recommended to take the place of pegs, is ladies' hair pins! and about them we can only say, that they would answer the purpose. Closely connected with these in idea are small twigs, or slender split portions of twigs of any tough kind of wood, bent in the middle, and both ends thrust into the ground; these have been employed, and they too are very well in their way, and there is little objection to their use. Another plan, which has been strongly advocated and has had many followers, is that of fastening down the shoots with little strips of tough bass matting such as gardeners use for tying. The matting is cut to a convenient length—about six inches—and is then pulled asunder into fine threads, one of which is placed round the twig to be fastened down, the ends a little twisted with the thumb and finger, and then thrust into the ground with the fore-finger. This has been said to be the neatest plan of all, and so perhaps it is; but we should practically give preference to such slender twigs as those already referred to, as being quite as effective as any other, and more ready and simple in use.

The directions already given for topping and training the plants, after they are planted out, obviously apply to the plan now so prevalent, of forming entire masses of one plant or colour. If the plan which has been hinted at in the course of these remarks, of adopting a more mixed and contrasted, though still in some degree a massed style of planting, is followed, it is evident that some modification

of this plan of training would be essential. The object should then be to convert every plant, whether naturally trailing or erect, into some such compact branching object as the scarlet Pelargoniums and the old yellow Calceolarias naturally form; and it would be extremely desirable so to control the growth of every plant, that the ground might be almost, but not at any time altogether covered. It is not meant that there should be much bare earth visible between the plants, but just space enough that every plant might be fairly said to be distinct from the rest. It is only in this way that any arrangement or contrast of form and colour could be made manifest, when the parts were considerably reduced in size, as they would be made under these circumstances.

The continued neatness and order of a flower garden depends upon a continuance of the system of removing irregular growths, and of arresting the growth of the points of the branches. Even when the plants get into blossom, this is to be continued, or they soon get into disorder or confusion. No plant or group of plants should be permitted to straggle or extend beyond the space allotted to it or them; and no lanky branches should be permitted to extend upwards beyond the allotted range of each particular group. On the systematic observance of these two rules, and the prompt application of that kind of attention which they suggest, depends, as we said before, the neatness and order of a modern flower garden.

ON SUMMER PRUNING FRUIT TREES.

BY M. MANOURY.

When vegetation has become active, it is indispensable, if we wish to form trees and induce them to fruit the following season, to attend to them carefully, and do what may be necessary to ensure that development of the shoots which is favourable to the attainments desired, the extension of such as are likely to form the frame-work of the tree. Among the means which may thus be employed with advantage, is the process of *pinching*, which consists in nipping off, with the nails of the thumb and fore finger, the extremities of the shoots while yet green and soft.

Pear-trees. — Pear-trees trained in the espalier form are often encumbered with shoots in front of the main branches, and which become very vigorous, forming those branches that are sometimes called *gourmands*, requiring to be taken off at a considerable sacrifice of sap. To obviate the inconvenience and injury consequent on these amputations, it is necessary to prevent these shoots from growing, and by this suppression force the sap into those whose vigour is required to constitute the frame-work of the tree. When a particular disposition of the branches is required on any tree, it is necessary to secure two good buds or eyes, at least, at that point where they are desired, and which should not be pinched back. If, however, one of them increases so much as to take away from the nourishment of the other, it should be pinched in order to induce the sap to flow into that other. Those shoots which are required either to invigorate or increase the number of the main branches, having been properly adjusted, the others which are likely to become too vigorous should be pinched, with a due regard, however, to such as are likely to form fruit-buds. Pear-trees of the pyramidal and quenouille form should be treated as the espaliers; that is to say, the leading shoots ought not to be stopped; but pinching is necessary as regards the fruit bearing branches, when they are likely to become too vigorous.

Peach-trees.—As with the pears, so peach-trees require to be pinched, and to have all superfluous branches completely taken off. Each fruit branch should be left with one wood-bud at the base, or two at the most. If these buds or shoots are in front of the branches, they should be pinched back from two to three inches long, after they have grown five or six inches, if they are above the branches; and if they grow from the under side of the branches, they may be allowed to have from eight to ten inches before they are pinched back. In winter the fruit-branches are trained with the view of making them productive, but sometimes many of the eyes, or buds, which have been left, produce a great number of shoots; all those above the fourth leaf which do not bear, should be pinched off, or pruned, bearing in mind that each fruit should be accompanied or surmounted by two or three good leaves. But as in the pear-trees, those shoots which are necessary to form the principal branches should not be topped.

Apricots.—Of all trees, the apricot is one of those which most require early pinching; but it is indispensable to be able to distinguish those buds or shoots which are likely to be productive of fruit, from those which are likely to come to wood; for the pinching of the fruit-buds completely destroys the ensuing crop. The wood-bud is full, and when about four or five inches long, it is terminated by a sort of cabbage-like bud, composed of a series of leaves rolled round each other; such shoots as this should be pinched back very short. On the other hand, the fruit-bearing shoot is much more lank, redder, not often longer than four or five inches, and having much less

of the leafy termination common to the other. Such shoots as this must not be pinched on any account. In other respects, the apricot may be treated like the peach.

Plums.—The treatment of the plum-tree is similar to that of the apricot.

Vines.—The vine, as well as the peach, the pear, &c., has woody branches bearing fruit-branches. On each fruit-branch it is necessary to preserve two eyes; one about an inch or two inches from the wood-branch, and the other rather nearer. These two eyes should produce two shoots. The leading branches, of a middling length, are themselves provided with eyes from which the fruit-branches issue. All these branches or shoots are, as with the other trees, subject to pinching as soon as they are long enough to allow of its being done without injury to the fruit; that is, after the grapes are somewhat formed, so that the pinching may be made at the extremity of each shoot, one leaf above the last bunch. This pinching serves to invigorate the fruit and cause the breaking out of eyes behind. It is also necessary to take away all the tendrils which appear either on the branch, or near the bunches. Pinching the vine excites the development of the grapes, which would be otherwise smaller; it also invigorates and enlarges the fruit-branches which are to bear the following season. While the pinching of the vine is attended to, the pruning of the redundant branches should not be forgotten. Two good fruit-shoots on each branch are sufficient. When the terminal shoot developed from the branch does not bear fruit, it should be pruned; but the one at the base should be preserved, even though it be sterile. The first pinching of fruit-trees is not always sufficient; and it sometimes happens, after the first operation of this sort has been made, in a few days afterwards, new buds break out. The scions, also, which have been pinched, will often assume a degree of vigour approaching almost to grossness; in this case, it is needless to say, the operation must be repeated.

The preceding remarks are abridged from a paper, by M. Manoury, published in a recent number of the *Ghent Annales*. The subject is important, and has attracted some attention in this country.

THE HORTICULTURAL SOCIETY'S MAY SHOW.

The great features in the Floral exhibition, were the Indian Azalea, and orchideous plants, but the former especially eclipsed every thing that had been seen before; Lady Antrobus showing twelve specimens that were certainly never equalled before in public exhibitions; whether we look to the noble size, the compactness, the healthy growth, or the size and quantity of bloom, they were unquestionably the finest ever shown in public. The Heaths were grand, certainly, but we have seen them as fine before; and the general collections were very noble; the Geraniums only middling. A few of the French fancy things, that we cannot like, were extraordinary specimens of mechanical arrangement, more than one hundred and fifty sticks supporting the stems, in a sloping direction all round the pot, as well as the upright ones to support the interior shoots, so that a plant exhibited a surface of bloom more than two feet in diameter. Mrs. Lawrence's general collection was splendid; many of the specimens not, perhaps, to be matched in the world. Garraway & Co. of Bristol sent twelve Pansies, that stood alone in their glory; but they were of such extraordinary size, that they would have been as much so, had they been surrounded by the usual quantity of ordinary specimens. Messrs. Veitch produced a really extensive collection of plants, which had travelled from Exeter without ruffling a leaf or a flower; nobody could have believed it possible to accomplish such a journey without exhibiting any sign of damage. Pot-grown roses were, for the season, fine. The most remarkable specimens were, China, *Triumphant*, a dark rose-colour; *Mrs. Bosanquet*, blush, or pink white; *Cramoise superieur*, crimson; *Archduc Charles*, light rose colour: Tea Roses, *Pactolus*, straw-colour, and *Bougeria*, salmon: Bourbon Roses, *Bouquet de Flora*, dark-pink, and *Armosa*, light rose; we mention these as good in themselves, as well as beautifully grown. There was a new yellow climbing rose from China, very remarkable and showy, but the flower loose and ill-formed. Messrs. Lane & Paul exhibited the most, but the Chinese climber was from Standish & Noble, and it will be grown, no doubt, by every rose cultivator, though excessively ugly in its individual flowers; and it will be an especial favourite, if it be a continuous bloomer. The Anemones were fine. The most remarkable, and at present the best of the season, are Porperina, a lovely blue-edged variety, as close and as round as could be wished; Eleanor, a good crimson variety; and Fair Rosamond, pretty. There were some high-coloured hardy Rhododendrons, from Messrs. Rollisson, which are a great acquisition; and Messrs. Jackson of Kingston, and Gaines, of Battersea, showed one each, very good in their way—Campanulatum superbum, by the former, was very striking; and Marie Taglioni, by the latter, was a French

white, with a remarkable dark spot, and well grown would be splendid. As the May shows are merely initiatory for Geraniums and many other subjects, and we are likely to see the same plants or varieties in better order, we shall not go through them all. Of the orchideous plants, the most remarkable were the Vandas, of which several varieties were exhibited in splendid condition. Of fruit there was but little, but that little was good. The arrangements were very complete, the tents triumphing completely over the heaviest rain and hail-storm we ever witnessed, and standing three hours of the rain without a dampness being felt inside. The conservatory is very full, and we may say, crowded, the plants having been (perhaps out of delicacy towards those who presented them) allowed to grow as they please; we seriously recommend the very free use of the knife. Many of the plants may be made noble specimens in form as well as size, if pruned well before they make their next growth. A specimen of the Brugmansia (Datura) sanguinea, in full bloom, was a most striking object; but the plants have not sufficient room; and be it remembered, that very many flowering plants will bear spurring as well as a fruit-tree.

FLORICULTURE OF THE MONTH.

BY GEORGE GLENNY.

The month of May is generally rich in subjects of floral interest, and notwithstanding the unfavourable weather, which has prevented many from venturing forth with their best specimens, the shows have far exceeded in splendour and specimens of skill everything that had been seen before. The Chiswick show was first on the list, and rich in azaleas, roses, orchideous plants, heaths, and stove and greenhouse plants. The Royal Botanic Society's show in the Regent's Park was much the same up to a given point, but there were many additional showers. The Surrey Zoological Gardens produced an exhibition of such extent and excellence among the plants, as the picking of the whole season any year previous would not have equalled. There has been nothing very novel in seedlings, except in Cinerarias, and the chief of these have been Henderson's, Ivery treading rather close on his heels, but by no means equal. Perhaps *Porperina*, with a sky-blue edging, and white centre, takes the lead, its habit being as rich as its colour. We have seen Ivery's *Iveryana* Azalea well exhibited; it is pretty, but not equal to his *Beauty of Reigate*, which is a fine white, with carnation stripes very well defined, and worthy of a place in every collection. The Verbena, Wyness' *Princess Alice*, has been shown badly, and it gives us occasion to recommend all growers of verbenas to abstain from showing early; they do not come to their proper colour early in the season, and they will not stand the least artificial heat. If Princess Alice were not already out, it would not have gained half-a-dozen customers from the specimen exhibited this month—the beautiful pure white of autumn is a stained affair in spring; those, therefore, who have seen it during May, can form no notion—no accurate notion—of its real qualities. Mr. Beck has some new Geraniums, which have been noticed at the Surrey Gardens but passed over at the Royal Botanic Gardens. Considering the great rubbish which have obtained certificates in the Regent's Park, we cannot understand the passing over of such flowers as *Emily* and *Pontiff;* we quite approve of refusing certificates to flowers that are not first-rate; but *Emily*, *Agatha*, *Cuyp*, *Dowager*, and *Pontiff*, if taken for comparison to the side of many of the present leading sorts, would make them look poor; the new ones have their faults, but the colour and size should save *Pontiff*, and the general qualities are fair in *Emily;* we repeat, that we should like to see the standard kept high, and certificates refused to such flowers as *Emily* and *Pontiff*, if the consistency were preserved; but to see scores of worse things obtain them, and such as they passed over, is not exactly the thing. Turner's Pansies have been magnificent this season, improving at each show. It would be encouraging if the grower would enlighten the amateur by a paper on their culture: we know he has done this in the *Florist*, but no one who has seen the cuts, or portraits of flowers in that work, can have any faith in its contents; whether they are misrepresented by design or for want of talent, we cannot say, but justice to those who might be misled by the representations there, compels us to say, that in most instances it would be impossible to recognise the flowers by any of the portraits; the *Beauty of Hastings* dahlia has not a solitary feature that represents the original; and the tulip *Rose Magnificent*, al-

though from a drawing that was a perfect portrait, has been so dreadfully travestied, that nobody could know it; and others have been so completely caricatured as to destroy the faith of every florist, however much he may be inclined to patronise it; therefore we say to Mr. Turner, write a paper where it will be read by the great number who are interested. In the absence of a paper devoted to floriculture, write it for the *Chronicle*,—the other paper no longer represents florists. Three of the largest meetings of florists that were ever got together, have decided that it is for the general interests of floriculture that there should be two garden newspapers, but that until there is a second, conducted by some one of ordinary intelligence, the science must continue to suffer as it has the last two years and upwards, much more to the injury of the fair dealer than to that of the less scrupulous trader. The show of American plants at the Royal Botanic Gardens, Regent's Park, will be very popular; but we are glad that Mr. Waterer of Knap Hill will open his private exhibition, as well as contribute to that at the Gardens, for the price virtually excludes thousands who cannot afford to pay five shillings for a peep at flowers hitherto to be seen for one shilling, and the exhibitors themselves will find out, that however much they may contribute to the income of the Society, they will not do much for themselves. Mr. Waterer, although he supplies three-fourths of the plants which form the exhibition at the Gardens, will open his great show at Chelsea, as usual. The Tulips have had a most unfavourable season; they were by the early fine weather brought too forward, and the untoward, gusty, cold days of May have checked them altogether; ragged blooms—one of the common results of sudden checks—are therefore prevalent, and many beds will suffer. A singular fate has fallen upon one old cultivator, who has lost his entire bed, with one solitary exception. They came up, and rotted down, without any apparent cause; and at the meeting of the Society for the Encouragement of Floriculture, the subject was discussed; after many suggestions and opinions which seemed untenable, the chairman elicited from the grower that his garden was upon an irony, hungry, clayey kind of subsoil, and that he had to trench low enough to mix this with the top; the doubts were thus apparently cleared, as many have suffered from the same cause. As the loss of a collection of many years' accumulation was considered a misfortune, the growers present resolved at the taking up time to help make up another collection, upon the unerring principle that a good many can help one, while one cannot help a good many. The growers of the dahlia have always fancied that we help them along a little by describing the seedlings of any consequence from year to year, and we have generally had one of each sent up to grow near London; this year, because we made earlier and better preparation than usual, we have been more behind hand. Growers of seedlings hurt the character of their novelties by driving off their delivery so late, and they frequently get blamed for sending out a bad variety, when they have only sent a bad plant, and that later than it ought to be sent. The two rival Societies for the encouragement of Floriculture will soon settle down into their places. The one which demands a pound subscription has shown the value of their certificates of merit by the fuchsia which they have adopted as a first-class flower, Lord Nelson; hundreds of better ones have been flung to the muck heap the last few years. It is almost too bad that people should meet and give each other certificates for subjects not worth cultivating; yet the same Society gave thirty in one year, and many have ordered the flowers form that fact alone. It has been averred too, within the last fortnight, that Lord Nelson is one of the best fuchsias out; while we with just as little hesitation say, that it is not worth a place among even a common collection. The other Society, which meets at all four sides of London, with just one-twentieth part of the subscription, has already withheld certificates from half a score subjects that have very improperly obtained them elsewhere. A new mode of encouraging amateur cultivators has been adopted by Mr. Hamilton of Cheapside. He has offered a prize, or rather series of prizes, for the best collection of annuals, the best melons, and the best cucumbers, that shall be brought or forwarded to him on a given day; and many who have hardly confidence enough to show in public gardens, are preparing to exhibit on the occasion. A general meeting of gardeners, amateurs, and nurserymen is called for the 29th of May, in London, and it is expected to be fully attended. The object is to adopt measures for the further encouragement of floriculture.

MYANTHUS FIMBRIATUS.

Myanthus fimbriatus, Morren (fringed flowered Myanthus).—Orchidaceæ § Vandeæ-Catasetidæ.

This fine and showy orchid has been introduced to, and cultivated in Belgium; and the following is the substance of an account of it published by Professor Morren, in a Belgian

Myanthus fimbriatus.

periodical, the *Annales de la Botanique de Gand:*—

"This beautiful plant particularly graced the horticultural exhibition held at Brussels in September 1848. The judges considered it so superior to all the others among the innumerable fine orchids brought forward—so elegant in itself, that instead of awarding to it the silver-gilt medal as offered in the schedule, they made an extra award of a gold medal. During the three days of the exhibition, more than 100,000 persons were delighted with this strange and admirable plant, which filled the room with its odour."

The intelligent owner and cultivator of this remarkable production was M. Legralle-D'Havres of Anvers, a gentleman who, together with his lady, has long been known as among the most distinguished promoters of horticulture in Belgium.

Some months after the exhibition above alluded to, "the same species flowered with the Chevalier Heynderycx, president of the Society of Ghent; but while the flowers of M. Legralle's plant were white and green, those on the Chevalier Heynderycx's were of a rose and yellow colour. It is known that the Catasetums, from which the Myanthi are separated, are capable of important polymorphisms, since we frequently see strange metamorphoses of form among them. In the present instance, however, it was a change of colour; but as we have preserved specimens in spirits of the flower of the plant which was exhibited, and also of that belonging to the Chevalier Heynderyncx, we have no manner of doubt but that they are one and the same species; only we propose to call the one—the green and white—*Legrelle's variety;* and the other—the rose—*Heynderycx's variety.*"

We have no information respecting the native country of this species, nor any historical particulars respecting its introduction to Europe.

"The culture of the genus Myanthus is similar to that of most tropical orchids. It is found to succeed in a pot, not suspended, but placed in a stove. The pot should be well drained with coke, which allows free aëration underneath, and facilitates the rapid running off of the water, when that element is supplied to it in the usual way. The soil should consist of turfy peat and sphagnum moss, freely mixed with broken pots. In such a mixture the Myanthus is found to thrive well; it produces its magnificent spikes in the autumn, and at the time of flowering it must be copiously watered."

THE ROYAL BOTANIC GARDENS AT KEW.

A visit to this national establishment impresses us with a notion of liberal and paternal government, and proves that under good management the intellectual poor of a country may be provided with the same enjoyment as the rich provide for themselves. The conversion of this noble place from a bear-garden to a comparative paradise, has been the work of ten or eleven years; it was only in 1837 and 1838 that the original garden newspaper denounced it as a filthy, dirty, neglected concern, a disgrace to the country and the management, and asserted that the plants were in a shamefully bad state of decline,—charges that were indignantly repelled, but, nevertheless, proved to be perfectly true in detail, as well as general substance. It was stated in the same paper, that there were but two modes of dealing with the affair—either the establishment should be broken up, the plants distributed, and all the cost saved, or a sufficient grant should be made to keep it as a National Botanical Garden, in the highest order, and open to the public, with the plants properly labelled, and a sufficient number of attendants to prevent depredation. Since all this was said and written, a commission of inquiry confirmed the truth of the charges, and recommended the adoption of the improvements. Sir W. J. Hooker superseded the former curator, and has been gradually carrying out the improvements necessary to complete the Royal Gardens, Kew; and in a former part in this book may be seen an article, showing the spirit of the changes, the way in which they were met, the results which followed, and a visit, after ten years' absence, by the party who was first to denounce the former management and suggest the improvement. We have just made a visit, our first since the plants were placed in the Palm-house, and we must say that, to any one who loves a garden, or admires plants, there is nothing to come near that splendid conservatory. The whole building, so far as superficial observation goes, is faultless; but no public building in this country can be so: there is among our best architects a great lack of that common sense which pervades less pretending classes, and it is scarcely possible to find any thing built within the last half century, in which the least attention has been paid to a proper elevation. The noble building at Kew is of course no exception. The system for the accommodation of the plants is excellent, but we are quite sure it was unnecessary to provide a place for the Thames; yet as four or five feet of room was wanted beneath the floor for the hot-water pipes, the architect could not provide this by having the floor so much higher, but he must go down to the territories of old Father Thames, who no sooner found them disturbed than he took possession, and though turned out very frequently, still finds his way back, to be turned out again. To be serious, the excavation beneath the floor is too low, and the water will come in, and frequent pumping is necessary to get rid of it. This, if true, is a great pity, because the place seems otherwise unexceptionable, with a central roof 66 feet high, covering a space of 138 feet by 100, and two wings 112 feet by 50; it is impossible to overrate the general effect now that the plants are in the house. A tropical forest would give some of the effect, but as the variety of the plants far exceeds anything that can be found in one locality, it is far more interesting than any other spot on the globe can be. In the central department, as it may be called, is a gallery, thirty feet from the ground, approached by means of a spiral staircase, and the effect is grand. The noble palms, and other tropical plants from various parts of the world, are rapidly recovering the desirable state of health which they have not enjoyed, and never could have enjoyed, in the wretchedly crowded houses which they inhabited before the conservatory was built; but there must be a complete new growth before the damaged trees can be got rid of. Nobody can find reasonable fault with its construction, nor the manner in which the plants are being placed; but we regret the intrusion of water, for water we could see; and we were informed that, by some unaccountable oversight, the excavation was below the level of the Thames, and required them to be always pumping. This, we suspect, was figurative, the "always" meaning only "sometimes." Certain it is that the public will not discover much inconvenience, and the ornamental water appeared to us to be low enough to bear a good deal of filling up. The plants in the cactus house are grand beyond description; a specimen of Melocactus, that weighs upwards of eight hundredweight, is called by the newspapers "The Monster Cactus." Some of the other specimens are enormous, though not quite so bulky; but the endless variety and the extraordinary forms present a collection of natural curiosities to be found nowhere else. The orchideous house contains just now one specimen of Oncidium, the most beautiful we have seen — the spike strong, the flowers very close and brilliant, and the plant altogether interesting; it is marked *Oncidium sp.* and has not yet had its name. Of course there are thousands of plants, that are desirable to plant lovers, but one of the best things we

saw among hard-wooded plants was *Erioste-mon intermedium*, with flowers thrice the size of cuspidatum, and altogether a beautiful plant. We do not altogether like the laying out of the clumps in the grass, but from the incomplete state of the establishment it would be premature to condemn. The garden in front of the great Palm-house is pretty and consistent, and the arrangements seem calculated to preserve the plants, while they afford facilities to the public who want to know anything. There is a man in every house at work at something: not that he can do a great deal, and keep his eye on the public also, but he may at intervals, and in fact does at intervals, some little work during the hours of exhibition. One of the most gratifying results of this national undertaking is the enabling of the poorest person who is clean, and respectably dressed, to enjoy a garden that no riches could surpass in interest; and we see the happy effects of this in the visits of persons evidently of humble condition, who are enjoying the walks and paying great attention to the plants, as well as evincing their care as they pass through the houses. The public cannot appreciate the luxury of a visit until they have seen the establishment as it is; for it is no more like what it was, than Bedford-square is like St. James's Park.

GARDENING FOR SOLDIERS.

In the mania for class legislation, which distinguishes the present age from its predecessors, it is singular that no one member of parliament has made himself conspicuous for philanthropic exertions in behalf of a body of men to whom we in a great measure owe, not only our influence abroad, but the peace and security it is our happiness to enjoy at home. There are nearly fifty members of the naval and military professions in the House of Commons, and the great majority of the rest of the house are more or less connected with the services; but not more than a fraction of the former ever concern themselves with the affairs of the army or navy, excepting when the estimates are discussed—and then only for a part of a single night—while the latter never, by any chance, turn from their favourite topics to bestow, for a time, undivided attention upon the welfare of the protectors of the country. They apparently deem their duty to soldiers and sailors sufficiently performed, if they give a silent vote in favour of any measures suggested by the Secretary at War, or absent themselves from the house when a division takes place upon a question of financial economy, which they are pledged to their constituents to oppose. We are loth to put a harsh interpretation upon this apparent callousness: it may arise from the constitutional dislike to a standing force, or from an ignorance which legislators find it too much trouble to overcome; or it may proceed from a confidence in the disposition of the Commander-in-Chief and the Admiralty to originate all benevolent works having reference to the services But be this as it may—there are some two or three hundred thousand human beings serving Great Britain, for none of whom the legislature of the country has a *special* thought, and who are rarely included in any of the great measures devised for the common welfare. Of this number, one hundred thousand, in round figures, compose the British Army, and it is because a means suggests itself for benefiting that class, bearing peculiarly upon the province of this Magazine, that we are induced to treat of what, at the first blush, might have seemed foreign to our vocation.

This is emphatically the epoch of sanitary legislation. Whatever concerns the health and exercise of the public engages primary consideration. Draining, ventilation, and the appropriation of open spaces to purposes of recreative enjoyment, form the subjects of innumerable private and public bills, and occupy the attention of various boards, committees, and associations. Some portion of the new light which has broken in upon Parliament has extended its illumination to the Ordnance department, in whom abides the duty of constructing, ventilating, and purifying the barracks of the soldiery. Yet, strange to say, one of the most obvious methods of combining health, exercise, and profit, with amusement and occupation, has been altogether neglected. There are many scores of barracks in Great Britain, Ireland, the Channel Islands, the Colonies, and India. In most of these there are barrack-yards and parade-grounds of greater or lesser dimensions, where the men assemble, perform evolutions, submit to inspection, or stroll about when off duty. But where do we find a single strip of ground attached to the soldier's dwelling, appropriated to the objects of A GARDEN?

To dilate upon the advantages of a garden in the presence of our readers, many of whom are, we are bound to presume, devotees of that source of endless pleasure and grateful toil, were a work of supererogation. It behoves us, however, to offer to those who, we take it, have but little considered the subject, an outline sketch of its many recommendations, and with this view we solicit the indulgence and patience of the initiated.

An elaborate garden, comprising some of the marvels of the floral world, and the cultivation of the choicest specimens of horticulture, is not what we contemplate as suited to the

soldier. As the object is to give him occupation extra to his professional labour, some inducement must be held out to him to embrace the pastime, and nothing seems more likely to achieve this aim than the association of his industry with his profit. Carefully tended, the kitchen-garden yields enormous returns upon the outlay of capital and labour. The power of growing such articles as may conduce to the improvement of his table and impart a relish to his rations, is therefore the first recommendation which an introduction to the *vegetable* world will possess in the eyes of the soldier. It is rarely that any other esculent than the potato, and occasionally the cabbage, graces the barrack-board, for the market cost of all others is beyond the sum assignable by the military regulations to the soldier's mess. Let him know, then, that a small fraction of his weekly surplus of pay will procure him seeds for carrots and turnips, salads, parsnips, onions, sorrel, spinach, greens, beans, radishes, and an infinite variety of herbs, such as parsley, sage, mint, thyme, &c., which a little industry will fructify, and he is at once supplied with a motive—the lowest and vulgarest, perhaps, and yet the most powerful—for taking spade and hoe and watering-pot in hand. Tell him that the inhalation of the pure air of heaven, and the fragrance of the well-tilled earth, will keep him out of the hospital, and save him the deductions to which weeks and months passed in confinement with others afflicted with all kinds of diseases will expose him, and a second inducement to rural occupations is furnished; and if to this be added the promise of a small bonus upon pre-eminence in horticultural skill, the stimulus is complete.

To the officers the employment of the men in gardening comes powerfully recommended. It encourages habits of order, cleanliness, regularity and industry; for the soldier-gardener will soon learn that the earth will yield none of her fruits unless her cultivators possess these virtues. The necessity for sowing many articles in rows, for weeding, watering, hoeing, manuring, transplanting, cutting and gathering, will evolve all the qualities essential to the formation of a good soldier and citizen. The man who will acquire habits of attention to drilling his bit of ground, will not be indifferent to *drilling* of a more military character. By way of encouragement, the officers' butler or caterer might be instructed to obtain his vegetable supplies from the men of the regiment; and this would, at the same time, serve the officers, for the cost would of course be less than that to which dealing with the green-grocer might subject them. If, in addition to the kitchen garden, the men raised flowers, they would have the opportunity of offering a bouquet to the wife of the captain of their company, or of decorating the little rooms of the married men, or improving their own personal finery. Who so gay as the orderly with a pink at the button hole of his shell jacket?

But, perhaps, the most important consideration connected with the introduction of gardening into the barracks, would be the withdrawal of the men from the ignoble and baneful pursuits of the canteen and the grog shop. The Government have lately interdicted the sale of spirituous liquors within the barrack walls, but the determined toper thinks nothing of a walk, even after a fatiguing parade, that takes him to his favourite haunt, while others console themselves with superfluous draughts of intoxicating beer. Various amusements have been devised by the military authorities to check this tendency to imbibition. Regimental libraries, tennis and racket courts, gymnastic exercises, fencing, and similar entertainments are countenanced, and unquestionably ensure a degree of benefit to the soldiery. Yet, to the pastime of the garden they must all succumb, whether considered in reference to the enjoyments they impart, the health they bestow, or the personal profit they yield. We trust that this brief mention of the subject may induce the authorities to give it, at least, a portion of their serious attention, in view to the soldiers' sharing in the general scheme of sanitary improvement.

Having thus said a word in favour of the principle of introducing gardening into the army, we shall, shortly, proceed to point out how and where such gardens should be formed, the method of management, the funds for their support, and such other matters in connexion with the plan, as may serve as the basis of a proposition to the Ordnance Board and the Secretary at War. We desire, in this good work, the aid of the military journalists, whose pages are ever open to the promotion of the welfare of the troops; and shall only be too happy to strengthen our position by the adoption of such suggestions as their experience may supply.

One word more. It is possible that it may be urged as an obstacle to the adoption of our proposal, that regiments are locomotive, and that the men may, by the calls of service, be moved away before they can reap the fruit of their horticultural toil. We answer this by anticipation. If the plan become universal, the troops will only go from one garden to another, where, probably, the same products will be in a corresponding state of forwardness. Should it, however, be otherwise, it will be easy to arrange the payment of an adequate compensation by the relieving corps, or the sale of the expected stock to some market gardener, if the barracks are not to be again immediately occupied.

CONTEMPORARY WRITINGS, AND ORIGINAL NOTES.

Death of Dr. Gardner.—A letter has recently been received in London from Lord Torrington, Governor of Ceylon, announcing the sudden death, from apoplexy, of Dr. George Gardner, superintendent of the botanic garden, Peradenia, Kandy, Ceylon. This zealous naturalist was a pupil of Sir W. J. Hooker, when Professor of Botany in the University of Glasgow. Soon after leaving Glasgow, he undertook the enterprising journey recorded in his *Travels in the Interior of Brazil.* He penetrated on this occasion as far west as the tributaries of the Amazon, and from near the equator to 23° of south latitude. He made abundant collections of plants; and we are indebted to him for many of the noble orchids now flowering in this country. The wonderful parasitic vegetation of the grand tropical garden of Brazil attracted his particular attention, and he set a worthy example to many practical botanists engaged in exploring that floral region at this moment. Upon his return from Brazil, about five years since, he was appointed to the office of Superintendent of the Botanic Garden at Kandy, Ceylon. Since then he has been actively employed in preparing materials for a Flora of that country, and undertook frequent excursions for that purpose. "The literary part of my work," says Dr. Gardner, in a recent letter to a correspondent of ours, "progresses but slowly; but materials are accumulating in abundance, and soon I hope to sit down to it in good earnest. I have just returned from a month's tour, made in company with Sir Emerson Tennent through the interior of the northern half of the island." Dr. Gardner's attention was not, however, confined to botany. Whilst searching for plants, the land and fresh water mollusca, living more in concealment, did not escape his quick eye. The loss of so indefatigable and sound a naturalist in the prime of life (we believe he was not much above thirty) will be seriously felt; and it is to be hoped that his collections and manuscripts will be carefully preserved.—*Athenæum.*

The Funebral Cypress. — The introduction of a new hardy evergreen tree into this country is an event that is seldom noticed at first in the manner it deserves. This arises from our being in general imperfectly acquainted with the history of such plants; and the result is most unfortunate, for till experiment has decided whether such a plant is hardy or not, nobody knows what to think or do—the seedlings are neglected, put aside, or ruined by being cramped in pots, and at last, when their value is discovered, the race has become almost extinct, and the constitution of the survivors is, for the most part, ruined beyond recovery. This has most especially been the history of Conifers; and Cryptomeria is a striking example of the practice. Of this fine species thousands of seedlings were distributed by the Horticultural Society; and where are they now? The greater part have perished, because the public was unacquainted with the value of so beautiful an evergreen. There was no certainty that it was hardy, and now that experience has shown that our winters will no more touch it than they will a Spruce Fir, the old stock is gone, and fresh supplies must be sought in China. It was the same with the Araucaria of Chili, with the Deodar, and with many others. An acquisition of the highest interest, lately received by Mr. Standish, of the Bagshot Nursery, will undergo the same fate, unless the history of it, and the certainty of its being still more hardy than Cryptomeria, shall be pointed out, so as to leave no room for misapprehension. We allude to the Funebral Cypress. This plant was first mentioned in Lord Macartney's Voyage as growing in a place called "The Vale of Tombs, near the Tower of the Thundering Winds," in the province of Zhe-hol; which is a mountainous district, lying in latitude 41° 58′ N. in Chinese Tartary, and has a far more rigorous climate than is ever known in England. The plants found in this province consist of hardy northern forms, oaks, elms, ashes, willows, pines, elders, sophora japonica, together with herbs of northern habits, calculated to bear severe frost, such as asters, pæonies, Solomon's seal, pinks, &c. In the foreground of the landscape representing "the Vale of Tombs," is a specimen of Funebral Cypress, much resembling a weeping willow; and the weeping tree so commonly represented in Chinese paper-hangings and porcelain, is evidently the same species. The seedlings in the Bagshot Nursery were raised from cones lately procured by Mr. Fortune, while at Shanghae, from a place 200 miles to the north of that port. We have also received a dried specimen of it, which enables us to say that it must be a plant of the greatest beauty. It may be best described as a tree like the weeping willow in growth, with the foliage of the savin, but of a brighter green; it is, however, not a juniper, as the savin is, but a genuine cypress. It has long been a subject of regret that the Italian cypress cannot be made to endure our climate, and to decorate our burial-places: but we have now a finer tree, still better adapted for the purpose.—*Gardeners' Chronicle.*

Ornamental Garden-Pots.—If we may judge by the prevailing taste of the present

day, we are midway in what may be termed the transition state from the plain matter-of-fact principles which have hitherto principally guided us, both in business and decoration, to that period when the highest efforts of artistic skill shall be brought to bear, not only on purely decorative objects, but also no more common articles. That such a period has arrived in the history of all nations who have been celebrated for refinement and civilization, there is abundant testimony to prove. No one can for a moment behold the restored treasures of the ancient Egyptians, the relics of Etrurian pottery-ware, or the matchless sculpture of the Greeks and early Romans, without being forcibly convinced how highly the decorative art was prized by them, and of the high degree of refinement requisite to design, execute, and appreciate objects, which generally speaking we, as a nation, are only beginning to understand and value. I need scarcely refer to the mediæval ages for corroborative proof. The decoration of tapestry, the embellishment of missals, and the carving with which the most trifling articles were enriched, all bespeak an appreciation of the ornamental and decorative styles, in an age not otherwise remarkable for the refinements of civilized life. At the present time, in our own country, and more or less in others, the attempt at restoring the true decorative style, both on objects justly considered within the pale of the fine arts, and on those more common utensils pertaining to our daily wants, which have hitherto been considered unworthy of such distinction, is daily pushing itself into notice. We may hail this as unmistakeable evidence that an appreciation of the beautiful and decorative in art is fast pervading society at large. I have been led into making the above remarks, on reflecting what might be done by way of improving the appearance of that most useful, common, and certainly, at present, most unornamental piece of pottery, "the garden-pot." Gardeners have hitherto been content with it, in its plain unpretending form ; and it may fairly be questioned whether any utensil employed either in gardening or agriculture has passed through the hands of many generations with its primitive form so little altered as this has. It is true, Mr. Forsyth some years ago recommended to have them glazed, or varnished; for which piece of advice he was unanimously voted an innovator, and I believe the plan was never put into practice. Some modification in its form, too, has been brought into notice, in the shape of the " West Kent Garden Pot;" but these, in so far as ornament is concerned, are not a whit before the original patterns. Again, lately, a substitute has been invented for our old friends in the shape of "slate tubs." Now I had always an inkling that these latter would be a great improvement, as regards appearance at least, to the common garden-pot; but after seeing a stage of plants growing in the " miniature orange tubs," I was so struck with their prim, formal appearance, producing impressions so unfavourable to my pre-conceived ideas of beauty, that I determined in my own mind they would never succeed, where taste was called in question. Perhaps some readers may not be aware how far the decorative art may be carried into effect on the common flower-pot, and the wide field it opens for design in their embellishment; several attempts have been made, one of which has come under my notice, and as they have stood with comparative safety for twelve years to my knowlege, I am enabled to speak as to their durability. The pots I am now describing were, I believe, made at Sherborne, and are of a large size. They are (to all appearance) made of the common pottery clay, in moulds. The rims of the pots at top and bottom are embossed with foliage and flowers, and festoons of the same, in high relief, are carried round the sides. There is likewise an elaborate border towards the bottom, in the same style. The foliage, &c. has all the sharpness of outline so valued in sculptured relievo. Altogether they are the most decorative article I ever saw made for plants. Now, it has often struck me while admiring the magnificent plants which annually crowd the tables of the metropolitan exhibitions, how much pots of this description would enhance the beauty of the plants exhibited. It must be admitted, that the value of all objects is increased by comparison, as they approach a certain point, or degree of excellence. The plants themselves are many of them matchless specimens of the gardener's skill. Nature and art cannot go much farther in cultivation. The pots, on the contrary, are neither better, nor perhaps worse, than they were fifty years back; try to embellish them, and make them worthy, as works of art, to be viewed with satisfaction, in connexion with the choice treasures they contain. The reader must not suppose, that pots thus decorated, are recommended to be universally used; such would be a misapplication of taste ; but for plants to bloom in, for the conservatory, and for plants intended during the summer to ornament the flower-garden, or parterre, such pots would harmonize with the surrounding objects and scenery, and by their warmth, and colour, form pleasing objects of themselves, independent of their proper uses.—*Spencer, in Paxton's Magazine.*

Fruits of North America.—The apple thrives admirably in the central and northern

States, and as far as Montreal, in Canada, splendid orchards of this fruit are to be seen. The peach is abundantly grown throughout the Union, but being mostly, if not always, raised from the stone, many worthless varieties are produced, and the better kinds are transient, as no trouble is taken to perpetuate good sorts by grafting, which, indeed, would not repay the labour of doing, from the short-lived nature of the tree in this climate, which comes into bearing in three or four years from the kernel, and does not last above eight or ten before requiring to be renewed. The peaches of New Jersey are esteemed for their excellence; but to the northward of that State, the summers are too short and cool for the perfect maturing of the fruit, and the trees themselves are apt to be injured by the rigour of the winter. The most northern station at which I remarked the peach as a standard, small, indeed, but apparently healthy, was at Burlington in Vermont, (lat. 44° 27′); but the vicinity of Lake Champlain, on whose shores the town is situated, has a mitigating effect on the otherwise severe climate of that part of the Union; for at Montreal, just one degree due north of Burlington, the peach has disappeared from the orchards, and sought the shelter of the garden-wall, being unable to resist the winter any longer as a standard fruit-tree.—*Bromefield, in Hooker's Journal.*

Planting a Flower Garden.—A flower-garden should be and can be always well-stocked, let the season be what it may; not indeed at all times with flowers, but at least with what produces as pleasing an effect. There are Aconites [*Eranthis hiemalis*], Christmas Roses [*Helleborus niger*], and Violet Grass [*Ionopsidium acaule*] for winter; Crocuses and their kindred species for the earliest spring; Hyacinths, Anemones, Wallflowers, and all sorts of early Alpine plants, for the later spring; a countless host of species ready to decorate the summer and autumn; and as for the dead season of the year, when the flowers of autumn have all perished, and the first blooms of winter are still dormant, nothing is more easy than to occupy the ground with moveable evergreens of rich and painted foliage. Upon this plan all seasons have their peculiar features, and every month will bring a change—precisely what is wanted to render gardens the most agreeable. No rarities are needed for this, no tender strangers, whose cost would buy the fee simple of the land they grow in, nothing demanding shelter and peculiar skill. On the contrary, the commonest and most old-fashioned plants are as good as the last novelty from the antipodes, and for many purposes better. Not that the present favourites would have to be excluded; on the contrary, their exquisite beauty and peculiar fitness for many of the purposes of embellishment will continue to render them indispensable in aid of other things. They must always form a conspicuous feature, because of their great intrinsic merit; but a feature only—a portion of the gay crowd, and not the crowd itself.—*Gardeners' Chronicle.*

Treatment of Nymphæa rubra.—The *Nymphæa rubra* had been grown in the pine stove [at Eaton Hall] for many years, but never produced blossoms, owing, as I considered, to its being too far from the glass, and the temperature of the pine-stove being generally too low for the development of its flowers. With this impression on my mind, in December, 1826, when its leaves were decayed, I took up the bulbs, or tubers, out of the stone cisterns in which they had grown for years, and put them into pots, according to the size of the tubers, and plunged the pots in water to within an inch of their rims. They remained in this situation in the pine-stove till the plants began to show leaves in the April and May following. They were then planted in cisterns, and in glazed earthenware pots, in which was the following soils; in the bottom, four inches of strong clay, made solid, above which was six inches of light mellow loam, and, at the top, an inch or two of sand, to keep the water clear. The cisterns, which are made of Yorkshire flags, and of the following dimensions,—three feet long, one foot eight inches broad, and one foot four inches deep,—were placed upon the end flues of pine-pits, where the fire enters and escapes: and they were elevated with bricks to within eight and twelve inches of the glass. The glazed pots were from fourteen inches to eighteen inches in breadth and depth, and were similarly placed, except a few that were plunged in corners of the melon-pits. They were kept constantly full of water, and it frequently was made to run over, in order that the water might be kept pure. The temperature of the pits was seldom under 80°, and in sunshine often above 100° of Fahr. No air was admitted at the lights immediately above the plants. As the plants increased in growth, they put out many runners, which were pinched off close to the tuber. When the roots reached the clay, the leaves got very strong, raising themselves on the sides of the cisterns. The *Nymphæa cærulea* and *N. odorata*, under similar treatment produced abundance of flowers. The first flower of the *N. rubra* opened on the 13th of August, and measured over the disk five inches and a quarter. The same plant produced another flower in September, somewhat larger, and with nineteen petals; and

many more buds were formed, but they opened very indifferently towards the end of September; in October, the plants began to lose their leaves. When this was accomplished, the tubers were taken out of the cisterns, and put into small pots as before stated. The *Nelumbium speciosum*, in a glazed pot, with similar soil, plunged in leaves in the same pit, has flowered well, and ripened seeds, while a plant in the pine-stove, although growing freely, has not even shown flower.—*Letter from Mr. C. Duff.*

The American Cranberry.—It appears from a paper read at the Horticultural Society in 1808, that the American Cranberry, the *Vaccinium macrocarpum*, had for some years been cultivated with success at Spring Grove. It is necessary to premise, that a spring rises in a small grove, within the precincts of Spring Grove, which is no doubt the origin of the name; this spring is carried in leaden pipes into the house, to which it affords an ample supply; the waste water is suffered to run through a small basin and a pond in the pleasure-ground, before it escapes to Smallbury Green. In the middle of the basin, a small island was formed, by supporting a box of oak upon posts driven into the bottom; in the centre of this pond, the waste water, which used before to issue through a fountain, is suffered to flow in the form of a spring, which, rising into a large shell of the *Chama gigas*, perforated for the purpose, imitates very well a natural spring, and gives in hot weather an appearance of freshness and coolness, very pleasant to those who walk in the garden. The oak box which constituted this artificial island, is circular, 22 feet in diameter, and 13 inches deep; the bottom is 5 inches under the surface of the water, and bored through with many holes; on this a layer of stones and rubbish was first placed, and upon that a covering of bog earth, brought from Hounslow Heath, which together are 5 inches below, and 7 inches above the surface of the water of the basin: in this bed of black mould, a variety of curious bog plants were placed, which flourished in an unusual degree; among these was the *Vaccinium*, which flowered and ripened its fruit the first year. In the autumn of the second year it again produced a plentiful crop, and soon after began to send out runners somewhat resembling those of a strawberry, but longer and rather less inclined to take root while young; they did however take root in the winter, and early in the spring threw out upright branches ten inches and a foot long, on which the flowers and fruits were chiefly placed; the produce was this year gathered, and found to be high flavoured berries, very superior to those imported, which have in general been gathered unripe, and have become vapid and almost tasteless by long soaking in the water in which they are packed for carriage. It was now determined to consider the American Cranberry as an article of kitchen garden culture, and to give up the whole of the island to it, which in a few years it entirely covered by its own runners, without any fresh plants being put in. In the year 1805, a bed was made on the side of the pond, 20 feet long and $5\frac{1}{2}$ feet broad, by a few stakes driven into the bottom parallel to the side, and lined with old boards; the bottom of this was filled up with stones and rubbish, and on these a bed of black mould, 3 inches above and 7 inches below the usual surface of the water, was laid: this was planted with Cranberry plants, many of them having been rooted in a hot bed, in which they throve most vigorously. It is remarkable, that during the seven years these Cranberries have been cultivated at Spring Grove, nothing has arisen, from the variety of seasons, from blight, or any other circumstance, that has diminished the quantity of a full crop; the flowers have issued out of their buds, in abundance, in their due season, and fewer of them have been abortive, than in general is the case in other plants. The fruit has gradually swelled and duly ripened without being subject to the attack of any vermin, or to injuries of any kind from the excesses of heat or cold, or from those of wetness or of drought.—*Letter of Sir Joseph Banks, Bart.*

[What has become of the island and the cranberries now, we know not; in all probability, the island has gone to the bottom. Those who like cranberries, however, may think it worth while to try their cultivation, although they have been since grown in an American bed with success, and without difficulty.]

Sowing Seeds.—In sowing seed beds for a supply of plants of any particular crop, it is best to sow enough seed, but not too thickly on the ground; a store of plants is often found very useful in garden culture. Recollect, too, that of quick growing crops a supply must be sown frequently, "little and often" being a better principle to act on than its converse.—M.

Compost for potted Plants.—A mixture of soils which will be suitable for growing the generality of plants, may be prepared thus:—To three parts of the turf of a loamy pasture partially rotted, add one part of turfy peat soil, such as heaths are found growing in upon our commons, and one part of cow-dung or hot-bed manure, in a completely rotted and friable condition; mix these ingredients well together, but do not sift them, except for very small pots. If the loam is adhesive, add about an eighth part of sharp sand—silver sand is generally preferred.—M.

LAPAGERIA ROSEA.

Lapageria rosea, Ruiz and Pavon (rose-coloured Lapageria).—Philesiaceæ.

"Lapageria looks like a Smilax, bearing the flowers of a Bomarea." To render the comparison more familiar, its blossoms may be said to resemble those of an immense-flowered Alströmeria, borne along the branches of the common black briony (*Tamus communis*) frequent in our thickets and hedges. Many years ago this fine plant was figured by the Spanish botanists, Ruiz and Pavon, in the *Flora Peruviana;* but although its existence has thus long been known to botanists, the plant has not, till within the last few years, been introduced in a living state into this country; or, as far as we know, into Europe. In the year 1847, we are informed, that "the Royal Gardens at Kew were first favoured with one from Conception (Chili), through the kindness of R. Wheelwright, Esq., an American gentleman, who has been instrumental in establishing steam navigation in the Pacific." In the following year it appears that Messrs. Veitch and Son received it from their collector Mr. T. Lobb. We believe Mr. Low of Clapton was also, among English cultivators, one of the earliest possessors of living plants of this Lapageria. We may soon expect, therefore, to see it become more extensively diffused.

The Lapageria belongs to Dr. Lindley's small group, which he calls Dictyogens, a set of plants intermediate between the Exogens and Endogens, agreeing in great measure with the former, in their net-veined foliage, and with the latter, in the structure of their woody matter; though possessing on either hand, distinctive characters which separate them from these two great groups. The families of Dictyogens are few, and limited in extent, but among them are included the Yams, the Smilaxes (plants which yield Sarsaparilla), and the Trilliums. The Lapageria is closely related to the Smilaxes, the natural order Smilaceæ, to which indeed some botanists unite it. Dr. Lindley has however formed a separate group of this and another plant called Philesia, giving the group the name of Philesiaceæ.

To come to a more exact account of the subject of the annexed engraving, we may state, that the *Lapageria rosea* is a most beautiful twiner, growing many feet in height, and having round branching stems. These bear alternate stalked leathery leaves, of an ovate-lanceolate acuminated figure, having a smooth

shining surface, marked longitudinally with five nerves or ribs, and furnished with reticulated veins between the ribs. The flowers grow singly from the axils of the leaves, on stalks, which exceed in length the stalks of the leaves. They are handsome, lily-like, pendulous, about three inches long, and expanding at the mouth to about two inches and a half, the form of the expanded flower being bell-shaped, a little compressed; the flowers are formed of six petals or flower-leaves, of which the three exterior ones are somewhat keeled at the base, and the inner three somewhat clawed; the colour is a deep rose, internally spotted with white, the three interior petals being broader, as well as more thickly spotted than the others. Ruiz and Pavon describe the colour of the flowers, as varying from rose to rose-crimson.

The native country of the genus, of which at present, we believe, only one species is known, is Chili. The plant has not yet, it appears, produced blossoms in England, although growing in a vigorous condition, to the height of six feet, in the nursery of Messrs. Veitch. A beautiful figure, prepared partly from dried flowers, and partly from coloured drawings made in its native place of growth, has been recently published in the *Botanical Magazine*.

The fruit of this plant, a large oblong pulpy berry, is in Chili held in some estimation as an esculent fruit, and is said to have a sweet agreeable flavour. In addition to this, the roots are used by the Chilenos, as a substitute for those of *Smilax Sarsaparilla*, the Sarsaparilla of the shops.

We know little of the cultivation of this plant as yet. That at Kew has not been found to make much progress; but on the other hand, Messrs. Veitch's plant is extremely flourishing; so that, on the whole, it will probably turn out to be of easy culture. It will at least be sufficiently hardy to rank among greenhouse climbers, and may perhaps succeed in sheltered places out of doors; that is, trained against out-door walls, if the situation be at all adapted to plants not perfectly hardy.

The name, Lapageria, was given by Ruiz and Pavon, in honour of Josephine Lapagerie, the wife of Napoleon Buonaparte, and in commemoration of the patronage she bestowed on the science of botany, not only in the encouragement of botanical authors, but also in furthering the cultivation of exotic plants, in the beautiful gardens of Malmaison.

HOEING, RAKING, AND WEEDING.

The operation of hoeing consists in the use of the well-known implement called the hoe, which is a plate of steel variously formed, and as variously set to a (usually long) handle; and which being furnished with a sharp cutting edge, acts by slicing or paring, as it were, the crust of the soil.

It was formerly the custom to have recourse to the use of the hoe as a means of destroying the weeds, with which, as is known to every one, the surface of the ground becomes covered, if left undisturbed for a greater or less length of time. Usually, except during winter, a very short period will suffice to allow the surface of the ground to become covered with this extraneous vegetation. It was to destroy these weeds that hoeing was formerly had recourse to; and it is often practised even now, in many gardens, with no higher purpose than the mere destruction of weeds.

But it is well known that the growth of vegetation of any kind, extracts from the soil the nutriment with which it was charged in proportion to the degree of its development. Weeds, therefore, in perfecting their growth, extract some of this nutriment; and as they serve no good purpose, it must be evident that what they draw from the soil for their support, is as it were stolen from the crops which are intended to occupy, or which may be occupying, the soil where they are found. Now, as weeds are entirely useless, this much of the produce of the soil, or of its capacity to produce, is lost — wasted. The proper application of the hoe should prevent this from taking place.

Hoeing, therefore, it will be perceived ought not to be an operation of destroying weeds, but of preventing them. In other words, instead of allowing the surface of the soil to lie neglected until it is covered with a crop of useless vegetation, and then cutting this down and removing it, the surface should be frequently broken up by the hoe, so frequently, indeed, that the weeds may not have time to do more, at the utmost, than just to break through the soil. Whatever nutriment the soil contains is thus retained for the useful crops with which the soil is to be planted, instead of being stolen away from them by useless, and in fact injurious herbage; for it must be remembered, too, that when the ground is clothed with weeds, the rays of the sun and the air are prevented from acting on and conveying to it those vivifying principles

with which they are charged. It has been very quaintly but justly remarked, that if we must have weeds kept in gardens, either as curiosities or as botanical illustrations, a compartment of the garden should be set apart for them; and they should be cultivated in the same way and with the same care as other crops, and not as at present allowed to grow amongst, and overrun, and choke, the latter more useful productions.

To render hoeing what it should be, as regards its effects on the soil as a prevention of weeds, it must be a continually recurring operation. It is not enough to hoe once just as or before the weeds break through the surface, and then afterwards to allow them to grow up to maturity. This will be of no utility whatever. As soon in the spring as the warmth of the sun excites the latent germs which have been hidden in the soil, and bids them spring forth into life and vigour, so soon in each recurring season must the hoeing of the surface be commenced; and at least as often as fresh races spring up from amongst the soil, must the hoe be put in requisition throughout the summer, and until the process of germination is locked up in the icy chains of winter.

But besides the mere prevention of weeds, there is another object in hoeing the surface of the soil, and that is, to break up and loosen the crust, in order to admit atmospheric influences, to equalize the moisture, and to raise the temperature of the soil. For these purposes the soil can never be too often stirred up. In destroying weeds merely a very shallow skimming of the surface is sufficient; but for the latter purpose deep hoeing is essential; and so that the roots of the particular kind of crop which may be contiguous are not injured, the deeper this can be done the better. Sometimes even the hoe may be assisted in this particular by forking up lightly the spaces between the crops. This treatment must begin as soon as the plants emerge from the soil, and must be carried on and repeated from time to time during their progress, so that at no time the surface may be hard and caked, but loose, and free, and porous. Neither the surface soil, nor that immediately below it within reach of the hoe, must ever be allowed to get consolidated.

The practice of keeping the surface of the soil thus broken up and loosened among all kinds of crops is very conducive to their growth. The atmosphere is then enabled to permeate the soil with freedom, and this is found to be of much importance to the health of plants; indeed, in a consolidated soil, or where, from the presence of water, the air has not free access, vegetation generally will not thrive. By this means, too, the soil is rendered far more equable as regards moisture than when consolidated, and this is especially the case (as it also then becomes especially necessary) during dry weather. Without entering into the philosophy of the matter, which would occupy too much space, it will be sufficient to state the fact, that a period of drought has far less effect on vegetation, when the surface of the soil is frequently loosened up, than when it is allowed to remain, as it then would usually become—hard and consolidated. And then again, the loosening of the surface has a similar effect with respect to the temperature of the soil which it has in regard to its moisture. These advantages, and perhaps others, are secured by the free use of the hoe; and they are of great importance to all kinds of crops.

Earthing up.—The hoe is also employed in the slighter processes of earthing up, that is, of drawing soil about the base of the stems of such culinary crops as peas, beans, cauliflowers, brocoli, potatoes, &c. Celery and some few other crops which are earthed up for the purpose of blanching them, are done in a different way. The object of the earthing up here referred to appears to be various: sometimes, as in the case of early peas, it is done to shelter them, and they are then earthed most liberally on the most exposed side: in he case of potatoes, it is done with a view of supplying a mass of light soil in which the underground stems that produce the useful parts of the plant, that is, the tubers, may have room to run and form these tubers, which become useless as food if pushed above the surface, and thus exposed to the air and light; for this purpose a flat broad ridge is preferable to the sharp narrow ones which are often seen. Some of the other crops appear to have the earth drawn up to their base with the view of supporting them, but the benefit is not very obvious; and it is probable that much of the benefit that is secured results from the mere stirring and loosening of the soil which necessarily takes place.

Drawing drills for seeds is another operation performed by the hoe; it consists in clearing out by means of the draw-hoe, used cornerwise, a narrow channel of uniform depth, the hoe being guided by the garden line stretched quite tight in the direction the drills are required; a section of such a channel would represent two sides of a triangle. The earth is forced out by the operation chiefly on one side of the drill; and if a deep one, after the seeds are deposited it is usually filled in by walking astride the drill, and pushing in the soil with the side of each foot alternately, the top being afterwards roughly levelled with the back of a rake. If the drill is a shallow

one, it is usually filled in by using the back of the rake.

To effect these various operations three kinds of hoes, and various sizes of each, are employed. The most common is the draw-hoe, which consists of a blade or plate of iron attached to a handle, at an angle less than a right angle; the handle is usually four feet long, and the blade of varied size, and shaped according to the use for which it is intended; for cutting weeds it is made wide and shallow; for drawing soil, deeper. Small sizes with short (or long) handles are used for hoeing between advancing crops. The thrust, or Dutch hoe, consists of a thin plate of iron attached somewhat obliquely by means of a bow to a long handle; it is used by pushing it from the operator, the draw-hoe being, as its name implies, used in the opposite way. The thrust-hoe is proper for cutting up weeds on light ground, and also for hoeing borders without treading on them, as they can be used from the walk, unless the borders or beds are very wide. In using them too, the operator walks backwards, so that if obliged to tread on the ground, he breaks up his footmarks; with the draw-hoe, on the other hand, the operator walks forwards, and, consequently, leaves his footmarks untouched. The thrust-hoe is not however so well adapted for heavy work as the draw-hoe.

For the express purpose of breaking up the soil, another sort of hoe is used; this is called the crane-necked hoe. It consists of a smallish, thick, egg-shaped piece of iron, attached by means of a curved stalk resembling a swan's neck, to the handle; the point of this hoe loosens and breaks up the soil to a considerable depth. Small sizes, with short handles, are made for use among small closely drilled crops. This kind of hoe is not well adapted for cutting up weeds.

Hoeing should always be done when the soil is sufficiently dry not to adhere much to the implement in using it; if the ground has to be trampled on, it should be so dry as not to be much consolidated, and where practicable, the places trampled on should be forked up. For killing weeds, of course only the driest weather is to be chosen; in moist showery weather the weeds strike root afresh, and not one in ten is killed.

RAKES AND RAKING.

The operation of raking consists in combing the surface of the soil, as it were, with the implement called the rake, which is formed by a number of parallel iron teeth set at equal distances along a slender bar of iron, fixed transversely to a long handle. Various sizes for different uses are manufactured. The operation of raking is chiefly resorted to for the purpose of combing off the surface weeds that have been cut up with the hoe; or for combing off large stones and rough lumps of soil, when a finer surface is required; or sometimes merely for the purpose of freshening up the surface of the soil for the sake of neatness. The rake is also used to "rake in" various seeds that are sown broadcast.

Raking, when practised to clear off weeds, should always be done in dry weather if possible, for if the soil is very moist a good deal of soil is disadvantageously removed with them. The rake is to be used very lightly, first being passed backwards and forwards once or twice to free the weeds as entirely as possible from the soil, and then pulled towards the operator, bringing the weeds along with it, and leaving the ground behind quite clean. It is sometimes necessary when rainy weather supervenes on hoeing, to take advantage of the first dry day, and go over the ground with the rake, passing it backwards and forwards, in order to loosen up the weeds and destroy any fresh hold they may have taken of the soil. If, however, the soil is hoed—as it should be—before the weeds attain any considerable size, it will be unnecessary to rake the ground, as they will dry up and perish; unless, indeed, it be in the flower borders or pleasure ground, where the rake must necessarily follow the hoe, if only to secure neatness and an orderly appearance.

Where the object is to produce a finer surface, the operation should be performed when the soil is in a medium state of moisture; the lumps of soil then break easily, and the rough stones are readily collected by means of the rake. The rough lumps of soil which it is partly the object of this operation to break down, should be reduced by striking them with the back of the rake. In this way, unless the soil is very stubborn, the whole surface may be rendered proportionately fine to the width between the teeth of the rake. Under these circumstances, it should be the object to remove as little soil as possible along with the stones and rubbish collected by the rake. It is also by no means desirable to remove assiduously—as is often done—every stone which is observed on the surface. In the flower borders it is necessary to do so to some extent on the ground of neatness; but in the kitchen-garden nothing more than the very largest should be removed, and these by hand-picking. In fact, if a garden is well managed, and the weeds are not allowed to get the upper hand, there will be but little to rake off the soil at any time, though the rake will be useful to collect together such remains of the crops as may be left; these remains should be either dug in as green manure, or

what is, perhaps, generally preferable, charred and distributed over the ground in the form of charcoal and ashes. To rake the soil with the view of obtaining a finer surface when it is either wet or very dry is a useless task: in the former case the lumps and particles of soil adhere together, and more harm than good is done by the attempt to separate them; in the latter, the lumps, unless the soil is very light, will prove so stubborn as to render the attempt ineffectual. When in a medium state, however, they break readily if worked with the teeth and back of the rake.

The "raking in" of seeds is done by passing the rake backwards and forwards several times over the whole surface, leaving the latter at last as level as possible. Of course previous to the sowing of the seeds, the surface of the soil should have been rendered moderately fine by the process just described. It is not, however, common now to sow crops broadcast, and it is such only that are usually "raked in" in the way referred to. It is considered preferable to sow every kind of crop in drills, and the seeds are then covered in by levelling the soil with the back of the rake.

The rakes to which we have hitherto referred are called garden rakes, but there is another kind used on lawns, called the daisy-rake. This is employed to remove the flowers of the daisy, which sometimes abound on lawns, and are apt to spring up into flower during the summer more frequently than the process of mowing is resorted to. The daisy-rake consists of a large thin plate of iron, of which the edge is somewhat turned up and cut into teeth, which are open only towards the edge, the spaces between them gradually narrowing. When this implement is passed over the surface of the lawn the daisy heads are collected by the teeth-like openings in the edge of the plate, and are of course nipped off by the part where the teeth are closed together. It is useful sometimes to save the trouble of mowing when the grass does not grow rapidly, the daisies being looked upon as a blemish to a properly-kept lawn.

WEEDS AND WEEDING.

In the fullest sense, the operation of weeding may be understood to include every means of destroying the weeds which infest gardens. According to this interpretation, the process of hoeing would be properly considered as an act of weeding, when it is performed for the purpose of destroying weeds. We, however, here restrict the meaning of the term to what is sometimes called hand-weeding.

Hand-weeding is the process of pulling up by hand, with the view to their removal and destruction, those weeds which occur under circumstances where the hoe cannot be used with safety or good effect. This chiefly occurs in the case of seed-beds, and among patches of young thickly-set plants which may have been transplanted. Where gravel or other well-constructed walks, too, become weedy, hand-weeding is resorted to; and in the case of pitched court-yards also, it is sometimes necessary to have recourse to hand-weeding.

Seed-beds, or seed-plots, should be very carefully weeded, whether they form patches of a yard or more in extent, such as cabbage, brocoli, lettuce, and other young plants for transplanting are raised upon; or whether, as in the case of onions, carrots, &c. which are sown where they remain, they occupy large spaces of the kitchen-garden quarters. Seed-pots, pans, and boxes, either of culinary or floral articles, also require careful and attentive weeding. In the first and last of the cases alluded to, hand-weeding is almost the only available means of effecting the removal of the weeds which spring up; but in the other case the crops are, at the present day, usually sown in drills, so that a narrow-bladed hoe can be used to effect the required result with greater facility; and when they happen to be sown broadcast, as the plants themselves require thinning to regular distances, a narrow-bladed hoe is still used to destroy the weeds and thin the crop at the same time.

The necessity of removing weeds from among young seedling plants is occasioned by the rapid growth which most weeds make, as compared with the crops sown. Naturally adapted to barren and waste ground, they grow with amazing rapidity and luxuriance in the richly manured and well wrought soil of the garden, and thus, if not early removed, they would smother and destroy the delicate seedlings among which they spring up. Weeds too are so prolific, that besides their rapid growth when germinated, a crop of them springs into existence much sooner than the generality of garden seeds will do, and consequently, by the time the latter make their appearance above ground, many of the former are strong and well established. It is then especially that their removal should be attended to. This is, however, better not too long delayed, because the larger the weeds are suffered to grow, the more numerous their roots become, and the greater disturbance or breaking up of the soil is occasioned by the process of removing them. This often does injury to the seeds among which they occur, for if the soil is left thus broken up and lightened, the probability is, that some of the seeds will be prematurely exposed in a half-

germinated state, and either perish or be greatly checked; or if the soil is pressed down again, it is possible, and sometimes very probable, that any seeds which happen to be still further advanced, will be thereby bruised and perhaps broken. These evils are avoided by pulling the weeds when they are quite small and have but few roots. The same remarks apply with still greater force to such seeds as are raised in pots or boxes, &c., for these being generally smaller, and of a more delicate nature, are so much the more susceptible of injury in this way.

Besides the advantage thus gained by removing the weeds when they are quite small and young, there is another of some importance which is at the same time secured. The labour of removing them is lessened. Not only is there a less bulk to clear off the ground, but what there is to remove is much more easily removed; the roots having less firm hold of the soil than afterwards, need less—often much less—exertion to remove them; and though in a limited way this may not be of much importance, it becomes so when there is a large space to be cleared.

Although, however, as we have just stated, the operations of hoeing and weeding are so nearly synonymous, there is some difference in the circumstances under which they are best prosecuted. Hoeing, which cuts off the weeds, leaving the most part of their roots in the soil, requires fine dry weather to supervene, that the weeds may perish. Weeding, on the other hand, which pulls up roots and all, and removes them entirely off the ground, is best done when the soil is somewhat moist, because they are then most easily drawn out of the soil. It is not intended that it should be done during rain, but soon after rain, before the soil becomes dry and parched, for in proportion to the degree in which the latter condition occurs, the difficulty and labour of removing the weeds become increased. On well wrought and light garden soils this is perhaps not of very great importance, because, from the period of sowing the seeds on well-dug ground, sufficient time would not elapse for it to become hard and consolidated; but on heavy soil, and late in the season, the surface often does become hard, and then, though there may be weeds to remove, there is some difficulty in removing them. Walk-weeding too can only be done with advantage when the gravel is in a soft damp state; and in the summer season, when weeds most commonly abound, it seldom occurs that gravel-walks are very soft or moist, except immediately after rain.

As a general principle, therefore, it should be borne in mind that, wherever there is weeding to be performed it should be attended to immediately after rain, and seldom can be done effectually in very dry weather, except it be on very light soils, or where the soil has been recently well lightened up.

In almost every garden, even where the close destruction of weeds is made an object, and still more commonly where they are to any extent neglected, stray weeds of large size will be here and there, more or less frequently, met with, which, having attained, or perhaps passed the flowering state, are prepared, or have already commenced, to scatter around them the germs of a succeeding progeny. Such weeds as these, wherever and whenever they occur, call for the vigorous application of hand-weeding. It is but little effective towards rendering a garden comparatively clear of these nuisances, to destroy, as recommended to be done, the bulk of them when scarcely developed beyond their embryo condition, if even a few such as those alluded to are allowed to grow on to perfection and disperse their seeds over the whole garden—and this they will many of them do. For instance, the seeds of the groundsel are furnished with a feathery appendage, by means of which they disperse in all directions when aided by a gentle wind; and this is one of the commonest of weeds, and one as likely as any to reach the fertile state alluded to without being detected, or perhaps hardly suspected. The only way to avoid this evil is to have every nook and corner, as well as every quarter, cropped or uncropped, carefully looked over frequently, and all the large weeds that are met with *pulled up, removed, and burned.* The trouble of doing so is well repaid by the result; for there is much truth in the well-known lines—

"One year's good weeding will prevent seeding;
But one year's seeding makes seven years' weeding."

We have hitherto referred only to the clearing of weeds from garden-ground in a regular course of cultivation. It may, however, be useful also to notice the method of clearing fresh ground intended to be appropriated to garden purposes, and also to explain what plants are understood to be weeds.

Strictly speaking, every plant which springs up naturally, except the crop sown or planted on the ground, must be regarded as a weed, irrespective of the consideration whether it is a wild and useless plant, or the remains of some previously cultivated and useful crop. Indeed some cultivated plants become very troublesome weeds when once established in the ground; but the greater portion of what are called weeds are wild plants not adapted to any useful purpose. Some of these consist of the plants natural to the soil, for particular kinds of soil are affected by different

plants ; and the latter, in fact, often furnish a sure index to the nature of the former. These peculiar races of weeds generally give way gradually under the process of cultivation. Others are the common plants which seem to follow man wherever he locates himself, such plants being common everywhere in cultivated ground, and in the neighbourhood of habitations ; and are probably seen mainly in these situations only because there the conditions are most favourable to their development. Other weeds are brought on to the ground with manures and composts, these sources furnishing a constant supply of weedy plants of various characters, according to the source whence they themselves are obtained, this class of weeds being especially numerous, when the materials of the compost are obtained from the wayside. Whatever their origin, however, the same modes of clearance are effectual with them all.

There are two distinct groups into which weeds may be classed, namely, *annual weeds*, and *perennial weeds*, each of which requires a distinct and separate course of treatment for its complete eradication.

Annual weeds are most easily cleared off. The destruction of every annual plant, if done before it perfects and disseminates seed—which is a necessary condition—is a total destruction. It can in that case give rise to no succeeding progeny. All that is necessary, therefore, to rid ground completely of annual weeds, is a moderate degree of perseverance and diligence to destroy *continually* as they spring up, and before the plants have time to from seeds, each succeeding race. It must not, however, be supposed that even by this means the soil will be rendered absolutely free from such weeds. Seeds lie buried in the soil for years in a latent state ; and the products of former years therefore supply a continued source of fresh plants, as those portions of soil in which the seeds are embedded are brought within the influence of air and warmth. Many kinds of seeds likewise travel long distances by various vehicles, so that surrounding neglected spots—not necessarily very adjacent—will furnish their quota for the renewal of the crop. Notwithstanding these drawbacks, there is still a great advantage derived from the destruction of weeds of this character when very young, for their progeny, which would under the circumstances supply the most numerous proportion of the succeeding crop, is thereby avoided ; and if the practice thus strongly recommended is well followed up, the labour of keeping the surface clear of weeds will be reduced to the removal merely of a few stray plants, instead of a thick-set crop. To keep the soil comparatively free from annual weeds, therefore, it is recommended, first, to destroy them continually, as they spring up from time to time, while they are quite young, and always before they have had time and opportunity to form, mature, or disperse a crop of seeds ; and, secondly, to take care that in no waste corners are any plants left to mature their seeds, and from these unthought-of places to disseminate them over the garden.

The principal annual weeds which are troublesome in gardens are the following :—Chickweed (*Stellaria media*), groundsel (*Senecio vulgaris*), and the common annual grass (*Poa annua*), which abound everywhere, and with which every one must be familiar. Almost equally common are various species of speedwell (*Veronica sp.*), dead nettle (*Lamium purpureum*), sun spurge (*Euphorbia helioscopia*), and shepherd's-purse (*Capsella bursa-pastoris*). Less general, but abundant in certain situations, are the fumitory (*Fumaria officinalis*), sow-thistle (*Sonchus oleraceus*), spurrey (*Spergula arvensis*), Jack-by-the-hedge (*Alliaria officinalis*), poppy (*Papaver Rhœas*), and charlock (*Sinapis arvensis*) ; the two latter are sometimes exceedingly common in cornfields. Near rubbish heaps, and in waste places generally, various kinds of *Atriplex* and *Chenopodium*, as well as the annual nettle (*Urtica urens*), and the black nightshade (*Solanum nigrum*), are met with, and usually in abundance. In some gardens, where it has been cultivated, the touch-me-not (*Impatiens Noli-tangere*) springs up in weed-like abundance ; and, in fact, in the flower garden, various cultivated species disseminate themselves in this way. Almost all composite plants, wild and cultivated, culinary and floral, if at all neglected, spread themselves wide in all directions, their seeds being in the majority of cases furnished with sail-like appendages, by the aid of which they float about in the atmosphere, and are carried along before the wind.

Gravel walks are chiefly infested by the common annual grass (*Poa annua*), and the pearlwort (*Sagina procumbens*), both of which become exceedingly troublesome and difficult of removal, if for any length of time neglected, and allowed to shed their seeds. Walk-weeding is a tedious operation; it should be done after rain, and the point of a bluntish knife (weeding-knife), used in conjunction with the thumb, affords the most convenient means of rooting up the weeds.

Perennial weeds are much more difficult of removal than annual ones, especially those of them which have creeping roots or root-stems. The partial disturbance of the latter, generally, does no better than increase the evil, as every little piece left in the ground will grow and spring up with the greater vigour, when the soil has in this way been loosened around it.

Where it is desirable to clear a piece of ground overrun with perennial weeds, and to bring it into proper condition for the growth of vegetables or flowers, there is no better way than to pare off the surface vegetation, with about an inch deep of the soil, and to char it; the charred ashes then form a very useful addition to the ground, whatever its nature may be; and the weeds and rubbish can in no other way be turned to so good account. If the ground bore only perennial plants with fibrous roots, the paring, if done fully to the depth recommended, would effectually clear them; but if, as usually happens, there are any among them with the creeping root-stems, it will be necessary, in the next place, to see to the removal of these as far as possible. The ground, if intended for purposes of cultivation, would require trenching, as a matter of course; and in doing this, the upper spit—or from the surface the necessary depth—should be turned over carefully with a fork, and all the pieces of the creeping root-stems of such plants as couch-grass and bindweed, and the tap-roots of such as docks, dandelions, &c., carefully picked out, removed, and burned (charred). If this were done carefully, there would be but little left to spring up the following year; but the ground would probably contain seeds which would produce seedling plants, and these must be destroyed by cutting them up or pulling them when quite young. If any of the plants make their appearance with any vigour the succeeding year, it is advisable to dig them out as deep as they run, with a fork or spade, removing, as before, every atom that can be seen, as the smallest piece of many kinds, if left in the ground, would at once produce a vigorous plant.

As soon as the ground is got comparatively clear, there is little trouble either in keeping them down or in destroying them altogether. It is an effectual recipe, to continually hoe them off as often as they form new shoots; if this is done they cannot long exist, the effort to put forth fresh leaves entirely exhausting the plant. When, however, it is attempted to get rid of them by this process, they must not be allowed to grow up large and vigorous between each cutting; this would add fresh strength to the root, and prolong the struggle; they must be cut off immediately as soon as they make their appearance, the efficacy of the practice lying principally rather in striking the blow at the proper time than in the magnitude and power of the effort itself.

It is often worth while to adopt special means to clear off perennial weeds. Thus, when such plants as dandelions, daisies, &c. abound on lawns, as is often the case, they require to be dug out carefully without breaking up the turf; and sometimes, on cultivated ground it may be desirable to dig out the plants, especially if they are of the tap-rooted kinds. Whenever the latter are dug up they ought to be entirely removed, to the very extremity of the root, if possible, or the part left in the ground will throw out new shoots. So, whenever it is attempted to dig up the creeping-rooted kinds, every little particle of the root should be removed, or else these particles will each send up shoots and form so many plants. Neither in the case of tap-rooted, or creeping-rooted weeds, is it at all effective towards destroying them, to hoe them along with other weeds in the ordinary routine of hoeing; for after this, at first, they only spring again the more numerous and more vigorous. If this plan of destroying them is adopted, it must be made a special object; they must not be cut off once, and then a second time, when a new crop becomes thick on the ground. As already stated, they must be *cut off continuously as fast as they spring up*, without giving them time to become developed and to gain new strength.

It is a rather common practice, in digging up flower borders, to dig in such portions as are trimmed off from the patches of herbaceous plants. In some cases, where the plant has only fibrous roots, this gives rise to no inconvenience; but if the plant is at all inclined to produce creeping stems, these trimmings become a great source of annoyance, throwing up a crop of young shoots, wherever they may chance to be buried. Such patches, when not required for planting elsewhere, are better removed to the rubbish heap, and either burnt or charred.

The principal perennial weeds which are found troublesome in gardens are the following:—Of creeping-rooted habit, coltsfoot (*Tussilago Farfara*), couch grass (*Triticum repens*, and others), bindweed (*Convolvulus sepium*), and nettle (*Urtica dioica*). Wherever it once gains a footing the dwarf elder (*Sambucus Ebulus*) is very troublesome; so are some of the species of woundwort (*Stachys sp.*) And of garden plants of this class which prove troublesome, must be specially named the horse-radish (*Armoracea rusticana*), and the various mints (*Mentha sp.*) Of tap-rooted plants, the most common as a weed in gardens is certainly the dandelion (*Taraxacum officinale*), which abounds almost everywhere. In damp situations the various kinds of dock (*Rumex sp.*) are very troublesome, but they hardly so much affect the garden as the field. Examples of fibrous-rooted perennial weeds are met with in the case of the daisy (*Bellis perennis*), which is common in most places; the plantain (*Plantago, major* and *media*); the different kinds of crowfoot (*Ranunculus sp.*), in damp situations; the sorrels (*Rumex acetosa*

and *acetosella*); the ground ivy (*Nepeta Glechoma*), &c. As already hinted, the various mints (*Mentha sp.*), wherever they are grown, spread about in all directions, and cost some trouble to remove them entirely; but of all cultivated plants, perhaps the horse-radish (*Armoracea rusticana*) is the most difficult to clear off, when once it has been allowed to establish itself. Of this plant, every scrap into which the roots may be broken, if left in the ground, is sure to produce a plant, and it is almost immaterial at what depth they may lie buried; at any rate, if at the very lowest point to which the operations of culture extend, they will certainly grow. The Jerusalem artichoke (*Helianthus tuberosus*), is another plant which takes possession of the ground wherever it may be introduced; and it is only to be cleared off by the most careful search for the small tubers, and by continually cutting off any that may be left to grow up. The same practice must be followed to clear off the horse-radish, or indeed any other crop having this habit. Even the potato often comes to be virtually a weed; for it is next to impossible to remove every small tuber; and any of these left in the soil grow with certainty the next year. The practice of autumn-planting potatoes—which is rapidly gaining ground—no doubt owes its origin to a hint taken from this circumstance.

The only implement required for weeding, strictly speaking, is the weeding-knife, a small instrument, blunt, with a moderately acute point, used in conjunction with the thumb to lay hold of and wrench up weeds that are too firmly fixed in the ground to admit of being pulled by the hand alone. It is more generally used for walk-weeding than required for weeding ground under cultivation. As, however, in our idea of weeding we have included the clearing of rough ground intended for garden purposes, it will be proper to indicate the tools necessary for successfully and economically carrying on this work. These are, the garden or draw-hoe, (strong made,) the weeding-spud, the digging-fork, and the prong-hoe. The former of these is well known, and is used for cutting up the lighter weeds without perennial creeping or tap roots. The weedings-pud is a small, narrow fork, with two prongs, set something like a compressed letter Λ; these prongs are about six inches long, slightly curved forwards, and are made lighter or heavier according to circumstances; the handle, which is like that of a spade, is fixed into a socket, at the bottom of which there is a cross bar, by which the implement is forced into the ground by the foot; at this point also, a broad, hollow bow is fixed behind, by which increased leverage is gained in prizing up the weeds; it is used for long, tap-rooted weeds chiefly, being set in close behind them, and then forced backwards. Lighter and shorter spuds of this character are made for digging up daisies from lawns. The digging-fork proper for forking up weeds, is made like a spade, but rather lighter, the blade being replaced by three flattish prongs: it is used for turning over the soil for the purpose of picking out the creeping roots of the various weeds possessing this character. The prong-hoe is made with a cutting-blade on one side, narrower and heavier in proportion than the draw-hoe; at the back of this is a fork, of nearly the same figure, with either two or three flattish, blunt-ended, somewhat cutting prongs; the long handle is fixed into an eye or socket, which connects the prong and the hoe: it is used for cutting and tearing up rough, heavy, strong-rooted weeds; the pronged side is also useful in earthing up potatoes.

A STROLL THROUGH THE GARDEN,

BY A TUTOR AND HIS PUPIL, IN THE MONTH OF JULY.

Here is a wonderful difference since we took our last ramble; not but that in our separate walks and visits we have seen at different times all the progress, but we have not been together contemplating the particular objects which we shall now be apt to notice. The kitchen-garden has altogether changed its appearance—here are peas, beans, spinach, turnips, carrots, lettuce, and all the summer products in high perfection, besides others in various stages of progress, advancing to the same end. Cabbages no longer require tying up, they have hearts as hard and as white as they need be; celery of the present year's sowing is already planted out, while the ground in which the last year's was perfecting itself is already cleared, and some of it covered with other crops. Here are beds of winter greens coming forward to be planted out; cauliflowers exhibiting their whitened heads of flower, only hidden from the view by the breaking down of a leaf to keep the sun off, for that would spoil the white colour. As you seemed to think it a waste to hoe out so many plants from the turnips, carrots, and onions, to give the remainder room, I have had a small portion of each bed left just as they came up, to show you the difference. Observe, particularly, that in the small portion, in which they are left so thick, they have arrived at no size; it is true there are three or four, or more than that, instead of one;

but besides the one that has room weighing more than all the others, the small ones are useless. The turnips are not much larger than turnip-radishes, and the onions are like those for pickling, not for storing. This shows you the necessity of giving plenty of room, better than if I had talked to you on the subject for hours.

The flower-garden is pretty full of bloom; here are beds of pansies with the plants as small as those that were coming into flower in April; they were cuttings a few weeks ago, struck in the ground under a hand-glass in the shade, and when rooted, planted out as you see. This is the only way to continue a succession of flowers, all the spring, summer, and autumn; small side-shoots stripped off the old plants root freely. The carnations and picotees are flowering beautifully under the same awning that protected the tulips, the earlier gaudy occupants. The hyacinth bed is similarly tenanted; and the effect of these July beauties under a cool canvass roof is very good. These grassy shoots round the bottom of the plant will be made to strike root by stripping the leaves off the lower ends, making a notch in the stem, and pegging that part under the soil; about October they will have struck root, will be cut off from the old plants, and potted, two in a pot, as you saw them in the frames last winter. Take notice of the summer-roses; one-half the trees are going out of flower, and the other half are bursting their buds; this is merely the effect of pruning at two different seasons. Pinks, ranunculuses, and anemones, have gone by; the shoots at the bottom of the pinks, like so much grass, have been stripped off, and all the pieces put under a hand-glass to strike; by-and-by they will be planted out in beds, similar to what these have been.

This is the season for budding roses, and we will just see the man do one, because it is a pleasing operation, and repays us for the trouble, if trouble it can be called. Observe he shaves off a thin slice of bark from a rose-tree, and takes with it a leaf. Now at the base of this leaf is the bud. He now runs his knife an inch down the bark of another rose-plant, so as just to cut through the bark to the hard wood, and makes a cross-cut of the same depth; with a thin piece of ivory on the handle of his knife he raises the bark from the wood, and loosens it so that he can tuck in the bit of bark he shaved from the other rose-tree, and he brings the leaf just to the part where his cuts crossed each other. A slight tie with a piece of matting to keep down the bark completes the operation. This is done with other trees as well as rose-trees; the bud that is inserted grows the same as if it were left on its own tree, and none but that bud will be allowed to grow. The rose-plant on which it was budded is only a wild brier, and so are all those that he is budding; it is the way they make a great many trees of one kind.

The annuals and perennials, you observe, are in flower all over the ground; and pray notice what a show the different kinds of lupines make; those with such beautiful symmetrical spikes of white, light blue, and dark flowers, are the *Lupinus polyphyllus*, the best of all the perennial species. Here are twenty different-coloured stocks; these are German, or rather from German seeds. The Germans are much more particular in their seed-saving than the English, and therefore imported seed is often far preferable to any saved in this country. All these strange slaty and leady colours look very rich among the more brilliant scarlets, and crimsons, and the delicate whites, because there is a pretty contrast.

The dahlias are beginning to bloom, but the flowers are very imperfect at present, and will not be otherwise until the plant comes to its full regular growth. There is not, in fact, strength enough yet to give the flowers the nourishment they require. There are some very handsome balsams in the border, where they form bright and pretty objects, but do not last a long while in good order. Many of the autumn-flowering annuals are planted out, and coming rapidly forward; the china-asters, French marigolds, late stocks, and mignonette will soon be showing their flowers.

Here are a great number of the plants from the greenhouse, placed out for their summer's airing, and to make their growth; they are too much exposed to the sun, but they will only require the more attention to watering, and their foliage will not be so good a colour for it. There is no other convenience. I perceive, these are some of the best things here; they are more in the shade.

The hothouse does not seem to afford so great a contrast in respect to temperature as it did in the winter; it does not seem so hot, but it is in reality some degrees warmer than when we visited it in the frost, though at that time it appeared almost insupportable. Some of the subjects that I pointed out growing on logs of wood,—I mean the orchideous plants,—are showing forth their bloom. The beautiful butterfly plant seems to be always in flower; those wiry stems which so abound must not be taken off, for they every now and then send forth a flower when least expected; and even those old ones will flower at every joint. Some of the grapes and pine-apples have been cut, but there is a succession to follow.

The conservatory seems to have got all the

richest plants from all the houses. It seems carpeted with verbenas of many colours; the climbing plants are displaying their beauty, and there is a complete mass of flower. The rhododendrons and azaleas are making rapid growth—I mean those large plants in the ground; but the potted plants of that family, as well as camellias, are all turned out to a shady part of the garden.

The lawn and shrubbery, with the flower borders and beds, all look very pretty, but here there is a good deal of work required. The lawn is mown continually, some portion every morning before the dew is off the grass: for after it is dry the scythe takes no hold of it, and it is very difficult to make the least impression.

The fruit-garden is now very interesting, for the trees are absolutely loaded; this is one of the effects of the pruning. The fruit is swelling much finer than it did last year, and there will be a greater quantity by measure. The peaches and nectarines are dispersed all over the trees at equal distances; there seems to be nothing nearer together than six inches. Now the fruit has been picked while very small to regulate this so well, and the consequence is, that it looks all alike fine. Had the whole of the fruit that came on the tree been allowed to remain, none would have been so fine, and the young wood could not have been so strong, because the fruit would have taken up all the juices of the tree, which would have been greatly impaired for next year's bearing. The only cause of years of scarcity in fruit following years of plenty, is the damage which the excess of fruit does to the trees; and if this excess were removed in time, there need be no such distinctions as scarce and plentiful fruit years in general, though serious storms and blights might occasionally make exceptions.

THE SCARLET RUNNER BEAN.

Perhaps there is no more profitable vegetable for a family than the scarlet runner bean, which in good soil and situation will bear for two months in succession, and under good treatment produce an incredible supply. The principal conditions required are plenty of room, ample support, and good strong ground. In the first place, they should be a foot apart in the row, and if they are to grow in an open space the rows should be six feet asunder. There are two methods of managing this vegetable; first, sow in a patch which can be well protected in case of frost, the quantity likely to be required, not more than an inch asunder, and cover them one inch deep. This may be done in March; and being carefully protected by litter they will be up strong, and be forward enough to plant out early in May. Let the ground be dug well; and if there were manure for the previous crop none need be used for this crop. Take up the beans carefully without breaking the roots, and separate them so that they may be dibbled in one foot apart, and the rows, if there be more than one, should be six feet from each other; but as they form an excellent blind to any disagreeable object, they may be planted against a bare wall, or palings, or a bad fence of any kind; only they must be planted sufficiently distant to have plenty of air through them. The best mode of supporting them against such places as these may be common packthread fastened to hooks or nails, at the top of the fence or wall if tall enough; but if dwarf, it will be better to place proper sticks. Bean-sticks may be purchased by the bundle, from eight to ten feet long and branching. These must be stuck firmly into the ground, and stand perfectly independent; and to obtain the greatest advantage there should be plenty of room to go behind them, not only on account of the crop, which will be greater, but for the convenience of getting them.

The other method of growing them is to sow them in the rows as they are to stand; but they will be a month later, for they ought not to be sown before April. Many persons who rely on the bean for a long supply of vegetables plant both ways, and so have two crops. When the first crop, which is planted out, has got hold of the ground and begun to grow, they should be earthed up, and the sticks, or supports, placed to them, and during their growth the space between them should be frequently hoed to keep it clear of weeds. The second crop, which is sown in the rows where they are to grow, should be earthed up as soon as they have got a pair of rough leaves, and likewise have their sticks. In gathering this vegetable it should be borne in mind, that they are in perfection when grown to a large size, and until the beans within them begin to swell; therefore, begin early, and take only the largest, before, however, they get too old. As seed is desirable, any that are overlooked till too old, should be left on the haulm to ripen; but they last twice as long if none are left to swell beyond the eating state. Half a pint of beans will make a good row capable of affording scores of dressings; but according to the consumption, which depends a good deal on whether it is a general favourite or not with the family, so must be the quantity sown. If any are left on for seed, they should be gathered as soon as the bean changes brown, and be kept in their pods till wanted.

THE KALMIA LATIFOLIA, ITS CULTIVATION AND PROPAGATION.

Of all the American hardy plants, there is not one so beautifully furnished with rich foliage and curiously constructed, but elegant flowers, as the *Kalmia latifolia*. It is one of the richest of flowering shrubs, of most perfect form and fine habit, and the flowers, which come in noble trusses at the ends of all the branches, are splendid beyond description. From the height of six inches, to the gigantic dimensions of six or even ten feet, the plant is equally perfect, and the flowers bear the same proportion to the foliage and figure. In a healthy state, the plant forms a handsome bush, with branches from the ground, which the lower ones touch, to the top; the form, a half globe, or perhaps a rounded cone; and the broad trusses of bloom at the ends of all these branches nearly touch each other, forming a noble and almost continuous mass of flower all over the plant. The foliage, which is evergreen and close, is unexceptionable; so that, when not in flower, this plant forms a fine evergreen shrub, inferior to nothing, not even the better and richer kinds of holly, which are considered the perfection of evergreen shrubs. The Kalmia is a free grower when in a good air, and in a soil that is adapted for it; nor is it difficult to raise, propagate, or cultivate.

SOIL AND SITUATION.

The Kalmia requires a turfy peat earth, such as appears to be full of fibre and half-decomposed roots—such peat as may be found on many of our commons; the natural soil, for instance, of Wimbledon Common, Bagshot, parts of Woking, Knap Hill, Beddington Park, in the neighbourhood of London, and numerous other localities in England. This peat earth, or turfy peat, is purchased in large quantities by nurserymen for growing American plants, heaths, and many Botany Bay plants. Such as is dug up in lumps and requires tearing asunder, and which seems held together by half-decomposed roots and fibres, is the best, where American plants are to be grown in perfection. This kind of soil is put into beds two feet thick, the earth being first excavated to that depth, and the natural soil removed. It should be chopped into pieces very small, and be knocked about a good deal, to make it workable in its new locality; and, if it be very full of fibre, one fourth of loam, such as is formed by rotted turves from a loamy meadow, may be mixed well with it. Before, however, these beds are used, the soil should be dug over and forked over, and well worked several times. The situation should be low, not exposed to high winds; and if there be distant lofty trees to shield it from too much of the burning sun, so much the better. The air must be pure; it must not be too near smoky towns. In such situations as we have described should be formed all borders, beds, and clumps intended for American plants, and especially the *Kalmia latifolia*, which, although very hardy and very easily grown in proper soil and good air, is more easily damaged than any other American plants by any deviation from the conditions under which they thrive.

RAISING FROM SEED.

The *Kalmia latifolia* ripens its seed freely, and the time for sowing it is as soon as we please after it is ripe. Get large wide-mouthed pots in preference to boxes or pans, because they hold a larger body of compost, and therefore retain moisture longer and better than the soil in a shallower vessel. Let all the peat be rubbed through a coarse sieve, and be mixed with one-fourth of leaf mould, or well-decomposed cow or horse dung; that is to say, three parts peat and one part dung, or leaf mould. Level the top, and settle it down properly by lifting the pot and striking its weight on the table or bench, but not by any pressure; let the top be made smooth and even, and then sprinkle the seed over

the surface very thinly indeed. With a fine sieve shake enough peat earth over it to just cover the seed and no more. The earth must be a little moist, but it will be easiest moistened by standing the pot for a few minutes in water three or four inches deep. Place a bell-glass over the seed. Let this pot be placed in the greenhouse, and near the light. If the surface become dry at all, water with a very fine syringe that will spread the liquid like dew and not disturb the seed ; or, if you have not this convenience, take a clothes-brush, dip it in water, turn the hairs upward, and, by drawing your hand along the hairs, the water will fly off in very minute drops, so as to completely saturate the soil without disturbing a grain of sand or a seed. In the course of time these seeds will come up, and from that time the hot sun must be shaded off by a piece of very thin transparent cloth or white paper, as the small plants will not bear the sun, and would perish. Take especial care now that the plants are occasionally refreshed with water ; indeed neglect for a very short time in this respect would destroy them altogether. The glass may now be taken off, as the plants will require the ordinary air of the greenhouse. As soon as these seedling plants get large enough to handle at all, get other pots of soil, and after they have been settled down and levelled, prick out the young plants an inch apart all over the surface, beginning with them close to the edge of the pot so as to touch the side. Water with the brush to settle the soil about their roots, and set them on a shelf in the greenhouse near the light, with a glass over them the first day or two, and keep the sun off by hanging a piece of thin cloth or a sheet of white paper. Here the plants will grow fast, and, when there is no danger of frost, they may be placed in a cold pit on the floor, and near the front wall, that the sun may be kept from them till they are strong and in good condition for planting out in the peat beds ; but this will not be until they pretty nearly touch each other in the seedling pot. They may then be planted out six inches apart, in the month of May, and well watered; bend some hoops across the bed, and throw a net over them to keep off birds and vermin that might scratch up the young plants, and also to be ready to throw mats over in case of violent rains, hail, &c. In a season or two they will be considerably grown, and require to be moved ; but they will come up with all their fibres undamaged ; they may then be planted out a foot apart every way; and after planting, which should be done while the plants are at rest, after making their season's growth, they should be covered against the sun and wind two or three days until they are fairly settled in the ground. Here they may go on two seasons more ; but they should be replanted from time to time as they grow larger, because there ought to be quite as much space between plant and plant as the plants themselves occupy. They want no other soil.

MANAGEMENT OF PLANTS.

The Kalmia, while growing, requires plenty of moisture, and especially from the time the buds begin to swell till it is in full flower ; for if it be once stinted the foliage becomes discoloured, and the ends of the leaves look as if they were burned ; and, when this is the case, the plant is spoiled. In fact the leaves never recover it, but retain the scorched appearance till they fall. Unless seed is required, cut off the trusses of pods as soon as the bloom decays, for the growth of the seed, though only like so much dust, detracts a good deal from the plant. When the trusses are cut off, which should be done only just below the bunches, the plant will rapidly make its next season's growth, and it must not be distressed for water : if the situation be not naturally shaded from the heat of the sun, it should be artificially shaded during the growth of the young wood. The growth once completed, no more attention is required ; it is able to bear ordinary winter frosts, and, so long as the plant is kept in health, will maintain a beautiful habit, increasing in beauty and dimensions every year. But as they are, when once raised, wanted in the lawn and in the shrubbery, places must be prepared for their reception by digging two feet of soil out from a space sufficiently large, and filling it up with the same soil as the American beds, that is, the beds they came from. Contrive, if possible, that some of the larger objects shade them from the extreme heat of the sun, and when the plants are established well they will do as well in their new place as in their own beds ; but even here you must recollect that they require water when other things do not, and if they are at all stinted while they are making their growth they will not complete it healthily, and they will miss bloom. Therefore, as soon as the flowers fade, cut off the trusses and be liberal with the watering-pot until you see they have completed their growth. It is a common thing to see American plants bloom abundantly one season, and scantily, or not at all, the next. The cause of this is in the plant being distressed by seeding. If, after the most abundant flower, the trusses were nipped off, instead of being allowed to swell their pods, the growth would be immediate, and the bloom plentiful twenty years running. It is the same with rhododendrons, azaleas,

and other hardwooded things that bloom abundantly. If they are allowed to swell their seeds, the growth is retarded and the growing season is over before the plant has perfected its shoots. It follows then, that as the bloom is destroyed, or rather, as the plant was not grown enough to perfect its flower buds, and so we are without flowers a whole season, the plant grows vigorously, perfects its growth only, and sets abundantly for bloom the next season. This then is the cause of American plants generally blooming badly or not at all, in the season following a very abundant show of flowers ; but if, as we before observed, the flower stems were nipped off the instant the flowers began to fade, the whole strength of the plant would be exerted in the growth for the next year, and there would always be a good average bloom. We cannot, however, too strongly impress upon the mind the necessity of liberally watering the Kalmia while it is flowering and growing, without which it is almost impossible to continue it in a fine healtyh state.

PROPAGATION BY LAYERING.

The Kalmia, as we have already observed, has branches to the ground. These branches may be so bent as to force the bend under ground ; and, by means of a hooked stick thrust into the soil, it may be held down, while the growing end of the branch may be forced upwards and be fastened above ground. Any branch so pegged down will in time send forth roots, and become dependent on its own roots, so that it may be severed from the parent plant and be entirely a new plant. But various means are used to hasten the development of roots from the branch laid down. Some cut a slit in the branch, and so form a kind of interception to the passage of the sap ; others cut a notch half-way through ; some give the branch a twist ; but the wood of the Kalmia is very brittle, and unless these things be done very carefully the branch will break off altogether. The easiest and safest process is to cut nearly half way through the wood, and then draw the knife upwards, so as to separate the wood a couple of inches in length ; the operation of pegging down will open this slit a little, and greatly facilitate the making of roots. The proper season for this work is when the plant is at rest, before it begins to make its summer growth ; and the branches laid down thus ought to be stripped of their flower buds, if there be any, that the whole vigour of the growth may be exerted on the summer shoots. To propagate, therefore, by layering, a good bushy plant should be placed in the centre of a four-foot wide bed, such as we have described, full of peat earth, and dug as recommended, and all the branches that can be, brought down to the ground, so as to be pegged at some part of their stem below the surface. The layers must be pegged down all round the plant, which is called a stool, and in one year from the time of layering they may be separated from the stool which makes fresh shoots, to be in turn pegged down in the same way. When once separated from the stool, the stem may be cut up close to the root, and the plants put out in beds to be nursed up to the size required, or may be planted in the shrubberies, or be potted off, as the case may be ; but the soil must be the same, and whenever they are planted in shrubberies there will be no dependence on their lasting in good order unless the place has been made fit for their reception and maintenance by the substitution of proper soil, to the depth of a couple of feet, for the natural earth of the place.

TREATMENT AS A STANDARD.

Where it is desired to make a standard of a plant that comes naturally as a bush, you must select the strongest leading shoot for growth, and cut all others away. As this will advance much more rapidly for having all the strength of the root, be careful to rub off all other shoots that may come up either from the stem or the root. At the end of the growing season there may be side branches close up to the head, as it were, but let none except the leader remain ; and pull off, or cut off, the flower bud if any come, because blooming retards the growth. If more than the leading shoot begin to grow, pinch them out, for until the plant has acquired the height you wish it to attain, nothing but the shoot that is to go up should be allowed to grow. All shoots, therefore, that come out of the stem should be rubbed off before they have time to grow ; and when the stem is long enough you may let the head form itself. If any one shoot now takes the lead, instead of the growth becoming general, take off the end to check it, and make it send forth lateral branches ; and, when the head finally begins to shape itself moderately well, its natural growth may be allowed to go on ; that is to say, you need not remove the flower buds, but let them perfect their flowers. Then take away the truss of flower stems, and let the plant make its growth : do not forget to water liberally while it is blooming and afterwards growing, and it will grow healthily and bloom as well as the dwarf plants in the ground. The only thing to guard against is, planting them in exposed situations, where they have all the sun and all the wind, for they will not kindly bear either the one or the other in extremes.

GENERAL REMARKS.

There are several other Kalmias, but they are altogether inferior in every respect; the most that can be said of any one of them is, that it is pretty for a few days, and then mean and untidy the rest of the year. *Kalmia latifolia* is broad-leaved, and of this we have spoken; the others are *K. angustifolia*, *K. glauca*, and *K. hirsuta*; they are all North American, and, as regards cultivation, may be treated alike; but, compared with *K. latifolia*, the others are very, very inferior. The plant may be had already grown at the principal nurseries; indeed there are some few nurseries in the neighbourhood of Knap Hill and Bagshot, where this class of plants is most extensively and almost exclusively grown. The places being prepared for the reception of the plants, they may be planted out at nearly any time of the year; but autumn, as soon as the summer growth is perfected, is the best time for their removal. They are beautiful plants for forcing, merely requiring to be potted up in the end of the summer, and placed at once in the greenhouse, where their flower buds will begin to swell very soon. If they are wanted to bloom earlier than the greenhouse will bring them, give them at first 40° by night and 45° by day, which, after a week, may be raised to 50°, and lastly, to 55° by day.

SPECIES, VARIETIES, AND HYBRIDS.

We have already given our opinion on the folly of calling foreign plants distinct species, when they are evidently only varieties. Any subject, no matter what, if it comes from abroad, and varies a little in appearance from those we possess already, is at once set down as a distinct species, whereas nine out of ten prove to be only varieties. The late T. A. Knight, Esq. was of opinion that if two distinct species could be got to fertilize each other and produce offspring, that offspring would be a mule, and incapable of bearing seed. He says, in a paper on this subject read to the Horticultural Society:—

"Much difference of opinion appears to exist between my friend, the Hon. and Rev. W. Herbert, and myself, relatively to the production of Hybrid plants; he supposing that many originally distinct species are capable of breeding together, without producing mules (that is, without producing plants incapable of affording offspring), and I considering the fact of two supposed species having bred together, without producing mules, to be evidence of the original specific identity of the two. Our difference of opinion is, however, I believe, apparently much greater than it really is: for I readily concede to Mr. Herbert, that great numbers, perhaps more than half of the species enumerated by botanical writers, may be made to breed together, with greater or less degrees of facility: but upon what sufficient evidence the originally specific diversity of these rests, I have never been able to obtain anything like satisfactory information; *and I cannot by any means admit that plants ought to be considered of originally distinct species*, merely because they happen to be *found to have assumed somewhat different forms or colours in an uncultivated state.* The Genus Prunus contains the *P. Armeniaca*, *P. Cerasus*, *P. domestica*, *P. insititia*, *P. spinosa*, *P. sibirica*, and many others. Of these, I feel perfectly confident that no art will ever obtain offspring (not being mules) between the *Prunus Armeniaca*, *P. Cerasus*, and *P. domestica*: but I do not entertain much doubt of being able to obtain an endless variety of perfect offspring between the *P. domestica*, *P. insititia*, and *P. spinosa*; and still less doubt of obtaining abundant variety of offspring from the *P. Armeniaca* and *P. sibirica*. The former, the common Apricot,* is found, according to M. Regnier (for a translation of whose account we are indebted to Mr. Salisbury),† in a wild state in the Oases of Africa. It is there a rich and sweet fruit, of a yellow colour. The fruit of the *P. sibirica*, seeds of which came to me from Dr. Fischer of Gorinki, is, on the contrary, I understand, black, very acid, and of small size: but nevertheless, if these apparently distinct species will breed together, and I confidently expect they will, without giving existence to mule plants, I shall not hesitate to pronounce these plants of one and the same species; as I have done relatively to the Scarlet, the Pine, and Chili strawberries. Botanists may nevertheless, if they please, continue to call these transmutable plants, 'species;' but if they do so, I think they should find some other term for such species as are not transmutable; and which will either not breed together at all, or which, breeding together, give existence to mule plants. I do not, however, feel any anxiety or wish to defend my own hypothetical opinions upon this subject."

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* The early period at which the Apricot unfolds its flowers leads me to believe it to be a native of a cold climate: and I suspect the French word Abricot, the English Apricock, and the African Berrikokka, to have been alike derived from the Latin word Præcocia, which the Romans (there is every reason to believe) pronounced Praikokia, and which was the term applied to early varieties of peaches, which probably included the Apricot. The Greeks also wrote the Latin word, as I suppose the Romans to have pronounced it, Πρακοκια.—*Hardouin's Edition of Pliny*, Lib. 15. Sec. xi.

† Horticultural Transactions, vol. iii. App. p. 23.

The facility with which the new species, so called, are made to aid the object of the florist, in the production of cross breeds, ought to teach people to be less inclined to call things species ; for we are much of Mr. Knight's opinion, that if plants will breed well together, they must either be the same species or produce mules, whereas we find the so-called hybrids producing seed as plentifully as the parents did. Mr. Knight, in following up the subject, says :—

"I sent to the Society, some years ago, a fruit which sprang from a seed of a sweet almond and the pollen of a peach blossom, and which in every respect presented the character of a perfectly melting peach. When the tree, which afforded that fruit, first produced blossoms, I introduced into them the pollen of another peach tree, with the view of obtaining more improved varieties of the peach of this family : and the necessary preparation of such blossoms prevented my noticing an imperfection which I have since observed in them. Little or no pollen is ever produced in them ; and though the tree has borne well subsequently upon the open wall, and has produced perfect seeds without any particular attention having been paid to it, I suspect that its blossoms have been fecundated by those of some adjoining nectarine trees. Having, however, often observed that varieties of the same acknowledged identical species, when one was in a highly cultivated, and the other in a perfectly wild state, did not readily succeed when grafted upon each other, owing, probably, to the very different qualities of their circulating fluids, I conceived it possible that the same causes might have prevented a perfect union at once taking place between the almond and peach tree. I therefore waited till I had an opportunity of observing, in the last summer, the blossoms of a second generation, which proved in every respect as imperfect as those of the first tree, and like those, afforded fruit and perfect seeds with the pollen of an adjoining nectarine tree. This result, which I did not anticipate, appears interesting : but I hesitate in drawing at present any inferences from it."*

This is so far curious; but we have abundant proofs of the fact, that even tender and hardy plants may be fertilized by each other, and the offspring partake of both parents ; moreover, that they will seed freely, and, if seeded away from all others, or fertilized by themselves, produce, as near as may be, plants very like themselves. Mr. Knight mentions his conviction that a plant produced by two distinct species would, to all intents and purposes, be barren ; and he says :—

"If hybrid plants had been formed as abundantly as Linnæus and some of his followers have imagined, and such had proved capable of affording offspring, all traces of genus and species must surely long ago have been lost and obliterated ; for the seed vessel even of a monogynous blossom often affords plants which are obviously the offspring of different male parents ; and I believe I could adduce many facts which would satisfactorily prove that a single plant is often the offspring of more than one, and, in some instances, of many male parents. Under such circumstances every species of plant which, either in a natural state, or cultivated by man, has been once made to sport in varieties, must almost of necessity continue to assume variations of form. Some of these have often been found to resemble other species of the same genus, or other varieties of the same species, and of permanent habits, which were assumed to be species ; *but I have never yet seen a hybrid plant capable of affording offspring, which had been proved by anything like satisfactory evidence to have sprung from two originally distinct species;* and I must therefore continue to believe that no species capable of propagating offspring, either of plant or animal, now exists which did not come as such immediately from the hand of the Creator."

After all that has been said, we are led to the conclusion that plants sport in nature as well as when aided by art, and that thousands of the so-called species are nothing but sports, which, fertilized again, give rise to new combinations of form and colour; for however much things may be diversified in our British gardens by crossing and the skill of the florist, the smallest difference in imported varieties is sufficient to obtain for every poor plant the honour of being set down for a species.

On the same subject, in a communication many years since made to the Horticultural Society, and published in the Transactions of the Society, the late Dr. Herbert has made some very apposite remarks :—

"Many plants," he says, "which botanists have considered distinct, *are certainly not so ;* as, for instance, *Ixia* (or *Tritonia*) *crocata,* of which seminal varieties have been erroneously named *I. squalida, I. miniata, I. fene-*

* Since the foregoing observations were addressed to the Horticultural Society, a tree which sprang from a seed of a Sweet Almond and pollen of the early Violet Nectarine, has produced a profusion of perfectly well organized blossoms, with abundant pollen; after having, in three preceding years, afforded imperfect blossoms only. If such pollen prove efficient, which I see no reason to doubt, either the specific identity of the Peach and Almond, or the transmutability of the two species, will be proved. But if the Peach be an originally distinct species, where could it have lain concealed from the creation to the reign of Claudius Cæsar?

strata, and *I. deusta; Ixia flexuosa and I. polystachya are the same; Babiana stricta, B. villosa, B. sulphurea*, and *rubro-cyanea, are not distinct;* I have had a natural seedling from *Babiana sulphurea* with a pale eye like that of *B. rubro-cyanea.* I raised from the natural seed of one umbel of a highly manured red cowslip, a primrose, a cowslip, and oxlips of *the usual* and *other colours*, a black polyanthus, a hose-in-hose cowslip, and a natural primrose bearing its flower on a polyanthus stalk. From the seed of that very hose-in-hose cowslip I have since raised a hose-in-hose primrose. I therefore consider *all these to be only local varieties, depending upon soil and situation.* I have raised a powdered auricula and a *Primula helvetica* from the seed of *P. nivalis;* and I have raised a *Primula helvetica* also from *P. viscosa.* I therefore esteem these Swiss Primulas to be local varieties of one species. The Violas are proved by cultivation to have been too much divided. The great heartsease, which adorns Covent Garden market, under the name of *Viola grandiflora*, is found all yellow in Craven in Yorkshire, under the name of *Viola lutea;* with large dark-purple flowers, without any yellow, in the neighbourhood of Moor-rig, above the falls of the Tees, in the county of Durham; and with mixed purple and yellow flowers, under the name of *Viola amœna*, in Weardale, a few miles from the last-named place. The seeds gathered in Teesdale from the dark-purple heartsease once produced a dirty purple and a yellow flower in my garden. These are therefore only local varieties, which, by their uniformity in their natural abodes, have *misled the botanist.*

"I believe the orange, citron, lime, lemon, and shaddock to be varieties of one plant. I do not, however, consider that Mr. Knight's experiment * has proved the almond and the peach to be one species. The peach is extremely similar to the almond, with the exception of the sweet pulp, which may be, very probably, the effect of cultivation; and, if any amelioration of the pulp could be produced in seedling almonds, I should incline to think that a long course of cultivation might have improved the almond into a peach. But the production of a fruit resembling a peach, from an impregnation of the almond with a plant so very similar, only shows that in an intermixture between two plants, which have such close affinity, the type of the male (as is frequently the case) has been very conspicuous; and this, even if the peach had been known to have grown wild, with a sweet pulp, before the deluge, would not have surprised me.

"The science of the botanist, *at the best, is very unstable*, because it is entirely a science of conjecture, *liable at all times to be overset by the test of cultivation.* He carefully observes in plants the features that are least liable to variation; and by their means is enabled to subdivide the classes, genera, and species of vegetables; but experience sometimes shows that the features on which he relies are very variable. Rhododendron and Azalea belong to two classes, widely separated by the number of the anthers, which is the characteristic feature of those classes; yet they are found to breed so freely together, and accord so exactly in the seed and capsule, that it can scarcely be doubted that they have branched from one original stock. Indeed the Azalea is reported to have been occasionally seen with ten anthers instead of five.

"The most distinguished botanists *are perpetually at variance with each other* as to the subdivisions of the vegetable system; nor has any precise meaning been affixed to the terms by which they are known, as a guide to their labours; and if we ask, What is an order? What is a genus? What is a species? What is a variety?—we shall find the answers very unsatisfactory. The most rational interpretation of the terms, I think, will be found as follows:—*An Order*—all the genera or original stocks which have general affinities to each other, though not such as to warrant a belief that they have branched from one stock. *A Genus*—all the species which have peculiar affinities, distinguishing them from all others; and which, I think, render it probable that they have branched, since the creation of the world, from one original. *A Species*—a race of plants that will, in the present state of the world, perpetuate itself without varying in essential particulars so as to confound itself with any other. *A permanent or local Variety*—that which will perpetuate itself in a particular form, if kept in its native soil or situation, or at a distance from all other varieties; but which would otherwise confound itself with them. *An accidental Variety*—that which cannot with certainty be perpetuated by seed in any situation. I do not believe that a better definition for the purposes of science can be given; and, if botanists attended to it, their classifications *would not be liable to such perpetual variety and contradiction:* but, at all events, the experience of the cultivator must always have weight *to supersede the conjectural decisions of the botanist.*"

No one was more capable of reasoning upon any practical subject than the Rev. author of this paper. Here he fairly arraigns botany as opposed in many instances to prac-

* Hort. Trans. vol. iii. p. 1.

tice; and it is singular enough that not only do botanists differ from one another, but they differ from themselves. Dr. Herbert continues:—

"The colour of the flower is one of the most uncertain features; and yet if immutable through successive generations, it is just as sound a botanical distinction as any other, whilst pubescence is a feature to which more weight is attached, and yet we sometimes find it as variable as colour. For instance, as to colour, the beautiful *Convolvulus varius*, figured in the *Botanical Magazine* as a variety of *C. purpureus*, is very similar to that plant in everything but the colour of the flower. The seedlings of *C. purpureus* vary with every shade of purple, red, and white, having always five spots at the mouth of the tube, but no variation of colour is ever seen in the different flowers of the same seedling. *Convolvulus varius* has the opposite peculiarity; the plants which I have raised, through twelve or thirteen generations, differed not in the least from each other, but it would be difficult to find two flowers upon any plant exactly alike in the marks of colour, but they never have the five spots in the tube; and the natural ground is a sulphureous white, with the inside of the tube pale purple, and the flowers are irregularly streaked with dark blue in infinite diversity. Sometimes an accidental flower, like a run carnation, will have the ground entirely blue, with streaks of a deeper colour, but no instance of a plant raised from its seed, with all its flowers alike, or spotted at the mouth of the tube, has been seen; and therefore it appears to be as truly a distinct species as if it had been distinguished by any other permanent feature. Permanent colour is also a principal feature in distinguishing the species of Anagallis. On the other hand, as to pubescence, the lovely *Echites suberecta* does not appear to vary in colour, but in a pot of seedlings I have found one with the stems hairy, whilst the rest have them smooth. If that difference had been found in a wild specimen, with some variation in the colour of the flower, *the botanist would have named it a distinct species, until the experience of cultivators had shown the difference to be uncertain.*"

This raising of new varieties from seed is rapidly destroying many botanical distinctions; species so called are proved to be only seedling varieties, and many of the varieties from seed differ more from each other than plants which we have been told are distinct genera.

"With respect to the fertility or barrenness of mule vegetables," continues the Rev. author of these remarks, "there is some mystery which I cannot at present, and perhaps never shall be able to develop. All the mules I have raised between the African Gladioli have proved exceedingly fertile, indeed certain of producing good seed from every flower; yet the *Gladioli cardinalis*, *blandus*, *tristis*, *hirsutus*, and *recurvus*, from the intermixture of which some of those mules have been produced, are plants exceedingly dissimilar to each other, and could not possibly be considered as varieties of one species. I have found no difficulty in crossing one of the mules produced from these with any third species: but the European Gladioli (which have not winged seeds, and ought to be considered as constituting a distinct genus) have as yet refused to breed with the African sorts. On the other hand, the hybrid *Crinum Govenium* has not produced any seed, either from impregnation with its own dust or with that of other Crinums, although I applied that of *C. speciosissimum* and *C. brevifolium*. Its stigma was, however, quite perfect, and furnished with the usual tubular fringe, and the particles of its pollen, examined with the microscope, though not very abundant, appeared to be furnished with the viscous juice which I consider to be the proof of fertility. I did not think of examining the interior of the germen till it had begun to turn yellow, but it appeared then as if there had been a deficiency of the embryo seeds in the germen, and therefore an incapacity of bearing seed.

"The American Azaleas do not produce seed abundantly in this country, and one reason for this is that they are frequently entirely deficient in pollen, in consequence, perhaps, of the dryness of our atmosphere or soil in spring compared with that of America. In the second week of May I was desirous of impregnating *Rhododendron azaleoides*, which had no pollen of its own, with that of some Azalea, but I could not find a single Azalea flower that had any pollen. I touched its stigma therefore with the dust of *Rhododendron Catawbiense*. The capsules swelled, and in August they appeared in fair progress to ripen the seed, but owing to the extraordinary drought (the plant not having been watered) the pods fell off; but they had remained on long enough to show that the germen had been apparently fertilized; those to whose stigma the dust had not been applied having withered long before. From this it should seem that the ovarium is not defective in that mule, and that it would probably be fertile in America. My own mule Rhododendrons have pollen, though not abundant, and I think I should have obtained seed from them this year if their roots had not been injured by too much water in the pots.

"I suspect that the germen is very speedily fertilized when the dust has touched the stigma; but I doubt whether, after being fecundated, it is closed against any further impression. Mr. Knight has assured me that by touching the stigma of a smooth cabbage with the dusts of a curled and of a red cabbage, he had given both the curl and the red colour to the seedlings; but I am uncertain whether both dusts were applied at the same time. It would be very desirable to ascertain by experiments how long after the stigma had been touched with pollen a second impression could be given. I wished to try the possibility of crossing a plant of *Pancratium littorale*, which had twenty-one buds on a stem, with Crinum, Nerine, and Corburgia. The first flower had expanded before I had taken out its anthers, and though I could not distinguish any dust on its stigma, wishing to make my experiments with certainty, I immediately cut the flower off so low as even to take off the summit of the germen, which I thought I had destroyed, the embryo seeds being partially exposed. The anthers were successively taken out of the twenty other buds, to which various uncongenial dusts were applied in vain; and the only seeds produced were from the germen of the flower which I had so cut off, and I raised true plants of *Pancratium littorale* from them. This proves the fecundation to have been speedily effected, unless the germen could have been fertilized by dust having actually fallen into it accidentally when I cut off the flower. I have been unsuccessful in obtaining mule Convolvuluses, Hibiscuses, and Turneras, and I attribute this to some difficulty in ascertaining the right moment for impregnating fugacious flowers. I have opened the buds before expansion, to take out their anthers, but the result has been a failure of seed. I did raise one mule between the red American *Convolvulus sepium* and *Convolvulus candidans*, but it was very weakly, and died.

"I believe it is an error to imagine that pollen will always retain its fertilizing powers for months if kept dry; on the contrary, I have found it quickly lose its virtue, entirely so the moment it became dry. The pollen consists of minute vesicles filled with a juice which is very visible by means of a microscope. The vesicles soon become dry, and though they retain their form, no juice can then be pressed from them; nor have I ever obtained seed by means of any dust that was not fresh from the flower."

Pollen to be kept long must be kept air tight, so that it cannot lose its moisture: but we believe it can be kept for a very long period. The pollen from dried specimens has been used, and we believe with effect, although it can hardly be proved until they produce flowers, when it will be seen whether there is any of the habit of the one from which the pollen was taken. There is no doubt, however, that pollen may be kept without losing its properties if proper care is taken with it.

CONTINENTAL GARDENS.

[The following particulars are translated from an account of a horticultural tour, published by M. Lecoq:—]

Leybach, the ancient capital of Illyria, stands on the very banks of the Leybach, a noble river which runs through a piece of water apparently at one time a lake. There are some fine promenades at this place, but not to be compared to those which are met almost in every town of Germany; here grafted rose trees are frequently to be seen attaining upwards of thirty feet; and it is not rare to find the eglantine reaching to the second story of the houses to which it is trained.

VIENNA.

Vienna is surrounded by a fertile and smiling landscape, watered by a small river from which its name is derived.

The Botanic garden, which is very extensive, and well laid out, is one of the most remarkable. The plants are arranged according to their natural orders, and grouped according to their affinities; representing the graphic classification which is to be sometimes seen on paper; while the analogies and points of resemblance are preserved as much as possible. A great part is laid out in clumps, having trees in the centre, and shrubs and herbaceous plants converging to the margins.

Each genus with its species is placed in a separate clump, which is generally made large enough to admit additions that may be made from time to time to the collection of plants. By this arrangement the plants are in the most natural position to be properly studied. This plan is not, however, only carried out at Vienna; it is adopted at Edinburgh, and some years ago, Professor Morren put it in practice at Liége. The extent of the Botanic Garden at Vienna gives this arrangement a decided advantage.

Extensive houses and arboretums, a capacious lecture-room and an herbarium, are among the principal objects; some rustic houses formed of the trunks of birch trees, here and there, have a very fine effect. To these erections the *Cobæa scandens* is trained,

its flowers falling in garlands over the white satiny bark of the wood.

SCHÖENBRUNN.

Besides this garden, which is dedicated to science, there are others in the town of a simpler kind, consisting chiefly of promenades for the public. Beautiful fresh green lawns are to be seen on all hands, with graceful figures, planted with *Pelargonium Zonale*, (scarlet Geraniums,) the oldest and commonest of our Pelargoniums, contrasting well with the green smooth turf, and producing an effect which could not be obtained by plants more rare or less rustic. Extensive lawns are to be seen decorated in this way, on entering the imperial grounds at Schöenbrunn near Vienna. Dahlias, China asters, and Petunias, form masses of blue, rose, white or purple, on the verdant carpet, without their colours being mixed or confused. Red dahlias are separated from the white, and the blue China asters are placed at a certain distance from those which are of a rose colour ; so that the *ensemble* of the six grass-plots before the palace have, with this arrangement of colours, a very imposing aspect. Add to this the two *jets d'eau*, which play so majestically at the extremity of the parterre, the weeping willows which droop over the basins, and the old vine whose leaves entwine the white marble balustrades, and you have a faint idea of Schöenbrunn.

Near this is a modern ruin, in which the architect has formed the broken pillars and the crumbling arches, so that the parts seem dilapidated by age, their beauties being respected by time ; and here, on the surface of the water collected among the *debris*, the Nymphæa bears its large broad leaves, and bright golden or alabaster flowers. From this, the visitor is led along some high and old palisades to the upper part of the grounds, where there is a perfect forest of elms, limes, maples, and exotic oaks ; while in another direction are magnificent conservatories, and an extensive menagerie.

HIETZING.

From Schöenbrunn to Hietzing, the distance is very short. Here is the largest garden in Europe, that of Baron Hugel ; it contains numerous straight alleys or walks, shaded by tropical trees, large New Holland plants, and imported conifers, among which the Araucaria attains a great size. This department, in which the plants are mostly in pots or boxes, is surrounded or sheltered by handsome trees of an indigenous kind, and the sombre walks, which the rays of the sun seldom or never penetrate, lead to beautiful lawns or brilliant parterres. Amidst the whole, Coboeas, Ipomœas and Glycines are trained to small cords and spread in all directions. Under this canopy of leaves and flowers, the flowering plants of an extensive garden are daily arranged. Pots embedded in moss form sinuous lines, either singly or one above another like steps. Sometimes they are grouped on stages raised in a pyramidal form, or suspended in baskets or in pine cones to the trees, or the leafy garlands ; the whole are arranged with the most artistic nicety in respect to their various colours. The houses here are very numerous, in which may be seen upwards of a thousand species or varieties of heaths ; all the known varieties of camellia ; rare or entirely new coniferæ ; besides whole houses filled with banksias, proteas, &c. The travels of Baron Hugel, and his [recent] high position at Vienna, explain the vastness and richness of his collections. His orchid house is the image of one of those mysterious *boudoirs* that nature conceals in the deep dark forests of tropical countries. The scattered light, the hot and humid atmosphere, the perfume of the plants, the mixture of colours, the strange position of those suspended from the roof, all tend to make this charming retreat a worthy sanctuary of the learned traveller who has amassed so much precious spoil. The orchids in general grow on old trunks or branches of trees ; some are grown in pots, others are suspended in baskets of various kinds and forms. Lælias, Stanhopeas, Oncidiums and Cypripediums, mingle their sweet perfumes. *Hedysarum gyrans*, placed in the midst of foreign genera, has its two folioles constantly in motion, and bending before the largest which remains still ; while the *Dionœa muscipula* spreads its leaves, but waits in vain for the insects of its native country, which have not followed it in its exile.

Besides the garden of Baron Hugel, there is nothing to be seen of any note at Hietzing, unless it is the miniature garden of Dr. Haike, which is laid out with great taste. It consists of some clumps of plants grown on a fine green lawn, with some trees, from whose branches are suspended small baskets filled with various flowers. There is also a rustic pavilion at the end of the garden, and an Æolian harp, whose melodious tones astonish the visitor, who vainly tries to find out the cause of the sweet harmony. Dr. Haike has a good collection of Petunias, with flowers so large, as to be too heavy for the stems ; but the wind which made the Æolian harp vibrate, had removed many of the broad corollas of the Petunias ; a pleasure for one sense, and a privation for another. It is thus human life is made up ; happiness without mixture does not belong to it.

PRAGUE.

Prague, though not precisely the geographical centre of Bohemia, is its centre of industry and commerce. The river Moldau runs through the town, and lends a picturesque appearance to the suburbs and surrounding country through which it passes. One of the commonest trees growing along the banks and the islets of the Elbe, is the white willow, which is allowed to grow in full freedom without being subjected to periodical amputations. Its graceful silver branches rise and bend with the passing breeze, sweeping the smooth green turf underneath. Numerous groups of oak, beech, elms, pines, and birch, are freely scattered over the landscape and the neighbouring grounds, or cover the numerous islets to be seen on the river; while the sharp peaks or rounded tops of the mountains are seen in the distance, and which are subsequently reached, when about forty miles from Dresden. These mountains are chiefly basaltic, often very high, and can be hewn with perfect ease, affording a valuable material for the purposes of building.

DRESDEN.

Dresden is a beautiful city situated on the banks of the Elbe, surrounded by verdant and fertile fields.

Here there is a botanic garden agreeably situated on the banks of the river Elbe, but, from the bad weather and the lateness of the season, I was prevented from making a careful inspection of it. The predilection of the sovereign for the study of botany, and the great and varied acquirements of Prof. Reichenbach, gives to this capital a very marked distinction in the study of this branch of natural history.

Here I was fortunate enough to be able to assist at one of the principal horticultural exhibitions, consisting chiefly of autumn fruits and dahlias, and to which the public were admitted on payment of a trifling sum. In the centre of the room in which it was held was a group of palms, surrounded by an elegant circle of numerous plants of *Justicia carnea*, and *Bignonia diversifolia*. Beautiful green moss concealed the pots and vases, being laid round them in the form of a compact border. Thousands of dahlias were then arranged, even on the floor of the room and around the moss, in a series of concentric circles, alternating in rose and white; then a graceful curve, enamelled with all the varied colours which this queen of Autumn presents, and at last a border of yellow sorts. This brilliant and novel assemblage, which might be called literally a sort of parterre, was arranged in the shape of a perfect oval. At its two extremities were placed two pyramids constructed of wood, and presenting the richest mosaical display of plums, apples, and other fruits, fixed on the wood, and completely concealing it by the closeness in which they were placed to each other. Two large dishes placed on the summits of these pyramids contained the most select sorts of all the fruits of the season. Opposite to the entrance was placed a magnificent cornucopia, or "horn of plenty," covered with dahlias, and from which issued an enormous bouquet. These flowers hung over a trellis-work constructed with wires, and garnished with long vine-branches bearing fruit of various colours, and partly shaded by their foliage, while the lower extremities rested in the water underneath, and sustained the freshness of the parts above. At the opposite side of this trellis-work were classed several varieties of vegetables, and a curious collection of gourds. These specimens were arranged round a mass of exotic ferns and Lycopodiums, in the midst of which large pine-apples might be seen here and there. The fruit was very abundant, and consisted of the choice sorts of pears, apples, plums, grapes, &c. Nothing was wanting but the black elder-berries, of which a fine purple or violet beverage is made, and said to be much esteemed for its cleansing properties, while the berries of the white elder are sold in the markets for the purpose of making preserves; they are also boiled and eaten with sugar.

Every thing connected with this exhibition indicated much good taste and knowledge of certain rules of decoration which are met with in the other parts of Germany.

LEIPZIC.

Leipzig (or Leipzic) is the second town in importance in Saxony, and the principal place for literature in Europe. It is situated in the middle of a vast plain, where agriculture has been carried to some extent, having some points of resemblance to the neighbourhood of Lille, or the rural districts of Flanders. The portions of ground, or holdings, are surrounded by a stripe of grass, and the soil is as productive as that of a garden. Favoured by soil and climate, the inhabitants of Leipsic are enabled to avail themselves of fine and extensive promenades. '*Le petit bois de Rosenthal*,' and '*Les jardins de Hendel*,' are always thronged by a vast concourse of people; and in Germany the gardens are seldom closed. There are neither gates nor hedges to obstruct the passage of any one, and it is never found that the slightest injury or trespass is committed.

BERLIN.

This is one of the finest towns in Europe, containing numerous long and broad streets,

and also many large and fine squares. The river Spree runs through the town and empties itself in the Haval at some distance from the faubourgs. The king has a great taste for horticultural pursuits, and most of the squares have, therefore, been transformed into public gardens, that are kept with the greatest care. They are laid out, for the most part, in grass compartments divided by narrow gravel walks, well kept up and containing various sorts of plants, often very common, but always arranged in a manner to produce a fine effect. The taste for gardens here is displayed in the most modest parterre as well as in the most extensive lawns. On the smooth green sward, which might be taken for a carpet of velvet, may be seen the beautiful panicles of the Gypsophilas; the isolated tufts of the noble *Arundo indica;* and masses of the spotted Eucomis half hidden under lilacs and jasmines. Here and there are planted on the lawns Kerrias surrounded with *Statice Limonium,* vervains bordered with hepaticas in spring, and variegated box during the rest of the year; while the pansy with its thousand varieties decorates all the places of public resort in Berlin. The practice of dwarfing plants is much followed here, so that they may occupy the smallest possible space, and *Lobelia Erinus* covered with its blue flowers is frequently used as a border for the small flower plots. The public parterres are sometimes formed after very intricate designs; such, for instance, is that of *La Place Guillaume,* where in the midst of the other clumps there is a perfect circle divided in twenty-four rays, which are themselves so many distinct parterres, arranged together in a manner so as to produce the finest effect. The centre was occupied with scarlet dahlias, enclosed within a ring of Symphoricarpos with white fruit. Next was a broad stripe covered with *Lobelia Erinus;* all the compartments were edged with box which is kept very short, and in the midst of each of them were small groups of Lantanas and Bengal roses. To these little formations is given an appearance of liveliness, while several climbers, such as Ipomœas, Coboeas, &c. are trained in a wavy garland manner from plot to plot, showing at the same time an impassable barrier, which is always respected by the people.

Leaving Berlin by the Brandebourg gate, we enter an extensive place which is called the *Thiergarten,* in which the collections of trees and flowers is very extensive. The lawns have a fine fresh appearance, and numerous swans are seen floating on the several pieces of water. Certainly a finer place for recreation does not exist anywhere; containing also, as it does, broad shady avenues for carriage and horse exercise; although one must walk on foot in order to examine all its details. Here especially may be seen that most agreeable harmony of arrangement produced with the very commonest plants. An admirable effect is also produced by contrast of foliage, differences in the colours of the fruit, and the disposition of the supplementary tints. In this department the highest skill of the artist has evidently been brought into requisition. As in all the north of Europe, the chief feature in a promenade or pleasure garden is a fine grassy carpet; red, which is the complementary colour of green, generally prevails in all its various shades throughout the clumps, plots, garlands, crowns, edgings, and ornaments. The holly with its green leaves and coral berries is freely distributed among the shrubbery, where here and there it bears up the long straggling branches of the nasturtium with their beautiful flowers. The large glandular balsam, though insignificant compared with other flowers, holds a distinguishing rank in the middle of a clump, from its fine habit. The maize, with its glaucous foliage, high panicles, and reflexed leaves, brings to mind the bamboos of the tropics, and serves as a centre to numerous crowns of amaranths, alternately red and green, under the load of which the spikes seem to bend. The flowers of *Polygonum orientale,* on their long pendant peduncles, hang over a plot of daisies bordered with red Bengal roses. Fresh objects of attraction are arranged on other plots; concealed supports, or poles, are raised, to which are trained alternately Nasturtiums and Ipomœas, and the prolonged repetition of the same plants and the same colours, produces an effect that can only be understood by a personal visit to the scene of this brilliant assemblage. The rhubarb, whose shoots in the spring time have so fine a rose and violet colour, is dispersed over all the plots, in order to produce a contrast with the green. Subsequently, its undulated foliage, its spikes of flower, and its brown coloured fruit, present different colours according to the season.

At certain points of the Thiergarten are clumps in which the effects of the natural colour of the foliage, or the tint it would probably take in autumn, have been studied. Thus the white poplar contrasts with the beech-trees, the leaves of which now begin to get yellow, with the cherry-trees and the sumach [Rhus typhina], which become of a bright red colour, and the laburnum, which turns brown and variegated. Then at their feet, as it were, might be seen the long glaucous leaves of the artichoke, and the red-veined leaves of the varieties of the common beet. Some of the clumps are planted with trees whose fruit is persistent, serving as

decorative objects of winter, intermixed with those cornels [Cornus] whose branches appear like corals during the severe weather of winter. Nearly all the trees that are common to the north of Europe are grown in the Thiergarten, but the greatest number consists of oak; beech is common, and the alder attains a great height; the elm, maple, and weeping willow, are intermixed with pines, firs, poplars, planes, Gleditschia, and everything is suited to bear the long winters of the north of Prussia. The same good taste in the ornamental arrangement is carried out in the garden of the king at Potsdam; but that establishment is more favoured by soil, site, and water.

POTSDAM.

At Potsdam the gardens of *Sans Souci* and those surrounding the *Palais-neuf* are particularly deserving of attention, especially that of gardeners. Here the grounds are laid out in lawns, clumps, and avenues, and planted with various trees and shrubs, around which *Pelargonium zonale* is grown in rings or garlands; and large spaces were covered with *Sedum Sieboldii*. The vine is often employed as an ornamental plant; the large leaved variety, especially, is planted at the foot of trees. In the avenues it is trained in long festoons, resembling the twining and climbing plants in the forests of the New World. Sometimes long walks are covered with a canopy formed of vine branches trained to a sort of trellis-work, under which one is apt to lose himself in shady labyrinths. The several kinds of grapes, too, with their different colours, are skilfully arranged, and which, though they seldom ripen, have a very agreeable effect, until the approach of the autumn frosts, presenting the spectacle of a hanging vintage within the 52° of latitude. Various kinds of the cucumber family are employed like the vine to cover large trellises, and often the supports disappear altogether under the large leaves of Cucumis and Lagenaria. It is curious to see the various forms of gourds suspended from these trellises during the autumn; some too that are not unfrequently exhibited at our shows as curiosities or articles of food. These trellises trained overhead form a kind of parody to the fable of La Fontaine, where it is easy to recognise the work of man and not that of nature. Nevertheless, nature has suspended these fruits so well, that the gardener might fall asleep in perfect security under the singular shade, without fearing the moral of the fable. Here the most common plants are successfully employed in decoration, in a country where the winters are generally long, and every resource is made available in order to increase the enjoyment of fine weather. Thus Hortensias are grown everywhere in profusion, and trained so as to conceal the tubs or boxes of the orange-trees; they are distributed in all the clumps and plots, and on the first of October during my visit, they were still in flower. The Arundo or Phragmites (common reed) formed groups planted along the ditches with the *Calamagrostis colorata* still waving its flowery panicles in the north wind, the precursor of snows. In the midst of these gardens of the *Palais-neuf* is a charming retreat—a kind of Italy in miniature under the cloudy skies of Brandebourg, viz. the Royal Baths, which are constructed after the model of those of Pompeii, and where some of the richest extracts from the Roman city have been brought together. Frescoes are placed on several points of the monument, [a sort of monumental spire or column raised considerably above the front part of the building,] on the walls of the rooms, and the vestibules, bringing to mind, by the style, those which are found to have been so frequent in the town of Pompeii. A bath formed out of a single block of the green jasper of Siberia occupies the centre of the building. It is a gift of the Emperor of Russia, and is said to have cost 500,000 francs. Near this is the king's bath, a half-circular basin, which is descended by steps of marble, and round which grow a number of exotic ferns, whose graceful and slender foliage is relieved by the flowers of Fuchsias. A portico ornamented with columns separates the bath from the *Viridarium*, a garden similar to those that the Romans possessed at Pompeii: it is a space enclosed by walls; or rather it is an uncovered apartment laid and hung with verdure. The walls are covered with ivy and cissus, which climb and twine on an imperceptible wire trellis. The floor, or ground, is formed of beautiful turf, garnished with a fine green moss. It is difficult to form an idea of the beauty and freshness of a place so exquisitely formed, when Fuchsias and some sorts of the red flowering currants are trained among the branches of the ivy; when the reddening leaves of the vine hang down in purple festoons, and Begonias discolor and manicata shed their rosy flowers on this natural drapery. The humble daisy is only admitted after having acquired in the gardens the fine form and purple colour which renders it desirable; while the Hortensia adds its delicate tints in harmonious contrast with the two complementary colours.

The palace of Sans Souci is a building of a single floor, having a pavilion at each of its extremities. It is situated on an eminence, and the gardens are formed in terraces. Majestic fountains play to a great height, in the

midst of larches and American oaks, clumps of roses, and an extensive rosarium, which occupies a prominent place in the gardens of the king. The trees are seldom naked, as vines, Cissuses, Aristolochias, and Clematises are trained round their trunks. At the highest part of the garden five very extensive terraces are laid out in parterres; where there are also extensive houses, in which fruit-trees are protected, and where the peach, the vine, and apricot, ripen in spite of the latitude. In front of the houses are long borders in which some sorts of vegetables and strawberries are grown, but these are so arranged as not to offend the eye. The orange-trees are numerous, very strong, and loaded with fruit. In this garden are also to be seen beautiful groups of lilacs, Staphyleas, junipers, handsome beech-trees, and curious labyrinths of clipped box-trees; also Bengal roses, and plots in the midst of which are clumps of cherry-laurels. Near the grotto of Neptune *Tussilago Petasites* is used to form an aquatic group, which is shaded by tulip-trees.

The Botanic Garden at Berlin is situated in the Faubourg of Stralaw, and contains numerous select and rare plants. In the houses are some old palms, and the largest tree of *Cocos nucifera* to be found in Europe; an enormous Pandanus, and the finest known collection of exotic ferns. It may be said that there are no houses in Berlin without flowers. The double windows, formed for the purpose of insuring the apartments from cold, are also made to serve the purposes of a greenhouse; they are generally filled with flowers and plants, forming at once an ornament to the streets, and to the interior of the houses. Numerous little baskets, vases, pots, flats, and other things of the kind, are hung at the windows, containing miniature plants, and bouquets, which are constantly renewed. Flowers are also placed on the staircase, the tables, or wherever they can conveniently stand in the rooms. Sometimes they are grown in vases, or cut, and skilfully arranged in large porcelain dishes, in which green moss is used to contrast with the brilliancy of the other colours, and increase their effect. The lustres (or candelabras,) are also ornamented with natural or artificial bouquets, chiefly formed in garlands of roses, which seem to add brilliancy to the light surrounding them. The balconies are provided with supports for pots, and the stands placed in the rooms are covered with small healthy plants, growing in porcelain pots. These miniature plants are also sold very cheaply in the streets of Berlin. Mignonette, the commonest Sedums, violets, and sweet basil, with the autumn fruits, are seen in plenty; and in a country where the vine is excluded, it is surprising to find that pine-apples may be bought for *half-a-crown*.

The plants are the household gods, and when a change of residence is made, they are always removed with the same care observed with china or crystal. Everywhere may be seen ivy growing in pots, and lining the interior of the windows.

KIEL.

The town of Kiel is built on a tongue of land at the extremity of the Gulf of the Baltic. Though situated beyond the 54° of latitude, it is surrounded with fine houses, and grounds laid out with great taste. In the streets, between the double windows, may be seen many of the newly introduced plants, among such kinds as Fuchsias and Gloxinias; Sedums suspended in ornamental baskets, and everywhere, as in Berlin, the ivy finds, like the birds in the forest, an asylum in the cot and in the palace. In the immediate precincts of the town are beautiful gardens, in which care is taken to cultivate those species which are hardy enough to resist the severity of the climate. Weeping willows wave their flexible branches over lawns of the finest green; the poplar bears his head erect; while the portly beech expands his boughs, and forms a shade for the broad beds and clumps of Bengal roses. Limes and ash-trees form detached groups, through which may be seen the masts of numerous vessels, with their colours waving in the wind. Gracefully undulating lines of red geraniums and orange Tagetes are formed on the lawns, while the Clematis and the climbing liseron, though at the end of autumn, were still flowering on the hedges. The various shrubs were loaded with their fruit; the bunches of the black elder mixed among the red, and the spindle-tree, the Viburnum, and the Cratægus, with their berries in bouquets or thyrses, mixed among the branches of the green trees, or the white pearls of the Symphoricarpos. In Denmark, even the colour of the soil is studied in the arrangement of the garden:—that which is naturally red is planted with shrubs of a fine green; the black, yellow, or white sands, commonly found in the alluvial strata of which the soil is composed, form graceful winding alleys, and the opposition of colours produces a most fantastical, and sometimes a strange and pleasing effect.

FLORISTS' FLOWERS: LISTS.

There is a great fallacy in the published lists of florists' flowers. Any cultivator well

acquainted with the numerous varieties of any tribe of plants, would detect in all we have seen certain sorts which are not worth the room they occupy if they were to be had gratis, and certainly nothing requires more caution than the purchase of a collection. It is not of half so much consequence to miss a good one as it is to get a bad one; the absence of one good flower from a collection of good ones only lasts for a season, and when we get it the following year it is cheaper; but the purchase of a bad one is a total loss of all we pay for it, and the room and trouble we bestow on it. But some may be inclined to ask why bad flowers should be recommended? how any body can be interested in so doing? what is to be got by deceiving the young florists? All these questions are natural, but easily answered. A new thing that is either puffed by publications or talked about much, is immediately purchased by the trade, because there is a demand for new things, and nobody in business likes to be without it. Ask twenty dealers for a list of good things, and they will all include in their list a thing that they have brought into stock and not sold out, even before they know any thing of its merits but what they have heard. What dependence then can there be on such lists? Again, there are many persons who are not judges of the properties of flowers, or who will not take the trouble to study them, and these are taken by the colour or some peculiarity of a variety, and overlook great defects—defects that would throw a stand, or collection, or single flower, in a class down below the rest, or clear out of the competition. In short, disguise it as we may, very few persons have the capacity to fairly estimate the rank in which a flower should be placed, and the decisions at public shows frequently belie all the rules of judging, sometimes from the ignorance, sometimes from the prejudice, and not unfrequently from the unfair intentions of some one censor, who influences the rest. We have observed now and then some busybody collecting among a lot of amateurs and dealers lists of the best flowers. Having no real judgment of their own, they want the collective wisdom of others, and the lists so collected are made the groundwork of what is called information, which however misleads generally all who depend on it. Hence the information is not worth having, if it be not directly mischievous. To make lists of flowers really useful, they must emanate from some one of known sound judgment, who has no direct interest in highly colouring anything, who has something like a character and credit as a florist to lose, and is sufficiently known to the world of flowers to influence the many in behalf of his authority. We regard many would-be teachers with great suspicion, if not with a less complimentary feeling.

BEDDING VERBENAS.

The only sorts that are really proper for bedding out when any figure is to be retained, are the dwarf creeping sorts, like *V. Melindres;* and the way to get these in perfection is to watch their growth, and peg down the shoots exactly where you want them, directing them in the best way to fill up their allotted place. They should be planted about a foot apart, and quite that distance from the edge of the bed; the whole of the branches or shoots of those plants nearest the edge should be directed towards the edge, and the next row should be directed towards the first row; as soon as any of the shoots reach the limit of their intended destination, pinch off the ends, and they soon put forth side-shoots, which have also to be directed the way they are most wanted. There will be no difficulty in making them fill up their allotted space, and as soon as they get to the edge of the bed on either side, they must be nipped off, because on no account must they run over. When the bed is entirely filled up or covered, let the shoots spread about over one another; confine them merely within these bounds, and they will present a mass of blooms the exact form of the bed, and as full of colour as a carpet; one foot apart will be found abundant for covering very quickly, and eighteen inches apart will only want a fortnight longer to fill up, for when the plants have once taken hold and begun to grow, they make rapid strides, and when once stopped by pinching off the ends, the side-shoots grow as fast as the main branch did. Unless great care is taken almost daily to pinch off the ends that obtrude, they will soon form themselves over the box or grass edging, so as to destroy the outline of the figure and the plants which form the edging, and the neglect of a few days would do all the mischief. You may thin out the shoots that have done blooming, if there be any.

THE TACSONIAS.

The Tacsonias were originally recognised as Passion-flowers; the splitting of old families into various branches, changed *Passiflora peduncularis* into *Tacsonia peduncularis*, while one introduced in 1828, by Mrs. Maryatt, was called *T. pinnatistipula*. This, and another more recently imported, called *T. mollissima*, are handsome creeping plants with pink blossoms, like those of a passion-flower, only having a long slender cylindrical tube. *Tacsonia pin-*

natistipula is a graceful climbing plant, which we have seen cover the front of a house in fine bloom on Christmas eve, and dead on Christmas day. It will not stand a frost, which is to be regretted; but as a conservatory plant it is second to none. The star-like flowers, comprising rich colours, in which rose-pink predominates, come abundantly, and when festooned above the roof, shine among the gayest of the gay occupants of the highly favoured number that occupy the best station of an establishment. By putting out a well-rooted cutting on a wall of south aspect in May, a favourable season will bring it to perfection out-of-doors, and there is hardly anything that makes so gorgeous an appearance; but it is not unusual to see it cut off just as it comes to perfection. It is a handsome plant exclusive of the flower, and a favourite if only for its foliage. It is best planted in a border for the conservatory, but it may be grown in a large sized pot, and exhibited like the Passifloras, on trellises of some fancy design. It is necessary to grow it in moderately good soil, not too rich, as it would go off to foliage and not even indicate bloom; turfy peat earth, with a very little good loam, will bring it into flower sooner than any other, and especially sooner than richer soil. It should not be topped, but, as it grows, wound round a pillar formed of wires, beginning quite low near the bottom of the pot, and continued not more than an inch apart upwards; it will flower by the time an ordinary sized trellis would be filled. It is propagated by the simplest means; if it be laid along the surface of a declining hot-bed and pegged down at the joints, every one will strike root; if it be cut into pieces with one joint underground and the other above, it is sure to strike under a bell-glass, and when the cuttings are rooted, they should be potted off into small pots, and be shifted only a little at a time, and that little not until the roots have begun to mat round the side. From the size of a forty-eight pot, it should be removed to the one it is to bloom in. The same treatment is applicable in the case of the more recently introduced *Tacsonia mollissima*.

SPUR-PRUNING AZALEAS.

The first time we had any idea of close pruning for flowers, was given us by the supposed loss of a fine *Azalea phœnicea*, seven feet high, through the frost of the 11th of January 1838, when three of that height were exhibited at the Egyptian Hall in full bloom, and met with their supposed violent deaths; they were certainly killed back all the last season's wood, and the day after we cut in as far as the frost had certainly reached, although in two cases it had perished the plants to the very root. One of the three specimens, not quite dead, was cut to within two or three inches of the main stem all the way up, and some part, nearly eighteen inches from the top, was also taken off dead. The plant was some time recovering or showing signs of life, when it broke all over, and we had to cut off more than half the shoots to make room for the others. The plant grew handsomely, set well for bloom, and the next season was as handsome a plant as was ever seen. This set us to cutting on all the other plants that had become gawky and at all thin of branches, and from ugly uncouth plants, with the stem to be seen in three-fourths of the plant, bought in fact in that state, they became all that could be wished. We have ever since these events used the knife freely with azaleas, cutting them in very much, keeping an eye to the form of the plant, and have always found the plants the better for it. The period for pruning in close is directly after the bloom has declined, and before they make any growth. *Camellia japonica* should also be pruned after the bloom, so far as to cut in any lanky ill-grown branches, that the new growth may be handsome. When plants are cut back in this manner, they are frequently inclined to break in many more places than it would be convenient to have branches. All that are not wanted may therefore be rubbed off, and no more allowed to grow than are required to make a close, handsomely formed plant.

HARDY CONIFEROUS PLANTS.

THE GENUS THUJA.

Thuja, *Linnæus* (the Arbor Vitæ).—Coniferæ § Cupressinæ.—Derivation uncertain, unless it comes from *thyon*, sacrifice, the branches or resin being used as incense in the sacrifices of the East.

1. *Thuja occidentalis*, Linnæus (western, or American Arbor Vitæ).—Leaves very small, adpressed, four-rowed, scaly. Cones very small, loose, obovate, with yellowish oblong scales.

In its native country, this tree is represented as reaching the height of fifty feet, and having a stem ten feet in circumference. It is plentiful throughout a great part of North America, from Canada to Virginia and Carolina, occupying very important sites in the scenery of the country. It fringes the stupendous cataract of Niagara, and is found in great abundance by the Hudson, and the rapids of the Potomac. Such situations indi-

cate, what is already very generally known, its love for a free, deep, moist soil. Indeed, it is one of those trees which might be successfully introduced in wet boggy places in this country, where no outlet can be found for the superfluous moisture. In Britain, it has long been one of the chief trees in shrubberies ; and in such of the older gardens as retain their ancient features, specimens are frequently met with thirty feet, forty feet, and even fifty feet in height. In England it forms a connecting link between shrubs and trees, and is very useful in this respect in the formation of pleasure grounds. It is also a very desirable plant in the formation of

Thuja orientalis stricta.

fences, where shelter, without strength or rigidity, is required. In this shape, it is frequently planted by nurserymen for the protection of half-hardy herbaceous and bulbous-rooted plants. As a timber tree, it is of no account in this country, though in Canada it is sometimes used, along with stronger wood, in the framework of houses. As a picturesque object, it is also of no importance, though it may be sometimes seen assuming a graceful pendent habit.

It is remarkably easy to propagate—which is done by seeds, cuttings, and layering. The seeds are ripe in this country in the latter end of September, or in the first week of October. As soon as the cones are gathered, they should be spread in an upper airy chamber, or loft, for a month, when they will become brittle and break to pieces on being rubbed with the feet. The seeds may then be extracted by sifting, and kept in a dry place till the first week in May, when they may be sown in a north aspect in finely raked loamy soil, covered to the depth of a quarter of an inch only, and kept uniformly moist for a few weeks, when the young plants will appear. The plan of raising plants by cuttings must in every instance give way to that of layering, which is by far the most expeditious mode of raising quantities of this shrub. The operation may be performed in the spring, pegging down every little branch, which does not require to be cut, as in the case of the carnation, &c. In many instances, the plants may be removed in the spring following, but if not sufficiently rooted, they should be left till the autumn. Plants one foot and a half high, 6*d.* each, or 4*s.* per dozen (1846).

The following are some of the varieties :—

(1.) *T. o. variegata.* A variety with variegated leaves raised in the Dunganstown nursery in the year 1830. The largest specimen in England is in the Arboretum at Chiswick.

(2.) *T. o. odorata.*—A fancied variation, entered in continental catalogues, and said to be more aromatic than the species.

(3.) *T. o. plicata.*—The variety most worthy of notice. By several nurserymen, it is improperly set forth as a species. Its branchlets are numerous and spreading, with leaves of a light green, shining colour. Found by Nee in Mexico ; and by Menzies at Nootka Sound, in 1796, when it was introduced by him into this country. It is most easily propagated by layers, allowed to remain for two seasons attached to the stool. It is a more compact grower, and more ornamental, than the species. Plants, two feet high, are 2*s.* each (1846).

2. *Thuja chilensis,* Lambert (Chili Arbor Vitæ).—Leaves three-angled, ovate-oblong, imbricated in four rows. Cones oval-oblong, with a few compressed obtuse scales.

A beautiful spreading tree, found by Nee and Pavon, associated with the Araucaria on the mountainous parts of Chili.

It is not yet to be had in the English nurseries ; but there is every probability of its proving hardy, and a most desirable addition to the English shrubbery.

3. *Thuja orientalis,* Linnæus (Oriental, or Chinese Arbor Vitæ).—Leaves in four rows, furrowed in the centre, ovate-rhomboid, adpressed, imbricated. Cones small, elliptic, with prickly prominences.

A compact-growing, handsome shrub, introduced into England in 1752, and generally preferred to the *T. occidentalis* on account of its lively green colour. After it is four years old, this plant becomes hardy enough to withstand our severest winters, though it is

invariably embrowned by exposure to frosts. Hence, in all cases where it can be conveniently done, dead branches should be stuck around young plants, in order that they may present a fresh and lively appearance in spring time. Many fine specimens of this tree are to be seen in the suburbs of London, where it seems to thrive remarkably well. Its propagation is by cuttings, layering, and seeds. The first process is seldom resorted to, because it is surer and quicker to raise the plants by layering the young twigs, which will strike root much sooner if cut underneath, in the same way that carnations are treated. Even with this advantage, the layers will not have sufficient roots until the second year after they have been laid down. The operation may be performed either in the month of September, or in the spring; but it is important to remember that autumn is a bad time to remove the plants from the mother-stools, as they have then to contend unsupported with the severities of winter. They should therefore be taken away during the latter part of March, or in April. During favourable summers, the trees ripen their seeds in this country in October. The cones should be spread in a dry airy chamber, and in the course of a few weeks they will shed part of their seeds, and the remainder may be easily got at by rubbing the cones. In the month of March a free loamy soil should be selected, and the seeds deposited to the depth of a quarter of an inch, watering them at all times when the weather proves dry. In the seed-bed the plants may remain two years, when they should be placed in lines. Plants, one foot high, 6*d.* each; and those eighteen inches in height, 1*s.* each (1846).

Some varieties are met with in gardens:—

(1.) *T. o. stricta*, is a variety with the branches gathered close up to the stem, assuming the habit, in a certain measure, of the evergreen cypress. Hence it bears the name of *pyramidalis* in some catalogues. It is propagated in several of the London nurseries, where it is sold at 1*s.* 6*d.* each (1846).

(2.) *T. o. tatarica* seems to be a stunted variety of the species, the branches and leaves being short and compressed. Plants are 9*s.* per dozen.

(3.) *T. o. Wareana.* Another variety, more distinct than either of the foregoing. It is cultivated by Knight of Chelsea, where the plant is sold at 1*s.* 6*d.* each (1846).

4. *Thuja cupressoides*, Linnæus (Cypress-like Arbor Vitæ).—Leaves four-rowed, smooth, imbricated, oblong. Cones four-angled, globular.

A yew-like plant, a native of the Cape, and introduced by Roxburgh in 1799. There is a specimen in Kew Gardens, but it is scarcely known in the nurseries.

5. *T. pensilis*, Lambert (pensile Arbor Vitæ).—Leaves alternate, three-rowed, trigonous, awl-shaped. Cones obovate.

An elegant tree, a native of China, whence Sir George Staunton brought specimens to this country, but the living plant is not yet procurable in the nurseries of England.

6. *Thuja pendula*, Lambert (pendulous Arbor Vitæ).—Branches filiform, pendulous; leaves distant, opposite, lanceolate, spreading. Cones globose, with smooth convex scales.

A most lovely shrub, native of Chinese Tartary, having long hanging branches of a light green colour. Few plants excel it in gracefulness, and it is to be regretted that it is rather difficult to propagate, and that, consequently, it is still high-priced and somewhat scarce. It has proved itself to be hardy in Britain, several specimens having stood in the open air at Dropmore for ten years. It is propagated by cuttings, carefully inserted in a mixture of sand and peat placed so to be excited by bottom heat. Plants in pots, one foot high, 10*s.* 6*d.* each (1846).

7. *Thuja filiformis*, Loddiges (weeping Arbor Vitæ).—Branches filiform, pendulous. Leaves opposite, distant, acute, spreading. Cones roundish, consisting of four scales, having each at the apex an obtuse recurved mucro.

A very charming shrub, with the habit of *T. pendula*, and usually confounded with that species. There is, however, a remarkable distinction in the cones. The habit of the plant is to produce drooping slender branches, which are of greater or less length according to the nature of the protective circumstances under which they have been produced. The plant is quite hardy. It is probably a native of Nepal. There is a fine old plant at Kew, and another in the Apothecaries' Garden, Chelsea. It is propagated by cuttings like the *T. pendula.*

8. *Thuja nepalensis*, Loddiges (Nepal Arbor Vitæ).—A handsome species from the mountains of Nepal, and hardy enough in the climate of Britain. Plants in pots, six inches, 21*s.* each (1846).

9. *Thuja hybrida.*—A rather tender species recently introduced; and, as the plants are small, nothing definite can be yet said as to its habit. Plants in pots, six inches high, are 21*s.* each (1846).

10. *Thuja dolabrata*, Willdenow, is a species not yet introduced; but, according to Thunberg's account, it is one of the most beautiful of all the evergreen tribes, becoming a tree of great height and dimensions, and planted as a roadside ornament on the hill of Fakonia. It has a dense head, and the foliage is of a beautiful shining green colour.

FLORICULTURE OF THE MONTH.

BY GEORGE GLENNY.

The last month has done something for Floriculture. The various shows have almost outstripped all former efforts in the quality, and, in some cases, the quantity of well-grown plants. Chiswick presented, in its admirable arrangements, a sight we had never witnessed before. The noble tents in use at the June show were so extensive and so well disposed on the grounds, that, with an immense concourse of people, there was neither crowd nor confusion, and the display of plants was equal to that of any former occasion. There was nothing secondary: unlike the mass of ordinary plants which we have seen crammed and crowded up together at some places, even the present season, there was ample room to place all the plants in the best possible condition to be appreciated; and if there were fewer competitors for the great prizes, the exhibition was greatly improved by the absence of those long, bare-legged, ragged specimens which, with no quality but their age and size, have greatly added to the inconvenience, without in the least increasing the interest or beauty of the more worthy specimens. In short, Chiswick presented nothing but winning specimens, while other shows have been crowded and confused by many losing collections, which were deservedly excluded from the prizes, and ought to have been absent from the tents. The authorities at Chiswick do not encourage florists' flowers to the extent they are patronised at the Regent's Park, but the absence of prizes is far better than injudicious distribution—the one deceives nobody, the other deceives all who place any faith in the awards. The geranium still forms, however, a grand exception, and is advancing still in public estimation, although opinions have been expressed that there is nothing more wanted. There were many seedlings at Chiswick that, being all placed together, attracted a great crowd all day. Among the mass we particularly noticed Hoyle's Cecil, Hoyle's May Queen, Hoyle's Ajax, Beck's Rosa, and Beck's Diana, not without faults certainly, but worthy to be admitted to the very best collections; keeping in our eye at the same time our established favourites, Salamander, Pearl, Forget-me-not, Queen Adelaide, Duke of Northumberland, Rosamond, Sundown, Cassandra, Gulielmus, and some others, which in June stood as high as any we have in common cultivation; and when seedlings equal, or superior to these, may be added without sameness of colour or character, there can be no question as to their merit. While upon the subject of Geraniums, we may mention two others, Major Domo (Beck's), the largest of all the good flowers in cultivation, and one of the most noble trussers of the family; and Flying Dutchman, a lively addition to the bright colours. We are obliged to admit, therefore, that the Pelargonium family has this year received a great acquisition, although we have not seen all yet; we were informed that Mr. Beck has others, and that Hine of Ramsgate, the successor of Mr. Miller, has a few worth exhibiting. There is a class very rapidly gaining ground in public estimation, the so-called French fancy geraniums for bedding out; but these are undergoing all the silly propping and spreading out into large plants that have characterized the show sorts. They are certainly very inferior and weedy at present, compared with the florists' varieties, and we never care to see the present sorts shown in collections; there are not half-a-dozen worthy of such notice, for we will never recognise flowers naturally ragged. The only tolerably fair ones are Donna Inez, Defiance, Hero of Surrey, and Negress. There is a great sameness among the others, all the markings are scratchy and indefinite, most of the petals uneven in the surface and serrated in the edges. In short, if they bloom as continuously as the dwarf scarlet kinds, they are very well adapted for bedding out, because there are various shades that will give a good effect in masses; but as show flowers, the four we have mentioned are the best, and they are by no means all they ought to be. The Hero of Surrey is new, and has been, we believe, awarded a certificate, but to this we attach no importance whatever. We consider that, from the sorts we have noticed, the Pelargonium family have advanced, and that we are getting fairly into a new style of flower that approaches the standard nearer than those of more distant days. Calceolarias have been at a stand-still, as to form, some time; it is, therefore, with great pleasure that we recognise a movement this year in the right direction. The flat faces which, according to antiquated notions, were no detriment, were nevertheless the prevailing fault. The melon-formed compartments were disappearing fast, and the sizes and colours of the flowers improving, but the flat pancake fronts were at a stand-still. We observed the other day two very pretty exceptions, Baron Eden and Ne plus ultra, well blown out, and pretty nearly as thick from front to back as from side to side—the habit of the plants, too, by no means despicable; and when we look at

such varieties as Gustavus, Black Dwarf, Eclipse, and Gemellii—or some such name, for botanical names are not always written plainly, and there is no possible rule to help one—we are glad to recognise the improvement; perhaps these six, that is to say, the two new ones and the four old ones, may be adopted by any new calceolaria grower as the best he can begin with and seed from for new varieties.

Plants of novel structure, or of scarce production, are rapidly increasing on us. At the exhibition were seen *Escallonia macrantha*, a hardy shrub, with half-tubular half-bell-shaped flowers all along the young branches, very abundant, and of a dullish crimson, produced at Chiswick by Messrs. Veitch, and proved by three years' exposure in the open air; *Hoya imperialis*, with immense flowers, produced by Mr. Glendinning; *Lisianthus pulchra*, with brilliant scarlet flowers; *Gardenia Fortunii*, a plant like the old *radicans* magnified ten times; *Abelia floribunda*, a shrubby plant with hanging trumpet flowers of purplish colour. These may be considered the most remarkable, unless we travel to the forest of orchids, in which we should be lost.

Pinks have been exhibited, but up to the Surrey show they were not half bloomed. We notice, however, two flowers under the name of Jenny Lind, of unequal merit. Parker's Jenny Lind is not fit to hold a candle to Read's, as we have seen them together. The Surrey show produced a few good Ranunculuses, such as Agamemnon, Admetus, Edgar, Ascham, Electa, Reliance, Pole, Prince of Wales, Belmont, Man-of-War, &c., flowers which show that we have but little room to improve on this beautiful tribe. Of the Rose exhibitors who have figured of late, Mr. Paul stands immeasurably before all others but Lane, and these are excellent rivals; other exhibitors come in with such ill-contrived and ugly supports and growth that the plants are hardly tolerable, but Mr. Rowland has beaten them all in this respect; the plants have been shrubby and stocky, strong, with no supports and no need of them; we mention this that others may follow the example.

The florists do not seem quite at home; some object to one party, because it is too selfish; others are condemned because they are exclusive; the whole complain that the Floricultural interest is not represented. At a numerous meeting of the gardeners connected with their late Journal, it turned out that some of them, out of their hard earnings, had expended seventy pounds, which they had totally lost in the attempt to save the paper, and that before they parted with it for the small sum of two hundred and fifty pounds, the number had declined six or seven hundred, and that through the inefficient manner in which it had been conducted, and especially the personal and offensive manner in which some leading florists had been treated. It was also stated that the paper had become political, and that therefore it was time they had some efficient journal as a second to the Gardeners' Chronicle.

NEW FRUITS.

We gather the following notices of new fruits raised in Belgium from the *Ghent Annales*, where the varieties described below are nicely figured:—

De Croen's Royal Grape.—This variety, which is spoken of as one of considerable excellence and beauty, appears to have been raised by M. De Croen, a nurseryman at Brussels. The bunches are described as measuring fully seven inches in length, and being somewhat broad or branchy at the shoulders, where the diameter is sometimes equal to the length. This variety is therefore included among those sorts which have a full or broad form of the bunch. The berries are free, well developed, not compressed, and measure from three-quarters to a full inch in diameter; they are globular, or somewhat ovoid; the pedicles are firm, and the berries hang easy. The skin (epicarp) is firm, smooth, and thickish, but not cartilaginous as in the grape of the south; this skin separates easily from the flesh. When ripe, the berries are of a yellowish-green. The flesh (mesocarp) is exceedingly juicy, abundant, full, very savoury, sweet, refreshing, and perfumed with an indescribable aroma, which is very different from that of the Muscat or of the Isabella grape; in fact this aroma is peculiar to this sort, and the berries must be tasted in order to form an idea of it. This grape was exhibited at the grand exhibition in Brussels in 1848; and the king having requested that the most remarkable among the fruits and vegetables should be pointed out to him, this grape "had the honour" of being included among those selected for presentation. This circumstance has given rise to the name of Royal Grape, by which M. De Croen's variety is designated. The origin of this variety is not very certain; because, as it often happens in sowing, an exact account of the seeds deposited in the soil is not kept. De Croen's Royal Grape is, however, a production from seed, the stock of which is unknown. It is especially suited to the vinery.

Gondouin's Red Currant.—This is an excellent variety, distinguished by remarkable vigour, by the length of its bunches, and by the size and flavour of its berries. It is,

in fact, double the size of the ordinary red currant. The wood is vigorous, with a brownish-coloured bark, having small light lines on its surface. The leaves, which are borne on angular petioles, from two-and-a-half to three inches long, are about four inches broad when fully grown, five-lobed, deeply and irregularly dentated at the margins; the veins, especially the three mid ones, being more than usually strong. The fruit bunches are fully four inches long, each bearing about twenty-five berries, which are nearly half an inch in diameter, of a fine dark vermilion colour, quite round, and having a slightly acid, and on the whole a very grateful taste. It is said to be a very prolific and much esteemed sort in Belgium, in which country it appears to have been raised by M. De Gondouin. It requires to be vigorously grown, and should be planted in a place partially shaded from the sun, and where there is plenty of air, and a good substantial soil; fresh plantations should be made every four or five years.

EXACUM ZEYLANICUM.

Exacum zeylanicum, Roxburgh (Ceylon Exacum).—Gentianaceæ § Gentianeæ.

This plant is closely allied to the Chironias, of which some pretty species are not unfrequently met with in cultivation; the present, which was called *Chironia trinervis* by Linnæus, is in every respect deserving the attention of admirers of plants. Whether or no it will prove to be a cultivable plant, remains to be proved; the probability is, that being an annual, it will some day die out for the want of a supply of perfectly organized seeds.

It is, as just stated, an annual plant; its habit is erect, branching only in the upper part, and there in a corymbose manner. The stems, as well as all the parts of the plant, are quite smooth, and they are, moreover, of an equal four-sided figure. On these stems are borne the opposite leaves, which are without foot-stalks, or nearly so, and are of an elliptic-oblong, or broadly lance-shaped figure, ending in a slender point, and marked on the surface by the presence of three longitudinal veins, called nerves or ribs. These leaves are a bright lively green on the upper surface, and paler on the under side. In the upper part of the stem short branches are produced, forming a terminal leafy corymb. The flowers are large and handsome, and grow three together on the ultimate branches of the corymb; they are rotate or wheel-shaped, that is, having a very short tube answering to the nave, and a nearly flat, spreading limb, answering to the rest of a wheel; the colour is a rich purplish blue, which is contrasted with the cluster of large deep yellow anthers. The limb of the flower consists of five oval or obovate-obtuse lobes, which are paler-coloured at the back than on the face.

This species of Exacum, as its specific name implies, is a native of Ceylon. From that country seeds were introduced to the Glasnevin Botanic Garden, at Dublin, where, under the care of Mr. Moore, it was raised, and flowered in September, 1848. It has received other names besides that here adopted; as *Chironia trinervis* (Linnæus), and *Lisianthus zeylanicus* (Sprengel).

Many of the gentian-worts, to which natural order the Exacum belongs, are rather shy of submitting to the restraints of cultivation, and often attain the greatest luxuriance under circumstances where it would be least expected, affording evidence that the proper treatment is hardly afforded them. The experience which has been had with the present plant, would lead to the supposition that it may belong to this set of shy growers, although it is to be hoped that so interesting a subject may prove otherwise when better experience of its habit has been had. An allied species, the *Exacum tetragonum*, has been observed to grow and flower readily when allowed to fix itself as a weed upon the damp loose mossy surfaces of pots containing other plants, such as orchidaceous plants.

Though an annual in its native habitats, where the conditions are such as to bring it to a more perfect state of fructification than it attains in our plant-houses under artificial management, it does not always under the

latter circumstances prove to be strictly limited to one season's growth. This, no doubt, arises from the fact that its effort at fructification is not perfect, and consequently the plants are not so much exhausted as after flowering in their native regions. The result of this is, that sometimes, after flowering, the plants produce branches near their base; and these branches may, with considerable care, in placing them under the most favourable circumstances, be preserved through the winter, so as to perpetuate the species. This, however, is a precarious matter.

The only way of bringing this species under cultivation, will be by inducing it to mature its seeds, and if this can be done, it may be continued in cultivation, though probably it will always rank amongst the shy growers. The manner of procedure will be thus:—Sow the seeds in sandy peat soil, not too much smoothed on the surface; the lower stratum may be potsherds, and on this coarse turfy peat, to act as conductors of moisture from below. Scatter the seeds thinly over the surface of the sandy peat, and leave them with no other covering than will be given to them by gently striking the bottom of the pot on the potting bench. The early spring should be chosen for sowing. As the plants require stove heat, the pots may be set in a moist warm part of the stove, and in order to keep the soil moist without pouring any water over the minute seeds, the pots should be set into pans supplied more or less with water, and a flat piece of glass laid over the pots till germination commences, when it may be removed. The seeds must not be continually wet at any period, but only kept from getting dry by these means. Like other delicate annuals, the young plants must be potted off very carefully, as soon as they are large enough to handle, first into the smallest pots singly, and then shifted on into larger pots as they increase in size. Five-inch pots are probably large enough under any circumstances for the blooming plants. Peat-soil should be used, employing it in turfy lumps, so that it may be always open, and not liable to be stagnated with water; for though they require to be kept moist, yet stagnant water is fatal to them.

RAISING SEEDLING FLOWERS.

THERE is a singular indisposition among the most enthusiastic growers to the raising of seedlings which require many years to develop their beauties or novelties, as the case may be. The very thought that a tulip will require upon an average five or six years to bloom, and perhaps as many more before it breaks into its proper colours, has deterred hundreds of excellent growers from sowing seed at all; and perhaps the fact that seedlings could be purchased old enough to bloom, and that had bloomed, and therefore seven years old, has still more excited an unwillingness to undergo the seven years' probation of taking up and replanting little bulbs. Yet how soon do a few years pass away, and how naturally do we reproach ourselves for losing the opportunities! It is a sad mistake, but having made it ourselves, we are the better able to show what poor satisfaction it is to deplore a neglect that prevented an advance in the qualities of the flower: who knows but we might have raised tulips as much better than those we have, as they are superior to the commoner ones that we possessed before? Besides, the best proof we can give of our folly in neglecting it while young, is the fact that we began it twenty years later than we ought to have done, and we believe hundreds are doing the same thing. We desire to see the tulip above all flowers advance nearer to perfection, for they lag behind sadly; we want also to see the culture better understood; the facts connected with their progress better accounted for; and nothing will tend more to accomplish these things than the watching them through all their stages of progress from the seed upwards, by all those who are raising seedlings. But there are other flowers as little encouraged as the tulip, although of much more encouraging length of imperfection. The auricula is bloomed often in two years, always in three, from the sowing, yet there is a very slow progress, during which time the greatest attention is required, and this perhaps induces many to neglect sowing. But the fact is, a man only wants the courage to begin. Every year adds to the interest of his task; every variety of foliage engages his attention, and feeds his hopes, and all the delight he takes when once fairly set to work, comes upon him unexpectedly. Nobody who has not raised seedlings can form the least conception of the interest excited by the pursuit, and therefore everybody who loves a good flower ought to save his best seed and sow it. Why are so many sowing dahlia and pansy seed? Because they so soon reward them with the result, be that result good, bad, or indifferent; but those who are deterred by the length of time that elapses before a tulip or an auricula comes to perfection, should recollect that if they follow up the task annually, they have a succession of seven or of three-year-old stuff, to gratify their love of novelty, or to disappoint their hopes, and that therefore the excitement is then continual year by year. Everybody who delights in a good flower, is bound, in our opinion, to do his best towards improving it, and we hope none will neglect to raise seedlings.

DAHLIAS GROWN DWARF.

The dahlia varies so much in its habit, that what would do well for one sort, would be impracticable with another. The dahlia, to be kept dwarf, should be selected of a short-jointed habit, with short footstalks to the flowers. Take the plant young, plant it at one end of the bed it is to fill, or if a large bed, plant the proper number of dahlias at one end, or one side, and always in the lowest part if there be any difference; lay it into the ground sloping, and cover the root well; then peg the stem to the ground; if there be any side-shoots already, peg them right and left of the centre or main stem, and as straight out as they can be forced without breaking. As the plants proceed, continue to peg down, and in this way cover the bed. You will find no difficulty in doing this with a little gentle coercion, using at first pegs that will hold them a little down, and by increasing the force. Cut away all that are too stubborn and cannot be laid down. When the dahlia is well laid, the bloom does not come half the height that the plant would have grown if unconstrained, and this kind of treatment is capital on slopes, or banks that want covering in the most effective manner. By the time the plant covers a good space, it begins to bloom, and it lasts a good while in perfection; it flowers with much less water, and much greater effect than any other kind would accomplish. Much depends upon the selection of a good short-jointed sort of plant, and a decided brilliant colour, for when in full bloom there is a mass of flowers that may be seen from afar. On slopes the growth is much more rapid than when the ground is quite flat, because you can appropriate any branch, which you cannot when the ground is level.

HIBISCUS MANIHOT.

This extraordinary flower once excited the surprise of many at the exhibitions, from its immense size and its odd colour. It may seem odd to call a flower as large as a plate, because there are plates of all sizes. We have seen the flowers of the present subject nine inches across the bloom, which is perfectly round and flat, of a buff-yellow, with a remarkably black centre or throat; we have had this from seeds which were imported from the East Indies, but the plant is of old standing. The seeds were sown in a common hot-bed, the plants soon potted into the size forty-eight, and as they advanced they were shifted until they were in size twenty-four, after which we began to consider them cumbersome, and as we knew nothing of them and they had reached six or eight feet, they were placed behind the pit, in the stove, where they remained unnoticed until one morning they were seen to have produced four or six immense yellow flowers, with black centres. The flowers closed at four o'clock, and never opened again; a succession of blooms came on, and we more than once or twice got a plant to an exhibition in good order, and it was greatly admired—not for its beauty, for the plants were gawky in consequence of being neglected. The next season, however, we cut them down, and re-potted them, when they branched out a good deal, looked very much more attractive, and were generally admired; but the ephemeral nature of the flower disappointed us two or three times, and we never attempted to carry them about afterwards. There is no difficulty in cultivating this plant, and it seeds freely. It will strike from eyes cut with half an inch of stem to them, and also may be propagated from cuttings and suckers. It is a stove herbaceous perennial, worth anybody's cultivating in a roomy stove, but not adapted for limited collections, for these should not contain a single plant that is not either curious or beautiful at all times of the year; whereas the *Hibiscus Manihot* is an uncouth grower at the best, and is not even interesting, except while the flowers are out, and there are scarcely ever two out at once on the same plant.

An Abstract of Reports, Papers, and Proceedings of the Horticultural Society of London, with Notes by F.H.S.

The Early purple Brocoli.—The Brocoli, of which I now offer some account, is reported to have been introduced from the Cape of Good Hope, by the Hon. Marmaduke Dawnay, and first cultivated in Surrey, where it is called the Early Cape Brocoli. Packets of seed, first sent here from Italy, appear to me to have produced the same variety. My method of treating it is as follows. Three crops are sown annually: the first between the 12th and 18th of April; a second between the 18th and 24th of May; the third between the 19th and 25th of August: these successive crops supply the family from September till the end of May. The seeds are scattered exceedingly thin, in a border of very rich light earth. Not a weed is suffered to appear, and when the young plants have from eight to ten leaves, which is in about a month, they are finally planted out at the distance of two feet every way, in a piece of sandy loam, which has been well prepared for the purpose by digging and enriching it with a large proportion of very rotten dung, frequently turned over to pick

out every sort of grub or insect deposited in it. The ground is kept constantly clean by hoeing, whenever a seed leaf of any weed springs up; and the loose surface is drawn together into a heap, round the stem of each plant. The second crop is treated exactly as the first, but the weaker plants left in the seed-bed are permitted to remain eight or ten days longer, to gain more strength. They are then transplanted into pots of the size called sixteens, filled with very rich compost, placing them close to each other in the shade, and duly watering the plants, till they begin to grow freely. After this, the pots are plunged in the open ground at two feet distance from each other, every way, and about three inches under the general level, leaving a hollow or basin round each plant, to retain any water given to them when necessary. By the time the pots are filled with roots, and that autumnal rains render watering unnecessary, the basins are filled up by drawing the earth round each plant, at the same time pressing it firmly down, to prevent the wind from shaking them. A few of these plants in pots sometimes show flowers too soon, and to guard them from early frost, a leaf or two is broken down over them. On the approach of settled frost in December and January, all the pots are taken up and removed to a frame, pit, or shed, where they can be sheltered from the extreme severity of the winter, but have air when it is milder, and by this method a supply is preserved for the table in the hardest winters. To make brocoli succeed in pots, I find, by experience, that it should be potted immediately from the seed-bed. If it is transplanted oftener, the head or flower is both less in size, and runs much sooner after it forms. For the same reason, I never prick out or transplant the general crops; and as the temperature of our climate does not suffer vegetation to go on briskly from October to March, by following this method the heads of flower will remain a long time in a state of rest after they are formed, without bursting, and heads from six to seven inches in diameter are the ordinary produce of our plants. The seeds of the third crop are sown in a frame, or under hand-glasses, and about the third week in October the plants become strong enough to remove, as in the two former crops. From this sowing, the best plants are selected for seed, and placed three or four under a hand-glass, according to its size; three, however, are sufficient, for they should not afterwards be disturbed. They are gently watered and covered till they have made fresh roots, after which, air is plentifully admitted, treating them through the winter exactly like Cauliflower plants.—*Letter of Mr. J. Maher.*

[The numerous varieties of Brocoli now in cultivation render the use of pots no longer necessary, for we have some of all seasons; but in a very hard winter, when we have sometimes seen the certain crop cut off by severe frost, a quantity in pots would have well repaid the trouble; no ordinary frost, however, will kill off our most hardy kinds. The foregoing plan was adopted by Mr. Maher, at Edmonton, which may be considered a cold situation, and where, therefore, all the precautions he could use were necessary to secure a supply for the table.]

Nelumbium speciosum. — In the year 1824, the tub in which a plant of *Nelumbium speciosum* was growing, became leaky, so much so, that when filled up in the evening, with the rest of the aquatics, it was nearly dry in the succeeding morning; this continued for some time, but the plant, notwithstanding, grew vigorously. About the middle of July I had the pleasure to observe three flower stems rising amongst the leaves; they grew very strong to the height of four feet, or thereabouts; the flowers all expanded, and were from six to eight inches in diameter; the capsules also swelled to a considerable size, but none of the seeds came to perfection. Previous to this, I had not been able to flower this beautiful plant; I was therefore determined to follow the same process in the succeeding year, as nearly as possible, and I am happy to be able to state that the experiment was attended with a favourable result, for a plant so managed in a tub about the same size produced five flowers. I was in hopes also that I should have succeeded in procuring ripe seeds, and I have some reason to think this would have been the case, had the idea of assisting the fructification struck me sooner; for I endeavoured to do so with the last flower which opened, and the capsule of that swelled much larger than either of the others, and the seeds attained nearly their full size, though they were not perfect. The tub in which the plant grew was plunged in a corner of a pit in which pines are fruited, and which is kept during the greater part of the spring and summer at a temperature as high as from 65° to 90°, and even to 100° of Fahrenheit; in winter the temperature is kept lower, being seldom above 60°. During that time the plant received but little water; and indeed the supply was diminished gradually from the time the plant flowered until it became almost dry, and it remained in that state during the winter. In the spring I gave rather more water, and as soon as the leaves began to grow a few inches above the surface, I took out as carefully as possible all the old earth from about the roots, and replaced it with strong rich loam; the tub was then kept

nearly full of water, so as to allow the leaves to float, and was continued in this state until they were sufficiently strong to rise of themselves above the surface of the water to the height of about eighteen or twenty inches ; I then began to reduce the water by slacking the upper hoop of the tub so as to let the water escape gradually through the staves to about the level of the earth which the plant grew in ; this it generally did in the course of the night. This process was pursued during the last summer, the tub being filled up with fresh water every night until the flowers and leaves died away gradually, and the water, as before noticed, was reduced at the same time.—*Letter of Mr. A. Stewart.*

Pruning Dwarf Standard Fruit Trees.—Young trees are to be treated in the following manner. If there are more than three shoots on the plant, reduce them to that number, and shorten each to three, four, or six eyes, according to their strength. The following season, reduce the number of leading shoots to six, and shorten them to three-fourths of their length, and spur in the remaining shoots. The tree should be managed in every respect in this manner until it has attained the required size, which of course depends on the convenience or fancy of the owner, or conductor of the garden. I make a point of letting the trees take their natural form of growth as far as the system described will permit ; for I consider it of little consequence what shape is given to the tree, provided my end is attained ; that is, to make every branch as it were a long spur, with bearing buds, from the base to the extremity. Two or three years' trial of this method only, might possibly deter many from a continuance of it, in consequence of the quantity of young wood which will be produced yearly at first, and from the apparent difficulty of getting rid of the superfluity. But the inconvenience will be ultimately surmounted, if the foregoing instructions are attended to, and the consequence will be the possession of both healthy and fruitful trees. To attempt to bring very old trees into this method of management, would be attended with difficulty, unless they were cut down short, and allowed to make new heads, which I should recommend where their produce can be spared for a time. In a few years fine healthy heads would be formed, which will yield fruit superior to any that could be expected from them if left in their rude state. But if the trees cannot be spared to be headed down, they may be very much improved, by thinning out the spray, and cutting away a few old branches, which will cause them to throw out young shoots, and these, in a short time, will become bearing wood. The remainder of the old branches may then be thinned out with effect.—*Letter from Mr. William Greenshields.*

Culture of Horse Radish.—After having fixed on a spot of the garden sufficient for the crop I intend to plant, it is trenched two good spades (I ought rather to say two feet) deep, either with or without manure, according to the state of the soil, which, if in itself good, requires no enriching ; but if it is poor, some good light manure ought to be added to it, and this must be carefully laid into the bottom of each trench, for, if not so done, the Horse-radish, which always puts out some side-roots, would send out such large shoots from the main root in search of the dung contiguous to its sides as to materially deteriorate the crop. After the bed is thus prepared, plants are procured by taking about three inches in length of the top part of each stick, and then cutting clean off about a quarter of an inch of this piece under the crown, so as to leave no appearance of a green bud. Holes are then made in the bed, eighteen inches apart every way, and sixteen or eighteen inches deep ; the root-cuttings, prepared as directed, are let down to the bottom of the holes, which are afterwards filled up with fine sifted cinder-dust, and the surface of the bed is raked over as is usual with other crops ; it will be some time before the plants appear, and the operation of weeding must be done with the hand, and not with the hoe, till the crop can be fairly seen ; afterwards nothing more is requisite, beyond the usual work of keeping clean, till the taking up of the crop, and this may be done at any time during the winter months. My time of planting is between the middle of February and the middle of March ; I always find that the stouter the cutting the better will be the produce ; no make-shift roots will do well, neither can careless planting be allowed: if due attention to these essential points is not given, I cannot promise a good crop. The instrument used for making the holes is like a potato-dibber, about an inch and a half in diameter near the point, and two inches and a half at the upper part, so that the top of the hole it makes is larger than the bottom.—*Letter from Mr. D. Judd.*

[We prefer leaving the sets in the bottom of the trenches to any dibbling ; but we have no doubt the writer grew them to his own satisfaction.]

Flax as an ornamental plant in the Flower Garden.—The soil of every flower garden is always rich enough to produce good flax ; but if it is loamy rather than sandy, the quantity will be nearly double : even in the fields, which can never be cultivated with the nicety of a gentleman's garden, I have observed the greatest crops in a loamy soil, and that they yielded an article superior in quality

as well as quantity; for as the durability of the fibre depends in some measure upon its size, there can be no doubt that tall and vigorous plants are preferable to small ones. There are various ways of disposing this plant so as to be exceedingly ornamental, but none more so than scattering it in random parcels, or little clumps of from ten to twenty plants, towards the back of the flower-borders, and in the front of the shrubbery: for, without the summer proves uncommonly dry, it will attain to the height of three and four feet. If a temporary edging, or summer screen, is wanted for any particular bed, it may be also employed for this purpose. The seeds of good flax are short, plump, thick, very oily, and of a bright brown colour. The best season for sowing them in most gardens is February, or the beginning of March, when the general crop of hardy annuals is put in; but if the ground be sandy, and naturally dry, they should be sown in October or November. No more attention than what is necessary for the other flowers in the garden—which is, keeping down all weeds, while in the seed-leaf, with a hoe—will be requisite for this. As soon as the seed begins to ripen, and the plants turn yellow, pull the whole up by the roots, and lay it in bundles exposed to the full sun, if the weather is fine, to dry completely. Then pull the heads off, and shake out the seeds. Immediately after it must be laid to macerate in a ditch, or pond of water, and kept under by a long piece of timber floating upon it. From five to ten days is the time necessary for its immersion, and after the fifth, it must be examined daily, taking especial care that it does not lie too long. As soon as ever you find the fibres are sufficiently macerated to separate from one another kindly, spread it to dry on a new-mown meadow. When dry it must be again collected into bundles, and either sent to the flax-dresser, or prepared for spinning at home by the gardener's wife. In many districts this operation is well understood, and if carefully performed, homespun linen from such flax will last twice the time of most of the Irish linen that is to be purchased in our shops. I believe it is a great error to pull the flax so green as is commonly practised, and a still greater to soak it in water before it is previously dried, for the fibres require twice the time to macerate sufficiently for separation in the dressing.—*Letter from Mr. J. Dunbar.*

Forest Trees in Parks.—This is a country abounding with stone, and as my quarries, out of which I was building a new mansion, afforded much refuse stone in large lumps, I made a trial by planting some trees of about eight feet in height, and placing at their feet two two-horse cart loads of rough lumps of stone, not built up high, but packed close by each other, and set on edge so as to make a tabular, but very rugged surface round the foot of the tree, and extended to the distance of four feet. These trees succeeded well, and far beyond my expectation. On considering the cause of their success, it appeared to me that the stones served the three purposes of fencing, staking, and mulching: the first of which is always necessary, to defend them from the assaults of cattle; the second is equally so if the plants are tall, to save them from being displaced by winds after they shall have taken fresh root; and the third also is necessary in case of a dry summer, the first after the transplantation of the trees, to protect the soil from over drought, whilst they are striking fresh root into it. The stones, placed as I have described, are a sufficient fence against horned cattle, which, having feet made for going upon soft ground, will not mount the rugged surface of the stones. Sheep and deer will scarcely annoy trees whose bark has acquired roughness; but they may be easily repelled by a few thorns bound round the lower part of the stems. Nor will common horses go upon the stones, or endeavour to reach the trees, and tear off the bark; but, against high-bred horses, which are disposed to attack everything of wood, the stones are not a sufficient fence, unless they are packed with a surface very rugged, and extended six feet round the tree. Against displacement by winds the stones are a better security than can be provided by any manner of staking and binding; for they are a power always in action by their weight, and the surface of the soil is shaded by them from the too great power of the sun, whilst the rains sink through, and encourage the roots to sprout afresh, and extend themselves through the soil; thus they serve the purpose of mulching. The best trees to plant out are certainly those whose roots and heads have been properly trained by pruning and cultivation in a nursery: such may be planted out at greater ages and sizes than trees taken from plantations of a few years' growth, and will both strike fresh root more certainly, and grow faster; but these last may be taken up when from ten to twenty or twenty-five feet high, and planted out with full success, provided the three following particulars are observed:—first, to get up as much root as possible; next, to reduce the branches down to the due proportion with the root which has been got up. A great part of the roots is unavoidably lost in the taking up of the tree, and it is the most efficient part, being the extreme fibres; the root has thus lost its natural proportion to the head, and is now insufficient to supply it with moisture,

Trees planted out in this state, often, after having put forth their leaves, die suddenly; and others, which continue to live, will fall into a languid state, and die off gradually, or recover their vigour very slowly. Thirdly, in planting the trees afresh, care must be taken to spread all the roots evenly, none being allowed to be curled round, or turned up at the ends. It is not necessary to preserve and carry any earth about the roots. Autumn, directly the leaf has fallen, is the best season for the work; and by careful practice, according to the method above described, I have had perfect success in transplanting trees of from eight to twenty feet high. — *Letter from Sir Charles M. L. Monck, Bart.*

VEGETATION ON THE BANKS OF THE WHITE NILE.

The rich and varied vegetation which was seen by the explorers of 1841 along the whole course of the White Nile has not yet been completely and botanically examined and described. When future travellers have ascended the mysterious stream, and ascertained the nature and names of the countless plants which bloom on its banks, we shall doubtless be presented with much new, curious, and valuable information, which will add largely to the store of our botanical knowledge, and perhaps reveal to us species, and even families of plants hitherto unknown. Mr. Werne saw, and often examined them; but could not pause, and may not have possessed the means thoroughly to investigate the subject. His descriptions, however, scattered amidst a vast mass of information of other kinds, may enable us to form an idea of the nature, the richness, and the variety of the vegetation which flourishes on the banks of a stream whose source has not yet been discovered, but which the late expedition ascended farther than any which had preceded it. We possess, consequently, in the narrative of Werne, the description of a new country; and everything connected with the aspect, the people, the civilization, the resources—animal, mineral, vegetable—of an almost untravelled region, must be invested with peculiar interest. And more especially is this the case with the White River of interior Africa, the father of the mighty Nile, which has from time to time engaged the attention of science through all ages, and among all civilized nations.

Having left the Blue Stream, and entered upon that whose sources they were now, if possible, to explore, the vessels proceeded along the broad river, whose banks were richly wooded with a belt of copses and trees, beyond which the unvarying desert spread itself away beyond the range of vision. Soon, however, new and more beautiful features presented themselves. The marshy country on either hand was covered with luxuriant aquatic plants, among which was a *Nymphæa*, with a reddish calyx, like the convolvulus, and large cordate leaves. This plant is called Loss, and exists in as much abundance in this region as the white lotus at a later season, the double flowers of which glitter brilliantly from among the leaves, in company with others of different species, but not less beautiful, which cover the surface of this watery expanse, described as a floating world of flowers, from forth of which this magnificent one glistens with peculiar splendour in the moist atmosphere of the morning. Werne's own remarks on the *Lotos* will be read with interest.

"The *Lotos* shines here in great luxuriance, like a double white lily. This stellated flower opens with the rising of the sun, and closes when it sets. I noticed, however, afterwards, that where they are not protected in some way from the ardent heat, they likewise close when the sun approaches the zenith. Some of their stalks were six feet long, and very porous; from which latter quality these stems, as well as the flower and the larger leaves—dark green above and red-brown below, with a flat serrated border—have a magnificent transparent vein; but become so shrivelled, even during the damp night, that in the morning I scarcely recognised those which I had over-night laid close to my bed on the shore. The ancient Egyptians must therefore have been quick in offering up the lotus. The flower peeps out, however, only a little above the water, and the fruit sinks downwards, either from natural inclination or from the weakness of the stalk. The flower has about twenty tapering white leaves, arranged round a calyx of a yellow gold colour, which is similar to that of the Nymphæa in our mill-ponds. The fillet, from one and a half to three inches in diameter, is like a compressed poppy head, and ring-like incisions extend from its corolla to the stalk. The small, white seed lies in a brownish, wool-like envelope, and fills the whole capsule."

The roots of the lotus form an abundant and nourishing food, somewhat of the nature of the potato. Mr. Werne says:—"Not only are the tubers of the Lotos eaten, but also the contents of the seed vessel, being mixed with sesame and other grains in the bread corn. In order to prepare the tubers to our taste, and to free them from the earthy flavour, the first water in which they are boiled must be thrown away; then they taste almost like boiled celery,

and may be very nutritious; but I was not inclined to become a Lotophagus, and would rather eat potatoes, skins and all. Although there are a number of tuberous plants in these regions, which the natives use for food, the potato would not flourish here, any more than in the far colder Egypt, where it becomes watery, from the length of time the water remains on it."

Floating islands abound on this part of the river. The base is formed by a pale velvet-plant, which spreads itself in auricle-like lobes, has fibrous roots to intertwine with the reeds, but never blooms. [Apparently a *Pistia*.] A kind of water couch-grass serves also to bind together the mass of vegetation, with a stalky, mossy plant, which spreads itself over the water, and shoots forth slender white suckers, like polypi, and over this a kind of convolvulus, with lilac-coloured flowers, and leaves like those of the butter-cup, grows in profusion, mingled with the blooming lotus, amid which various parasitical plants twine their slender creepers, so as to form a compact island of vegetation. The spectacle presented by one of these fields of flowers, floating on the surface of the water, and extending for miles together, surpasses in singularity and beauty anything that can be imagined. From the tall dark mimosas on the shore, down to the waving reeds, and the spikes of the high grass shooting above the surface, a vegetable life spreads with an exuberance absolutely marvellous. The splendid leaf-like webs of the *lianias* form hillocks and garlands of flowers, and, with their variegated bright colours, shine in the distance like magnificent tapestry hung over the more sober foliage of the forest, amongst which, however, the blooming *Ambak* tree, with its abundance of large flowers and acacia-like leaves, lifts its gay head in striking contrast.

The *Ambak*, which is sometimes found in thickets, was known to the ancient Egyptians. Its stems were doubtless employed as writing materials, in the same manner as the stalk of the gigantic reed (*Papyrus antiquorum*) which is so abundant in the White Nile. [The Arabs call it *Ambak*, but they are only acquainted with the dry, light wood which floats down to them. The tree grows only either in the water or in the mud, and dies down to the roots after the water leaves it. Its growth is more rapid than the rising of the Nile; and it shoots ten or fifteen feet above the highest level of the water. It rises somewhat conically out of the water, but is smaller again towards the root; and in the middle is about the thickness of a man's arm. The wood is spongy, and can only be called a fibrous pith enclosed in a bark, which is dark green, covered with a rough brownish growth, and little, inconspicuous, curved thorns. The branches are divested to the summit, and are wholly green and rough. The acacia-like leaves are in pairs, succulent, and green as a rush. The yellow, bean-like flowers, solitary, but very numerous.]

Indeed the edge of the river's bank was wrapped in flowery vegetation, so rank in its luxuriance, so exuberant, so lavishly thrown upon the surface, that it seemed as though nature had flung her gifts there with a partial hand; thus compensating the people, in a measure, for their small share in the advantages which other and less beautiful regions bestow upon their inhabitants. Nor were all these crowded together in particular places. The river, from its confluence with the Blue Stream, as far as the Mountains of the Moon, presents, with few exceptions, the same rich spectacle which compensated, in the eyes of the travellers, for the otherwise monotonous landscapes which they saw in ascending the White Stream.

As we have before observed, our limited scientific knowledge of the vegetation on the banks of the White Nile precludes a botanical description of any of the plants there to be found. Our object must be to afford an idea of the richness and variety of that vegetation, in order that a knowledge of this fact may induce some enterprising traveller, whose studies have fitted him for the task, to push his researches up that mysterious river, to examine the hitherto unnumbered shrubs and plants which there flourish unknown to those who feel the deepest interest in such subjects. When that is accomplished, it will be interesting to compare the descriptions of the botanical explorer with the statements of the unscientific man who repeats in his narrative the impressions produced on his mind, but cannot embody his description in the technical language employed in this as in all other branches of science.

The bright flowers of the *poison-tree* were often visible on the shore. There are species, both Euphorbias, with blue and red blossoms. The deadly exudation with which the native arrows are poisoned, proceeds from the bruised stems; an intoxicating milk gushes from the leaves, and is infused into bowls of meressa, a kind of spirituous liquor consumed in great quantities in these countries. One of the poison plants attains the size of a tree; the other species, seldom the height of a bush. They are singular in appearance, and easily distinguished from other trees by their curious shape.

The red and blue convolvulus is found in much abundance in nearly all parts of the river, as well as two species of wild cucumbers, one of which has a large and deep yellow flower, whilst the other bears a blossom of somewhat the same colour, but smaller.

Red and yellow flowering beans, growing in the water, and twining amid the mass of other aquatic plants, creep up the banks in the utmost luxuriance.

Water thistles, with lanceolate leaves and reddish flowers of the thickness of a finger, grow here in the same manner as in the German fishponds, with green water lentils, which in some places completely cover the banks of the stream, from which, far into the margin, there is sometimes nothing to be seen but an immense extent of land carpeted with bright yellow grass, and dotted occasionally with clumps of an acacia tree, with flowers of a golden colour, hanging in clusters like the dark bunches of the laburnum. These grassy plains, with occasionally the more luxuriantly covered lands, are not unfrequently swept by vast conflagrations, which, aided by the powerful heat of the sun, in drying the vegetation, and rendering it fitter food for the flames, sometimes burn for days together, driven before the wind, and leaving behind them a wide track of desolation, covered with black ashes, and a damp unctuous smoke. These accidents are commonly the result of a practice much in vogue among the dwellers on the shores of the White Nile,—namely, that of kindling signal fires to communicate with each other, and also small conflagrations to drive away the gnats. Nevertheless, such circumstances are not of sufficiently constant occurrence to divest the country of that luxuriant aspect under which it, in most places, and at all times, appears ; for a small tract of land, swept clear of verdure by the flames of a conflagration, was rather a relief than otherwise to the eye, wearied by bright flowers and green grass and foliage. The river islands which we have mentioned were covered literally with masses of verdure, " high-sprouting plants and vegetables, between blooming shrubs."

Doum and Dhellib palms, the latter especially remarkable from its singular shape, with poison and elephant trees, were constantly to be seen, rising high above the inferior vegetation. This last, whose gigantic fruit is used as an article of food, attains a great size, and spreads out a broad shady roof of leaves, intermingled with magnificent long clusters of flowers, which may be reckoned among the most beautiful of the ornaments of this region, favoured as it is in these respects. There is another tree, the Emeddi, with light-coloured branches, like those of the sycamore, and buds at the end of the boughs, similar to those of the chestnut-tree. It is said to flourish on all the mountains of Nubia, and is covered at the proper season of the year, the exact period of which has not been ascertained, with small flowers, and a sweet red fruit, hanging in bunches like the grape, and somewhat of the same shape and size. It is to be regretted that Werne could not obtain exact information connected with this tree, and was not able to observe it when in the fulness of its bloom.

There is another, no less beautiful, and even more curious. It looks, from a distance, like a handsome tree covered with snow. This appearance is caused by the immense number of its delicate white flowers. The leaves are small, pointed, and succulent, and something like those of the pear, which indeed resembles this tree in many other respects. Four white leaves are arranged round eighteen long blue stamina. The fruit is said to be as large as an egg, and is eaten with great relish by the natives.

Among all the trees, however, which our traveller saw, none flourished in such plenty as the Mimosa, which like the Mangrove in the rivers of the Indian Archipelago, wearies the eye with its monotonous abundance. Ropes were fabricated from the soft wood of these trees, to be used in towing the vessels against the current, and in the absence of wind.

Our author, whose journey lay, for a great distance, through a country totally unknown, was not urged by curiosity to examine, even cursorily, the various plants, flowers, and trees, which he saw in such abundance and in such variety. On the contrary, he constantly makes mention of immense numbers of flowers, and other ornamental plants, of different colours and species, but does not even so much as attempt to individualize or describe them with minuteness. Had he done so, had he even counted the different kinds which came under his observation, we might have possessed much more information than has in reality been collected. However, sufficient is said in the volume to answer our purpose in the present article, which is to excite the reader's interest in those wonderful regions which border the White Nile.

The small-leaved tobacco, with dun-coloured flowers, grows in the country lying immediately before that where the traveller's progress ceased, but Werne is not able to tell us whether it is indigenous, or has been introduced by immigrants. Open expanses of sand were seen farther up, extending for miles, covered with the small white and variegated bean, which also flourished luxuriantly on the skirts of the wood.

" I made an incursion," says the author, " into this interesting forest. It lies upon a slightly elevated, sandy bottom, on which the doum palms do not grow as luxuriantly as in the country of the Tshierer, where I counted sixty lances on one leaf, whilst here there are only from forty-two to forty-six. I had previously preserved a vegetable, though without knowing the nature of its root. Here the

sailors grubbed up some of the same sort, and I saw tubers on them three feet and a quarter thick; running towards the upper part in a round form, but appearing to branch out below like enormous roots. Slender roots shoot from these main tubers, and on them rises an insignificant-looking vegetable, a foot high, covered at the top with small oval, pale green leaves, like those of the box-tree; the clusters of gossamer flowers are of a yellowish colour. It is called *Irg-el-moje* (water-root) in Nuban; is very full of juices, but of a nauseous sweet taste. The suckers, properly speaking, must strike to a great depth in the soil. Our liquorice tastes perhaps better, owing to its dryness."

Beautiful red peas, or vetches, were also found. They are small, hard, and rough, like beads, have a black eye, with a white and scarcely visible line, and are called *Hafn-el-aruss* (bride-grain). The *Enderab*, a large tree, with willow-like laciniated bark, grows in great abundance in this part of the country. From its name it would appear to delight in moist situations. It bears clusters of green flowers on its lower branches, hanging in wild plenty and disorder, small round fruit, and truncated leaves. A large tree, completely stripped of leaves, but covered with prickles and a species of apple, was also observed. It is said, in the proper season, to bear great quantities of small, round leaves, with abundance of white flowers.

The floating islands continued to meet them in their descent, now moored, as it were, by binding ropes of vegetation, now borne down by the current, like so many moving gardens, covered with convolvuli, in verdant splendour, and considerably elevated above the water. The appearance of these floating parks was singularly picturesque.

The return voyage lay, for a great part, through new channels, whose banks were equally rich in flowers and other plants. But further observations are unnecessary, since they could only describe beauty and abundance of vegetation, without descending into what would be most interesting—minute particulars connected with the nature and species of the plants. We therefore quit the subject, and assure our readers that we have not overrated the magnificence of these green and verdant shores, between which the Nile, the river of mystery, pursues its course. Its place of birth is still unknown; the glories around its fountain head remain undissipated; but future travellers may, within the present age, unravel the difficult problem, and submit to us a botanical description of the banks of the White Nile, at the same time that they lay bare the secrets of its source.

THE FRENCH, OR FANCY GERANIUM.

There is a completely new class of geraniums which may be compared to the original fancy dahlias; that is to say, they were extraordinary in their colours, and extremely ragged; they were marked in a strange manner unlike any of the florists' varieties, and the great fault of the originals, if tried by the test laid down for exhibitions, was their ragged edges, and the undefined, cloudy, or scratchy nature of the markings. The former is improving, and the shape of some of the new ones is pretty round, but none of them as yet have a smooth edge; they are all more or less frilly, although much less so than some of the earliest. They are all inclined to be dwarf, and therefore adapted for bedding out, and are said to be continuous bloomers, after the fashion of the scarlets, a point of great advantage for border flowers. They have been much improved by Ambrose and Gaines, the English nurserymen; and at the recent exhibitions they have been shown a good deal varied in colour; still they want brilliancy, one of the most essential qualities of a bedding-out flower. Scarlets, yellows, blues light and dark, are tolerable; whites are distinct, but those indefinite dull lilacs, purples, and rose colours, that have nothing distinct, are by no means desirable, although where we have many beds we must have the best we can obtain. It is almost impossible to decide upon their general habit by the specimens we see at shows, for they are spread out a foot round the pot; and the surface is made even by the mechanical means applied; still they are more dwarf than other geraniums, more so than some of the alleged dwarf scarlets, and may be useful. One of the richest colours may be found in a new one shown by Gaines, called the Hero of Surrey.

We have now, however, an entirely new family, originated in the hands of Mr. Beck. Two or three years ago there was a flower of his exhibited, called Harlequin, a bright colour and a shape as different as can be imagined from the whole geranium tribe; a flower full of points and deep serratures, neither square, round, nor any other describable form, except that it was uniform. The present season there were two others exhibited quite as remarkable, very different in colour from each other, and from the original one of this strange branch of the geranium family. They will be more effective for bedding out than any of the fancy ones, because their colours are brighter, and better defined, and contrasted with the ground. They also appear to be abundant bloomers, and of pretty habit. There is no accounting for the de-

parture from the ordinary form of the geranium flower when every other peculiarity of the geranium is preserved. The petals of the flower are as thick as thin leather, and perfectly stiff, a quality likely to render the flower capable of remaining a long time in perfection. In a general way we do not approve of perpetuating any monstrous and unnatural tribe of flowers that have attained anything like an approach to perfection. Hence we denounced anemone-flowering dahlias; successfully too, for they were banished. But where there is novelty with good qualities to be had, we have no objection, therefore we are glad to see the fancy dahlias encouraged by prizes, because there was no reason why they should be second in form to the best show flowers. Now we have fancy or border flowers in the geranium tribe which may become of use from their peculiar habits, we are not sorry to see prizes awarded for them as seedlings, but as pot plants we do not like them, and we hope to see common sense triumph, and all potted geraniums that depend on sticks for support driven from shows. The new family, of which we have seen *Harlequin*, *Columbine*, and *Singularity*, may be deemed an entirely new race of extraordinary but not florists' flowers.

RUSSELIA JUNCEA.

This is one of the most graceful plants in the stove, but one very likely to attract the mealy bug, if once suffered to be checked materially, or to stand still too long when properly at rest. It is a long grassy weeping plant, ugly if grown too vigorously, for there will sometimes be shoots so ramping as to seem unnatural. It is a plant which should never rest long until it is a specimen and well flowered. Use for its culture half turfy peat, and half loam from rotted turves; this, well chopped up together, but not sifted other than through a sieve that would let a bullet through, will be found quite adequate to its vigorous growth. In a small pot put a rooted cutting; or, if you have only the cutting, insert it in such a pot with a small glass over it, and plunge it in the tan for the sake of bottom heat. When it has struck root, and the root has reached the side of the pot, give it a pot one size larger, with the same kind of soil, but let one third of the height be filled with broken pot for draining. Let it now have a moist heat, and if the stove is kept too dry, have a glass over it, but it will do no good without a moist heat long together; keep it still in gentle bottom heat, you will find the shoots begin to move pretty fast, on which top any one that is growing too fast, and if any remarkably vigorous shoot come up, as will frequently be the case, stop it at once; the great beauty of this plant consists in the shoots growing numerous but rather weakly, and hanging over the side of the pot, which must be elevated as the branches lengthen. Some cultivators support the plant up to a certain height, and then let it grow over and hang down towards the pot, and it will even hang below it then; but the plant is more likely to get unhealthy when tied up to supports than when it takes its natural course, and grows at once over the edge of the pot. As fast as the roots reach the side of the pot, it must have a shift into the one it is to bloom in, say a nine-inch pot. As soon as it is shifted into this, there may be several very strong shoots come up much thicker than any other about the plant, and these must be shortened at once, that they may throw out lateral branches; the shoots should be placed equally round the pot, and any that grow strong enough to stand upright, should be topped before they advance much; the plant will very soon assume its natural habit, and droop round the sides, becoming thicker and thicker, that is, more and more numerous. If there be a disposition to send forth a few straggling blooms here and there, pick them off immediately; let it be syringed occasionally, and continued in moist heat until it has grown as much as it will, and begins to slacken, when it will go at once to flower, and bear abundant scarlet or coral coloured blooms about the size of the common barberry, all along the graceful long pendant branches, which will hang a yard down if well grown. The propagation of this is very simple; any one of the joints of a shoot will strike root, but in a plant of any size there are many side shoots at the bottom that would come off with roots to them. Many who support the plant with rings and sticks as it advances, continue to change the pot from size to size until it comes to the largest, but those who allow the plant to grow at once over the edge of the pot cannot do this, for after one or two shifts it is very difficult to keep the plant out of the way of damage, so that it is necessary to place it in the large blooming pot at the end of two or three shifts; while it is blooming there is a complete stop to its growth. It makes a great show for a long time, and there are many successive flowers, but when the bloom is over, the plant is a good deal distressed, and although by thinning out, cutting back, and repotting in new soil, it may grow vigorously again, it is better to keep a constant succession of plants to come in after one another.

It is the fashion to grow it in rich compost, and to produce very large and handsomely grown plants, but they are more shy of blooming, and rarely prove well-flowered specimens at any considerable age. Plants may be excited too much, and we have seen this too often in the case of stove and greenhouse specimens.

NEW FLOWERS AND PLANTS.

Calanthe vestita, *Lindley* (clothed Calanthe).—Orchidaceæ § Vandeæ-Calanthidæ.—This is one of the most beautiful and striking of the family of orchids. It is a terrestrial species, that is, growing in soil; with rich green leaves eighteen inches or more in length, springing from the roots; these leaves are lance-shaped and plaited, and are narrowed towards the base. The flowers grow on scapes, several of which issue from a vigorous root; they grow erect, three feet high, and are unbranched, but the upper foot of their height is furnished with flowers, forming thus a terminal erect raceme. The flowers are large, pure white, stained in the centre with a conspicuous blotch of deep rich crimson; the sepals and petals are nearly equal, oblong, and reflexed; the lip much longer, broad, measuring an inch and a half in each direction, deeply three-lobed, the central lobe two-parted; the crimson blotch is at the base of the lip. Native of Moulmein. Introduced in 1847, by Messrs. Veitch of Exeter. Flowers in November, and probably at other periods. *Culture.*—Requires a stove; turfy loam and peat; propagated by division of the root. The plants must be kept cool and dry during their resting period.

Stemonacanthus macrophyllus, *Nees* (large-flowered Stemonacanthus).—Acanthaceæ § Echmatacanthi-Ruellidæ.—A free-growing sub-shrubby plant, rather showy, well cultivated. It grows three to four feet high, with round erect-growing branches, bearing large opposite ovate-acuminate leaves, and from their axils, spreading di-tri-chotomous panicles of flowers, on slender peduncles and pedicles. The flowers are large, between two and three inches long, handsome, of a bright scarlet; the corolla consists of a long curved laterally compressed tube, which is broadest towards the apex, and divided into a large spreading limb of five oblong obtuse lobes, which soon become reflexed. Native of New Grenada, and also of Mexico and Jamaica. Introduced in 1844. Flowers through the summer months. It is the *Ruellia macrophylla* (Vahl). *Culture.*—Requires a cool stove, and to be grown in a genial moist climate; rich loam and peat, with plenty of pot room; propagated readily by cuttings.

Asystasia scandens, *Hooker* (climbing Asystasia).—Acanthaceæ § Echmatacanthi-Ruellidæ.—A very ornamental climbing plant, of shrubby character, having stout round stems, and branches bearing opposite, obovate, or sometimes ovate, acute leaves of a dark glossy green, thickish, and somewhat fleshy in texture, and attached by short thick petioles. The flowers grow in thyrsoid racemes, terminating the numerous branches; they are numerous, large, and of a creamy or yellowish-white colour, often tinged with blush; their form is somewhat funnel-shaped, with a narrow base, the tube curved and becoming bell-shaped above, where it divides into a spreading two-lipped limb of five broadly ovate lobes, crenato-crisped along the margin. Native of Sierra Leone. Introduced in 1845. Flowers in the spring months. It is the *Ruellia quaterna* (Thonning), *Asystasia quaterna*, (Nees), and *Henfreya scandens* (Lindley), by which letter name it is known in English gardens. (See *Annals of Horticulture*, 1847, p. 207.) *Culture.*—Requires a stove; peat and loam; propagated by cuttings.

Primula altaica, *Lehmann* (Altaian Primrose).—Primulaceæ § Primulidæ.—A very beautiful dwarf stemless herbaceous plant, with so much the appearance of our common primrose when out of flower, as to have been mistaken for it. The flowers however are very different, being of a purple colour, with a beautiful orange eye. When grown freely, its foliage is very large and robust; it is a most profuse bloomer, and possesses a slight but delicious fragrance. Native of Karak, a quarantine station on the Asiatic side of the Bosphorus, near the mouth of the Black Sea, and elsewhere. Introduced in 1848, by C. J. Darbyshire, Esq. (Recorded as having been introduced originally in 1819, but probably long since lost.) Flowers throughout the winter, if the weather is mild, commencing in October. It is the *P. nivalis* (Turtsch). *Culture.*—Quite hardy; rich loamy soil; propagated by division of the root.

Lapageria rosea, *Ruiz and Pavon* (rose-coloured Lapageria).—Philesiaceæ (Smilaceæ, *Hooker*).—A beautiful climbing plant, with a round branching stem many feet in length, and furnished with alternate ovate-lanceolate leathery leaves, which have a shining surface, and are marked with five longitudinal nerves or ribs. From the axils of the leaves issue singly the pendulous flowers, which are of a deep rose-red colour, and possess great beauty; they are lily-like, consisting of six petals, so arranged as to form a narrow bell-shaped

blossom ; the colour varies from rose to rose-crimson, and the blossoms are internally thickly spotted with white, especially the inner three of the series of six organs, forming the perianth or blossom. Native of Chili. Introduced in 1847. Flowers—— ? *Culture.*—Perhaps hardy enough to live against an open wall, certainly hardy enough for a greenhouse; turfy peat and loam, well drained ; propagated probably by cuttings, or by seeds.

CONTEMPORARY WRITINGS, AND ORIGINAL NOTES.

Hoya Picta.—Messrs. G. De Winter and J. G. Jongeling, horticulturists at Mail à Utrecht, have published a special circular respecting this plant and another variegated leaved species named *H. variegata,* accompanied with two coloured drawings of it. From that source we obtain the following particulars of the species :—" It is to the zeal and efforts of Dr. Ph. Fr. Von Siebold, director of the Royal Society for the Encouragement of Horticulture, that we are indebted for these plants. That learned botanist was fortunate enough to have them transmitted from Japan in 1845, being their first introduction to Europe. About the end of the same year we purchased them from the Society for 3,000 florins, so that we are the only parties who possess them. These beautiful plants are justly objects of admiration with every one, from the manner in which the leaves are shaded and coloured. In *Hoya picta* they are spotted with a golden yellow, and in *Hoya variegata* they are striped, blotched, and bordered with pure white. At the exhibition of Ghent, in the summer of 1846, among more than a hundred other new species, these were awarded the large silver medal. At Utrecht and Dordrecht, also, they attracted the attention of all, and at both received extra awards. M. W. H. De Vriese, Professor of Botany at the University of Leyden, having undertaken to give descriptions of these plants, has not hesitated to pronounce them quite distinct species of Hoya, and remarkably distinguished from all other known species. The Editor of the 'Annals of the Royal Botanical Society of Ghent' is quite of Professor De Vriese's opinion. Although these plants have not yet flowered in Europe, there is every reason to believe that their flowers will at least equal those of Hoya carnosa."—*Annales de Société Royale de Botanique de Gand.*

The Underground Onion.—The following account of the Russian mode of cultivating this onion, is taken from the Report of the Transactions of the Imperial Society of St. Petersburgh :—" The *Journal de Musselil* has an article on growing onions, which consists in the following method :—The bulbs are hung up for some time to dry and smoke ; they are then cut in four equal parts from the crown, but left adhering at the base. They are immediately planted in moderately rich soil which has been recently prepared and laid oïf in beds. The author of the article, although this method did not appear to him to be very beneficial, considered that the experiment was worth a trial. Accordingly, in the absence of dry onions, he selected large bulbs full of juice, and after having cut them in the manner described above, he submitted them to the ground, with a half conviction that they would soon rot. In this, however, he was mistaken ; for he had the pleasure of seeing not only that each of the four parts of the onions had grown, but that they even produced flower-stalks, which made them the more valuable for seed. Thus each onion had produced four. It would seem that the Russian mode of growing onions, not from seed but by division, is not known in other countries. It would, therefore, not be surprising to find that the onion which is thus cultivated in Russia is something different from that which is commonly sown. It is, in fact, the species which is called 'potato-onion' by the Russians, and 'onion-potato' in France and Belgium, (under-ground onion.) Baron Foelkersahm, a member of the Society at St. Petersburgh, has grown them by the above method for upwards of thirty years, with the most perfect success. After these onions have been stored during winter in some place where they are safe from frost, and also well dried, as early in the spring as the weather and ground will permit, they are planted like the potato, in rows about a foot apart, in soil which has been dunged and prepared in the autumn. They are planted with a blunt dibble, not very deep, and lightly covered with soil. As a preservative against frost, and also to enrich and strengthen the soil, some horse-dung, well dried, and reduced to powder, should be prepared. With this the bulbs, or the place in which their holes have been made, should be covered to about the size of a tea-cup, and perhaps two inches thick. This operation being performed, a bed three feet broad will have three rows of little heaps. By-and-by the onions will grow up and push the dung aside ; but it should not be removed. The onions [large] are usually cut in four parts adhering at the base, and they are placed in hot dung during twenty-four hours, and planted immediately after. The small onions

are planted entire. In a short time the shoots are seen above the ground, generally from five to eight to each bulb. They should be carefully kept from weeds. About the middle or the end of August, at the latest, they may be gathered, and their leaves taken off. We believe they are equally productive in other countries as well as Russia." It has been believed for some time that this onion was first brought from Egypt by some officers of the English army, who introduced it to this country in the year 1805. It appears, however, from a paper published in the Transactions of the Horticultural Society of London, (iii. 305,) that this bulb was already cultivated in 1796, in Messrs. Driver's nursery. This onion is rather productive, and its taste is not so strong as that of many other sorts, a quality which with many people is no small consideration. It propagates itself under ground by forming young bulbs, and when gathered, the crop is most abundant. It ripens also sooner than the other sorts; but it ought not to be taken out of the ground until it is quite ripe. The following method has been found successful in growing this onion. It is necessary that the soil in which the bulbs are planted should be rich and in good condition. A series of beds four feet broad having been formed, three equidistant lines are drawn in each, and on these lines the onions are planted about ten inches apart. Care should be taken to preserve the quincunx or chequered disposition of the lines, for the sake of regularity and neatness. When the bulbs are planted, they may be covered with leaf-mould, stable-litter, or even some old compost; only the very extremity of the bulb should be left exposed. As they come up, a dry day should be chosen to draw the earth to them in the same way as is done with potatoes, and afterwards they should be carefully weeded. In this and neighbouring countries onions are extensively cultivated; this variety is planted at the season when the days are shortest, and the crop is gathered in midsummer. Only the middling-sized bulbs are planted. In Devonshire they are planted in furrows six inches apart, and at twelve inches in the row. In Scotland the same mode is followed.—*Ghent Annales.*

Fossil Forest.—I determined upon a trip into the Desert to see the *Fossil forest*, as a large tract of country covered with fossil wood is called . . . Our course lay to the south of Cairo, along the ridge of hills at whose Nileward termination the city is built. These hills are limestone . . . For the first few miles out of Cairo, there was scarce a trace of vegetation. About five or six miles south of Cairo, the scenery changes totally, the country being broken up into broad valleys, and every here and there a little vegetation . . . All the soil is limestone rock, with a profusion of sand and pebbles, and occasionally fragments of fossil-wood. As we proceeded, the bits of fossil-wood became more and more frequent, and larger, till, about eight or ten miles south-east of Cairo, the whole pebbly and rocky soil of the plain part of the Desert consisted of fossil-wood, chiefly rolled pebbles and fragments, but now and then huge trunks, prostrate and half-buried in the sand, always broken up into truncheons. Most of them were heaped together in the greatest confusion: more rarely, individual trees lay isolated, frequently 70 feet long, some 120, and it is said even 140. Their colour is generally dark reddish brown: they are all chalcedony and agate of a coarse description, with the rings of the wood well preserved. The sandy limestone (full of shells) and soil of the Desert are white; so that this fossil vegetation contrasted curiously with the general appearance of the country. Here the Pacha had sunk a pit for coal, sapiently concluding that so much fossil-wood above-ground indicated no less below. He however did not get through the limestone rock, which is subjacent to the formation to which I presume the fossil-wood belongs. Contrasted with the surrounding sterility, this record of a once luxuriant vegetation is a very impressive object, for it is not confined to a few miles only of Desert, but (I am given to understand) extends forty or fifty in one direction. I do not at all suppose that these forests ever characterised the Desert, or the land now replaced by desert, in its present relation to the general features of Egypt. On the contrary, I expect that the fossil trees were imbedded in layers of conglomerate and sandstone which have been gradually destroyed by the ocean, leaving the silicified trees to resist for the greater part the action of that surf by which the softer rock was triturated, forming the sand and pebbles of the Desert. About one hundred miles above Cairo the sandstone rocks commence and the limestone ceases; and as on the Nile behind Cairo detached masses of the same sandstone rock as the statue of Memphis is cut from occur, so it appears probable that this pebbly bed with fossil-trees belonged to that series of rocks all of which, south of lat. 29°, are washed away, leaving only the agatized trees, all grievously water-worn, many being ground up with the sand into pebbles.—*Dr. Hooker, in Journal of Botany.*

Zabucajo is a new esculent nut, recently imported into this country. "In the Museum of the Royal Gardens of Kew may be seen some nuts or seeds, under the name of *Zabucajo*. They were brought to us by our friend Mr. Purdie (lately engaged on a bo-

tanical mission to New Granada, now in charge of the Botanic Garden, Trinidad) from Edinburgh and Glasgow. His attention was first directed to them at the fruiterers' shops in Edinburgh, where he learned that they were already rather extensively imported from Para to Glasgow, and much used at table with the dessert. In size and shape the seeds are not unlike the so-called Brazil-nuts (seeds of *Bertholletia excelsa*); they are equally covered by a hard coat, but are more irregular, and are longitudinally furrowed. This led to a comparison with the fruits of allied plants in the Museum; and it was easy to see that the seeds belonged to a species of *Lecythis;* and all doubts were removed on referring to *Aublet*, and finding the identical species described as *Lecythis Zabucajo.* It is there remarked that the seeds are much eaten by the colonists in French Guiana, being sweet and delicate, and considered preferable to the almonds of Europe; an opinion in which we are quite disposed to agree. On account of the excellency of the seeds, the French government, much to their credit, introduced the cultivation of this tree into the Mauritius nearly a century ago, and in 1761, Aublet tells us the plants were then in a flourishing condition. Happy would it be for our colonies, and for the British West Indian islands in particular, if the introduction and cultivation of useful plants, suited to the respective climates, were, in like manner, encouraged by the British government! The entire fruit in question is, like all the *Lecythideæ*, highly curious: it is six inches and more long, and about four wide, of a thick and woody texture, opening at the top like a box, with a transverse lid, from the upper side of which lid a woody column descends to the bottom of the inside of the fruit, and around this column the large seeds are arranged. This and other species of the genus are called in French Guiana *Marmite* (porringer) *de singe;* partly because the monkeys have the good taste to show a fondness for the kernels, and partly from the use made by the negroes of the emptied capsules (the lid being removed), wherewith to entrap these wily animals. The mouth, it will be observed, of the capsule is narrower than the inside; this being filled with sugar, and laid in a place frequented by monkeys, they grasp the sugar, and by this means enlarge the paw so as to be unable to extricate it; while their greediness forbids the opening of the paw and loss of the sugar. The heavy fruit of the *Zabucajo* prevents the escape of the animal, who is pursued and taken in the monkey-trap."—*Hooker's Journal of Botany.*

The Rose of Jericho.—At the beginning of the present year (1848), Dr. D'Avoine, President of the Society of Medical and Natural Science of Malines, published a memoir of John Storms, a learned professor of the ancient University of Louvain, who was born at Malines in the year 1559, and died 1650; and who wrote a monography of the *Anastatica hierochuntina*, better known under the name of Rose of Jericho. Dr. D'Avoine was far from anticipating that an illustration by Sir William Hooker of the Anastatica would appear in England a few months afterwards, giving an excellent figure of the fresh plant, and another of the dried plant, with all the details of its structure. In the remarks of Sir William Hooker on the Rose of Jericho, there is no mention made of the eminent labours of John Storms; neither of the writings of Professor Kickx, who had already exhumed from oblivion the monograph of 1607 (the time when the work of John Storms appeared); nor is there any notice taken of those of M. D'Avoine. Lonicera calls it *Amonum rosa sanctæ Mariæ;* but Linnæus, Jacquin, Aiton, De Candolle, Sprengel, and indeed all botanists call it, *Anastatica hierochuntina*, or Jerusalem Anastatica. Sir W. Hooker does not seem to recollect other synonymes; neither is he disposed to speak of the sacred quality of the plant, nor of the superstitious veneration which is shown for it among the ignorant people in the country where it grows spontaneously. Commelin first called it *Rosa hierochuntina*, and Dalechamp *Rose of Jericho;* latterly these names have been given to two other hygrometric plants, both different from the true roses; viz., to *Lycopodium lepidophyllum*, a south Mexican plant, and to the capsules of a certain Mesembryanthemum from South Africa. "The rose of Jericho," continues Sir W. Hooker, "is as much a rose as it is a cabbage. It is a humble and insignificant plant in appearance, but it has long since attracted the attention of travellers in the East by its hygrometrical properties. The old annual stem, being preserved, rolls itself up in the dry weather or season. It then rises out of the sand in the hurricanes of the deserts of Syria and Egypt, and floats in the wind. If it rains, the branches revert to their natural position; and again, when the weather becomes dry, it curls up and contracts. This property lasts for years: all kinds of fables have been cherished about it, and it has acquired a considerable reputation among the people. This vegetable is, nevertheless, rarely cultivated, and it is only propagated from seed. It is thus that it is in the collection at Kew."

In regard to the locality of the Rose of Jericho, M. D'Avoine has cited the passage of Eloy, and in our turn we cannot do better than quote it; it is as exact as the original:—

"The pretended rose of Jericho," says Eloy, in his *Dictionnaire Historique de la Médecine Ancienne et Moderne*, "is a sort of Thlaspi that grows in the deserts of Arabia; it is not a rose, and there is none of it to be found round Jericho. During the time that this plant is still in vigour in the ground, it appears in the form of a bouquet; but in proportion as it dries (itself), its branches interlace each other, and the extremities fold inwards, meeting or joining at a common centre, forming a kind of little globe, which the quack doctors make the people believe will only open at Christmas. They extol its merits also to the pregnant women, in predicting to them that if they put this rose to steep a certain time in water during travail, they shall see its branches gradually unfold, and its flowers blow, which circumstances will materially lessen their pains. But the fact is, at whatever time this plant is put in steep, whether by man or woman, the rose of Jericho will produce the same phenomenon, while as soon as it is taken out of the water, it becomes dry and curls up as before. This plant serves better to indicate the variations of the atmosphere than announce the termination of the pains of labour—it is, indeed, a true hygrometer. When the weather is dry, the pretended (or supposed) rose contracts, and at the approach of rain it swells and develops." M. D'Avoine states in his memoir of Storms, that M. Rigouts, Professor of Medicine, and Secretary of the Horticultural Society of Anvers, had sown seeds of Anastatica without obtaining plants from them. Storms does not state that he cultivated this plant, but it is certain that he had seen it in a living state. His only mistake is having classed it with violets, to which it has no relation. I may also add, that in the herbarium of the brother Wynhouts, formed at the Abbey of Dilighem in 1633, the Anastatica was included as among the culinary plants grown in the garden belonging to the Abbey. For some years the catalogues of disposable seeds of the different botanic gardens of central Europe have contained *Anastatica hierochuntina*, and in the borders of most of these establishments the plant may be seen in its living state, grown among the cruciferous kinds.

Seeing that the most remarkable property of this plant is its hygroscopicity, and that this disposition to imbibe the aqueous fluid of the atmosphere lengthens the internal side of the branches only, it is, we think, somewhat singular, that no phytologist has ever dissected the stalks and demonstrated the cause of this effect. The Rose of Jericho is but seldom found among our dealers in curiosities; at the present day it has become still more rare; and it is useless to consider our Anastaticas, cultivated in the manner of a ligneous Rose of Jericho, as answering the description of those originally brought from the East. Under our sky the stems do not assume a woody character.—*Prof. Morren in Ghent Annales.*

Phenomena of Tropical Vegetation: Forests, Plants, and Flowers along the Banks of the Amazon, the Xingui, and in Brazil.—Amid the varied objects in Nature so magnificently developed beneath the tropics, the wonders of vegetation there displayed form a no less remarkable than interesting feature. Colossal proportions, perfection of formation, and brilliancy of hue, combine in bestowing, as it were, a sublimity of beauty upon foliage and flower in these regions. On the lovely islands which lie before the entrance of the Bay of Rio, the richness of tropical vegetation is disclosed to us in forms unknown to the European. Overtopping the plants and shrubs which cover the hill sides, are seen trees with full gigantic crowns, or shooting lightly upwards, and stretching their fantastic boughs high into the air. Mountains and rocks clothed with thick foliage, above the outline of which rise magnificent palm trees, form a labyrinth of loveliness which seems to discover a new Fairy land to us.

The immense crowns of the cocoa-palms, and the gigantic leaves of the bananas, with the dark mango and cypress trees, in their solemn magnificence, ornament the villas and gardens of the city of Rio, while the fantastic branches of the North American pines,* looking like inverted fans of the palm tree, wave high in the air. In the delightful environs of this city we meet with the *Nissolia* of crimson leaves, and thousands of flowers resembling the violet blossoms: but, perhaps, the greatest ornament is the high arched crown of an immense tree, resembling a colossal flower, of a splendid red or violet, almost crimson colour, a prominent object in the landscape. The Mamœira (*Carica Papaya*) is also seen.

On the edge of the primeval forests of the Corcovado appear here and there brilliant silvery foliage intermingled with the green, which involuntarily reminds the beholder of the "patriarch with the silver beard," that venerable trunk with its silvery roof of foliage and beard floating in the wind. An excursion to the heights commanding a charming prospect of the beautiful Bay of Rio discloses to us innumerable species of trees, and a variety of foliage such as is never found toge-

* This tree is said to have been introduced within a few years into the gardens around Rio.

ther in Europe. One tree remarkable for beauty, with dark green foliage, and blue blossoms resembling the periwinkle, is of frequent occurrence.

In these picturesque environs too, isolated groups of reeds, twenty to thirty feet in circumference, rise from the meadows, like sheaves of lances, thirty to forty feet in height, and, each only a few inches thick, wave their elastic tops to and fro with indescribable grace. The bamboo may also be recognised here. But the chief ornament of the forests are trees with magnificent large lilac, and others with white blossoms, contrasting beautifully with the surrounding tints of green. The flame-coloured raceme of a "Tillandsia," a foot tall, and resembling a Brobdignagian pine-apple or strawberry, glows like fire among the dark foliage. The charming "Epiphytes" climb up the straight trunks of the trees, or picturesquely cover their branches, which seldom shoot out from the trunk at a less height than fifty to eighty feet from the ground. The Tillandsias nestle at the ramification of the smaller branches, or upon excrescences, where they often grow to an immense size, and have the appearance of an aloe, the length of a man, hanging down gracefully from a giddy height over the heads of the passers-by.

Among various other plants, the mosses hang down, not unlike horses' tails, from the branches which support the "Epiphytes" and "Tillandsias," or one might fancy them the long beards of those venerable giants of the forest that have stood unbent beneath the weight of a thousand years. Myriads of "Lianas" hang down to the ground, or suspended in the air, coated with bark like the branches of the trees. It is impossible to conceive the fantastic forms they assume, interlaced and entangled; sometimes they depend like straight poles to the ground, and striking root, might from their thickness be taken for trees; at other times they resemble large hoops or rings from ten to twenty feet in diameter, or are so twisted that they look like cables.

Conifers are seldom seen in the primeval forests, but the dark coloured foliage of other trees much resembles them. There is one that presents a peculiar appearance; their slender, smooth, and white stems rising high above the surrounding thicket, their small crowns of large lobed leaves crowding picturesquely together. The palm, too, that noblest forest ornament, rises frequently from sixty to seventy feet, or half the height of the tallest trees. The crown resembles a tuft of pendent feathers, consisting of finely pinnated fronds, from the midst of which rises a pointed spire, of a light green colour, giving to these beautiful palms the appearance of the slender shaft of a lance or a waving reed. It is beautiful to see the enormous fern leaves, at least ten to fifteen feet long and five feet broad, agitated by the gentlest breeze, and gracefully waving to and fro with a ceaseless motion.

In the most charming and secluded spots, springs rise from the ground in the midst of beautiful marsh plants and broad-leaved Heliconias, overshadowed by magnificent trees, luxuriantly clothed with Epiphytes and creepers. "We halted," says a traveller, "under a tree, from which we shook down a number of Zabulecabas, a fruit resembling a black cherry, which were refreshing; and then rode on through a shady arched avenue of Heliconias more than twenty feet high, which bent their gigantic leaves over our heads, fanning us most agreeably. Magical was the effect of the magnificent palms and crimson Sapucajas which rose above the mass of foliage! We rode along the sea-coast round the Gavia, and, after passing Bolefogo, came to the Jardein Botanico. An avenue of Casuarinas from New Holland, laid out with great taste, occupies a charming site under the perpendicular walls of the Corcovado. Bread-fruit trees, and the trees that produce cloves, nutmegs, cinnamon, camphor, and cocoa, were pointed out to us; also an extensive plantation of the tea-plant, cultivated here by the Chinese, who have been brought over on purpose. There were also several new species of palms."

A magnificent avenue of mango trees leads hence between two canals through fields at the back of Nossa Senhora de Beleni; and opposite is an open space with a church, close to which we saw the first fan-palms (*Miriti: Mauritia flexuosa*); at a short distance commences the primeval forest—a thick and almost impenetrable forest of pan-palms, skirted by a broad margin of the large-leaved tree-like *Caladium arborescens*, extended along the Aroizal river, and reflected on the cool still waters. At spots where this belt of Caladiums is interrupted, entangled masses of colossal roots are seen to be undermined by the waters.

In another part, the small stems of the *Corypha umbraculifera* stand in the foreground of closely compacted fan-palms, overtopped by the taller *Corypha elata*. Among both species is seen the graceful Assai-palm (*Euterpe oleracea*) waving to and fro its finely pinnated fronds supported on a slender bamboo-like stem. In a third line rises majestically the summits of the lofty forest-trees, crowning the whole with their true Brazilian roofs of rich foliage or vaulted tops—red creepers of a magnificent colour here and there climbing up their huge trunks.

These islands round the Isla de Santa Isabel and Rio das Bocas, have frequently been called the Palm Islands, from the luxuriance of that plant.

Along the Estrada up the river Xingui, vegetation seems to acquire its grandest development. Trees as well as plants of increased size and splendour appear, while the forest remains true to its general character. One of these trees, a Copaiba, or, as the Padres term it, "Itauba," measured at about four feet from the ground thirty feet seven inches in circumference. Some of these giants of the forest reach thirty-nine feet in girth, and attain one hundred and fifty in height, the stems nevertheless looking quite graceful and slender.

"Wending our way among the numerous islands, we had from time to time many interesting views through the openings between these channels of the most luxurious vegetation and magnificent trees. What would an Englishman give to transplant a small slice of this natural garden of South America and attach it as a noble park to his country mansion! The only thing required to give it its greatest beauty and interest would be to make roads and walks, and abstain from any caprices of artificial culture. . . . In the midst of these wild scenes, where for some hours past the view had been shut in, the small branch which we navigated rushed like a mountain torrent over rocks, and was precipitated to a depth of ten or twelve feet. Trees and shrubs projected over the stream, shading this lovely spot, while high dark green walls of tangled foliage and creepers, overtopped by magnificent Itauassi-palms, closely encompassed this charming picture of wild solitude. We seated ourselves here upon the rocks, and watched our boats as they were lowered down the falls. Looking from this still and peaceful spot upon the dark surface of the clear and rapid stream, with which the white foam of the little fall contrasts so agreeably, who would have imagined that we were sitting on the banks of one of the gigantic rivers of the New World?

"Acahi, with its broad margin of Caladiums, was soon left behind. This plant is much more common on the Lower Xingui than above the Caxoeiras. We spent nearly the whole forenoon in the Furo das Velhas, having proceeded more than an hour before the pilot discovered his mistake. We did not, however, regret the time thus spent, for the aspect of the magnificent though low vegetation recompensed us for this labour lost. Here seemed to be collected an assemblage of all kinds of palms, together with splendid flowers of various species of passion-flower and Stizolobium."

Entering the Tocantius, the mighty stream rolls its olive-coloured waves between forests of Miriti-palms, while all its islands rising from the dark surface are so many forests of fan-palms. The straight trunks of the Miriti stand in thick interminable rows of a whitish green colour, like those of our fir-trees.

The Earth Nut.—The earth nut is the indigenous growth of our soil, but like the potato plant before its introduction into this country as an article of sustenance, it is now neglected, and nobody thinks it worth while to have a plant even in his garden, although it is as plentiful in its native and wild state, as the potato is in Peru, or in the first place of its discovery. Yet, by cultivation in two or three years, it will produce as large a quantity per acre, of a root three times more nutritious than the potato, and at less than one-fourth the expense. The plant is known to almost every school-boy; it grows in old pastures, and is called jar nuts, earth nuts, or earth chestnuts. The plant is rather larger than a parsley plant, and something like it; it bears a white flower, and is to be found in almost all old pastures in any part of England. I planted some roots of these nuts (but they may be produced from seed as well) in the year 1840, and they came up beautifully; and in the summer, when I dug them up, I found some of them two inches in diameter, and nearly as large as a man's fist. I roasted some of them, and found them delicious. They something resemble in taste the sweet potato of Virginia, or roasted chestnuts of our own growth. They are a rich vegetable production, containing more of the elements of nutrition than the potato by three times at least, and will be relished as well by the community, as soon as they can be introduced.—*Gardeners' Journal.*

Growing Camellias on Wall-trellises.—The Camellia may be grown very well on trellises in the span form, or parallel on a wall. The ground may be composed of a free sandy loam, mixed with turfy peat and leaf mould; the border may be about three feet broad, any convenient length, and a foot deep. In the bottom should be laid about nine inches of broken bricks, broken pots, and a little gravel, so that the roots may have plenty of drainage—an essential condition. In winter the plants should be covered with mats, or fir branches, taking care to cover them completely. In summer they should be watered with water in which a little urine and guano has been put; care must also be taken to train them so as their flowers and leaves may be perfectly developed. In a garden at Brussels we have seen them so grown with perfect success.—*Ghent Annales.*

Cyclamen coum.

THE CYCLAMEN, ITS VARIETIES AND CULTIVATION.

THE name of this genus is derived from the Greek *kyclicos*, circular ; which term was applied to them by Linnæus, in allusion to the circumscription of their leaves, the outline of which, in the majority of the species, is more or less round, though not strictly circular. The common name is Sow-bread.

The plants themselves form one of the most distinct and pretty groups which are brought under cultivation. They are all dwarf herbs, having flattened fleshy tubers, from which both leaves and blossoms spring up, in a more or less dense tuft, according to the peculiar habit of the different kinds. Sometimes, under good cultivation, the flowers preponderate in number over the leaves; and in some cases two or three hundred blooms are produced at one time, when the plants are strong and in good health. This character is attained chiefly by the *Cyclamen persicum*, which is the most common of the tender species, the most varied in its flowers, and perhaps the most beautiful of all.

The blooms of the Cyclamen family are of a most singular form: they are monopetalous; that is, they consist but of one piece, which is made up of a very short tube, by which they are united to the flower stalks, and a comparatively large recurved limb, of five segments, which, from their being so deeply divided, look like distinct petals ; naturally their face would be towards the earth, but the segments are bent upwards quite at the base, and the effect is, that the entire inner face of the corolla is exposed to the eye, while the back is as completely hidden.

THE SPECIES OF CYCLAMEN.

These are confessedly involved in considerable confusion, especially the European species, though the remarks of the Hon. Mr. Fox Strangways have cleared up some doubtful points. There are about sixteen nominal species, of which we find twelve recorded as having been introduced into cultivation in this country, and of some of these there are distinct varieties. The late Dean of Manchester took considerable interest in the family of Cyclamens, and had, we believe, at the time of his death, a quantity of plants procured from their foreign habitats, which would probably in his hands have served to rectify errors of nomenclature yet undetected; but these plants are now dispersed. Perhaps, among cultivators, there is no one at the present day who has a more extensive acquaintance with the family of Cyclamens, than Mr. Gordon, one of the superintendents in the garden of the Horticultural Society.

Cyclamen, *Linnæus*.—Calyx bell-shaped, divided half-way into five permanent ovate segments. Corolla wheel-shaped ; the tube nearly globular, deflexed, twice as long as the calyx ; the limb, of five oblique segments, reflexed upwards, many times longer than the tube ; the mouth open, naked, and prominent at the circumference. Filaments short, inserted in the base of the tube ; anthers straight, sessile. Style cylindrical, straight ; stigma simple. Capsule one-celled, globose, opening at top, with five parallel teeth, rather fleshy ; seeds numerous.

Cyclamen æstivum, Reichenbach (summer-flowering Sow-bread).—A small hardy perennial species, with roundish heart-shaped leaves, the lobes at the base of which are quite distinct, and not overlapping, and the margins entire, or slightly and remotely toothed. The flowers are small, rosy purple. Native of Italy. Flowers through the summer months. Introduced in 1596? This is the *C. Clusii*, and is perhaps not distinct from *C. europæum*, although some botanists separate them.

Cyclamen coum, Miller (round-leaved spring Sow-bread).—A small hardy perennial species, with flat round leaves, heart-shaped at the base, quite entire, dark green above, and reddish purple beneath, and having small flattish tubers. The flowers are reddish purple, scentless, small, the segments being oblong-obtuse. Native of the south of Europe. Flowers from January to March. Introduced in 1596. This species, according to Mr. Gordon,* is, in some collections, called *C. orbiculare*, a name which seems to be the same with Miller's *C. orbiculatum*. This latter plant is probably to be regarded as a variety, for Miller states that the flowers appear in spring, and are flesh-coloured, with purple at the base.

Cyclamen europæum, Linnæus (European Sow-bread).—A small hardy perennial species, having small tubers, and leaves which are small, roundly heart-shaped, slightly toothed, and strongly marked on the upper surface with an irregular pale or nearly white band ; the basal lobes are overlapping. The flowers are small, sweet-scented, bright reddish purple, the segments oval-lanceolate, and acute. Native of the south of Europe. Flowers from July to September. Introduced in 1596. This sort is called in some collections by the following names :—*C. officinale*, *C. retroflexum*, and *C. hungaricum*. Miller's *C. purpurascens*, retained as a species by some, is probably a variety of this species. This Miller describes as having large orbicular leaves, purple beneath, and purplish flowers, deep red at the base ; produced in autumn.

Cyclamen ficariifolium, Reichenbach (pile-wort-leaved spring Sow-bread).—A hardy perennial species, closely related to the following, with which some botanists unite it. The tubers are globular, of moderate size. The leaves are deeply cordate, with an ovate outline, the margin cut into five angles, crenulate, acuminate. The flowers are large, white, or flesh-coloured, purplish about the mouth ; the segments are narrow, lanceolate, and twisted. Native of Europe, and found in some parts of England. Flowers from March to May. According to Dietrich, this species is the English plant. Under the more common names of *C. hederifolium* and *C. europæum* it is employed medicinally. It is a very acrid plant, especially the root, the acrimony of which, according to Sir J. E. Smith, is not much perceived at first tasting, but soon becomes intolerable. Its medicinal action is that of a drastic purgative ; formerly it was much esteemed as an emmenagogue.

Cyclamen hederifolium, Willdenow (ivy-leaved spring flowering Sow-bread.—A perennial species, scarcely hardy, and rather larger than the preceding. The roots are of moderate size; the leaves broad, seven or nine-angled, denticulate, beautifully variegated or marbled with dark green and white on the upper surface, and purple beneath. The flowers are large, white, changing to deep flesh colour, purplish about the mouth, the segments broadly ovate, acute ; they are very sweet-scented. Native of the south of Europe. Flowers from March to May. Sometimes called *C. latifolium* and *C. fragrans*.

Cyclamen ibericum, Goldie (Iberian Sow-bread.)—A small hardy perennial species, with small tubers. The leaves are roundish-cordate, blotched or marbled on the upper surface with white. The flowers are small, rosy or reddish purple, resembling those of *C. coum*. Native of Iberia. Flowers in February and March. Introduced in 1831.

Cyclamen linearifolium, De Candolle (linear-leaved Sow-bread).—A hardy perennial species, with linear obtuse entire leaves, and purple coloured flowers, the segments lanceolate. According to Mr. Strangways, *C. lineare* is "now considered fabulous." Native of south of Europe. Flowers in April. Introduced in 1824.

Cyclamen littorale, Lindley† (shore Sow-bread).—A small hardy perennial species of the Europæum group. The tubers are small and spherical. The leaves roundish cordate, somewhat acute, entire, and blotched or marbled with white above, entirely purple beneath. The flowers are small, rose coloured, sweet-scented, the segments oblong. Native of the northern parts of Italy. Introduced in 1843. Flowers in the summer months ?

* Gardener's Chronicle, 1843, p. 660.

† C. littorale, Sadler?—*Lindley*.

Cyclamen neapolitanum, Tenore (angular autumn-flowering Sow-bread).—A hardy perennial species, the largest in size and the most hardy and vigorous of those known in cultivation. The tubers are large, rough, and flattish; the leaves variously shaped, mostly five-angled, but sometimes triangular or hastate, crenate, distinctly marked on the upper surface, and "having an irregular band of white and purple on the under surface." The flowers are large, rosy purple, scentless, the segments ovate obtuse. There is a white variety of this species. Native of Italy. Flowers in August and September. Introduced in 1824. According to Mr. Gordon, this bears the following names:—*C. autumnale*, *C. purpurascens*, *C. subhastatum*, *C. Poli*, and *C. hederifolium purpureum*. The *C. subhastatum* of Reichenbach is by some thought distinct as a variety; it has cordate-triangular crenate leaves, and flowers with the segments broadly oval and acute; it is also a Swiss plant.

Cyclamen persicum, Miller (reniform spring-flowered Sow-bread).—A tender perennial, rather large compared with the majority of the species. The tubers are large and flattish; the leaves large, reniform-cordate, crenate, marbled with white on the upper surface, and purple beneath. The flowers are large, the segments oblong-obtuse. There are many varieties as to colour,—*albiflorum*, which is entirely white; *lilacinum*, which is pale purple; *punctatum*, white with lilac spots; *laciniatum*, white with a red throat, the petals jagged; *odoratum*, the common sweet kind, white with a red throat; *inodorum*, white and red, but scentless; *flore-pleno*, with double flowers. Native of the island of Cyprus. Flowers from February to May, according to its treatment. Introduced in 1731. It is called sometimes *C. pyrolæfolium*, *C. utopicum*, and *C. odoratum*.

Cyclamen repandum, Sibthorp (repand-leaved Sow-bread).—A somewhat tender perennial species. The bulbs are of moderate size, bearing thin cordate-marbled repand leaves, having the angles entire, and mucronate. The flowers are rose-coloured, with the segments oblong. Native of Greece. Flowers from March to May. Introduced in 1816.

Cyclamen vernum, Reichenbach (round-leaved winter Sow-bread).—A hardy perennial species, of moderate size, "having the leaves of *C. persicum*, and the flowers of *C. coum*." The roots are larger than those of *coum;* the leaves double the size, quite round, entire, with the lobes at the base overlapping; the upper surface is marked with an irregular band of white. The flowers bright reddish-purple, rather larger than those of *coum*, but of the same short form. Native of the south of Europe. Flowers from November to January. Introduced in 1814. It is often confounded with *C. coum*, and is the *C. vernale* of Miller.

These are all the species of which we find mention of the introduction to English gardens. There are others described in books, such as *C. aleppicum*, Fischer; *C. græcum*, Link; *C. intermedium*, Wenderoth; *C. indicum*, Linnæus.

CULTURE.

The Cyclamen is one of many modest yet beautiful plants belonging to the natural order Primulaceæ to be met with in a cultivated state. It is somewhat surprising that it is not more generally cultivated either in private gardens for the sake of display, or commercially for the purpose of gain. It is a plant well suited for amateurs, as it takes but little space, and may be turned out of doors in a northern aspect, when it has done flowering, to make room for other plants. The treatment of these plants is not so difficult a matter, but that any one may grow them who has the convenience of a two or three-light frame, to protect them in the winter from frost and excessive rains, which latter do them more harm than slight frosts. Some who have grown, or attempted to grow cyclamens, have not met with the success they anticipated; this disappointment is traceable in the beginning to the existence of disease, caused either by giving them too much or too little water at particular periods. These are the two main things in which inexperienced cultivators are liable to fail; for they are plants that are soon seriously damaged by an over-dose of water when at all dormant on the one hand, and on the other hand, by being allowed to get too dry, in the growing season.

RAISING FROM SEED.

This is the best mode of propapating the cyclamen, though it may seem a long and tedious way of getting flowering roots; it is, however, the surest method, as you then know the constitution of your plants, which is of material consequence in plant-growing. For the sowing of cyclamen seeds, some persons recommend the period immediately after the ripening of the seed. Others defer the operation until the spring. This latter is the best and safest way, those sown in autumn being apt to damp off in the dull winter season. The beginning of March is a good time for seed-sowing; and the operation is performed in the following manner:—Prepare ordinary seed-pans, selecting those which are about four inches deep. They are prepared by filling them, first with about an inch of broken potsherds, then a layer of rough peat or moss, then a compost consisting of one-half peat made rather fine, one-fourth friable

loam, and one-fourth silver sand; or drift-sand will answer the purpose, if white sand is not at hand. With this compost the pans are filled up to within an inch of the top. The soil is then to be pressed down lightly, and the seed scattered thinly over the surface. The seeds are covered in by sifting about half an inch of fine soil over them, which is to be pressed down rather firmly, and then moderately watered. The seed-pans are then to be covered over with a thin layer of loose moss to keep them moist; this prevents evaporation, and does away with the necessity for frequent waterings. Place the pans in a frame or pit, which should be kept close until the seeds begin to germinate; then shade them, and give a little air in fine weather. Or they may be set upon the shelves of a green-house, which will answer as well as a frame. When they are pretty well established, they may be potted into single pots.

TREATMENT OF THE YOUNG PLANTS.

The seedlings must be potted off into separate pots as soon as they have made two or three young leaves. Get some of the same kind of compost as that used for seed-sowing, and have it made rather fine. The pots used should be large thumbs, or those which are three inches in diameter. Take the strongest plants out of the pans, without damaging the roots more than cannot be avoided. The plants must be carefully separated so as not to damage or break off the leaves, which are attached by rather brittle stalks. In potting, the soil must be pressed rather firmly around the base of the plant; and after potting they must be put back into the frame, where they should have a good watering, and must be kept quite close and well shaded until they begin to root round the sides of the pots. When this is the case, they must have more air and less shade until they are quite hardened, when the lights may be left off entirely, except during heavy rains, when of course they must be put on, to keep the soil from becoming saturated with water. The young plants that are left in the seed-pans may be thinned out, if too thick, and a little fresh soil may be added to fill up the openings where the young plants were taken out; after which they should be watered and put in a shady place in the open air, that they may grow hardy and stunted. The plants so treated will make good plants for potting off the next year.

As the plants show signs of becoming dormant, water must be withheld to a great extent until the following season. They will recommence growth about the latter end of March or the beginning of April. As soon as this is observed, they must be turned out of the thumb-pots and shifted into three-inch or four-inch pots, according to their size, using the compost a little coarser than that employed for the young seedlings. Select those only for shifting that have begun to grow. After shifting, keep them close for some time, admitting a little air in the middle of the day, but shutting them up early in the afternoon, to raise the internal temperature. After they begin to root round the sides of the pots, they must have a little manure water. Cow-dung will form the most suitable liquid for them, and it should be prepared thus:—to three gallons of soft water add half a spadeful of the dung, which will make it strong enough for them; this must be well stirred up two or three times, and then allowed to settle, the clear liquid only being given to the plants. This manure must only be given them when they are in full health and growing freely or blooming; and must be no more applied after there is the least sign of the decay of the leaves. From this period all the water they require, which will be but little, must be given to them in a pure state; and the proportion will vary according to the stage at which the resting process is arrived. By the time the plants are quite matured, they will, if kept in a frame, require scarcely any water; the dampness of the frame will most likely keep them moist enough. In this case the pots should be laid on their sides, in order that they may not catch any drip from the sashes during wet weather; they may remain in this position until the following spring. It is to be understood that the plants are not to be dried off completely, or so far as to destroy all the leaves. If the plants have to be rested in a green-house, the shelves of which afford a very convenient place for the process, they must not stand through the resting period without water; but should have just enough to keep the leaves from dying off completely. The less they can have, so that this is secured, the better.

Mr. Mitchell, of Stokeley, some few years since, proved peat soil to be very conducive to the growth of these plants. He states, that although for many years he has raised seedlings by the thousand, he had never been enabled to bloom them in less than three or four years from the seeds (except *C. coum*), until he used peat soil in a very rough state, mixed with sandy loam, in the proportion of six parts of the former to one of the latter. The seeds were sown in June, as soon as they had ripened, and the pots containing them set into a cool frame till the March following, when many of the *C. persicum* produced flowers; this was before they were one year old. The peat earth employed was full of fibre, but with scarcely any sand, and was obtained from a dry elevated situation where the common heath abounds.

TREATMENT OF THE MATURED PLANTS.

There is some slight difference in the management of the young plants and of those which have reached maturity. Supposing the plants to have gone on favourably until they have reached the commencement of the third season, when they will have formed pretty strong tubers, you must now use for them the following compost:—one-fourth of maiden loam, one-fourth peat earth, one-fourth silver-sand, and one-fourth of well decomposed leaf soil or cow-dung; these ingredients must be well incorporated preparatory to repotting the tubers, which is the next process. Turn them out of the pots, and if the roots are sound and healthy, repot them, or at least the strongest of them, into six-inch pots. In doing this, take away as much of the old soil as can be removed without injuring the roots. Prepare the pots, which should be new or clean washed, carefully; use plenty of potsherds; about one-fourth of the depth of the pots should be filled with this material; then put a layer of the roughest fragments of the soil on the potsherds, and on this use the ordinary mass of soil, which should not be rubbed or sifted very fine, but should contain rough turfy lumps of moderate size to keep it open. Set the bulbs in the pots so that one-third of their surface may be exposed at the top of the soil, and make the soil moderately firm, in the ordinary way. Water them until you are satisfied the soil is wetted through. Keep them close and shaded until the leaves acquire a firm appearance; then inure them to the sun-rays by degrees, until they get well established so as to bear full exposure, when they may be turned out of the frame and placed in a northern aspect, in which they may grow and mature their foliage, and remain until they manifest symptoms of maturity in the autumn. While in this situation they must be sparingly watered, and subsequently, if wintered in a frame, as before explained, the water must be entirely withheld. If this plan of keeping them is adopted, they must be placed in the frame in the same way as before, and treated similarly. After this, the tubers may be considered to have reached a mature flowering state; and indeed it is highly probable that blossoms will have already been produced, though, for the sake of strengthening the plants, it is as well to have these early blooms removed.

TREATMENT FOR BLOOMING.

After the plants are thus fully established, it is an easy matter to bloom them. It will be found that some of the bulbs start much earlier into growth than the others; these should be repotted first, using the same kind of compost as before, and the same proportion of drainage materials likewise. Encourage these as much as possible by liberal treatment, keeping them rather warm and moist. In this way there will be a succession of flowering plants, from March or April, until June. It is a convenient plan to divide the plants into three batches, which can easily be done, by placing some of them in a shady situation, and shifting them at different intervals until all are done. The first batch of them, after they have done flowering, must be put in a shady place, and watered with caution, so that they may keep their leaves healthy and perfect; these being rested, will be the first to start the next season, and the others will follow them in succession.

TREATMENT OF SICKLY PLANTS.

With proper care, the plants may be kept in health and vigour for many years, by following up the routine here recommended; but if any of them, in any of their different stages, are seen to look rather sickly, the leaves withering, or turning yellow, it may be concluded that something has gone wrong. Turn the plant out of the pot, and probably it will be evident that it has had too much water, so that the soil is soddened or water-logged. Or, perhaps, it will be seen that it has been allowed to get too dry. In either case, one repotting, with ample drainage and careful watering, will recover the plants. Or, if the damage has not been very great, those that have been watered too much may be set in a shady place until they get rather dry, and then carefully watered, until they return to health; but they will not be likely to flower the same year; or if they do, the blossoms will be poor and meagre. Those that have been allowed to get too dry, if the damage is not very great, can be easily brought round again to their natural freshness, by cautious liberal waterings.

There is among Cyclamens another source of disease which is all but irremediable. Instead of propagating young plants by seeds, division is sometimes practised, the tubers being cut asunder into as many pieces as the crown will admit of being separated into. These plants are scarcely ever sound and healthy, except under the most dexterous management, and are even then very uncertain. They go off from decay of the root; and if an unskilful manager has one of these divided plants, and finds it becoming sickly, the best thing he can do is to throw it away, and purchase a seedling plant; unless, indeed, he may take advantage of the opportunity to learn a lesson in horticulture. The treatment is to remove the rotted portion, and dry the wound with caustic lime, and then to pot in well drained soil, and water with every care till health is re-established.

CULTURE AS A WINDOW PLANT.

There is scarcely any class of plants better adapted for a window, than the Cyclamens. Of small size, neat habit, and easy management, and bearing beautiful blossoms in profusion, which, in properly selected varieties, are deliciously fragrant, there seems to be no quality wanting to render them just what window plants should be.

The odoriferous varieties of *Cyclamen persicum* are those which should be chosen for domestic culture ; and the process of cultivation is nearly the same in this case as in the greenhouse. They require an airy situation. and a carefully limited supply of water ; that is to say, they are by no means what may be called thirsty plants, although, on the other hand, the soil must not be suffered to become very dry. The plants do not suffer from exposure to the sun. As the plants may be liable to sustain some rough treatment, especially as to watering, it is, in this case, very important to pay attention to the manner of potting the tubers ; they must not be entirely buried in the soil, as is the case in planting many bulbous roots, but should be left about half exposed, the lower half only being placed in the soil. That soil should consist of loam, peat, and leaf mould, in about equal proportions, to which compost enough silver sand should be added to prevent anything like adhesion amongst its particles. The pots must be very carefully drained, with a layer of potsherds, charcoal, or some such material, occupying about one-fourth of the depth of the pot : which latter ought to be large enough to allow an inch of clear space all round the tuber, between it and the pot.

Young plants may be raised as well in the window as in the greenhouse, and by precisely the same process. The tubers are not to be suffered to dry off completely, as some recommend, but should be kept plump throughout their existence ; although at that period when they are not in active growth, they ought to be kept much drier than when making their growth. The best plan is, as soon as the leaves have decayed, to plunge the pot containing the tubers in the open ground, in some convenient place, so that the pot may be an inch below the surface of the ground ; this will keep the tuber from being subjected, during its resting time, to the alternations of drought and moisture, to which it is exposed when kept in the ordinary way, and in which case occasional watering becomes necessary. Under this treatment, an uniform degree of moisture about the tuber is more nearly realised, and it thus may be, as it should be, so regulated that the amount of moisture present may neither be too great nor too small. In this state the tubers may remain during the summer. Towards the approach of autumn, say by the middle of September, the young leaves ought to make their appearance. When this is the case, the pot should be brought up to the level of the ground, in which situation it may remain, with carefully regulated waterings, as long as the character of the season will admit ; it must, however, neither be touched by frosts, nor saturated by heavy rains. Henceforward, the pots must be placed in the window, subject to the provision of exposure to light, and to as much air as circumstances will admit.

Plants of *Cyclamen persicum* so managed will come into bloom at the ordinary blooming season, which will vary, say from February to May, according to the characteristic peculiarities of individual plants. But they may be had in bloom earlier, if they are required, and this result is obtained by the application of some extra heat, which Cyclamens bear very well.

FORCING.

To have Cyclamens in flower before the ordinary season, they require some preparation, the chief feature of which is to promote free growth during the latter part of the summer. With Cyclamens, as well as all other plants or flowers intended to be produced in any given state, at a particular and somewhat unnatural season, it is of the utmost importance that the plants should be managed as it were in a kind of cycle. In other words, the plants which are excited first in one season, should be first excited in each succeeding season, and those which follow, precisely in the same relative order year after year. The reason for this is, that plants naturally adapt themselves to circumstances. A plant which is for the first time excited early, so treated as to make a healthy growth, and brought in strength and vigour to a state of early rest, will the following year be in some measure prepared for early excitement by the treatment it has undergone ; it will have become in a certain degree natural to it, to make its growth earlier than usual. From this step, therefore, another may be taken, and the plant, without sustaining any injury from the stimulus, may be had somewhat earlier than before. In this way, year after year some advance in earliness may be made, provided the entire treatment throughout the season is consistent therewith ; and not only so, but year after year the plant will have more strongly acquired the habit of early growth, and thus, in each succeeding season, may be brought into bloom at a given and corresponding period, with a less amount of forcing.

This must not, however, be misunderstood. It is not intended that Cyclamens, or other

flowers, may be had in blossom year after year at an unnatural season, especially if that be, as in this case it would be, in the winter, while in each succeeding year they receive a less amount of heat and the other agents of vegetable excitement than was given to that at the first. This may be so to some extent; but the fact is, that a certain amount of heat, light, and moisture, is essential; and anything short of this amount will prove insufficient. The real advantage of the practice just recommended, and what is meant by the statement that a less amount of forcing is requisite in each succeeding year, is this: the plant grows more readily, more freely, under the conditions it is subjected to, and, consequently, there is less "forcing" required to produce the result, though the actual condition it is subjected to may be nearly the same. It, however, takes some few years to establish the precocious habit in any plant, though some take it up more readily than others.

Having explained this matter, we may proceed to notice the mode, or at least one mode, by which the *Cyclamen persicum* may be made to bloom earlier than usual. We must start with a strong root, arrived at a mature and blooming age, for such only are fit for forcing; and provided there is a choice of plants, those should be taken which go first out of bloom. Suppose this to be early in March, then the plants should be set in a situation perfectly exposed to sunlight and air, in order that the foliage may be well ripened. This treatment may be continued for about a month, the plants being during this time regularly watered. Then they must be kept somewhat drier, with the view of resting them, but the soil must not be allowed to become thoroughly dried, nor should the leaves be suffered to become flaccid. By the beginning of May the quantity of water may be again increased, the plants being placed in the warmest position the greenhouse affords, in order to excite them a little into growth.

As soon as they begin to make any new growth, the plants should be shifted into larger pots in very rich soil, and then set into a frame where they may have plenty of air and full exposure to the sun. Watering must on no account be neglected, although nothing like saturation of the soil should ever take place. Some persons recommend to plant out the roots during this period into an unshaded bed of rich soil in the kitchen-garden; this bed should contain a considerable proportion of vegetable soil and sandy peat earth, which forms a good compost for them. For pot culture, however, a rich compost for these plants may be compounded thus:—one part good light loam, two parts light turfy peat rather sandy, one part good leaf mould, half a part broken charcoal; no additional sand will be required if the loam and peat used be light and sandy.

Whether planted out, or grown vigorously in pots placed in frames, the plants will have advanced considerably by Michaelmas; and then in the former case will require to be taken up and potted. This must be done carefully, the balls of earth being kept as entire as possible, and the plants put into pots large enough to take their roots without cramping or injuring them. In either case the plants may now be set in a light airy position in the greenhouse or frame until wanted for forcing. In many cases the plants will be already showing blossom.

The developing of the blossoms is another matter. The proper situation for them is an intermediate stove, that is, a cool stove, where an average day temperature of 60°, and a night temperature of 45°, is kept up. Being dwarf tufted plants, they ought always to be kept near the glass and in a very light position. Into this temperature and situation a few of the plants should be brought in succession at intervals of about three weeks. When fully in bloom, the plants may be taken to the drawing-room, or placed in the conservatory, but in the former situation they must not be kept too long at one time, or the foliage will become sickly, which is very injurious to the general health of the plants. It is better to change them frequently, than thus to impair their vigour.

TREATMENT OF THE HARDY KINDS.

The foregoing instructions in cultivation refer chiefly to the *Cyclamen persicum*. To this species *C. repandum* most nearly assimilates. Such of the remainder as may be cultivated in pots may have similar treatment in all respects, except that they are more hardy, and should have a greater degree of exposure to air. In fact, an airy frame or pit suits them best at all times.

Probably all the kinds beside those just named are hardy enough to grow in the open border; but the winter and very early spring flowering ones are inappropriate for such a situation, because their blooms would in all probability be destroyed by frosts. The whole of the remaining kinds, namely those whose blooms are produced in summer or autumn, form beautiful objects under favourable conditions of growth. These conditions are:—a cool shady situation—not where tree roots rob the soil of its moisture; a soil in which peat earth preponderates; and liberal waterings in continued dry weather. These hardy kinds, like the rest, are propagated by seeds.

THE JOURNAL OF THE HORTICULTURAL SOCIETY.*

The July number of this work has several very excellent papers. The table of temperatures, for the use of gardeners, arranged according to the respective localities in which the observations have been made, is a weighty affair, making but little show, but requiring an immense labour. A description of the Kaisha, a new Syrian apricot, introduced by John Barker, Esq., of Suedia, is very interesting, as it opens up a new family, as it were, of a fruit of which we had but few varieties. A paper, by James Duncan, on the subject of edgings to flower-beds, gives a lesson that will be new to hundreds, although the writer seems to have practised it for years. He recommends very narrow edgings of turf, as narrow as one inch, instead of box or any other of the numerous subjects which have been adopted from time to time. We cannot, in the face of a man's declaration that he has tried a thing for years, deny that it may be made available; but we are more than half inclined to doubt the assumed easiness of keeping it in trim. It would seem to us, who have not tried it, that there would be very considerable difficulty in keeping it in order, on account of the disposition it has generally to spread. It is quite certain, that unless it be kept in repair it would soon be a nuisance; and however successful the writer may have been, we doubt if it would be sound long together in the hands of ordinary gardeners. The idea of keeping turf only an inch broad in good condition would alarm some men; at the same time, it must be conceded that if it could be kept in high condition, nothing would be neater or better. The paper is worth reading, and the experiment worth trying, though we confess we are strong advocates for box. A paper on the cultivation of the genus Epacris is a little bit of sound practical gardening which we subscribe to; and because all we have done with plants of the same habit has proved the efficacy of the directions, we shall some day extract this paper. The paper by Mr. Fleming, gardener to the Duke of Sutherland, on permanent studs on walls for training fruit trees, is not new—that is to say, the idea is not new. When the patent leaden wire, or we suppose we must say metal wire, was first introduced to be used instead of threads, permanent studs were recommended, and it has been followed with great advantage by many practical men. The patent wires were as easily managed as a string or bass tie, and they might be removed and replaced several times without being the worse for it; indeed, proper studs or neat headed nails were introduced at the same time. Mr. Fleming recommends bass ties, and the common cast-iron nails, first made red hot and then plunged into oil, by which, he says, oxidation is prevented, and these are to be placed in lines and at proper distances. Of course, whatever is to be permanent should be uniform; and this among other matters was suggested at the time the wires were introduced, and we confess we like wires better than bass ties. Mr. George Lovell, the gardener to the Marchioness of Hastings, has some observations on the growth and maturation of the wood of plants. This is a clever paper, and can only be done justice to by republishing it. The writer has some peculiar crotchets, but in the main he conveys a good deal of good information on subjects which are little thought of even by those whose practice in a great measure assimilates. "Contributions to a History of the Relation between Climate and Vegetation in various parts of the Globe," gives us some valuable information on the subjects of vines, figs, and other fruits as connected with the climate of Australind, Western Australia, and will be read with great interest. An excellent paper, by Mr. Henry Bailey, of Nuneham, on the proper management of fruit-tree borders, will be a useful study to those who have been hitherto careless in these matters. And an article by Mr. Conway, of Earl's Court, on the culture and management of the scarlet geranium is very likely, from its usefulness, to be transformed to our pages. But perhaps the most valuable part of the number is Mr. Gordon's elaborate notes upon some newly introduced conifers, collected by Mr. Hartweg in Upper California, no doubt long before the mineral productions occupied so large a space in the minds of travellers to that locality. Descriptions of four interesting species or varieties, with excellent illustrations, will be highly appreciated by those who take delight in this extensive family. Notices of the new plants from the Society's garden occupy a few pages profitably; and the proceedings of the Society, though mentioned last, must be regarded as the staple commodity in this journal, and perhaps in no quarterly part has this portion been more important. It records changes greatly to the advantage of the Society. We cannot pass over the work without giving our humble testimony to the great improvement

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which it shows over the old "Horticultural Transactions." We miss the large coloured plates, but we have a good deal more care in the selection of the articles. There is less theory, but more practice—less pretension, but much greater value. Indeed it stands, from very peculiar advantages, highest among the periodical works connected with the higher walks of Horticulture. Our space will only admit of the following extracts :—

Description of the Kaisha, a new Syrian Apricot, introduced by John Barker, Esq., of Suedia. By Robert Thompson, Superintendent of the Orchard and Kitchen Garden Department in the Society's Garden.

Fruit of this was sent to the Society, July 21, 1848, by J. Warmington, Esq., of Kensington, accompanied by the following note :—"I take leave to send you a couple of Apricots from one of Mr. Barker's Syrian trees, which has borne for the first time this year, and carried twelve fruits to maturity—rather too many for its size. I know not if it possesses any advantages over the common sort, but it certainly is early. Some of the fruits were ripe on the day of the late Chiswick exhibition, 12th of July; and on the same wall where these ripened were Moorpark and Turkey apricots perfectly green and hard." The tree was sent to Mr. Warmington, by John Barker, Esq., from his garden at Betias, near Suedia, in the Pachalik of Aleppo, where he states there exist thirteen varieties of apricots with *sweet kernels*—this is one of them ; and the sweet-kernelled apricot of Ispahan, or "*Shuker Para*," described in vol. iii, p. 228, is another. The fruit is roundish, five inches and a half in circumference, rather deeply and acutely channelled on one side near the base, the channel becoming less, till only like a shallow indented line as it approaches the summit, where it terminates in a slight depression formed round the base of the style. The fruit is semitransparent. Skin slightly downy, pale citron-coloured where shaded, tinged and marbled with red next the sun. Flesh tender, juicy, of a clear citron-colour, parting freely from the stone, sugary and delicious—like well-refined lump-sugar combined with the apricot flavour. Stone small, roundish ; kernel *sweet*, like a nut.

A valuable early variety for the dessert ; and probably excellent for preserving ; if it be employed for this purpose, the transparency of the flesh will exhibit a new feature amongst apricot preserves. By its clear citron-coloured flesh it may be distinguished from the orange-fleshed varieties hitherto known in this country, some of which have likewise sweet kernels, such as the Breda, Musch-Musch, and Turkey. It is earlier than either of these.

Hints on the Cultivation of the genus Epacris. By Robert Reid, C.M.H.S., Gardener to Mrs. Clarke, of Noblethorpe.

This useful genus, which is yearly becoming more interesting by the addition of new varieties, almost rivals heaths in beauty, and must doubtless soon receive more extensive cultivation than it has hitherto done ; for Epacrises are much better adapted for mixed collections than heaths, both on account of their more robust habits and the certainty with which they can be brought into flower at almost any given time, but more especially in the winter season. The following hints, therefore, on their cultivation may be found to be deserving of attention :—

With respect to propagation and soil, they require the same treatment as heaths. I have tried a little loam with peat, but find they always thrive best in sandy peat alone. The time for shifting can hardly be fixed, but it should mostly be done betwixt the months of January and May. My practice is always to shift when the plant has done flowering, whatever time that may happen to be. The first thing to be effected before shifting, is to carefully cut down and thin out the small shoots, which should be cut to various lengths and heights according to the size and strength of the plant. The rule is to cut low enough to cause the plant to break down close to the surface of the soil, so that every part may be fully clothed with a sufficiency of young flowering shoots ; for the main point to be considered in pruning is to produce a regular crop of well-ripened young wood, on which depends the future display of blossoms. When the plant is properly pruned and shifted, it should be at once placed in a warmer atmosphere, there to grow and ripen its wood. During its growth, stop the young shoots frequently, more particularly of the strong growing varieties, such as grandiflora, impressa, &c. These should often be stopped, say at six or eight inches, for if allowed to grow too long they will be destitute of flower-buds, and will require support from sticks, which should be avoided as much as possible. It will also be advisable, where the shoots are too thick, to take them off close to the stem, so as to prevent them from growing again.

Having no other convenience at this place, I grow my epacrises in the pine-stove, where, although they do very well, yet the hot sun is almost too strong for them ; for towards the middle of summer it causes the young shoots to droop. A pit, where they could be shaded, or a vinery, would, I should think, be more suitable for them ; but where none of these places can be had, then they must occupy the warmest part of the greenhouse ; and when

this is so, the plants should not be pruned so closely as when heat can be had, for the young shoot will not in that case grow so long, and will consequently ripen sooner. The plants should never be turned out of doors at any time, except when they have been grown in heat and the wood brought to maturity early; then a few weeks out of doors will be of benefit to them, rendering them more hardy for the greenhouse in winter. The advantges of growing epacrises in heat, consist in the certainty of having every shoot covered with flowers; and by placing the plants in heat at different times, a constant succession of flowering plants during the winter and spring will be obtained.

By carefully attending to pruning and growing them in heat, epacrises may be kept handsome in appearance, and in good health, for many years, and will never fail to produce a regular crop of bloom in due season. It is well known, and perhaps still believed by many, that E. grandiflora was considered a shy bloomer: the reason of this is, that being always grown in the greenhouse, and the shoots allowed to attain any length without stopping, they never got properly ripened, and the few flowers that did expand were only on the smallest and shortest shoots, which ripen early; this shows the necessity of having a supply of these short shoots on every part of the plant. The more weakly growing kinds, such as pulchella, will not require to be so severely pruned as the stronger kinds; judicious stopping will mostly be found sufficient for them. Watering should be carefully attended to during their season of growth; they require a good deal at that time.

Hints on the proper Management of Fruit-Tree Borders, having for their object the attainment of early and permanent productiveness. By Henry Bailey, Nuneham.

In making a communication to the Society upon a subject of so much interest to every lover of a garden, I may be allowed to say that I do so with great deference to the opinions of others. In treating the subject, it will be my endeavour to advance nothing in practice which cannot be accounted for by science, being well assured that no dissertations, in this enlightened age, can be really valuable to the community which do not unite theory with practice.

The walls of a garden are amongst the largest items of expense in its first formation, but we may travel long distances without seeing (however complete in other respects gardens may be) these expensive provisions adequately furnished with well-trained and fructiferous trees, or if we see them *now*, in a few years they will have vanished. How often do we see trees growing in the wildest luxuriance during one season (perhaps a wet and sunless one), doomed to perish the next from their crude and immatured condition!

Various have been the suggestions of modern gardeners conversant with horticulture as a science, to control the vigour of their trees within certain limits, and to establish that desirable balance in them which, while they possess all reasonable strength of growth, does not prevent their producing abundantly. In old times it was said,

> "He who plants pears,
> Plants for his heirs;"

but in these days, thanks to Mr. Rivers, root-pruning, shallow planting, and the quince stock, where it flourishes, every lover of this valuable fruit can now look for and have immediate results.

Equally diverse have been the modes of planting trees on walls. In former times, when the importance of drainage was less understood—when the revivifying powers of atmospheric air in penetrating soils were chemically unappreciated—deep excavations were dug out, without provision for the water to escape, and filled with soil; the trees were planted, and left uncontrolled, save by the periodical prunings, till nature caused them to fruit, which they generally did in the most sparing and uncertain manner. It seems to have been an established principle in old times that the roots should penetrate *deeply* into the earth, no one reflecting that from this cause proceed late and immature growths, the sure preludes to decay and death.

It has been reserved for modern gardeners to appreciate the importance of the temperature of the soil in connexion with the growth of plants. I mean, of the temperature of the soil *being in advance of that of the atmosphere*. Mr. Reid, of Balcarres, "found that in a cankered orchard the roots of the trees had entered the earth to the depth of three feet;" and he also ascertained "that the average heat of the soil, at six inches below the surface, was 61°, at nine inches 57°, at eighteen inches 50°, and at three feet 44°." Surely, then, when we take into account the manner in which the earth's surface is heated by the sun in the native countries of the fruits which British gardeners cultivate, and when we understand the advantages which the *comparative* bottom heat confers on trees, in causing early and advanced root action, moderate growth, and early maturity of the wood, at the same time endowing them with protective properties by diffusing through their air-vessels that temperature which the surface-roots absorb, it cannot but be wise practice to adopt shallow platforms of good sound loam, on well-drained bottoms impervious to the

descent of roots. Such has been my practice —such the plan advocated by one of our most skilful gardeners, Mr. Errington, gardener to Sir Philip de Grey Egerton, Bart. M.P. By such means, in almost all situations, fruit-trees may be made to flourish and yield fruit "after their kind."

There is another advantage which these impervious bottoms secure to us, viz. the most perfect command of the roots; and I think there are few who in this age would hold this to be unimportant. For my own part, I conceive that the roots of every fruit-tree should be as much under control as the branches.

Of late years there has been practised, by several very intelligent men, a system of covering the surfaces of borders with concrete, thereby excluding the rain-water from percolating, and preventing, to a great extent, the admission of air. I am quite willing to admit, that in certain places, where the situation is low, the soil tenacious, and the locality subject to an amount of rain exceeding the average, it may have been wise to make provision to prevent the saturation of the border by excess of rain; but as a general rule, on light soils, or those of a medium quality, it does not appear to me that such a proceeding is either *warranted by practice* or *supported by scientific theory*.

If it be true that "the water which plants obtain from the soil contains those saline and gaseous matters which plants want," surely it cannot be in accordance with the established data on which the universally recognised improvements of modern horticulture and agriculture are founded, to exclude the rain-water from penetrating the soil. The advantages derived from drainage (the basis of all cultivation) are due to the removal of the *excess* of water, thereby admitting the air—"Because," says Mr. Solly, "plants cannot derive the elements of organic matter from the earthy constituents of the soil, nor from the organic matters which it may contain, unless there is AIR present." Again, the same high authority says—"The most abundant constituent of soils is commonly *silica*, which frequently forms nearly nine-tenths of their whole weight. Silica, or natural compounds containing silica, in combination with several earthy and alkaline bases, are quite insoluble in water, and are scarcely acted on by the strongest acids, nevertheless they gradually decompose *when exposed to the* AIR."

Seeing, then, the very important functions which rain-water is ordained to perform in percolating through the soil — water itself being a large constituent of plants, containing also in its own body a quantity of air, and in its course leaving cavities through which the air of the atmosphere penetrates, rendering into soluble food for plants those organic substances which without such agency would be insoluble—I cannot but doubt the propriety of covering the surfaces of borders with an impervious substance like concrete.

Dr. Lindley says, that "hardy trees, on whose roots earth had been heaped, or paving laid, are found to suffer much, or even to die. In such cases, the earth in which the roots are growing is constantly much cooler than the atmosphere, instead of warmer." Is there not on this account another great objection to concrete surfaces?

I have paid much attention to the management of fruit-tree borders, and feel convinced that the great object which we should have in view is to secure a shallow stratum of sound pure loam on a dry and impervious bottom, to avoid mutilating the surface-roots by cropping with vegetables, not to apply rank and stimulating manures, and to endeavour to keep the mass of soil always open, healthy, and permeable to the sun, the atmosphere, and the rain, using especial precaution that excess of the latter is not permitted to saturate the soil. Nothing in my opinion is more injurious to wall-trees than the heavy cropping of the borders in which they are planted. I would not do this if I were not obliged. My opinion is, that in first-rate gardens the fruit-borders should be set apart solely for the trees. If paled fences were erected, running east and west over a division of such gardens, northern and southern exposures for early and late cropping would be secured, offering the advantages of shade and exposure to the fullest extent, while the trifling additional expense would be amply repaid by the permanently-improved condition of the trees, and more abundant and highly-flavoured fruit.

NEW PLANTS, ETC., FROM THE SOCIETY'S GARDEN.

WISTARIA SINENSIS: *alba*. (Mr. Fortune sent this from China)—According to Siebold, the Chinese have many varieties of the Wistaria (or Glycine) Sinensis. Of these a pure white one has flowered in the garden. It differs in no other respect from the lilac kind, and is much less handsome; but when plentiful it may produce a pretty effect by being inarched upon the branches of the latter.

CŒLOGYNE ASPERATA. (Received in flower from T. Twisden Hodges, Esq., May 30, 1849.) —This, which is much the finest of all the Cœlogynes, is a native of Borneo, and flowered in the garden of Hemsted Park in such profusion that not fewer than eight spikes were produced at the same time. Each of these spikes is nearly a foot long, and hanging downwards bears twelve or fourteen magnificent white flowers, full three inches in

diameter when spread open. They have a firm fleshy texture, are a pale cream colour, except the lip, which is richly marked with brownish-yellow veins, springing from a rugged bright orange central ridge. At the base of each flower grows a brown concave dry bract, one-and-a-quarter inch long, which, by its dead colour, much enlivens and improves the delicate tints of the flowers themselves. It is nearly related to the Java *C. speciosa*, but is a very much more striking species, on account of the whiteness of its noble blossoms.

Mimulus tricolor, *Hartweg.* (Raised from seeds brought home by Mr. Hartweg, and said to be collected on the plains of the Sacramento valley, in California.)—An annual, soft and covered with delicate glandular hairs. Leaves pale green, oblong-lanceolate, tapering to the base, here and there toothed at the edge, those near the root of the same form as the others. The flowers, which are about two inches long, grow singly and nearly sessile in the axils of the leaves; they have a long narrow plaited unequal calyx, beyond which projects the very slender tube of the corolla, which then widens into a funnel-shaped limb, with an oblique border cut into five nearly equal rounded lobes. Its general colour is bright pink, with a deep crimson spot at the base of each lobe, and a bright yellow stain along the lower lip. It is distinguished from *Mimulus brevipes* by the uniform shape of the leaves, by the nearly sessile flowers with a long, narrow, by no means ovate, calyx, and by the slender exserted tube of the corolla. As far as its cultivation is understood, it appears as if it would be best to treat it as a half-hardy annual. It is a delicate growing plant, with very neat party-coloured flowers, well repaying any care required for its cultivation.

Nuttallia cerasiformis. *Torrey and Gray, in the Botany of Beechey's Voyage*, p. 336, t. 82. (Received from Mr. Hartweg, in January 1848, from California, said to be a deciduous shrub, two feet high, from the woods near Monterey.)—A shrub, with a very thin half-transparent smooth deciduous foliage. The leaves are obovate-lanceolate, or oblong, perfectly smooth, pale green, rather glaucous beneath. From the base of the young shoots, opposite one of the earliest leaves, springs a nodding raceme of greenish-white flowers, furnished with broad, reflexed, thin, very pale green bracts. There are five petals, which soon fall off, and fifteen stamens inserted on the calyx in a double row. The aspect of the plant is something that of a bird-cherry, but its fruit is said to consist of from one to five leathery drupes, which finally dry up and split. A hardy, dwarf, neat-looking shrub; increased by suckers or seeds, and growing freely in any good garden soil. It flowers before the leaves are produced, in February and March.

Epidendrum fragrans, *Swartz;* var. megalanthum. (Presented to the Society by G. U. Skinner, Esq., in July, 1848, and said to be from Guatemala.)—In all parts of tropical America this epiphyte seems common, and many varieties are known to cultivators; but they are generally too trifling to merit special names. In this instance, however, a form has been received which is most remarkable for its unusual dimensions. The flowers are full four inches in diameter, of a pale clear greenish white, and the lip is vividly marked by clean stripes of very rich crimson. It is quite a giant of its kind, for the pseudo-bulbs and leaves, taken together, are sometimes eighteen inches long. It is best grown in the coolest part of the orchid-house, potted in fibry peat, with half-decayed leaves, and liberally supplied with moisture during the growing season. It is a very desirable plant, with large fragrant flowers.

Cortusa Matthioli, *Linnæus.* (Seeds received from the north of India, from Capt. Munro.)—Among many highly interesting plants raised from the seeds sent to the Society by this officer was a Cortusa, which upon flowering proved not to be distinguishable, even as a variety, from the charming European alpine form. The species having also been found in the birch-woods of the Punjaub, near a fort called by Jacquemont "Choupienne," must now be considered to extend over all the lofty mountain-chains lying between Savoy and the Chinese frontier; an unusually wide distribution for such a plant. A hardy perennial, requiring a rather dry situation, and well suited for rock-work, growing freely in any good loamy soil which is not over retentive of moisture. It is increased by dividing the roots when the plants are in a state of rest. It is a well-known neat little alpine species, deserving a place in any select collection.

Pæonia Moutan: *versicolor.* (Received from Mr. Fortune, in April, 1846, from the north of China, and said to be the "Tee-lok," a greenish-white kind.)—Flowers large, semi-double, or probably quite double, with large broad petals, very irregularly arranged and cut on the edges, deep purple near the base, fading to a rosy lilac near the outsides. Foliage narrow and pointed, like that of the old P. papaveracea. Requires the same kind of treatment as the other kinds of Tree-pæony. Very handsome, showy, and distinct.

Pæonia Moutan: *atrosanguinea.* (Received from Mr. Fortune in May, 1846, marked "dark purple," from Hong Kong, and from Shanghae as "very dark, nearly black."

Flowers, a good double, dark crimson ; outer petals large and mostly entire ; inner ones much smaller and lobed ; foliage like that of the old P. papaveracea, but rather narrow and more pointed. This is a very handsome, deep blood coloured variety, the darkest in colour of all the Tree-pæonies yet in cultivation.

Ophrys vespifera, *Willdenow : species Plantarum*, 4, 65 ; *Lindl., Gen. et Sp. Orch.*, p. 372. (Purchased at the sale of the late Dean of Manchester's plants.)—In this and the following species we have gained two of those rare and curious kinds of terrestrial Orchids in which the lovers of singular forms have always been much interested. Their foliage has nothing that deserves special mention, but their flowers are sufficiently remarkable. The Wasp Ophrys was found by its late lamented possessor in Corfu, and was brought in a living state to England. It has a yellow lip, perfectly free from hairiness, but marked with brown streaks and spots, so as to resemble the body of the insect after which it is named ; especially when the sepals and petals are curved down upon its base, as is the case in its natural state. The species is so rare, that it can scarcely be said to exist in the herbaria of this country ; the plant called *O. vespifera* by some, and which is usually mistaken for it, being quite different, with large deep yellow flowers, having a broad stripe of crimson wool. That plant, which is as common in the south of Europe as this is rare, is the *Ophrys lutea* of Cavanilles and other botanists. Like other species of the genus, the true Ophrys vespifera varies a little in the form of the lip, which is sometimes roundish and sometimes obovate ; but it appears always to have the middle lobe emarginate.

Ophrys mammosa, *Desfontaines, in the Annales du Muséum*, vol. x. t. 15. In the same collection which furnished the rarity just described was obtained another Ophrys, which is apparently the obscure plant hitherto only known from a drawing by Aubriet, in the Museum of Natural History of Paris, and called *mammosa*, because of its having two prominent spaces on the side of its lip. Here the flowers are much larger than in the last : the petals have a rosy tinge, and form, with the green sepals, a flat circle : the lip is a deep chocolate brown, downy, nearly square in its outline, with a pair of parallel bluish lines passing down the middle. It is a very curious thing, nearly allied to *O. ferrum equinum* (the Horse-shoe Ophrys) ; a species, that, however, wants the two mammæ on the lip, which moreover is more lozenge-shaped and irregularly wavy on its edge. Both these plants are the subject of an experiment now in progress in the cultivation of terrestrial Orchids, the result of which will be communicated to the Society hereafter.

DOWNING ON LANDSCAPE GARDENING.*

The appearance of the fourth edition of a Treatise on the Theory and Practice of Landscape Gardening, betrayed us into the reading of between five and six hundred pages, by an American, we should presume, as he writes from New York, and ransacks all our previous authors for the history of the science. We shall best describe the work by saying that it is a neatly written volume, containing a large number of the worst cuts we have ever seen in a respectable work, and not one novel idea in theory or practice. Landscape gardening should be, and in good hands is, reduced to a principle. It consists in imitating as many of the beauties of nature as can be comprised in the ground we have to lay out ; but whether we have room for one or more great features, there should be no mixture of palpable art to destroy the natural scene. Mr. Downing has evidently read our best authors, though he does not appreciate them and rank them as we do, and the very best of them take a good deal more pains to inform us what others have done, than they do to teach us what we ought to do. As we purpose making rather copious extracts, the work shall speak for itself, but we cannot help regretting the want of novelty. Not that a man is obliged to give novel ideas where the best that can be given merely work out those of other people, but we cannot find an excuse for writing on any subject which has been written on before, unless the writer gives something more than we already possess. We are inclined to find fault with most authors ; a little practice is worth a good deal of theory, and the mere changing of words to convey the same meaning that has been conveyed before, has no merit in our eyes. If we traverse a forest, and are struck with the beauty of a particular scene, it either gives us a notion of something that we might carry out in landscape gardening, or it confirms our opinion upon the effect of scenery that we are acquainted with already ; and the whole art and science consists in bringing as many of these striking effects together as the space we have to work upon will admit ; but so far

* A Treatise on the Theory and Practice of Landscape Gardening, &c. By A. J. Downing. Longman, Brown, Green & Longman. 1849.

from desiring to do things on a smaller scale for the purpose of increasing the number of features, we should strive to make the limited space we have produce one grand feature, rather than lessen the effect to produce two. If there be, in a noble and extensive estate, a little nook that seems more inviting than the rest, and perhaps hardly contains, in that particular spot, half an acre, and an apparent opening to the rest, it would be a lesson to us for the laying out of half an acre, and, therefore, to attempt too much on a limited space, is to destroy all; for it is impossible to view anything upon a small scale, without the conviction that it is artificial. The whole science may be expressed in a few words, and the carrying of it out is that which may be called the practice. The theory is the imitation of nature, the practice is the working it out. The remarks of all modern writers on this science assimilate very much, and savour little of originality; they have all something to say of "Capability Brown" and some other of those employed in the early days of English gardening. They all admire the same things, which says much for the propriety of the early writers' notions, but little for the necessity of followers in the way of authorship. We have had our say upon the subject, but we have followed nobody's footsteps. We have simply endeavoured to lay down principles that should be adopted by all gardeners: we have laid down no plans; we have endeavoured to show, in a few short rules, what is to be avoided in laying out a garden landscape-fashion, and left the details to taste. In the volume before us, we have many observations on individual estates, and some excessively coarse illustrations of American domains, none of which give us any favourable impression of the author's talents. There are a few which certainly appear inviting, but the advantages are natural, and not created by art. American cataracts and cascades are effective auxiliaries in scenery. The author, however, has some observations, in which he draws the distinction between what he calls the beautiful and the picturesque, the sublime, and so forth; and these, perhaps, are the best we can select in justice to him. The special pleading is pointed, and if not such as to convince the reader of the facts, they are plain enough to indicate what the author himself thinks upon the subject. There is some merit in this, for some authors hardly convey enough to tell us what they mean by what they say. Upon the whole, we do not think the book any useful addition to the works on landscape gardening in England; what it may be in America, is another matter. They may be far behind us in landscape gardening; if so, what has been borrowed from our English works may be acceptable. The work praises Mr. Loudon in the highest terms, but, although it is impossible to say too much of him as an industrious, useful, and amiable public writer, landscape gardening was the least successful of his labours, and his writings on the subject not the most useful of his works. In stating this, we claim no right to arrogate to ourselves that we have a better taste, but we insist on principles which are consistent every where, whether right or wrong, whereas Mr. Loudon never has preserved a consistency in landscape gardening, either in theory or practice. Our American friend has a right to praise Mr. Loudon, because he has made great use of him. It is hardly fair to say that the author is not in some respects original, because some of the illustrations are contrary to every principle of landscape gardening. Fig. 7, p. 51, gives a carriage sweep to a mansion without the slightest excuse for the bending of the road; not a tree or shrub to show why the road was not straight. The same occurs in Fig. 10, p. 54. At p. 73 we have, Fig. 15, "an example of the beautiful in landscape gardening," which, for want of planting in the bends of the road to the house, is as bare and as ugly as we could expect to find a spot where a landscape gardener had never been seen or heard of. "An example of the picturesque," is better from natural advantages; stately timber, and abrupt broken ground, help it considerably; but, in the hands of a tasteful operator, it might have been wonderfully improved. In Fig. 19, p. 99, we have "the view of a country residence as frequently seen," which has a straight road up the left side of the picture, and a short turn to the right, the house standing in the corner; and the next page exhibits, Fig. 20, "the same residence improved." In this, which, being imaginary, gives us the author's real taste, we have the road forming a half circle to the left of the picture, but nothing on the inside of the curve as an excuse for bending it, except two trees in the foreground. So far as the bending of the road goes, it is an improvement, but as it is natural that all persons should make the shortest cuts, we hold that obstacles such as in nature prevent a road from being straight, ought to be placed to reconcile us to the deviation. In the ground plans of two or three places, there is a much better notion, so far as the roads are concerned, but the planting is in the worst possible taste; the space is spotted all over with trees, nothing bold or striking, the roads, the groupings and general plans, adapted to curtail the space instead of showing it to the best advantage. All this, however, is simply our notion opposed to the author's; we differ also from Loudon. The author says, page 75:

"The recognition of art, as Loudon justly

observes, is a first principle of landscape gardening, as in all other arts ; and those of its professors have erred, who supposed that the object of art is merely to produce a fac-simile of nature, that could not be distinguished from a wild scene."

We dispute this point altogether, and we say that the nearer the best scenes of nature can be imitated, and the more art is concealed, the more perfectly has the landscape gardener completed his task. We do not believe any artist would attempt fac-similes any where, for as no two scenes in nature are alike, so no man in his senses would attempt to make a fac-simile; but nature is varied without end. Numerous beautiful spots present us with features that we may imitate with advantage, and a combination of wood and water, hill and valley, without a harsh line to offend the eye, is practicable, and is the business of the landscape gardener. We all know that the mansion is a work of art, but it should appear to have been erected on that spot on account of its beauty, and not convey an idea that the house was built on a plain, and art had done the rest. In short, terraces, straight roads, avenues, and even bent roads, without proper obstacles to their being straight, all convey an idea of artificial, and are opposed to the true principles of landscape gardening. We shall, however, give some extracts, and at present, the author's remarks on the beautiful and picturesque, seem most appropriate :—

"The two most forcible and complete expressions to be found in that kind of natural scenery which may be reproduced in landscape gardening, are the Beautiful and Picturesque. As we look upon these as quite distinct, and as success in practical embellishment must depend on our feeling and understanding these expressions beforehand, it is necessary that we should attach some definite meaning to terms which we shall be continually obliged to employ. This is, indeed, the more requisite, from the vague and conflicting opinions of most preceding writers on this branch of the subject ; some, like Repton, insisting that they are identical ; and others, like Price, that they are widely different.

"Gilpin defines picturesque objects to be 'those which please from some quality capable of being illustrated in painting.'

"Nothing can well be more vague than such a definition. We have already described the difference between the beautiful landscapes of Claude and the picturesque scenes painted by Salvator. No one can deny their being essentially distinct in character ; and no one, we imagine, will deny that they both please from 'some quality capable of being illustrated in painting.' The beautiful female heads of Carlo Dolce are widely different from those of the picturesque peasant girls of Gerard Douw, yet both are favourite subjects with artists. A symmetrical American elm, with its wide head drooping with garlands of graceful foliage, is very different in expression from the wild and twisted larch or pine tree, which we find on the steep sides of a mountain ; yet both are favourite subjects with the painter. It is clear, indeed, that there is a widely different idea hidden under these two distinct types, in material forms.

"Beauty, in all natural objects, as we conceive, arises from their expression of those attributes of the Creator—infinity, unity, symmetry, proportion, &c.—which he has stamped more or less visibly on all his works ; and a beautiful living form is one in which the individual is a harmonious and well balanced development of a fine type. Thus, taking the most perfect specimens of beauty in the human figure, we see in them symmetry, proportion, unity, and grace—the presence of everything that could add to the idea of perfected existence. In a beautiful tree, such as a fine American elm, we see also the most complete and perfect balance of all its parts, resulting from its growth under the most favourable influences. It realizes, then, perfectly, the finest form of a fine type or species of tree.

"But all nature is not equally beautiful. Both in living things and in inorganized matter, we see on all sides evidences of nature struggling with opposing forces. Mountains are upheaved by convulsions, valleys are broken into fearful chasms. Certain forms of animal and vegetable life, instead of manifesting themselves in those more complete and perfect forms of existence, where the matter and spirit are almost in perfect harmony, appear to struggle for the full expression of their character with the material form, and to express it only with difficulty at last. What is achieved with harmony, grace, dignity, almost with apparent repose, by existences whose type is the beautiful, is done only with violence and disturbed action by the former. This kind of manifestation in nature we call the picturesque.

"More concisely, the beautiful is nature or art obeying the universal laws of perfect existence (*i. e.* Beauty), easily, freely, harmoniously, and without the *display* of power. The picturesque is nature or art obeying the same laws rudely, violently, irregularly, and often displaying power only.

"Hence we find all beautiful forms characterized by curved and flowing lines—lines expressive of infinity, of grace, and willing obedience : and all picturesque forms characterized by irregular and broken lines—lines

expressive of violence, abrupt action, and partial disobedience, a struggling of the idea with the substance or the condition of its being. The beautiful is an idea of beauty calmly and harmoniously expressed; the picturesque an idea of beauty or power strongly and irregularly expressed. As an example of the beautiful in other arts, we refer to the Apollo of the Vatican; as an example of the picturesque, to the Laocoon or the Dying Gladiator. In nature we would place before the reader a finely formed elm or chestnut, whose well balanced head is supported on a trunk full of symmetry and dignity, and whose branches almost sweep the turf in their rich luxuriance; as a picturesque contrast, some pine or larch, whose gnarled roots grasp the rocky crag on which it grows, and whose wild and irregular branches tell of the storm and tempest that it has so often struggled against.

"In pictures, too, one often hears the beautiful confounded with the picturesque. Yet they are quite distinct; though in many subjects they may be found harmoniously combined. Some of Raphael's angels may be taken as perfect illustrations of the beautiful. In their serene and heavenly countenances we see only that calm and pure existence of which perfect beauty is the outward type; on the other hand, Murillo's beggar boys are only picturesque. What we admire in them (beyond admirable execution) is not their rags or their mean apparel, but a certain irregular struggling of a better feeling within, against this outward poverty of nature and condition.

"Architecture borrows, partly perhaps by association, the same expression. We find the beautiful in the most symmetrical edifices, built in the finest proportions, and of the purest materials. It is, on the other hand, in some irregular castle formed for defence, some rude mill nearly as wild as the glen where it is placed, some thatched cottage, weather-stained and moss-covered, that we find the picturesque. The Temple of Jupiter Olympus, in all its perfect proportions, was prized by the Greeks as a model of beauty; we, who see only a few columns and broken architraves standing, with all their exquisite mouldings obliterated by the violence of time and the elements, find them picturesque.

"To return to a more practical view of the subject, we may remark, that though we consider the beautiful and the picturesque quite distinct, yet it by no means follows that they may not be combined in the same landscape. This is often seen in nature; and indeed there are few landscapes of large extent where they are not thus harmoniously combined.

"But it must be remembered, that while landscape gardening is an imitation of nature, yet it is rarely attempted on so large a scale as to be capable of the same extended harmony and variety of expression; and also, that in landscape gardening as in the other fine arts, we shall be more successful by directing our efforts towards the production of a *leading* character or expression, than by endeavouring to join and harmonize several.

"Our own views on this subject are simply these. When a place is small, and only permits a single phase of natural expression, always endeavour to heighten or to make that single expression predominate; it should clearly either aim only at the beautiful or the picturesque.

"When, on the contrary, an estate of large size comes within the scope of the landscape gardener, he is at liberty to give to each separate scene its most fitting character; he will thus, if he is a skilful artist, be able to create great variety both of beautiful and picturesque expression, and he will also be able to give a higher proof of his power, viz. by uniting all those scenes into one whole, by bringing them all into harmony. An artist who can do this has reached the ultimatum of his art.

"Again and again has it been said, that landscape gardening and painting are allied. In no one point does it appear to us that they are so, more than in this—that in proportion to the limited nature of the subject should simplicity and unity of expression be remembered. In some of the finest smaller compositions of Raphael, or some of the landscapes of Claude, so fully is this borne in mind, that every object, however small, seems to be instinct with the same expression; while in many of the great historical pictures, unity and harmony are wrought out of the most complex variety of expression.

"We must not be supposed to find in nature only the beautiful and the picturesque. Grandeur and sublimity are also expressions strongly marked in many of the noblest portions of natural landscape. But, except in very rare instances, they are wholly beyond the powers of the landscape gardener, at least in the comparatively limited scale of his operations in this country. All that he has to do, is to respect them where they exist in natural landscape which forms part of his work of art, and so treat the latter, as to make it accord with, or at least not violate, the higher and predominant expression of the whole.

"There are, however, certain subordinate expressions which may be considered as qualities of the beautiful, and which may originally so prevail in natural landscape, or be so elicited or created by art, as to give a distinct character to a small country residence, or portions of a large one. These are simplicity, dignity, grace, elegance, gaiety, chasteness, &c.

It is not necessary that we should go into a laboured explanation of these expressions. They are more or less familiar to all. A few fine trees, scattered and grouped over any surface of smooth lawn, will give a character of simple beauty; lofty trees of great age, hills covered with rich wood, an elevation commanding a wide country, stamp a site with dignity; trees of full and graceful habit or gently curving forms in the lawn, walks, and all other objects, will convey the idea of grace; as finely formed and somewhat tall trees of rare species, or a great abundance of bright climbers and gay flowering shrubs and plants, will confer characters of elegance and gaiety.

"He who would create in his pleasure-grounds these more delicate shades of expression, must become a profound student both of nature and art; he must be able, by his own original powers, to seize the subtle essence, the half-disclosed idea involved in the finest parts of nature, and to reproduce and develop it in his landscape garden.

"Leaving such, however, to a broader range of study than a volume like this would afford, we may offer what, perhaps, will not be unacceptable to the novice—a more detailed sketch of the distinctive features of the beautiful and the picturesque, as these expressions should be embodied in landscape gardening.

"The beautiful in landscape gardening, Fig. 15, is produced by outlines whose curves are flowing and gradual, surfaces of softness, and growth of richness and luxuriance. In the shape of the ground, it is evinced by easy undulations melting gradually into each other: in the form of trees, by smooth stems, full, round, or symmetrical heads of foliage, and luxuriant branches often drooping to the ground,—which is chiefly attained by planting and grouping, to allow free development of form; and by selecting trees of suitable character, as the elm, the ash, and the like: in walks and roads, by easy flowing curves, following natural shapes of the surface, with no sharp angles or abrupt turns: in water, by the smooth lake with curved margin, embellished with flowing outlines of trees, and full masses of flowering shrubs—or in the easy winding curves of a brook. The keeping of such a scene should be of the most polished kind,—grass mown into a softness like velvet, gravel walks scrupulously firm, dry, and clean; and the most perfect order and neatness should reign throughout. Among the trees and shrubs should be conspicuous the finest foreign sorts, distinguished by beauty of form, foliage, and blossom; and rich groups of shrubs and flowering plants should be arranged in the more dressed portions near the house. And finally, considering the house itself as a feature in the scene, it should properly belong to one of the classical m des; and the Italian, Tuscan, or Venetian forms are preferable, because these have both a polished and a domestic air, and readily admit of the graceful accompaniments of vases, urns, and other harmonious accessories. Or, if we are to have a plainer dwelling, it should be simple and symmetrical in its character, and its verandah festooned with masses of the finest climbers.

"The picturesque in landscape gardening, Fig. 16, aims at the production of outlines of a certain spirited irregularity, surfaces comparatively abrupt and broken, and growth of a somewhat wild and bold character. The shape of the ground sought after, has its occasional smoothness varied by sudden variations, and in parts runs into dingles, rocky groups, and broken banks. The trees should in many places be old and irregular, with rough stems and bark; and pines, larches, and other trees of striking, irregular growth, must appear in numbers sufficient to give character to the woody outlines. As, to produce the beautiful, the trees are planted singly in open groups to allow full expansion, so for the picturesque, the grouping takes every variety of form; almost every object should group with another; trees and shrubs are often planted closely together; and intricacy and variety—thickets—glades—and underwood—as in wild nature, are indispensable. Walks and roads are more abrupt in their windings, turning off frequently at sudden angles where the form of the ground or some inviting object directs. In water, all the wildness of romantic spots in nature is to be imitated or preserved; and the lake or stream with bold shore and rocky, wood-fringed margin, or the cascade in the secluded dell, are the characteristic forms. The keeping of such a landscape will of course be less careful than in the graceful school. Firm gravel walks near the house, and a general air of neatness in that quarter, are indispensable to the fitness of the scene in all modes, and indeed properly evince the recognition of art in all landscape gardening. But the lawn may be less frequently mown, the edges of the walks less carefully trimmed, where the picturesque prevails; while in portions more removed from the house, the walks may sometimes sink into a mere footpath without gravel, and the lawn change into the forest glade or meadow. The architecture which belongs to the picturesque landscape, is the Gothic mansion, the old English or the Swiss cottage, or some other striking forms, with bold projections, deep shadows, and irregular outlines. Rustic baskets, and similar ornaments, may abound near the house, and in the more frequented parts of the place."

BARRACK GARDENS.

The suggestion thrown out at p. 283, that gardens should be established for the purpose of providing wholesome and profitable entertainment for the soldiery, has, we are glad to find, received the countenance and approbation of the journals consecrated to the interests of the British army. Thus encouraged, we proceed to the consideration of the second branch of the subject, namely, the means which should be adopted for forming the plantations, and initiating the men into the art and science of cultivating their little possessions.

Spread over the United Kingdom there are, we believe, some hundreds of barracks of various dimensions, suited to the size of the fortress to which they may be attached, or to the amount of the garrison destined to occupy them. In some places, the barracks are capable of accommodating two or three thousand men, in others there is not space for the reasonable reception of one hundred soldiers. And we believe, under the alterations which have taken place in the coast defences, the establishment of railways, which facilitate the concentration of troops upon emergencies, and the abolition of military stations which have ceased to be of any political consequence, several of the barracks are totally unoccupied, and likely to remain so.

Now to propose the formation of gardens in localities where soldiers are never likely to be quartered, or to be quartered so seldom, and for such brief periods, as would shut out all prospect of their being able to bring any of the fruits of the earth to maturity, would be extreme folly. We therefore would have the addition of gardens limited to those cantonments which are constantly occupied ; and, perhaps, as an experimental essay would be preferable, at first, to the comprehensive adoption of our scheme, it might be advisable to begin with the larger garrisons, gradually extending the system to the lesser barracks, as the plan should be found to answer.

We would suggest, then, that the vicinity of the barracks at Chatham, Portsmouth, Winchester, Weedon, Manchester, Deal, Chester, Edinburgh, Glasgow, Dublin, Limerick, Cork, and Kilkenny be the first localities selected, always providing that there is ground enough in and around them available at a small cost, for gardening purposes. We do not suppose that at a time when the financial reformers are opposing themselves to any extraordinary outlay on behalf of the army and navy, the Government would go the length of purchasing ground upon which houses may be standing, for the purpose of removing all obstructions to the formation of military plantations. From at least two to three acres of land, however, being applicable without this expense, the first thing to be done is, of course, to enclose it, and prepare the ground for the reception of seed. To this end a couple of practical gardeners, sufficiently versed in the first principles of geology to be able to determine the best method of primary treatment, should be engaged, and that their strict and constant attention to their duty may be secured, it would be advisable that they should be formally enlisted, at once promoted to sergeants, to ensure obedience to the instructions they may give to their subordinate labourers, and placed upon a scale of pay commensurate with the ordinary earnings of *civil* gardeners. To enclose three acres of ground with protective palings, until a *chevaux de frise* of hedge row had been matured, would cost but little, and this sum the Government might be invited to grant at once, with an addition for the purchase of mould, gravel, manure, barrows, hoes, spades, rakes, and such other *materiel* as might be indispensable to the due preparation of the allotment.

In laying out the ground, it would be advisable to form ten distinct divisions, or as many more as the space would allow, so that each company of a regiment (we believe the regiments generally consist of ten companies), might have a separate space. This plan, while it prevented confusion of property, would tend to excite emulation among the companies.

As the Barrack Gardens would be intended more for an entertainment than an occupation, it would be unadvisable that any man should be required to work in them, or subscribe his spare pence for the purchase of seeds, unless he had taste or inclination for the pursuit. Every inducement ought, however, to be held out to the soldiery to share in the healthful employment. To them only should the fruits of the garden belong, to consume or dispose of as they might feel inclined. Premiums might be awarded for superior industry, or the production of a superior specimen of edible vegetation, or a more beautiful flower or plant ; and when vacancies occur in the situation of sergeant-gardener, the promotion should be made from among those men who had most distinguished themselves by their labour, obedience, and horticultural skill. Although, for the sake of securing their services in the infancy of the gardens, we have recommended the enlistment of the gardeners, it would not be expedient to continue them longer in the service than might be necessary for the due initiation of the uninformed men in the practical parts of horticulture. On

giving them a twelvemonth's notice they should be prepared to receive their discharge, and in like manner with six months' notice, they ought to be allowed to claim it. The way is thus paved to the promotion of the studious disciples of the art, and the service relieved of men who would, in time, become useless burdens upon the finances of the country, unless they were made to combine the labours of the garden with the military duties of the country.

To protect the little plantation from rude invasion or wanton injury, a sentry should be placed at the entrance gate ; and as some difficulty would attend the making this a voluntary service upon the part of the soldier-gardeners, the commanding officer of a regiment might fairly enough impose the work upon the whole corps in due rotation. Sentinels are placed over the bad and ill-conducted soldiery ; it is, surely, no great additional tax to demand that they should be employed in the service of the creditable and industrious.

It has been represented to us that some of the barracks in Great Britain are, like the St. George's Barracks in London, so surrounded by buildings that it would be impossible to carry out our scheme without trenching upon the parade ground;—while, in the manufacturing districts, the quarters of the soldiery are immediately within the influence of the smoke of factories, so prejudicial to the healthiness of vegetation. Without stopping to anathematize a system which debars to hundreds of the most valuable servants of the State the blessings and advantages of free ventilation, we meet the objection that has been advanced by suggesting that wherever it is impracticable to create gardens at the very doors of the soldiers' dwelling, they should be formed at convenient distances from the barracks. No difficulty is advanced by the men on the score of the remoteness of an ale-house ; the well-disposed are not therefore likely to be disinclined to walk a few hundred yards to indulge in a pastime congenial to their inclinations and promotive of their welfare.

In regulating the subscriptions of the men to the first expenses of gardens, much will depend, of course, upon the size of the ground applicable to the plantations, the quality of the vegetables, fruits, and flowers the temporary proprietors may be disposed to rear, and the amount allowed by the Government in the first instance. In any event, however, a very few pence from each soldier will suffice ; and as the *capital* so employed will return a handsome interest in the shape of produce, (to say nothing of the entertainment purchased, and the health unconsciously promoted,) we cannot anticipate any objections to the necessary deduction from pay. As we said in our former article upon this subject, it should be impressed upon the men that, although they may sometimes be ordered to march to another station before they can reap the reward of their industry and outlay, they will, in all probability, find a garden equally prepared in their new location. By making the system general, this end would be secured by the Government, excepting in cases of the embarkation of troops for a distant colony, or other foreign service. In such events, the men might receive an indemnity for their outlay and the barrack-master could arrange for the disposal of the produce to some market-gardener, unless the departing regiment was immediately succeeded by another.

It need scarcely be added that we contemplate the extension of our project to India, the Colonial Stations, and the Mediterranean. Indeed, we are much mistaken if greater facilities will not be found in those places for the establishment of gardens, than in almost any part of the United Kingdom where troops are quartered.

Generally speaking, there will be found plenty of men in the ranks well acquainted with all the routine of practical gardening, and in such cases there would be no occasion to seek for a gardener elsewhere ; but the gardener to the barracks, whether taken from the ranks, or otherwise, should be a permanent appointment, and not be removed with the regiment. If there were any difficulty arising out of the property which the labourers may be supposed to have in the stock of the garden, let there be a low scale of payment for all who work in the garden, and let all who work be paid. The soldier would then have his choice whether he worked or remained idle, and there only need be compulsory labour when necessity pressed ; but if soldiers have other modes of employing their time—and this is frequently the case—it would be hard to force them to labour on a garden at a disadvantage to themselves. There would be this advantage in barrack gardening, which does not occur in all cases, the produce can always be disposed of. There is no reason why cabbages and potatoes, carrots, or any other vegetable, should not be distributed as well as their bread, and the quantities of the various crops could be so regulated as to afford this. In such case a man could do as he pleased about eating the produce, or disposing of it. It may be that the soldier's pay will not afford money for seeds, and there might be many objections to any of them being called upon for contributions in the form of money ; and the difficulty which has only been glanced at, of regulating claims on

the removal of the men, would perhaps prove more formidable than has been imagined. Nothing, however, could be more simple than making the garden and all its contents as much Government property as the barracks themselves; there would then be no difficulty; and by allowing none but useful crops to be grown, and confining them as much as possible to things of a permanent nature, in the same way as we should the crops for cottagers, the advantage to the men would be great. We do not see why the garden should not be a necessary appendage to the barracks; nobody will dispute that vegetable food is wholesome and nutritious, and whether it were actually attached to the establishment, or a mile or two off, healthful and profitable employment at times when industrious men would be, under the present system, unemployed, must effect a change for the better. Idleness is the parent of vice; men will be doing something, and if not led to something good, they will be soon engaged in something bad. However lightly, therefore, we may have touched upon this matter, we regard it as a most important measure as regards the health, comfort, and morals of the British soldier.

The site of the garden being chosen, and supposed, for our purpose, to be without any fencing, the deficiency must be supplied in the way most easily accomplished according to the facilities afforded in the neighbourhood. If wood be attainable for cutting, a rough fence may be constructed by the men themselves; but supposing there be none, and the soil itself has to be used, let there be a ditch three feet wide and deep dug all round, and the soil taken out will form a bank three feet wide and somewhat higher inside. This is mere labour. There is, however, nothing new in soldiers working in trenches. All the slopes of the bank, within the garden, may be planted. It would not be lost ground, and especially on the south and west sides it would be warm and valuable. In removing the soil from the ditch or trench it may be found that the top soil is the best; this, therefore, should be thrown within the bounds as far as possible, it being valuable for the top spit of soil. When the whole is done, the poorer soil must be placed bank-fashion on the inner edge of the ditch; and when all the stuff that comes out of the ditch is formed into a bank of the angle of 45 degrees, and straight with the side of the ditch, the inner slope may be regulated, and all the top spit laid on the inner slope, so that it would form available space for crops. Briers may or may not be planted on the outer slope, a foot from the top of the bank, six inches apart, all the way round, and for two years cut close down, and all future years be regularly trimmed to a compact hedge that would, if kept clear from weeds, be impenetrable; and there is no good reason why the "quick" should not be reared in the garden itself, because the bank and ditch will be sufficient fence or boundary while the quick is growing; and as this would be an easy task, let a piece of ground be dug, or trenched if necessary, and well dunged, make drills six inches apart, and having procured good seed sow it in these drills very thin, nothing nearer than an inch apart; cover about half an inch, and from that time keep the ground clear of weeds. Autumn is the best period for sowing; and when they have had one year's growth you may plant or bed them out, about two inches apart, in rows, and the rows six inches apart, in well-dressed ground; or if the bed they come out of be dug well, and the lumps bruised, the same ground will do, as far as it goes, with a little fresh dressing. When they have had another year's growth you may plant your hedge with them, or give them a third year's growth before you use them. They will be good thick stuff, and two or three feet long, at the end of the second year, and large enough for anything if they have grown well. When you plant them out on the bank, let them be placed at right angles with the slope of the bank, which will be, of course, pointing outwards; shorten every one to three inches out of ground, and when they have had a year's growth on the bank, cut them down again pretty close to the old place; in other words, cut away all but an inch or two of the new growth, and from that time trim in and down, so that the hedge becomes solid at the bottom, and would hardly let a mouse through. It is of the highest importance that the bank, ditch, and hedge be thoroughly cleared of weeds, and kept clear, for nothing sooner destroys a young hedge than choking it with weeds. The place once enclosed, we turn to look to the laying it out, path or road making, and cropping it; but this will come under another head; we are not entering upon details at present. If the garden be cultivated by regimental labour, and its produce shared by the military in barracks, there will be in all respects a *quid pro quo* for the Government, to say nothing of the improved morals of the soldier, which is no small consideration; and the keeping up of a garden under such circumstances is no more than keeping the barracks clean. There may be fifty regulations adopted for the production of the necessary labour, without trenching upon what may be called the implied rights of the soldier. Those at work in the garden might be excused from particular duties, in the same way that officers' servants selected from the ranks are; and there is certain to be

men enough in a regiment well acquainted with the gardening necessary for barrack supply, to enable them to be changed or take turns. Of the crops, the culture, and general routine, as well as of the laying out, and apportioning the ground to different uses, we may write hereafter; all we have to do with here, is the principle, and the practicability of gardens for barracks; and this once admitted, we may offer details, rules, regulations, and useful hints for carrying out the plan upon the most effective scale.

Canterbury Bell.

Wall-flower.

GARDENING FOR CHILDREN.*

Before noticing the second edition of a little book under the title we have quoted at the head of these remarks, we shall briefly explain our ideas as to the proper *manner* of teaching juvenile gardeners.

The greatest care should be taken to let the pupil's very first lessons be good in their way, and to explain the motive for the act. Show the young horticulturist how to dig, and tell him why the ground is dug—what is the effect of digging. Show him how to use the hoe and the rake, and tell him why they are used. See that he is not allowed to do a single act in his garden, without first knowing its object; and by no means allow him to do anything that is improper.

Make him begin by raising plants himself. Let him sow the seeds, and see their progress; choose for him some that soon perfect themselves, others that are longer growing; some that are to bloom where they are sown, others that require, or that, at least, will bear planting out. The chief should be annuals; but a few biennials and perennials will be desirable for appearance, and he will thus easily be taught the difference between these three very distinct classes. Where there are many pupils, or, indeed, more than one, see that the same subjects be not raised by several, because it would incur a waste, and lessen the varieties

* "Gardening for Children." Edited by the Rev. C. A. Johns, B.A., F.L.S., author of "Botanical Rambles," "Forest Trees of Britain," "A Week at the Lizard," &c. Second edition. London: Charles Cox, King William-street, Strand; Oliver and Boyd, Edinburgh; and J. Robertson, Grafton-street, Dublin.

cultivated among the mass. We, of course, make an exception as to those things which must bloom where they are sown; but it would be unwise to see half-a-dozen youths sowing sweet-williams, columbines, wall-flowers, ten-week stocks, China asters, and other subjects of which one little patch would supply the whole. It is better to let each boy sow some one thing for general distribution, and thus increase the number of subjects without overstocking anybody.

We need hardly say that we should confine the gardening, in the first instance, to flowers, first, because it is more likely to gratify the young gardeners; secondly, because they are pretty sure to succeed more or less; thirdly, because a much less plot of ground would be sufficient for each pupil, while the lessons afforded, and the experience to be gained, are equally valuable.

The very first lesson will naturally be digging. The implements first required are a line strong enough to bear stretching very tight; there are proper irons made to wind these lines on. The single spike of iron which has one end of the cord tied to it is thrust hard into the ground, and the winder on which the whole length of the line is wound is carried to the place where the other end of the line is to reach. When the right length is unwound, wind up, pulling close on the regular winder, but make a few turns round the spike itself, which has to be thrust into the ground, so that the line is quite tight; so tight, that if it be moved three or four inches one way or the other it will spring back into its place. The first use that will here be made of this line will be to mark out the piece of ground intended for the pupil, which may be done various ways. The best of all methods of dividing these plots is by paths or alleys of not less than eighteen inches width, between each pupil's allotment. In this case the line is to be stretched at the edge of the path, and the edge chopped three or four inches down with a spade, (which should be the same depth as a man's spade, but only half the width,) by standing in the path, and pressing the spade down three or four inches; then bending it back to loosen the soil in front of the spade, merely shovel it inwards. The tight line which is even with the surface of the ground shows where the spade is to be put down, and it will be necessary to show the youth how to begin, that he may not adopt a more troublesome or difficult way than is necessary to accomplish a very simple object. When you have shown him how to do it, by partly doing, and partly making him do half-a-dozen spades' width, he may be left to himself, except keeping an eye on all the pupils, to see that they do not get awkward. When the piece of ground is thus well defined, so that they see how much there is to dig, the path between two gardens will form a hard undisturbed piece, cut down sloping on each side towards the allotments. The digging then may be begun. Gardeners can dig, and some can even draw drills, without lines; but young ones must go by rule first, as the pupils at writing learn by lines ruled for them, though, after much practice, they write better without; therefore, stretch the line across the bed, or if it be pretty wide across, only one-half of it, just one foot from the end, and let the pupil dig out a trench the depth of his spade and the foot wide, wheeling the stuff to the other side, if the trench be half across; but to the other end altogether if it be all across, because this soil is to fill up the last trench when the digging is finished. When the trench is dug out let the line be placed further back, or, if you have time, chop a sort of mark for the pupil, a foot backwarder, and show him how to dig this out so as to fill up his first trench with the earth, and leave a second one empty. He need not dig back more than two or three inches at a time, because he would not have strength to lift the soil; but it will be of great assistance to mark him a foot at a time, that he may not get materially out of line, and he should also be guarded or cautioned to keep the surface pretty level. If the bed has been divided into two, and the pupil has come to the end trench, he must begin the other half in the same way as he did the first, by making a trench a foot wide, and with the stuff fill up his end trench; but, if the whole of the bed has been dug at once, instead of dividing it, the end trench will have to be filled with the stuff wheeled away from the first trench at the beginning of the digging. Supposing it, however, to be divided, the pupil continues working the other half backwards towards the end he set out at; and when he has made his last trench, he fills it up with the stuff he took out of the first, which is close to his work. Now in all this a youth can hardly go wrong if fairly started, and then he must be told why all this labour has been expended on his plot of ground. He should be told that the digging of the earth lets the atmospheric air into it, which is very beneficial to the roots of plants; that it breaks the lumps, and lightens it so that the seeds can vegetate and send their roots into it freely; and it so loosens it that the rains or artificial watering can soak into it, and penetrate every part, so as to nourish whatever may be depending on it for support.

The next lesson to give a child is the use of the rake, the instrument with which the lumps on the surface left by the spade and the

inequalities which remain after digging are broken and laid level. Show him that the lumps may be broken by striking them with the back of it, and spread abroad and levelled with the teeth, which should be drawn and pushed backward and forward all over the surface until it is even and smooth. Of course the smoother it is left with the spade after digging the less there will be to do with the rake, and the rougher it is left from digging the more labour there is to level it. If any part of the ground is to be sown "broad cast," as it is called, which means evenly all over it, the rake is of use in another capacity, because when the seed is sprinkled over the surface, the rake is used to stir all the surface, so as to let the seeds into the ground; but there is another way of sowing, which brings us to the use of another implement, the hoe: this is, sowing in drills or rows. In this operation the garden-line is stretched tight where you wish the row of seed to be sown. With the corner of the hoe a furrow is made, by drawing it along the line and pressing it gently into the soil; when the furrow or drill is made according to the depth required, and even all the way, the line has to be removed to the distance that the next row is to be, which of course is according to the space intended between the rows, for, according to the seed intended to be sown, there may be three inches, or any other distance up to as many feet. The hoe is always used for this among other purposes, but it should be explained that it is also used to chop up weeds and plants, which are to be thinned, and which operation may be shown at the proper time. In these drills, as in broad cast, the youth should be shown how to spread the seed very thinly and very evenly, not so close as to impede each other's growth and waste the seed; and he should also be shown that if the seed be fairly covered it is all that can be required. Generally, however, the larger the seed the deeper it may be placed in the ground; and it is no bad rule to cover seed with as much soil as the seeds are thick, so that peas and lupines would be deeper than mignonette or larkspurs.

It may, however, be expected that we should say something of the plan of the gardens before there is any sowing, but in plots all alike and upon too small a scale to exercise any ingenuity there can be hardly any plan. The very best that could be adopted by the principal of a school would be beds of four feet wide, because they can be managed without trampling on them, and admit of being treated as two borders of two feet wide, or one border of four feet wide; or part of each may be treated as a bed, particularly for any subject which the youth may be desirous of cultivating in particular. The seeds that are to bloom where they are sown may be placed in patches those which require planting out may be sown in drills across the bed. In families where children have their little plots, the same care should be taken to form the plots alike, and, if possible, four feet, or three feet six, should be the width, because it is the width which is suggested by all bed culture in mature gardening; and in all things, the nearer the child's recreation is like proper gardening the more real service it does him. Find the young gardener in the seed best adapted for his success and therefore gratification. Mignonette will do to bloom where it is sown, and will also plant out well to fill up future vacancies. Sweet peas will engage him in the operation of sticking; two or three roses at the proper time for planting out will be pleasing and attractive; but let all his perennials and biennials be his own raising, or raised under his observation, as would be the case if some are raised by his brothers or brother-pupils at home or at school. He will take infinitely more interest in them than if they are given to him ready to flower, which is too often the case; for see a child's garden where we will, there are to be found unhealthy plants moved too forward to do any good, and therefore only calculated to excite feelings of disappointment, by comparison with others more healthy, or plants of the same growth where the sickly ones came from: whereas, if the youth sows at a proper time, is taught to thin them where they are sown, and to plant out those that require it, these productions will be as flourishing as any others about them or near them. This gives the young gardener unalloyed pleasure. He sees his efforts succeed, his ambition is aroused, and he becomes an enthusiast in one of the most useful and gratifying occupations,—an occupation which enlarges the mind, and teaches youth the necessity and the value of forethought, without which gardening would be a mere farce. As soon as the seeds are up, and the plants well growing, the attention of the pupil should be directed to thinning them out where they are too thick to grow well, except those to be planted out, and clearing them of weeds. It should be explained to him that if the plants are too close they have not room to spread and grow, and that the roots being crowded into too small a compass have not sufficient nourishment, and that the only way to remedy this is to remove all but the proper quantity. If they happen to be much too thick, occasion should be taken to show that it is a fault in the sowing, and that they ought not to have been so thickly laid in the ground. Still, as they always require a little thinning, even with good sowing, it may be shown how far apart they should be to blow well; and by no

means ought they to be allowed to leave them thicker than they ought to be ; for nothing detracts so much from healthy growth. In the middle of the bed, and among large plants, the use of the hoe may be shown in weeding; but among small seedling plants hand weeding is the safest. When the seedlings are large enough to plant out, (and we ought to have mentioned that these hardly ever need be thinned, because they are so soon removed after they have begun growing,) the pupil must be shown how to manage this operation. A small piece of wood cut to a tapering form is sufficient to make a hole for ordinary flowers, such as ten-week stocks, mignonette, China asters, balsams and other annuals ; so it is also for columbines, wall-flowers, sweet-williams, Brompton stocks, and perennial lupines ; but planting out to any extent is done with a proper dibble, an implement with a place for the hand like the handle of a spade, and tapering off to a bluntish point, shoed or cased with iron, with which the hole can be made an inch or a foot deep, as may be required ; and when the root is held down in the hole, by thrusting down the dibble by the side of it two or three times the first hole is closed about the roots of the plant. It will be necessary to explain, that mignonette and ten-week stocks, balsams, China asters, and such like annuals, may be planted out in threes : make a circle with the top of a six-inch flower-pot, and plant them in the circle six inches from each other; they will have abundant room, and even if one be placed in the centre it will matter but little; they are for border flowers, and are not required to be developed so finely as those in beds or pots ; but three on the circle will be enough. With regard to the perennials, they may be planted out later, but ought not to be less than a foot apart, except in nursery beds, from which they are again to be removed, and in which six inches apart will do, because they do not remain to grow their full size. If they are to be planted out where they are to bloom, the next year they must be a foot from each other and from every thing else ; and the young gardener should be told the reason, which is, because they require a foot of room to grow in perfection, and even more would be better if there were abundance of room. As the seedlings advance, the pupil should be taught to support those that require it,—for instance, he must place small branches of wood to the sweet peas, to allow them to grow up among them for support, and place sticks to any tall-growing annuals that require it, as nothing looks worse than to see the advancing stems of flowers leaning and lopping about. He must be taught also to give them water in very dry weather, with a watering-pot that has a rose, to enable him to sprinkle all over the surface like rain, or by taking it off to pour a full stream if necessary. He must be constantly reminded of weeding, for in the growing months weeds would soon get the upper hand of the crops or flowers, and overrun the whole plot if not hoed out or pulled out pretty often ; indeed as fast as they grow the necessity of cleanliness cannot be too earnestly impressed on his mind—neatness and tidiness not only in keeping all flowers properly supported, but all decayed flowers and stems cut down, all that have done flowering removed, and so on. Again, as China asters and some other plants will plant out late as well as early, some may be planted out in the places where the earliest things come off, and by blooming later in the autumn continue the succession of flowers. If inclined to indulge the young gardener with one or two showy plants, two or three dahlias to plant out in June will keep up the gaiety of his garden until the frost cuts them off. Towards the autumn you may direct his attention to bulbs, because it is the time he has to begin providing for his spring flowers. A few crocuses, narcissus, and hyacinths, which should be planted in October or November, will highly gratify a youthful aspirant for floral honours ; and he must be here taught to label the places where he deposits them, with their proper names, and, if he please, their heights and colours, so that he may be able to regulate his other planting accordingly. He must be shown how to remove subjects as soon as their beauty has gone by, and to replace them, if possible, with other things. He must be specially shown how to support his dahlia plants, if he has any, that the wind may not blow them down, nor beat the flowers one against another. As some of the annuals ripen their seed, the young gardener may be taught to save it, and thus provide for future seasons, or put himself into a position for exchanging with others. As we approach the winter months the borders must be kept clear of weeds and decaying plants. Falling leaves must be raked off, and saved with all other decaying vegetation to rot somewhere out of sight, for there is no better manure than the mould formed of rotted leaves. Wall-flowers may be planted about the borders, because they will bloom early in spring, and be out of flower in time to remove them for stocks or other annuals, and this should be well explained to him at the time. The next spring he will see the flowers of his own perennials ; but the columbine, the perennial lupine, and some others, should occupy prominent places ; the wall-flowers and sweet-williams may be renewed every spring by seed, but the perennials need not, for, as he should be told, they are permanent, and may

be increased by merely parting them when they are too big for their places. By simply attending to these hints the children of a family or the youths at a school may in one year become masters of certain garden operations, that will be familiar to them as long as they live; and year after year, as their minds expand, they will seek eagerly for further knowledge. What they will have acquired in one season will be sound, and the limited knowledge they acquire will be a good foundation for whatever may be added to it; nay, if they never learned any more but from their own observation, they will have had an especial service rendered even by this limited teaching. But there is no reason why you should not take them through the kitchen garden to see others work, or even occasionally to do a little themselves, although their own plot must, from its limited size, be only a flower garden; for in the kitchen garden they will see operations on the ground, and changes of crops going on at all times of the year, while their own must be chiefly in the spring and fall. They will know from observation that the same process which raises a China aster will produce a cabbage; the sowing, the cleaning, watering, transplanting are all the same. The mere difference of distances is learned soon. The difference of seasons may be taught as a task in spelling or reading a catechism; but families and schools that will attend to the foregoing, will have good cause to be satisfied that gardening for children is one of the most gratifying and inexhaustible sources of profitable occupation.

Such are some of our notions as to the best method of initiating the young gardener into the practice of this delightful and healthful recreation. The little volume before us takes nearly the same view of the subject. This second edition is greatly improved in the arrangement of its contents; and we observe a considerable addition to the number of illustrations. The text has also evidently undergone revision, and not without advantage. We shall borrow a few illustrative extracts, with the cuts that accompany them :—

DWARF LUPINE.

This is one of the prettiest of the lupines, bearing leaves cut so as to somewhat resemble one's expanded fingers, and spikes of what are called butterfly-shaped flowers. This kind is about a foot in height, and bears long spikes of blue flowers. Sow them where the plants are to remain.

CHINA ASTER.

These are gay star-like flowers, growing a foot or fifteen inches high, upright, but spreading when they once begin to branch. The original has a single flower, in shape like a daisy; but there is a great variety in gardens, and the double and full-quilled sorts only are prized.

Dwarf Lupine.

The colours are various; not only are there all shades of red and blue, both of which appear mixed with white, but the white is mixed singly with all the shades; so that the

China Aster.

Autumn garden is indebted to this flower for a good deal of its gaiety and brilliant effect. The Germans have raised many varieties, which are sold under the name of German asters; and the imported seeds generally

produce very fine varieties. I have selected for you some of the most distinct colours. You had better sow the seeds of each sort

Double Bee-Larkspur.

together in one place, and afterwards plant out the seedlings into the borders, in groups of about three. They want little attention, provided they are kept clear of weeds, and are planted in a moderately good soil.

WALL-FLOWER. [See p. 357.]

The Wall-flower is one of the earliest, the most fragrant, and therefore the most welcome, of our Spring flowers. You should sow them in July and August, in a spot where they may grow for a few weeks without being disturbed, and afterwards plant them out where they are to bloom the next year ; or else transplant them, while they are young, to a nursery-bed, where they may grow stronger, and be, late in the Autumn, removed to their final destination. When these have bloomed, they may be thrown away, and the supply kept up by later sown ones ; for, although biennials can be occasionally kept over their second year by means of cuttings, yet they seldom prove handsome or healthy. Double-flowered varieties are propagated by cuttings planted in April or May.

CANTERBURY BELL. [See p. 357.]

This is a showy, erect plant, bearing a number of very large bell-shaped flowers, which are of different shades of blue or purple, and sometimes white. Some varieties bear double flowers, but they are not so handsome as the single. The seeds may be sown in July, and the plants should be put out singly for blooming.

DOUBLE BEE-LARKSPUR.

A noble plant, growing three feet high and upwards, and bearing a long-branched spike of the most intensely vivid blue flowers, which are of dazzling richness.

Of this I shall give you a plant each, and a stately appearance it will make when it has been established a season. This will not bear seeds, so that you will be only able to propagate it by dividing its root.

HEPATICA.

This is a pretty plant for the front of your bed ; it is not more than six inches high, and throws up a mass of flowers in February or early in March ; the leaves appear later. This is the single blue variety, but there are others, white and pink, both single and double.

Hepatica.

Some useful observations on weeds are also well worth the attention of our little gardeners.

THE BINDWEED,

A species of wild convolvulus, is a very troublesome weed : it has long creeping roots, or rather underground stems, which are very brittle, and most tenacious of life. The stems

are long and wiry, and support themselves by turning round any plants that may happen to grow near them, not only hiding them from sight, but strangling them. So mischievous are they, that if they have been suffered to establish themselves in a shrubbery, they will quickly injure or even kill strong and vigorous shrubs. This and couchgrass, or stroil, are the greatest enemies, as weeds, that the gardener has to contend against; for they will entangle themselves among the roots of other plants, in which case they can only be eradicated by clearing the roots of the plants to which they have attached themselves. They should therefore be picked up as soon as their leaves appear above the ground,—care being at the same time taken to remove every particle of root, or they will grow again.

THE FIELD CONVOLVULUS

Is another very mischievous weed, which can scarcely be eradicated after it has once established itself in a garden. The roots are tough and creep widely; the flowers are very pretty, light pink striped with red, and fragrant.

Field Convolculus.

These directions will enable you to distinguish some of the worst kinds of weeds, but long experience will alone enable you to detect them all. You will sometimes, perhaps, discover that you have been expending your pains in nursing an unsightly weed, for which you have rooted up a favourite plant, the habit of which, in its young state, was unknown to you. This will teach you the necessity of accurately observing the characters not only of full-grown plants, but of the tenderest seedlings: you must learn also to distinguish weeds by their first leaves, and master them before they have mastered you. The gardener who does not begin to clear away weeds until they have thoroughly established themselves, may be compared to a medical man who does not prescribe remedies for a disease until it has assumed its most virulent characters.

In its present form, the little volume, "Gardening for Children," has our warmest commendations.

NEW FLOWERS AND PLANTS.

Mimulus tricolor, *Hartweg* (three-coloured Monkey-flower).—Scrophulariaceæ § Antirrhinideæ-Gratioleæ.—A very pretty little annual plant, growing erect about a foot high, soft, and covered with delicate glandular hairs. The leaves are opposite, pale green, oblong-lanceolate, tapering to the base, slightly toothed on the margin; the leaves are an inch or more in length. The flowers are numerous and pretty, not very large, but about two inches long, having a long and very slender tube, which above the calyx widens into a funnel-shaped limb, with an oblique border, cut into five nearly equal rounded lobes; these flowers grow singly and nearly sessile in the axils of the leaves; the general colour is bright pink, with a deep crimson spot at the base of each lobe, and a bright yellow stain on the lower lip. Native of California, in the plains of the Sacramento

valley. Introduced in 1847 to the garden of the Horticultural Society by Mr. Hartweg. Flowers in the summer months. *Culture.*—Apparently best managed as a half-hardy annual; light rich loamy soil; propagated by seeds.

Mormodes lentiginosa, *Hooker* (freckled Mormodes). — Orchidaceæ § Vandeæ-Catesidæ.—A curious and rather pretty epiphyte, having oblong round pseudo-bulbs, which, when young, are nearly globose. These bear several leaves, each a span long, lanceolate, and striated. From the base of the pseudo-bulbs grows the flower scape, a foot or a foot and a half long, bearing a raceme of pale reddish-brown flowers, everywhere sprinkled with darker coloured dots, the column being of a deeper colour than the rest of the blossom; the sepals and petals are oblong, acute, with the margins recurved; the former are directed backwards, and the latter forwards; the lip is fleshy, obovate, with the sides curved back, like the flaps of a saddle. The flowers are drooping, so that the sepals stand upright and the petals point downwards. Native of Central America. Introduced about 1847, by Mrs. Lawrence, of Ealing Park. Flowers in April. *Culture.*—Requires a stove; turfy peat soil; propagated by division. In winter it should be kept rather dry.

Wistaria sinensis, *var. alba* (white Chinese Wistaria).—Leguminaceæ § Papilionacæ-Galegæ.—The old lilac-flowered *Wistaria* (or Glycine) *sinensis*, is well known. Like that plant, the present variety is a deciduous shrub, with long trailing woody branches, bearing pinnate leaves, with rather large oval leaflets, and in the spring producing long drooping bunches of the pea-like blossoms. In this variety, however, the blossoms are quite white. The Chinese are said to have many varieties of this plant. The present is spoken of as a much less attractive plant than the old one; but it would no doubt produce a pretty effect when in blossom, if either trained with or inarched upon the common sort. Native of China. Introduced about 1846 to the garden of the Horticultural Society. Flowers in May. *Culture.*—Hardy; requires a strong rich loamy soil; propagated by layers.

Alloplectus capitatus, *Hooker* (capitate Alloplectus).—Gesneraceæ § Gesnereæ.—A beautiful tall-growing, robust, soft-stemmed plant, but little inclined to branch, the stems fleshy, and bluntly four-angled, clothed in the upper part with short, dense, blood-coloured, velvety down. These bear large spreading or somewhat drooping leaves, which are ovate acute, with serrated margins, clothed all over with velvety down, and of a rich deep green colour on the upper surface, with a blood-coloured midrib; they are from ten inches to a foot in length. The flowers grow in a large dense umbellate head, and are very showy; the calyx is large, consisting of five broad downy cucullate sepals, of a rich blood colour; the corolla, comparatively small, consisting of a ventricose tube, terminating in a small mouth of five small rounded segments; its colour is yellow, forming, as it were, an eye to the broad expanded calyx. Native of tropical America. Introduced in 1848. Flowers in March and April. It is the *Alloplectus speciosus* of gardens, but not of Poeppig. *Culture.*—Requires a stove; semi-epiphytal; should be potted in loose peat, and in winter not over-watered; propagated by cuttings of the stems and leaves.

Cœlogyne asperata, *Lindley* (rough-lipped Cœlogyne).—Orchidaceæ § Epidendreæ-Cœlogynidæ.—Much the finest of all the Cœlogynes. It is an epiphytal plant, bearing pendulous racemes of noble blossoms, in spikes nearly a foot long, containing each from twelve to fourteen flowers, which are three inches wide when spread open; the sepals are lanceolate, keeled; the petals narrower, and without a keel; these parts are of a pale cream colour; the lip is cucullate, with erect ovate lateral lobes, and an intermediate oblong crisped one, the disc being broken in a rugged verrucose manner; this organ is richly marked with brownish-yellow veins, springing from the rugged bright orange central ridge. The beauty of these fine blossoms is heightened by the presence, at the base of each, of a brown concave dry bract, which by contrast produces this effect. Native of Borneo. Introduced in 1848. Flowers in May. *Culture.*—Requires a hot moist stove; turfy peat soil; propagated by division of the plant.

Epidendrum fragrans, *var. megalanthum* (large sweet-flowered Epidendrum).—Orchidaceæ § Epidendreæ-Læliadæ.—A very desirable epiphyte, belonging to a species which is not very attractive in appearance, but possesses a delicious fragrance. The present variety is one producing very large blossoms; they are fully four inches in diameter, the colour a pale greenish white, the lip vividly marked by clean stripes of very rich crimson. Native of Guatemala. Introduced by G. U. Skinner, Esq. in 1848. Flowers in May. *Culture.*—Requires a cool part of the orchid house; turfy peat soil; propagated by division of the plant.

Amherstia nobilis, *Wallich* (splendid Amherstia).—Leguminaceæ § Cæsalpinieæ-Amherstieæ.—One of the most splendid of tropical trees. It has large pinnate leaves, with from six to eight pairs of elliptic leaflets, and bears its flowers in magnificent axillary racemes, each blossom hanging on a long pendulous crimson stalk. There is first a

pair of lanceolate acute opposite bracts; then the peduncle is continued onwards, in the form of a calyx tube, dividing into four linear-lanceolate obtuse sepals ; then come five petals, of unequal form, the two inferior ones being minute, the two lateral ones wedge-shaped and spreading, deeply tipped with yellow, and the larger obcordate and clawed, the claw being white ; the rest of the flower is vermilion coloured, the upper larger petal being spotted, and marked with a yellow blotch. The stamens are very long, curved, and diadelphous. This magnificent plant has been flowered for the first time in England by Mrs. Lawrence, of Ealing Park, though it was first introduced in a living state some years previously by the Duke of Devonshire. Native of the East Indies, "around the hill at Kogun on the Saluen river, in the province of Martaban." Introduced in 1837. Flowers in April. The Birman name is *Toha*. Of Mrs. Lawrence's flowers, "the first raceme was fitly sent to her most gracious Majesty Queen Victoria." *Culture*.—Requires a strong moist heat; good loam and peat, with bottom heat ; propagated by cuttings planted under a bell-glass, in sand, and placed in bottom heat.

Ophrys mammosa, *Desfontaines* (teated Ophrys).—Orchidaceæ § Ophreæ-Serapiadæ. A curious tuberous-rooted herbaceous plant, growing with a short upright stem, furnished on the lower part with a few narrow leaves, and at the upper part continued into a flowering raceme. The flowers in this genus have a singular resemblance to some insect, but in this case it is less striking than in many others ; the sepals are ovate and green coloured ; the petals are lance-shaped, and have a rosy tinge ; the lip, which is the part which assumes the insect form, is of a deep chocolate-brown colour, with a pair of parallel bluish lines passing down the middle, having a downy surface, and two prominent mammæ-like spaces on the side of its lip. Native of Asia Minor. Introduced about 1846. Flowers in June and July. *Culture*.—Requires slight protection ; loamy soil; propagated very rarely by seeds.

Pæonia Moutan, *var. atrosanguinea* (dark blood-coloured Tree Pæony).—Ranunculaceæ § Helleboreæ.—One of the varieties of the Tree Pæony, and a very handsome one, the darkest of all the varieties yet in cultivation. The foliage is compound, the segments narrow and pointed. The flowers are a good double, the outer petals large, and mostly entire, the inner ones smaller and lobed ; the colour is a dark crimson. Native of China. Introduced in 1846 to the garden of the Horticultural Society. Flowers in May. *Culture*.—Hardy ; good loam and peat soil ; propagated by layering.

Pæonia Moutan, *var. versicolor* (particoloured Tree Pæony).—Ranunculaceæ § Helleboreæ.—A showy, distinct, and handsome variety of Tree Pæony. The foliage is compound, with narrow pointed divisions. The flowers are large, semi-double, or probably, when perfect, fully double ; the petals broad and large, irregularly arranged, and cut at the edges ; at the base of a deep purple colour, fading to a rosy lilac near the outsides. Native of China. Introduced in 1846 to the garden of the Horticultural Society. Flowers in May. *Culture*.—Hardy ; good loam and peat soil ; propagated by layering.

Epimedium pinnatum, *Fischer*, (pinnate-leaved Epimedium).—Berberidaceæ § Nandineæ.—A beautiful little perennial herbaceous plant, growing with a short rhizome, partially produced underground, from which the leaves and flower-scapes arise. The leaves, which are not fully formed until the flowers are decayed, are sometimes ternate, that is, having three leaflets, or more generally pinnate, or having five leaflets ; these leaflets are ovate-cordate, ciliate-serrate on the margins. The flower-scapes grow up from the rhizome amongst the leaves, and reach from six to eight inches in height, bearing a raceme of rather numerous distant flowers ; the flowers consist of four roundish veined yellow petals, within which are four yellow cucullate nectaries, toothed on the edge, and terminating behind in a blunt orange-coloured spur. Native of Persia and the region of the Caucasus. Introduced in 1846. Flowers in March. Apparently the same species as the *E. colchicum* of the gardens. *Culture*.—Hardy, or proper for cultivating in pots with other Alpine plants; light loam and peat, well drained ; propagated by division of the root.

Ophrys vespifera, *Willdenow* (wasp Ophrys, or Orchis).—Orchidaceæ § Ophreæ-Serapiadæ.—A very rare and singular tuberous-rooted herbaceous plant, growing with a short erect stem, furnished about the lower part with narrow leaves, and continued at the upper part into a flowering raceme. The flowers of this species have a yellow lip, perfectly free from hairiness, but marked with brown streaks and spots, so as to resemble the body of the insect after which it is named, especially when the sepals and petals are curved down upon its base, as is the case in its natural state ; the form of the lip varies a little, being sometimes round, and sometimes obovate ; but the central lobe is always marginate. Native of Barbary, and also of the south of Europe. Introduced about 1846. Flowers in June and July. *Culture*.—Requires slight protection; loamy soil ; propagated rarely by seeds.

Cyrtochilum citrinum, *Hooker* (lemon

coloured Cyrtochilum).—Orchidaceæ § Vandeæ-Brassidæ.—A pretty epiphytal plant, having short, clustered, compressed pseudo-bulbs, terminated by a pair of linear-oblong leaves, four or five inches in length, and of a somewhat leathery texture. The flowers grow in an erect loose raceme, the scape being a foot or more in length, and issuing from the base of the pseudo-bulbs; the sepals are ovate-lanceolate; the petals ovate, and rather shorter than the sepals; the lip large, roundish fiddle-shaped, narrowing at the base, where there are two elevated ridges; the whole blossom is a clear pale lemon-yellow. Native of Central America. Introduced in 1847. Flowers in April. *Culture.*—Requires a cool stove; turfy peat soil, or suspended on a block or in a basket; propagated by division of the plant.

A STROLL THROUGH THE GARDEN,

BY A TUTOR AND HIS PUPIL, IN THE MONTH OF AUGUST.

The gayest portion of the garden now is that occupied by the dahlias. The flowers begin to fill out well, and their varied colours are striking and effective; but although we fancy at first sight there is almost every shade and colour, there is not even an approach to blue; and as people always want what they cannot have, they cry out for a blue dahlia. However, most tribes of flowers are deficient in some leading colour. We have no yellow larkspurs; no blue roses; no blue nor yellow geraniums. Many persons go so far as to say there cannot be found in any one tribe or family of flowers the three primitive colours, red, blue, and yellow; there are no scarlet or red heartsease. Still, there are genera that possess very close approaches to all. The tropæolum has scarlet and yellow in profusion, and a dull blue in *T. azureum*. The hyacinth has reds and blues, and an approach to yellow. The auricula has red, blue, and yellow, but still imperfect. We have no tribe of flowers that possesses the blue of the convolvulus minor, or salvia patens, with the scarlet of the geranium and the yellow of the crocus. Observe, that these blooms on the dahlias intended for exhibition are carefully shaded. A flat board supported by legs has a slit in the centre, through which the stem is directed to the middle of the board, where it is fixed with its bud upwards, and covered with a flower-pot. The effect of this is to bring the flowers larger, to change the colour several shades, and to render the blooms much more tender and liable to damage by travelling. Some of the plants are thinned out, that is, branches are cut away, often to the prejudice of the bloom, though it is supposed that it throws more strength into the remaining branches. If, however, it is not done speedily it has a contrary effect. The dahlia takes as much nourishment through its branches as at its roots; for let them be every way suffering for want of water, and a shower of rain that will not reach their roots will freshen them up. As a proof that cutting may be carried to extremes, you may trim them up till you cannot get a full grown flower at all; they want their leaves, and when they are lost the plant feels the loss as much as it would the loss of its fibres. You see the gardener continues to propagate pansies by taking the young side-shoots; he is also planting out seedlings; these will make good Autumn blooms. The pinks are also occupying attention; the side-shoots or pipings are all struck, and must be planted out soon. The sweet-williams, Canterbury bells, wall-flowers, perennial lupines and other seedling perennials and biennials, want planting out too. The carnations, although not out of bloom, are all layered and doing well; the flowers are very noble. They have been dressed just the same as I was explaining to you about the pinks. As soon as they have quite done flowering, they will be removed to the open air, and all the soil in this tulip bed will be thrown out on each side to sweeten before it is again used; so also will the soil of the hyacinth bed, and some of the beds that are uncovered, but that will be used for tulips. The ranunculuses have all been taken up, for it is wrong to keep them in the ground after their leaves turn yellow. The auriculas, if you notice, are now being repotted in pots a size larger. The soil in which they are growing is only plain loam taken from the heap of rotted turves; there is plenty of vegetable mould, or decayed vegetable matter, in that loam to do without dung; but if the loam were less rich of that commodity, some vegetable mould or decayed cow-dung must have been added; these plants, after repotting, have to be shut up a day, and afterwards shaded some time, because when they are repotted, the roots are examined and trimmed a little if there is the least sign of decay or canker.

The man yonder is untying the bass matting from the roses that have been budded, and cutting the growing part of the stock away that it may not waste the strength that should be given to the bud. He continues to cut

the China sorts, but the stocks are of the Boursalt rose, as rapid a grower as the wild brier, and better adapted to the China sort for budding, as the bark runs as free now as the others did last month. Another man is making cuttings of all the verbenas, dwarf geraniums, and any other plants in the clumps and beds; but this would do quite as well next month for all ordinary kinds. I see he is only taking them from a few favourites; he wants more than he does from any of the common ones.

The houses look naked now, except the conservatory. The greenhouse is fairly emptied, and the pots are in different parts of the ground in the open air. The stove is not so empty, but some of its best plants are removed to the conservatory. Those beautiful funnel-shaped flowers, hanging down from the plant with broad leaves, are yielding the powerful perfume that we experience. The plant is the *Datura arborea* sometimes now called *Brugmansia suaveolens;* and those by the side with flowers more tubular and contracted are of the same family, *Brugmansia bicolor* or *sanguinea*, and *Brugmansia lutea*, the one is orange and red, the other perfectly yellow. There are finer plants of the same kind in the conservatory. In these pots we have balsams and cockscombs coming rapidly to perfection; they are kept warm and close to the glass. The borders are looking very gay.

Let us now look in upon the kitchen-garden, not that it is very interesting, but there is always something going on. You see the man pulling up the roots of parsley; well, he is pulling out all the plants that have plain leaves, and leaving none but those with exceedingly crumpled foliage; that is called "rogueing," or taking out the bad ones. They have been breaking down all the green tops of this bed of onions; they fancy it makes the bulbs thicker. It is a foolish mistake; all it does is this: it makes the foliage decay sooner; and as onions are said to be ripe when the foliage decays, they argue that it ripens them sooner; this is another mistake. The onion is no forwarder than it would have been with the foliage on. It is a wrong notion altogether. Onions untouched in that particular ripen better and keep better than if their necks are bruised. Here they are earthing up celery, that is, banking up the soil against the stems to whiten them. There the man is taking off the tops of all the broad beans, that is to throw the strength of the plant into bearing; the tops would otherwise continue growing. In yonder quarter they are sowing more turnips, salads, cabbage, &c.; and there they are planting out winter greens. The hoeing between all kinds of crops is to loosen the surface and kill the weeds, both of which are of the utmost importance to growing crops. That row of leeks ought also to be earthed up, and when the man reaches them in his hoeing, he will, doubtless, see to it. The cucumbers on the ridges out-of-doors look well. Observe, all the useless shoots are taken off, all the branches are spread over the surface neatly, and the fruit is coming in considerable quantities at all the joints. Those flowers which have no fruit at their base are the male blossoms, those with the fruit are the female. There is abundance of vegetables of all kinds, but all those very small plants huddled so close together, are in the bed they were sown in, and have not been at all thinned; they consist of brocoli, cabbage, savoys, kale, Brussels sprouts, cauliflowers and pickling-cabbages; further on, there are the same kinds taken from these very beds, and planted six inches apart to grow a little strong before they are put out for their winter growth. As the peas and beans come off the ground, after yielding their crops, the strong plants taken from these will be planted in their places, and these small ones will be pricked out to get stronger. These beds, therefore, will supply the crops for all the bits of ground as they become vacant. The carrots here are a good size, and are drawn as they are wanted, leaving the early sorts last; those intended for storing are in the further bed, a larger kind and not so forward. The fruit-garden looks very promising, the wall-fruits ripening one after the other, and the standards ready to follow. The strawberries are now being cleared of their runners, and the bed dug between the rows. It is a curious whim of the gardener, but he always digs in the waste of the beds, upon the principle that the best manure for any plant is the decaying remains of such plants. Hence, a sort of self-manuring system is preserved. I know that in some vine countries all the cuttings of the vines are dug in to decay, and there is no doubt, but that if the fruit as well as the plant were dug in, the earth would get richer instead of poorer every year; but inasmuch as the fruit destroys a plant most, and too large a quantity would almost kill it, the absence of that fruit, which is not returned to the ground, must be felt;—but we may talk of these things at home.

IXORA COCCINEA.

THERE is not a stove plant that better deserves universal cultivation than this floral gem; nor is there one which more readily yields to the real skill of the gardener. Like

most of our stove plants, it is no sooner out of health than it is attacked by the mealy bug; and whatever check it may meet with, soon impairs its health. It does not require rich earth, but it does a sound compost, one-half rotted turf, (which is of itself strongly impregnated with vegetable mould,) and one-half peat-earth such as we should use for heaths, will make an excellent compost; and although—if rapidity of growth be an object—they would be greatly excited by the addition of cow-dung, we do not recommend it for the stock, nor do we agree with those who want strongly excited growth. The Ixoras are propagated by cuttings, which should be the small side-shoots, and they should be struck in the common hot-bed, with much about the same heat as we should use for a cucumber. Let the pots be prepared for the cuttings by being filled to within half-an-inch of the top, and that half-inch must be sand; when this is all well saturated with water, it is fit to receive the cuttings. The cuttings should be selected from the shoots which have pretty well made their growth, but are not too long, as it requires that there should have been some rest previous to cutting them off their mother plant. Cut up to a joint, and take off the leaves carefully for half-an-inch up, and they are to be struck in the wet sand, so that the bottom of the cutting just touches the soil but not enters it. Then place it in a hot-bed, with a hand or bell-glass over the cuttings. This glass must be wiped dry every morning, and the pot of cuttings should be plunged to give a good bottom heat. The cuttings will soon strike, when they must be potted off, one in a pot, size sixties, or two and a half to three inches across. These should be returned to the close frame till they are established, when they may be removed to the stove. If they are at all inclined to run up tall, instead of branching out well all round, let the top be pinched out, but the greatest care should be taken with the stove to keep up a regular heat, not less than 65°, but varying up to 80°, would be effective. If there be the slightest appearance of bug, it must be removed by a soft brush, and soap and water, not too warm nor too strong, and afterwards rinsed with plain water. As soon as the pots are filled with roots, let the plants be shifted into pots a size or two larger than those they have already fitted; continue them in the hot-bed, but constantly check any of the shoots that grow too fast, or too vigorous, because the form of a plant is soon spoiled if any portion of the plant runs away. When they have fully established themselves, they may be removed to the stove, where they will be liable to attacks of the mealy-bug, even if they had not been affected before, which, indeed, is likely enough, considering that the heat from a dung-bed is unfavourable to animal growth in general, and will kill almost any description of insect; for this reason it is that pines to be cured of the scale, and plants to be cured of the mealy-bug, are frequently submitted to dung heat to clear them of the scale and other insects that infest them. In the stove, therefore, they will be doubly liable to attack to what they were in the hot-bed, and the precautions must be washing with soap and water or tobacco water, and syringing with clear water frequently. We may now begin to regulate the number of shoots that we intend to compose the plant. It is as bad to be too crowded as too open; therefore, if in addition to the shoots that you have excited by stopping the early branches you find some shoot up from the bottom, remove the weakly ones, and leave none but the strong and best disposed as to form, to grow onward. Shifting from time to time as the pots fill with roots comes almost as a matter of course with all specimen plants, and, as a general rule, all great changes of temperature are much more effective in the stove than in any other habitat for plants. If the stove which is kept up to a moist heat of 65°, to 85°, were suddenly left at a dry heat of 60° for a few days, every plant would suffer greatly in general health, and red-spider, mealy-bug, thrip, aphis, scale, or some other equally destructive thing, or perhaps all of them, would appear among all the plants in the place. When the plants are wanted very rapidly grown, they are sunk into the tan-bed; but it is not desirable to grow them too quickly. It is only those who value plants by their size, and who perhaps sell them according to size, who take an interest in getting them a tolerable size for the first sale. Specimen growers ought not to grow for size, but for beauty. If you desire to have numerous small heads of the bloom, the ends of all the shoots may be kept stopped until you have any number of side-shoots you require, every one when perfected being terminated with a little truss of bloom; while, when not so stopped, but allowed to grow for large heads, they will yield from eight to ten heads as large as small cauliflowers, or large brocoli. As the blooming always delays, and for a time stops the growth of a plant, it is the better way to pick off all the blooming buds as soon as you can get hold of them; but if you are not in a hurry to get the plant large, let the bloom perfect itself. It is plenty of time to take it off when it begins to decay; but it is so much the fashion to get the plants for exhibition as large as possible, that many are completely spoiled by the hurried growth; that is, spoiled for those who look

critically at the form of a plant, the leaves getting too far from each other during rapid growth exposes bare stems. When the blooms appear that you mean to let grow, let the plant have abundance of water, because the bloom is heavy and absorbs a good deal of moisture. When the plant has done flowering it should be judiciously pruned, all the parts with crumpled or injured leaves should be removed if it can be done without destroying the plant, even if the plant be cut back to a skeleton, and the stems must be well washed with soap and water, and so left that the young wood will make a good handsome plant again ; but if there be any indication of bad health, or the plant is attacked with vermin so as to spoil it as a specimen, condemn it at once and get new plants. But those who profess to grow this plant should have a regular succession. It is no use attempting to make one or two plants do; there must be half-a-score got up every year, and they must be taken the greatest pains with, for there is not a more effective stove-plant in a show, nor one so susceptible of injury from check or from attacks of the mealy bug. Bear in mind that plain warm water syringing is effective, soapy water more so ; tobacco water ditto; but wherever the bug has intrenched itself in the corners, it may want a long-hair brush to dislodge it.

SEEDLING ROSES.

We are always ready to learn what we do not know, and to teach what we do know ; and although all we have said of rearing roses from seed has been justified by our practice, we are ready to admit we have not practised everything. A friend of ours in the neighbourhood of Birmingham has succeeded in raising seedlings, and though of little, or perhaps no value, they have bloomed in less time than used to be thought necessary to get them above ground. We know very well that it was a general practice to bury the seed-pods for a year, and that much the same practice is extended to the berries of some other trees and shrubs. Our Birmingham friend has described his practice to us, and we felt half inclined to restate the facts to our readers, but we preferred to have a few words in writing, that he may tell his own tale in his own way. All that we have to say of him, as he will not let us use his name, is, that he is an enthusiast in the fancy, not confining his operations to roses, but cultivating stove, greenhouse, and orchideous plants of all kinds, as well as florists' flowers. He gives us the following account of his doings in the rose way :—

"For many years it was supposed that the seeds of roses required two years before their appearance above the surface of the earth ; the length of time prevented many from attempting to raise them ; whether this doctrine was promulgated by the nurseryman for this specific purpose, or it arose from ignorance, is doubtful, and it is not my purpose or wish to extricate it from the mystery which so long has shrouded it. It is a now well-known fact, that seeds of the rose, *even sown in drills in the open air*, in the latter end of February, will not only appear above the earth, but that many of them will bloom as early as July. In my short experience I have always considered the best time to sow seed, is when taken from the plant perfectly ripened by nature, with all its energies and vitality strong within it. Acting on this idea, I this season gathered my rose seeds in November ; I made up a small bed of loose soil, six inches deep, on the tan of my propagating-house, and sowed them. In February they began to appear, and now on this day, May 16, there are at least 150 out of 200 heads, an inch high ; the greatest part of them, if carefully attended to, will bloom this year. I should not have broached this subject, but that I know how generally this flower is admired, and justly so, not only for its fragrance, its form, or variety of colour, but from the fact that, as the difficulty of raising seedlings vanishes, we may hope, by judicious hybridizing, to have this lovely flower in bloom the whole of the year. Having said thus much, perhaps the mode of collecting the seed, storing, &c. &c. will not be unacceptable to your general readers ; after having carefully hybridized the flower, from which I hope to save the seed, it is, of course, allowed to get thoroughly ripe, before it is gathered ; this, of course, depends, as to the time of ripening, upon the class to which it belongs ; when gathered, the outward fleshy part is taken away, and the seeds carefully stored in very dry silver sand, and placed upon the shelf of a greenhouse, or other place, where no damp or drip can affect them. At present, as I have before stated, I shall adhere to the autumn sowing, although this argument is liable to one objection, the difficulty of carrying seedlings safe through the dark, damp months of winter; still, in face of this difficulty, and till my further experiments prove my position wrong, I shall continue the autumn sowing of all seeds, of course, with proper protection."

There can be no doubt as to the propriety of sowing seed at the period that nature would sow them, but it is quite certain, also, that except the plant be very hardy, the plants or the seeds will perish in a bad winter, unless

under protection, from excess of frost and wet. When, as in this case, the plants are in the propagating-house until they are large enough and strong enough to bear the open air, there is a great saving of time. With regard to the plants sown in February blooming in July, much must depend on the sort. The summer roses we have invariably found to go over the winter, that is, go over a whole year without blooming, and some even over the second season; but the China rose does not leave off growing if kept in a proper temperature, and therefore they are very likely to bloom early. Besides, they bloom while small, and are altogether different in their nature to the ordinary summer-rose. With us, the seedlings of the summer-rose made their growth, and shed their leaves, and the only way in which we got them to bloom in the second year was by budding them on strong brier stocks. However, we do hope that there will be a more general practice of raising seedling roses. There is abundance of room to improve our sorts by the addition of the one grand feature of constant blooming; for this purpose, we recommend seeding only from the Bourbon and China sorts, that constantly bloom and keep the garden perpetually brilliant.

RHODANTHE MANGLESII.

Of all the delicate plants that we can find in English gardens, perhaps there is nothing equal to this extremely delicate subject. When exceedingly well grown it is more like an artificial than a real flower, and the texture of the bloom, and its lasting horny nature, rather favours the notion. Those who are acquainted with the Xeranthemum and other "everlasting flowers," will understand the peculiarity which may be found in the Rhodanthe Manglesii, for the flower is the Xeranthemum in miniature in a plant as delicate and light as can well be imagined. It is its extreme lightness that renders it delicate, and we verily believe that if it were in a young state to be exposed a few hours either to the sun or a dry wind, it would be destroyed; when sown in the open borders, and allowed to shift for itself, it will either be destroyed altogether, or be so insignificant as to be scarcely worth notice. In a border of ordinary flowers it would be lost. It is, in fact, a pot annual, good only in a pot, and may by management be the most interesting of all tender annuals. The balsam and the cockscomb, the egg plant, ice plant, sensitive plant, and globe amaranthus, are not more worthy of attention than the Rhodanthe Manglesii, and not one of them requires more care and attention.

SOWING.

Prepare pans or large pots in March, with a compost of one-half peat earth, rubbed through a sieve of half-inch meshes or squares, and one-half loam from rotted turves; but if you have not any loam from rotted turves, the best substitute you can make is to mix two thirds of plain loam and one-third leaf mould, for this well mixed would be as nearly the same as can be made; the only disadvantage being this, that the loam from rotted turf contains a good deal of fibrous matter which is favourable to the roots of plants; and the fibres of a delicate plant like that which is under notice, require an extremely porous soil. Fill the pans or pots with the compost, first securing a good drainage by placing a layer of crocks all over the bottom; or if a pot instead of a pan, two or three inches thick; bump the pot or pan on the bench to settle the soil a little down, but it must not be pressed. Level the top, and sow the seed thinly all over the surface, the thinner it is sown the better; an inch apart all over would be the perfection of sowing, and save the trouble of pricking out; but there are two objections to this. Some say plants are better for the change that pricking out gives to a seedling, and therefore, that sowing wide enough apart to avoid it, is no good to the plant; and then it is quite clear that it takes a good deal more room; and therefore, when frame accommodation is scarce, thicker sowing must be resorted to for the supply of a proper stock. When the seed is sown cover with silver sand. In sowing seed, not merely of this kind, but all other sorts which are very small, such as rhododendron, azalea, and many others which are extremely light, and seem almost like dust, the soil should be to a certain extent damp; and the instant the seed is sown and covered, it should be watered; but the water must be given as fine as dew. For this purpose a syringe is best, because the distributing roses which are screwed in are of various sized holes, and some distribute the water in such small particles that it falls without disturbing the surface; and this is absolutely necessary, because seeds of the Rhodanthe and many others are so very light that they would be washed out of the soil altogether with the least violence; but if you have not a syringe, the best substitute is to be found in a common clothes brush; dip this in water, turn it face upwards, and draw the flat of your hand along the brush and towards you, and the wet flies off in the opposite direction in the smallest particles, and does not disturb an atom of dust in its fall. The earth being a little damp when used, readily absorbs the water; and from the time they are sown to the period at which they vegetate

they must not once be dry; but keep them in a hot-bed.

TREATMENT WHEN GROWING, TILL POTTED.

When the seedlings have two pairs of leaves besides the seed leaf, they must be pricked out unless they happen to be sown thin enough to stand till potting time; prick them out in any sized pots, but only round the edge, for the roots derive a good deal of benefit from working down the side of the pot. Let them be an inch, or an inch and a half apart round the outside, but put none in the middle. Let them be placed in the hot-bed again until they have recovered their moving and begun to grow again, when they must have air to keep them from drawing, and be regularly moistened with water; kept in the frame, to be the same temperature as the soil and the plant, they will soon be large enough to put in their pots singly; the soil should be the same all through their growth. They want no exciting material; the addition of dung, or of any enriching compost, would induce rapid growth and longer joints, which would greatly disparage the plant. Get sixty-sized pots with a lump of peat at the bottom for draining, or, in the absence of that, a thin crock over the hole, and an inch in thickness of small pieces; when you pot the plants, first saturate the soil of the pots they are in with water, then half-fill all the pots with the soil we have already mentioned; turn the ball of earth out of the pots they are in and break it—the plants are easily taken out of the soil without breaking their roots; then one by one take the plants, hold them in the centre of the pots at the right depth with one hand, and fill up the soil round them with the other, gently pressing the compost round the side, so that the root may be fixed solidly, but not pressed. Regulate the surface, water them gently, and replace them in the hot-bed, giving them air as much as is consistent with keeping up the heat of the bed. We ought, perhaps, to observe, that although there are some few plants that will thrive with the same treatment, such is the delicacy of the Rhodanthe that it ought to have a hot-bed to itself until it attains as large a size as it can in the first small pot, when the plants are established and have recovered their vigour, which is always more or less affected by their removal to their first pots.

SHIFTING.

When the roots have reached the sides of the first pots, the plants will require shifting, and they may be put into the size thirty-two at once, or be first transferred to the size forty-eight, to be again shifted. If they are put into the thirty-twos at once, there is the whole trouble of one shift saved, and the majority of growers would prefer that system; we do not. When the pots are filled with roots, the plants receive a partial check, and this is always beneficial. It prevents rampant growth and promotes flowering. We therefore recommend pots of the size forty-eight, and with two inches thickness of crocks; put in enough of the soil to raise the ball of the other pot a proper height. Turn out the ball from its pot with the plant and drainage undisturbed. The best way to put the soil in the new pot is in the form of a cone, because you can press the ball of earth down to its proper height, and then fill up round it; but if the soil is put in flat, you cannot press it much, and therefore have to guess very exact, or you may have to lift out the ball again, and, in all probability, break it, which will derange the fibres and check the plant too much perhaps to recover. When you have placed the ball so that the surface is in its right position, fill in all round, using a small stick or the finger to press the soil down gently round it, that the earth may be solid, but not pressed. Return the pots to the hot-bed and well water them; keep them close for the first day, but afterwards give air rather freely; and as the spring advances and the sun gets powerful, let them be shaded from the extreme heat. In the course of a few days they may be removed to the greenhouse, and kept near the glass. They must, however, be kept from thorough draft, and must only be allowed air in the heat of the day. The rule for shifting from the pots, size forty-eight, to the larger ones, size thirty-two, is the commencement of the matting of the roots round the sides of the pot. It is quite well that they begin this, but if left too long, the check becomes too great. The shifting of the plants into this last pot for blooming is much the same as the change from sixties to forty-eights, and in the last pots they are placed near the front glass, and allowed to flower. The habit of the plant is very beautiful. They require no stopping; their natural growth is far more beautiful than any kind of restraint, and they will be covered with their rose-coloured stars all over. The petals of the flower are thin but horny, and if the stems are carefully dried, the flowers last a long time in their dry state. As a border plant, the Rhodanthe is useless, but only because of its delicacy, for the more brilliant colours and the more gigantic size of the subjects in flower in the open garden throw it completely into the shade; but if you desire to grow it in beds, or borders, in a situation in which it will be seen, or for the purpose of seeding it, let the period of planting be at the time of shifting from the forty-eight sized pots. Bed them out a foot apart

every way without breaking the ball; water them in to settle the earth about the roots, and leave them to the ordinary care bestowed on bedded-out subjects. The seeds are not ripe till the stem is dry, but you must not let it remain on the plant till it loosens, or the wind would clear it all off in a short time; when gathered, it should be put in dry bags or boxes until the spring, when it may be sown, or otherwise disposed of.

BRITISH WILD FLOWERS.

THE VILLARSIA.

Villarsia nymphæoides, Ventenat (fringed Water-lily, or fringed Buck-bean)—Gentianaceæ § Menyantheæ.

This pretty subject is one of our common water-plants, that is to say, common in respect to its abundance where it establishes itself, either naturally or by artificial assistance, and not in respect to the number of localities in which it is found. It is moreover one of our most beautiful water-plants, its flowers being abundant, of a rich yellow colour, and prettily fringed around the margin, more so than our engraving fully represents.

The plant was formerly called *Menyanthes nymphæoides*. It has been, however, by various botanists separated from *Menyanthes;* "chiefly," observes Sir J. E. Smith, "because of its corolla having to each segment a bordered fringed margin, while the base of the limb, not the middle of the disc, is hairy, or bearded." Besides this, Wiggers calls it *Waldschmidia nymphæoides*. The genus was called Villarsia, after M. Villars, the author of the *Flora des Dauphines*.

Villarsia nymphæoides, is a floating aquatic plant with round smooth stems, which are several feet long, repeatedly branched, and of a soft succulent texture. These bear the roundish heart-shaped leaves, which have the margins more or less waved or toothed, the surface smooth and shining, a pale variegated green above, and dark purple beneath. The leaves float on the surface of the water. The flowers are produced in axillary sessile umbels; or in other words, axillary on simple aggregate stalks. The calyx consists of five smooth lanceolate obtuse segments. The corolla is about an inch and a half in diameter, spreading, rotate with five spreading segments, more or less fringed, yellow, with a smooth darker radiating disc; the orifice of the short tube is fringed with simple hairs.

Though a "wild flower," the Villarsia is deserving a place in ornamental lakes or pools where aquatic plants are introduced. In such places it spreads considerably and is with difficulty extirpated. As its specific name implies, the general appearance of the plant

is that of a nymphæa, although its flowers are unlike those of that plant; but in fact, being produced close to the water's surface and among the numerous leaves, the blossoms, unless closely observed, do not appear strikingly different from what would be expected in a small water-lily. Of course this resemblance only finds a place in the idea of the mere casual observer; though the existence of such an idea in any case, serves to show what is the general aspect of the plant.

As to culture, none is required. The plant has only to be fixed, by one of the many ways which will naturally suggest themselves to every one; and so that this is done, its long branching floating stems go on growing on the surface, and sending down roots into the liquid element beneath them. Any fragment of the stems with roots and leaves will form a plant.

THE HYACINTH.

As there is every prospect that the leading horticultural societies who have early shows, will give prizes for hyacinths the ensuing spring, we have resolved on giving a few useful hints as to their culture, and some information as to the kinds that are best adapted for general cultivation. Whatever may have been hitherto accomplished in this country as to the raising of hyacinths from young offsets, and however well a few have succeeded in producing tolerably good roots, the generality of growers contrive to spoil all they buy in, or at least to reduce them to the condition of common border flowers. The exceptions are but few. Mr. Lockhart, who, if not a Dutchman, was brought up among the raisers of bulbs in Holland, has done a good deal with the hyacinth in common soil, brought into condition by his own method; and certainly we have seen far more noble trusses or spikes of flowers this year in his garden than we have in any of the nurseries; but to bring the hyacinth to perfection, so that we may equal our neighbours the Dutch in the production of fine bulbs, we must consider the peculiarities which favour or otherwise the health and vigour of the plant. There is nothing in the climate of Holland that should place it before us in all the requisites for the production of bulbs; therefore we must seek for the favourable circumstances in the soil; and that in the bulb gardens, which are no doubt selected for that circumstance, is a deep sand; the only dressing used by the most successful growers is well-decomposed cow-dung, and in this small offsets soon become fine roots; the natural conclusion is that the sand is poor, or so much dressing would not be necessary, and therefore we ought to supply, as nearly as we can, a soil of sand and decomposed cow-dung. All the instruction hitherto given on the subject of cultivating hyacinths has been favourable to rich and light soil; but to produce the bulbs as fine as the Dutch ones, we would make the soil altogether eighteen inches deep. At first we would see that the bed is well drained, so that no water can ever stagnate; but this should be done with everything else, as well as hyacinths. We would then make a compost of two-thirds sand and one-third decomposed cow-dung, that is, cow-dung rotted to mould, and fill up the whole eighteen inches with it. Let all the young offsets be carefully planted three inches deep, and three or four inches apart, with their names carefully labelled, so that there may be no mistake about sorts while they are young. As soon as they throw up their spike of flowers, pick off all but the top two or three pips, or even the top one. When the leaves have died down, or nearly so, take up the bulbs, which will be found much enlarged, and twist off the foliage; but lay each sort together in the ground again, and in a fortnight or three weeks you may pull off the roots, and lay them in an outhouse, where they have a good air but no sun. In a fortnight or three weeks more you may clean off the loose skins, and lay them by until you want to plant them, taking care that neither sun nor damp reaches them. Make up another bed in the same way for them the next year, and use the former bed for anything else; for by giving another good dressing of cow-dung or leaf-mould, you will adapt it for many things; and in the mean time, the hyacinths will get on much more rapidly in a new bed. These bulbs will imbibe a fatal disease if they grow two years running on the same spot or in the same soil. Even in Holland, where they have the soil natural, instead of artificial, they do not grow again under three or four seasons in the soil they have been once grown in. If a change of crops be necessary for many crops, to keep them from degenerating, it is absolutely called for with bulbs to prevent total failure. Small offsets become good roots in three seasons; and for strength of bloom, the three-year-old bulbs are by far the best, although they are not the largest. In Holland, as in this country, the hyacinth grows to its full size, and when it has bloomed its best, it goes into offsets, and these are nursed as we have directed until they become fine full roots like their parents, and are sent over here for sale.

The consumption of hyacinths in this country is enormous; there is no seeming limit; but considering the splendour and the ease with which they are cultivated, they are greatly neglected. Whether it is that they come earlier than people are prepared for flowers, before they seek for beauties in a garden, or what else can be the reason, we know not; but it is quite certain that many noble gardens are almost without them; and the annual purchases amount perhaps to a dozen or two, to grow in pots, or to be placed in glasses of water. Considering the pounds which are laid out in the expenses of a garden establishment, the cost of a handsome selection, to form a feature among the ornamental beds, would be no great object; but certainly as a pot plant, there is nothing surpasses a well-chosen collection, and the conservatory that has not the advantage of this feature in season is sadly deficient. There are some hundreds of varieties in cultivation; but as the English dealers generally import the cheapest, the collections are generally limited. We therefore propose to give the names of a selection comprising something under two hundred, which are considered in Holland the finest that can be grown, and the worst of them far better than thousands which are sold in England:—

Double Dark Blue.

Supposed Retailed Prices for 1849.

	s.	d.	s.	d.
Abbe de Veirac . . . . from	2	0 to	2	6
Alamode	0	6 or under.		
Bloksburg, very beautiful . . .	2	0 to	2	6
Bonaparte, ditto . . .	2	0	2	6
Duc de Buffon, magnificent . .	4	0	5	0
Duc de Normandie, fine . . .	0	9	1	0
Director Van Flora	0	9	1	0
Eendragt, very fine	1	0	1	6
Envoyé, extra fine	0	8	1	0
Helicon, grand, dark, scarce . .	10	0	15	0
La Plus Belle, fine	1	6	2	0
La Charmante, new	0	6	1	0
L'Importante, extra fine . . .	7	0	10	0
Lourens Coster, very splendid* .	2	0	2	6
Martinette, good	0	9	1	0
Morillo, very fine	2	6	3	6
Prolifera Monstrose	2	6	3	6
Zeebergen, extra fine	5	0		

The two prices are given because something depends on the size and quality of the same kind of roots; some are worth double the price of others on that ground alone.

Splendid clear and Porcelain Blue.

	s.	d.	s.	d.
Comte de St. Priest, fine flower . from	1	9 to	2	0
Duc d'Angoulême, extra fine . . .	0	9	1	0
Gloria Mundi, marbled with purple eye	5	0	6	0
King of the Netherlands, fine . . .	0	6	0	9
Madame Marmont, very splendid . .	1	3	1	6
Orondates, very fine	1	3	1	6
Paarlboot, very beautiful	0	9	1	0

* This, we are assured on good authority, was sold as a seedling when first raised at 1600 guilders.

	s.	d.	s.	d.
Pasquin, very fine trusser	0	9 to	1	0
Sartorius, very fine indeed	4	0	5	0
William Pitt, excellent	5	0	6	0

Double Black and Blue.

Albion, the largest in cultivation, fine.	21	0 to	25	0
Alexander, an excellent flower . . .	2	6	3	6
Mehemet Ali, new and fine	1	9	2	6
Othello, a splendid new flower . . .	4	0	5	0

Double Dark Red.

Belvedere, a fine flower	1	6 to	2	0
Bouquet Tendre, or Waterloo, an old favourite	0	6	0	9
Cochenille, very dark indeed, new . .	4	0	5	0
Comte de la Coste, extra fine . . .	1	0	1	6
Le Beauté Supreme, good	0	6	0	9
Milton, extra fine	2	6	3	6
Moore, a general favourite	0	9	1	0
Racine, fine, very deep colour . . .	3	6	4	6
Rouge, delicate, fine	2	0	2	6
Sans Souci, very splendid	2	0	2	6

Double Lighter Red.

Alida Catherine, very early	0	9 to	1	0
Hecla, fine large pips	1	0	1	3
La Guirlande, fine bright red	1	3	1	6
Lady Grafton, fine large striped flower	1	3	1	6
L'Honneur d'Amsterdam, bright rosy .	0	9	1	0
Shakspeare, splendid large flower, new	2	6	3	0

Double Rose Colour.

Catherine Victorieuse, fine large bright flower	3	6 to	4	6
Coerus, general favourite	0	6	0	9
Duc de Chartres, fine	0	6	0	9
Frederick the Great, large truss, new .	1	3	1	6
Goëthe, fine	1	6	2	0
Grootvorst, the finest old flower in cultivation	0	6	0	9
Johanna Cornelia, fine	1	6	2	0
Lord Wellington, splendid rose . . .	3	6	4	0
Marquis de la Coste, fine	0	9	1	0
Madame Catalane, fine	0	6	0	9
Peruke Royal, fine	1	0	1	3
Roxane, bright rose	1	6	2	0
Tamerlane, fine extra	1	9	2	3

Double White.

Constantia Alba, very fine	1	0 to	1	6
Duc de Berry, fine red eye	1	6	2	0
Elise, splendid flower	0	9	1	0
Gloria Florum, splendid truss . . .	0	9	1	0
Grandeur Royal, fine	1	6	2	0
Heroine, very pure white, fine . . .	1	6	2	0
Imperatrice Romaine, fine	1	6	2	0
La Belle Noaille, very fine	0	6	0	9
Lord Anson, new, white	1	6	2	0
Og, King of Basan, fine	0	9	1	0
Perle Brilliante, fine	1	0	1	3
Prince of Waterloo, excellent . . .	1	0	1	3
Pyrene, clear white	0	6	0	9
Sphæra Mundi, clear eye	0	9	1	0
Tour d'Auvergne, large truss . . .	0	9	1	0
Venus, excellent	2	6	3	0
Vesta, fine	1	0	1	3

Double White, with Yellow Shades in Eye.

Bride of Abydos, good	3	0 to	3	6
Comtesse de la Coste, new and splendid	0	9	1	0
Dongratuit, fine old flower	0	6	0	9
Gulde Vrijheid, good	0	6	0	9
Mungo Park, fine	1	6	2	0

Double White, with Red and Violet Shades in Eye.

Anna Maria, fine	0	6 to	0	9
Bourdaloue, new and splendid . . .	1	6	2	0

	s.	d.	s.	d.
Gloria Florum Supreme, splendid pink eye	3	6 to	4	6
Grand Monarch de France	0	9	1	0
Hooft, pink eye	0	9	1	0
La Virginité, new, excellent	0	6	0	9
Miss Kitty, fine	1	0	1	3
Non plus Ultra, excellent	0	9	1	0
Staten-General, fine	3	0	3	6
Virgo, fine	0	6	0	9

Double Yellow.

Duc de Berry, fine	2	6 to	3	0
Gloria Florum, good	1	3	1	6
Heroine, one of the prettiest in cultivation	1	6	2	0
Le Grandeur, large flowers, fine	3	0	3	6
Lady Sale, new and fine	1	6	2	0
Ophir d'Or, good	0	6	0	9
Pure d'Or, excellent	2	6	3	0

All the foregoing are double, and for the most part show flowers; some are mentioned for the splendour of their individual flowers, others for the noble truss they form, others again for their extraordinary colours; but numerous as they seem, they form but a very small portion of the whole that are found in Dutch catalogues. We have given the names without regard to price, which is governed rather by the scarcity of a variety, than by the actual qualities. If, for instance, a flower like Grootvorst, which has been out many years, and is as plentiful as blackberries, were put by one dealer at one penny more than would pay a reasonable price for the trouble of growing it, other cultivators would put them down, and the dearer one would have no sale; but while a flower is scarce, no one is willing to part with it at less than a given price, depending entirely on its scarcity. If Lourens Coster was so grand an improvement when it was first raised as to sell for 1600 guilders, in five years there would be, perhaps, a hundred roots, each of which must then be worth more than sixteen guilders, to bring the purchase home again; in another year, perhaps they would be doubled in number, and something towards halved in price. This explains the difference in price of hyacinths, as well as anything else. Grootvorst is as good, except colour perhaps, as any in cultivation.

We have thus gone through the double varieties, which are for the most part great favourites. We now come to the single, which are beautiful in their way, and form trusses as handsome as the best of the double; in many cases, the flowers are much more numerous and closer together; and we think they are decidedly more distinct and brilliant in colour than most of the double ones.

Dark Blue Single.

	s.	d.	s.	d.
Auriculas, new and beautiful . . from	2	6 to	3	0
Campra, fine	0	6	0	9
Cœur Blanc, good	0	9	1	0
Emelius, beautiful trusses	0	6	0	9
Emiens, a good old favourite	0	4	0	6
Franklin, new and fine	1	0 to	1	6
Grand Lilac, very fine	0	9	1	0
Lord Graham, new and good, very large	0	9	1	0
Nimrod, a great favourite	0	6	0	9
Staten-General, an old favourite	0	6	0	9

Single Clear Porcelain Blue.

Bleu Agatha, new and fine	0	6 to	0	9
Count of Nassau, an extra fine new flower	0	9	1	0
Grand Vidette, fine large individual flowers	1	3	1	6
Iris, very new and very neat	0	9	1	0
L'Unique, singular colour, dark lilac	1	0	1	6
Nonpareil, excellent flower	0	6	0	9
Orondates, very noble flower	0	6	0	9
Porcelaine Sceptre, fine	0	6	0	9
Robinson, fine bright marbled	0	6	0	9
Voltaire, deservedly a great favourite	0	9	1	0

Single Black and Blue.

Abd-el-Kader, a fine flower	5	0 to	6	0
Asterius, fine	1	0	1	3
Georgius Primus, new, excellent flower, with white eye	1	6	2	0
Incomparable, fine	1	0	1	3
L'Ami de Cœur, fine dwarf, close truss	0	3	0	6
Prince Albert of Prussia, fine, dark and indigo	1	0	1	6
Prince Albert of Saxe Coburg, new and fine	0	9	1	0
Quentin Durward, fine indigo	0	6	0	9
William the First, extra fine indigo	0	9	1	0
Zoraide, fine	0	6	0	9

Single Dark Red.

Appelius, excellent flower	0	9 to	1	0
Cerise, excellent large individual flowers	3	6	4	6
Cochenille, good flower	0	9	1	0
Cornelia Maria, new, fine ball	0	9	1	0
Homerus, early and fine	0	4	0	6
L'Eclair, a very taking variety	0	9	1	0
L'Ami de Cœur	0	3	0	4
Lina, quite new, large truss	1	6	2	0
Mezzofanti, both new and large	1	0	1	3
Prosper Alpini, very deep bright red, new	2	6	3	6
Rosalia, new and fine	0	3	0	6
Satella, large, new, splendid flower	1	0	1	3

Single Ordinary Red.

Bouquet Royal, fine old flower	0	4 to	0	6
Duchesse de Richmond, new and fine	0	9	1	0
Fanny Kemble, fine	0	6	0	9
Grande Pyramide, fine truss	0	9	1	0
Johanna Grey, neat flower	0	4	0	6
L'Imposante, nearly orange	0	9	1	0
Lupolow, new, fine trusses	0	6	0	9
Madame Hodshon, fine	1	0	1	3
Poniatowski, fine, early, large truss	0	9	1	0
Queen Victoire, splendid close truss of red	15	0	20	0
Vivante de Dame, new and fine	0	9	1	0

Single Rose Colour.

Anna Powlona, beautiful large flower	2	0 to	2	6
Johanna Christina, very pretty	0	4	0	6
La Dame du Lac, very fine	0	9	1	0
Lord Wellington, excellent	0	6	0	9
Miss Ainsworth, new and splendid	2	6	3	0

Single White.

Angelique, new	3	0 to	3	6
Anna Christina, very fine, new	0	9	1	0
Emiens, new, excellent	0	6	0	9
Grande Vidette, very large pips	0	9	1	0
Kroonprins der Nederlanden, new and fine	1	6	2	

	s.	d.	s.	d.
La Candeur, fine	0	4 to	0	6
Mont Blanc	6	0	7	6
Queen Victoria, excellent	1	0	1	6
SINGLE WHITE, SHADED OR SPOTTED WITH RED.				
Albertine, new and fine	0	9 to	1	0
Bernardine	0	9	1	0
Grandeur à Merville, large and new	1	6	2	0
Rousseau, very fine large truss	0	9	1	0
Tuba Flora, new, extra fine	1	0	1	6
Voltaire, a fine old favourite	0	9	1	0
Virgo Maximus, good	0	9	1	0
SINGLE YELLOW.				
Catherina, new and very fine	0	6 to	0	9
Heroine, good old favourite	0	6	0	9
King of Holland, fine, but reddish cast	0	6	0	9
Pointe du Jour, excellent	0	9	1	0
Prince of Orange, fine	0	9	1	0
Sterne, excellent	0	9	1	0
Victor Hugo, new pure citron	0	9	1	0

We have now gone through a first-rate Dutch catalogue, intended for the trade, and containing nearly four hundred more than we have mentioned. We do not insist that all we have set down here are first rate, or that there are not some fine flowers that are unnoticed in our list; but, considering the immense number that are in cultivation, we do mean to say that it would be difficult to find a score to add, or a score to take away, that would improve the list upon the whole. We have selected the flowers for some good point; they are finer with regard to certain qualities than others that are omitted; and some are really almost unexceptionable by comparison. We have done this for two sound reasons—first, because we want to induce people who have gardens to adopt a flower which is certainly at the head of all spring bulbs, and is without exception the easiest of all flowers to grow tolerably well. The darkest kitchen in the city will produce the bloom of a hyacinth from a healthy bulb, scarcely any ill treatment will destroy the flower, and we are only sorry that people have been so often deceived into a belief that there was some difficulty, when all their misfortunes have arisen from the purchase of damaged bulbs. The auction mart has done more towards injuring the sale and discouraging the growth of bulbs, than anybody can imagine, and the very system ought to convince them that it is so. The Dutch florists execute the seedsmen's orders with prime healthy bulbs; they would on no account wilfully put in a single damaged article, for the best of all reasons, the price would be deducted; damaged roots are almost thrown away; they are sold to people who make a living by gathering them up at the lowest possible price, for if diseased bulbs are not got rid of they may infect others. These huckstering buyers make them up into cases, and send them to be sold at the mart, where, in spite of all the reasoning that can be urged against it, people are found to buy them at nearly as large a price as the shops would supply them at in full health and vigour. By chance, a diseased bulb will yield its bloom before it dies; but the proportion of bulbs that turn out well is so small that it is perfectly ridiculous to lay out a shilling in such a lottery, while within a few yards of the very place there are several respectable seedsmen who would supply the proper healthy bulbs, for perhaps the same money. Hundreds of persons have bought bulbs at the mart, and been completely disappointed at the result.

We have already mentioned the growth in beds, but the principal charm is to grow them in pots, so that we may carry them wherever we desire to show them; and the process is exceedingly simple. It is the custom to bury them, after they are potted, in tan or ashes; to this we have no objection if they are released in time; but as soon as the bulbs have shot half-an-inch we would remove them to the light, whereas we have seen the long yellow spikes so far advanced that the plants could not be other than lanky and ugly. In potting there are several things to mind; first, the soil cannot be too rich; secondly, they should be planted as soon in October as convenient, just under the surface of the soil in the pot; thirdly, they should be plunged in ashes or tan, three inches below the surface, until the roots have grown and the plants begun to shoot; this can only be known by examining them now and then. They may then be removed to a garden frame, and be kept from the frost by covering up during bad weather, and at nights they should be close to the glass; and from these cold frames they may be drawn out and removed to the greenhouse or the stove, or to a common hot-bed, as you want to begin forcing them; but for perfection of growth and colour they are better without forcing. No plants are hardier, but frost destroys the petals of most flowers; and therefore, hardy as they are, they should not be subject to the changes of frost and thaw. The strongest bulbs, and the most vigorous growers, can be got well up in a thirty-two sized pot of really rich compost. If it be complained that the term rich compost is not sufficiently distinct, we will just observe that they would grow in all decomposed dung; but few are prepared with that; and it must be recollected that the hyacinth will grow in plain water, and in wet sand, so that it is impossible to fail with healthy bulbs. Yet good rich soil, without forcing, will bring fine colour, stout growth, and noble flowers. We trust, therefore, that there will be a general adoption of this flower in all gardens, and in every private house, for London or country, manufacturing towns or open plains. The

hyacinth always repays us with a bloom, and the principal difference between the very best and the worst is only a difference in the size; but it is requisite for success that we first go to a respectable seed-shop or nursery for the bulbs; next that we inform the principal whether we design to grow them in pots, in water, or in the ground, and what is the locality; and if we grow them in water, that we should, thirdly, change the water once a week, and use soft water; for this purpose always use dark glasses, for we are quite sure that for the sake of having the water look clear in the brighter kinds of glass, pump-water, without regard to its quality, has been applied to hyacinths, greatly to their detriment, sometimes to their destruction.

EPIMEDIUM PINNATUM.

Epimedium pinnatum, Fischer (pinnate-leaved Epimedium)—Berberidaceæ § Nandineæ.

The Epimediums form a small family of Alpine plants, interesting partly on account of the neat manner of their growth, but chiefly attractive to cultivators in consequence of their being hardy, and thus within the means of every possessor of a garden. Some of the kinds are decidedly ornamental, as is the case with the subject of the present remarks, a species with brilliant yellow flowers originally named *E. pinnatum*, by Fischer, a Russian botanist, and apparently the same as a plant which has been grown for a year or two in gardens under the name of *E. colchicum*. In the published figures of the two, we can detect

no material difference. This *Epimedium colchicum* was noticed in the *Annals of Horticulture* (1848).

The *E. pinnatum* is a most lovely little hardy perennial plant, growing with a short rhizome, partly concealed under ground, bearing a few leaves, the bases of which are invested with large scale-like bodies analogous to stipules. The flower-scapes also arise from these rhizomes, and grow somewhat in advance of the leaves; that is to say, at the time the flowers are developed, the leaves are but half expanded. Both leaves and their stalks as well as the flower-scapes are, when young, clothed rather thickly with spreading hairs, but in the adult state the leaves become glabrous, except on the veins of the lower surface. The leaves are compound, sometimes ternate, that is, composed of three leaflets, but more generally having five leaflets, the two pairs of which are remote from each other; when fully grown these leaves are about a span long. The divisions of the leaves (leaflets) are ovate-cordate, or between

egg-shaped and heart-shaped, with a deep narrow sinus at the base, and ciliate-serrate on the margin. The flower-scapes about equal the full-grown leaves in their length; but as already remarked, they somewhat precede them in the order of development. They proceed distinct from the rhizome, and grow erect, each bearing a raceme of flowers, which are bright yellow, and not unlike, in general appearance, those of the common sun-rose; they consist of four roundish petals, having each an internal cucullate appendage of the same yellow colour, terminating behind in an orange-coloured blunt spur. It is a spring flowering plant.

It appears to have been originally gathered by Hablitz in Persia, growing in shady mountain woods, in the province of Gilan. Subsequently it has been detected in the region of the Caucasus, "on Mount Talusch, between Leukoran and Suwant, at an elevation of 2,400 feet above the level of the sea." It appears to have been introduced into England about 1846, and to have reached this country from Belgium.

In its culture it should have the usual treatment of small choice Alpine plants: that is to say, it should be grown in a pot, and during winter should have the slight protection of a frame. A cool shady situation is what in this respect it prefers. All the Epimediums grow most vigorously in a compost in which peat soil preponderates: say three parts peat to one of loam, lightened if necessary by sand. When well cultivated the plant is a very ornamental one in its class.

FLORICULTURE OF THE MONTH.

BY GEORGE GLENNY.

Prolific in subjects of great interest, July has come with more than usual novelty, and has been useful in telling tales of undeserved prizes, and ill-gained certificates of merit. It is not so much our place to point out particular discrepancies between novelties and their deserts, but one striking instance is a lesson which should not be lost on society. We have heard of bygone prizes that misled the many as to the value of a new flower. This season one of the most aggrieving cases has been a fuchsia, named Lord Nelson, which proves, as we said it would, coarse and ugly, without a redeeming quality. It is admitted that many scores of better flowers have been thrown away, and the buyers are naturally vexed that such a variety should in 1848 be assisted into cultivation by a first class certificate. At a meeting of the Newington, Hoxton and Kingsland branch of the Royal Society for the Encouragement of Floriculture, blooms of this fuchsia, among others, were produced, with a view to show the necessity of the check which this Society has put on the deceptions which injure the science. Many varieties, infinitely superior, of several years' standing, were produced as a sort of contrast to Lord Nelson, which (except by the trade, who will perhaps endeavour to get back some of their money,) will be thrown away. Nobody with a dozen moderately good flowers would tolerate it in his collection. At this meeting it was communicated that the gentlemen of Shacklewell and Newington had resolved on holding an open show of Dahlias in that locality, and that the prizes would be liberal. We are glad of this, because now that the dahlia has lost its grand annual exhibition so well known at the Eagle grounds, Cremorne House, and Baker-street, it wants a fillip in the outskirts. The last great show in or near London nearly ruined the trade by destroying all confidence in the new flowers, which with a few exceptions that we thought worth a notice, proved absolute failures. The Shacklewell show is to be thrown clearly open, and the judges' names will be published; so at least we are informed. Norman and Turner have produced some splendid carnations and picotees, which we may further particularize when we have seen more of them; but some of Puxley's novelties, let out by Catleugh, have disappointed the growers. There must be more attention paid by buyers before this issue of bad or ordinary flowers at large prices can be stopped. If people will buy without recommendation, without knowing anything, there will always be found persons to sell, and the disappointment that ensues does more mischief than can be imagined by setting people against buying at all. Bragg, of Slough, seems to have gone heart and mind into Floriculture, and his collections of roses, dahlias, carnations, picotees, pinks and pansies, show that he is in downright earnest. Before this paper is in print there will have been held a first-rate show in the midst of the grounds of the Royal Nursery, Slough. The carnation and picotee are the subjects for competition, and the splendid collection belonging to the Nursery will be shown on the plants, as of course Mr. Turner does not compete on his own ground. There is a good deal said of a fuchsia reared in Devonshire, and let out by Mr. Pince; we wish we had

seen it in time to have given a careful judgment whether it helped the flower or informed the amateur. Mr. Perry, the hon. secretary to the Handsworth Horticultural Society, says it is one of the best dark varieties grown. "SAPPHIRE," says Mr. Perry, "is in colour a bright coral red, sepals broad, beautifully reflexed, and of a thick waxy appearance. The corolla a deep blue purple." Moreover, the habit is said to be good, and the flowers profuse. All we can say is, we hail anything good among the dark varieties as a relief to the endless rubbish sent out of late seasons. The Floral and Horticultural world has had a loss in the death of both Messrs. Noble, of Fleet-street; the active promoters of our favourite bantling, the benevolent Society, and of everything else good and charitable; and it is the more to be deplored, as one was a victim to the cholera, the other had long been ailing.

The break up of the *Gardeners' Journal* has been of great service to the *Chronicle*, as the florists who are dropping off rapidly, have to fly to the *Chronicle*, which has been rising ever since. The general opinion is, that there ought to be two newspapers; but the total inutility of the *Journal* the last two years, has gradually reduced it to a low ebb, and there wants but an understanding among some of the distant florists to establish an independent florists' newspaper, or go over to the *Chronicle* at quarter-day. The only opportunity there was of rendering the *Journal* the second paper has been twice lost; first, by the united gardeners, when they sealed the fate of the paper by the engagements they made; and, secondly, by the parties to whom they sold the wreck of the paper, and who continued the management in the very same hands that ruined it. It may well be said, as it was at the meeting of florists on Tuesday last—"There never was a time when Floriculture was so disjointed, and those engaged in it pulled so many different ways; there are several publications all representing different cliques, and, but for the Tuesday evening meetings, it would be rare to find fifty florists together."

The last show at Chiswick was grand beyond measure. The display was in quantity and quality surpassing everything we had seen, and the grounds were in fine order. The arrangement improves from time to time, until there is little room for amendment. Gigantic plants, far superior to the generality of small ones, as to health and vigour, were exhibited in great quantity; and as to orchidaceous plants, there appeared no end to the number and variety. To describe the various articles of merit where every plant seemed a specimen, would be impossible in our limited space; and the grounds of the Duke of Devonshire being thrown open, there was nothing to wish for. Country shows are moving too. The Leamington exhibition, which comes off next month, is worthy of imitation; more especially the cottagers' department of the show. We refer to the usefulness of the prizes, which are to encourage the growth of nothing that is not adapted to the circumstances of the class to be benefited. There are no prizes for things that will grow of themselves. All that are promised are for subjects that persons in humble life should chiefly grow. Cabbages, lettuces, savoys, potatoes, turnips, carrots, parsnips and beetroot, are all nutritious and wholesome, and the family which has plenty of them cannot be starved, and on a good supply of them much happiness and comfort may depend. What a contrast does it show compared with many country exhibitions, where prizes are injudiciously given for half-a-dozen pinks or pansies, or bouquets of flowers, as if to encourage the waste of time over frivolous and useless things; for it is well known that a rod of flowers, and particularly of some kinds, will actually cost more labour than an acre of vegetables. Floriculture cannot be indulged in by the cottager without a great sacrifice of time and money, which he can ill afford, and it only tends to degrade the science when incompetent persons are urged by the hope of reward to attempt growing and showing things which they cannot produce in perfection.

THE CULTURE OF BULBS.

NOBODY would believe, from the casual visitation of the English gardens, that there are hundreds of species and varieties of hardy bulbous roots, sufficient to keep a garden in gay colours almost the year round; for go where we may, there seems to be no space allotted for the culture of bulbs, as compared with the enormous room occupied by the most common and uninteresting plants. In the open ground we see the crocus; it is here in all its splendour; but the scilla is not to be seen in one garden of a hundred; yet the last February we saw, in an establishment greatly devoted to the hardy bulbs, the scilla fairly challenging admiration in the midst of millions of crocuses, which were flowering in all their splendour, but with no shade of blue to come nearly up to the varieties of blue in their rival. It would hardly be conceived that persons who loved flowers could be so ignorant as not to know them, or, if they knew them, so indifferent as to neglect them. The brilliant blue of the scilla is brighter than *Salvia patens*, the small bunches of flowers appear almost before any foliage is

indicated, and a bed filled with them is almost too bright to look upon.

Then there is the hyacinth, almost a stranger in gardens, and confined to pot culture and glass culture; while it presents us with a variety of colours which hardly any other tribe possesses, and is withal a very hardy genus, and requires no trouble as a border flower. In this family may be found blues of all shades, reds of all shades, purples, and whites, and a very respectable approach to yellow. If the bulbs are merely placed three inches deep in a border, they will want no other attention than keeping them clear from weeds. If they are left in the ground, they will come up year after year; but they spread into offsets, and the flowers come in smaller spikes than they would if they were taken up when they begin to decay, and sorted, the smallest left out, and the largest replaced after remaining out of ground two or three months; but, treated as perennial plants of the herbaceous kind, and left in the ground from year to year, they look quite as gay, and give no trouble.

Next look to the early tulips, a family comparatively unknown, and certainly not at all encouraged by those who do know them; yet they rapidly succeed the earliest bulbs, and last until the late ones flower. We can safely say that a dozen sorts, as distinct as possible, and the best of the tribe, might be cultivated with great advantage to the garden.

The various irises with bulbous roots form a magnificent group, and are deserving a much better fate than the neglect evinced towards them by almost all gardeners and amateurs. It is almost vexing to a man of taste to see garden after garden without any of these splendid objects.

Then let us turn to the narcissus tribe. Scores of varieties of all shades of yellow and pure white may be found in bloom at once; some sorts bearing only single blooms, others having large bunches; some all of one colour, others with two, for instance, white and yellow, or yellow and orange, and in endless variety of forms and sizes. They are truly very beautiful, and some earlier than others; so that the season of bloom in this one family is prolonged. The jonquil is very like the narcissus, but perhaps more elegant and smaller; but many people fancy they are like the same family on a smaller scale.

We have, it is true, mentioned, with perhaps one exception, bulbs well known, but nevertheless as much neglected as if they were only fitted for pot and glass culture, and in fact almost always forced. Now there is no good reason why they should not enrich the flower borders several months in the year. But there are other splendid families to follow. Many kinds of ixia and sparaxis are beautiful, and some of the colours extraordinary; but a portion of these are not hardy, yet they seem the most encouraged, for even in the choicest gardens we have hardly ever seen them in beds, borders, or clumps. Then we have the grand family of lilies; the only three of which that we see at all plentiful in English gardens are the Turk's cap, or scarlet martagon—the orange lily, by some called the fox's lily—and the white lily; the two latter seem plentiful in all cottage gardens; but there are scores of species of the lily family almost unknown to common gardens and gardeners, and yet not dear. The crown imperial and all the fritillaries are both early and interesting. They do not vary much in colour, being chiefly different shades of yellow, but they are nevertheless graceful and handsome in their growth, and make a noble appearance among early bulbs. *Lilium japonicum* comprises a large family, and all of them splendid. *L. punctatum* and its varieties are gorgeous in the extreme; Groom, of Clapham, was the first to make any great show with them; but those who have seen his collection, and reflect for a moment upon their comparative hardiness, for they want very slight protection, will easily form an idea of the acquisition they would be to well-managed establishments. In short, the lily tribe is extensive, hardy, beautiful, varied, of easy culture, and some of them are in bloom during May, June, July, and August. If we look at their colours, they take the range of all the crimsons, orange, yellow, and scarlet; there are many exquisitely pure white, and others are speckled; and as for forms, from a globe to a trumpet, there is every shape. Here then we fairly occupy with flowers all the period from February, when crocuses, snowdrops, and scillas commence their bloom, until the end of August, when the gayest of the lilies occupy prominent places among even that gay flora. Then comes the colchicum, of which Paxton gives an account of purples, whites, and pinks, blooming from July to November; and in addition to these, the Amaryllis lutea, now called Oporanthus luteus, but affording their golden yellow after all other flowers have done, and forming an excellent helpmate to the varied and beautiful tribe last mentioned. Besides this late visitor of the Amaryllis tribe, we have aulica and Belladonna, and varieties coming with their green and scarlet, red and flesh-coloured flowers, somewhat earlier; and we might go on almost *ad infinitum* with particulars and descriptions of other bulbs, to show that if we could not in the open ground have a rich supply of flowers the entire year, we cannot exclude more than two months out of the twelve. Indeed, those we have already spoken of bloom ten out of the twelve months;

and by judicious selection, a border might be so finished as to require nothing but bulbs to keep it always during these ten months gay, and often rich beyond conception. So little, however, are many bulbs thought of in this country for the open borders, that few are to be seen; and though they are imported from Holland, at moderate prices, in large quantities, those only that are cultivated in pots, and forced into early bloom, seem to create any demand. Hyacinths will always be favourites, because they can be grown anyhow—in mould, in sand, in water and in moss, they always reward the purchaser with a bloom. In the most wretched alleys and confined places in London, a sound bulb will give a comparatively good flower. There is nothing more certain. The crocus, and some of the kinds of narcissus, are rivals in this respect; and this may account for the fact of their selling better and in larger quantities than all the other sorts of bulbs put together. Early tulips are not quite so obedient; they will not always return the cultivator a bloom for his trouble when pent up in a dark room or a smoky town; but it is quite time bulbs were better understood, and more generally cultivated in gardens. Thousands of people do not even know that early tulips, narcissus, hyacinths and jonquils are perfectly hardy; they know they grow in pots and in glasses within doors, but they would fancy the bulbs lost to be put in the ground. This delusion arises from the fact of their seeing them constantly potted at all nurseries, but rarely planted out; for nurserymen too often keep their surplus stock out of sight, and pick out the finest of the roots to pass off the next season as imported Dutch bulbs. A London seedsman played us off this trick last autumn, and out of some dozens of narcissus not six put up blooms; this is a very discreditable sort of transaction, as it lost us all they cost, for we were ashamed to charge for them; and of course it is the last order the same party will get from us, so that he will gain nothing in the long run. But let it not be misunderstood that roots grown properly in England would be worse than those from Holland; only there is a difference between those planted in proper beds in autumn and grown well, and those which are kept in a window until all chance of selling them is gone, and then stuck in the ground to save their lives. Let us then strongly recommend everybody to cultivate bulbs; they are far more beautiful and durable than hundreds of herbaceous plants now cultivated, and will repay any cultivator his cost and trouble.

Bernard Saunders, of Jersey, and Lockhart, of Parsons-green, grow more, and perhaps sell more, bulbous roots than many other growers put together. They keep a greater number of varieties than any houses in England or the Channel Islands. In Saunders's catalogue, for instance, there are no less than twenty-six varieties of gladiolus—a family which we have not mentioned, though perhaps worthy of a first place; twelve kinds of iris; nineteen or twenty sorts of ixia; twelve distinct kinds of lily; twenty-seven sorts of narcissus; eighteen sorts of sparaxis; and more than fifty distinct families of bulbs, enough, in all conscience, to supply the finest garden with a border such as has never been shown in England; though perhaps Lockhart, within a sixpenny ride of London, may have them planted out in store beds.

We have chiefly, in fact entirely, confined our remarks to hardy bulbs; but if we turn to the stove and greenhouse kinds, the variety is without limit—perfectly endless. One family alone is worthy of a house to itself—the Amaryllis. It is impossible to conceive a more beautiful sight than a good variety of these in full flower. So many beautiful hybrids have been added to the distinct species that they are comparatively worthless, except so far as to show the difference between the original species and the various crosses. At the Earl of Carnarvon's there was at one time a most noble collection of very distinct varieties, which had been obtained by Mr. Lindsey, from seed—having, however, had the good fortune to begin from the best collection that could be got together by the noble owner, from all parts of the world. However, tender bulbs may be grown by the hundreds who have the convenience; the hardy ones may be cultivated by every body who has a rod of ground and good air; and we cannot too strongly recommend immediate attention to a subject unaccountably neglected by the lovers of flowers.

A few words on the culture of hardy bulbs, taken from the instructions given by Mr. Saunders, may not be an unfit conclusion; we only received them recently, having made up our mind to commence the cultivation of all the best hardy bulbs, and requested hints as to anything we might not know from our own experience.

In September or October begin to prepare your borders for the cultivation of gladiolus, sparaxes, ixias, and other Cape bulbs, by digging them a spade deep, burying a good stratum of good rotten dung at the bottom—about two barrowfulls will do for a bed thirty feet long and four feet wide. The soil, in general, should be a good friable sandy loam, well broken on digging, and rounded on the surface, to throw off excessive rains in the winter season. As soon as the ground is thus prepared and raked smooth, plant the

bulbs in clumps, or rows, across the bed, from two inches and a half to four inches deep, covering them one inch with sand previous to covering them with the soil. After the beds are thus planted, rake and dress the ground well; and thus the work is completed till the spring, except keeping the surface clear of weeds, and stirring it occasionally with a small fork, which accelerates their growth. The different varieties flower in succession, from the middle of May till the end of June; and large beds produce a splendid effect.

By thus early planting they get well established, and will resist a hard frost; as a proof of which, during the severe frosts of 1837-8 and 1840-1, ixias, sparaxes, and tritonias, were preserved by a covering of two inches of sand spread over the surface of the beds, as reported in the *Gardeners' Magazine*. But the climate may in some places be too severe; and in this case the best way will be to plant the bulbs in pots. One gladiolus is enough in a three-inch pot; and three ixias or babianas, sparaxes or tritonias; and plunge them in old tan ashes or sand, under the protection of a frame, until April, when they might be turned out into the open borders.

After all, we would take no such trouble in England. We recommend those who wish to cultivate bulbs in good earnest, first to well drain their borders; then mix half loam from rotted turf and turfy peat, or, for want of it, leaf mould and sand, and well amalgamate it; the layer of good well-decomposed cow-dung, or dung from an old melon frame, two inches thick, in the bottom. In this border plant all the sorts of bulbs that will stand a mild winter; if frost threatens to be severe, cover the border with litter during the prevalence of the bad weather, and by the end of April it may be removed. The blooms will be far better than in pots, or than the bulbs turned out of pots, and all the kinds will flower strong. The planting is a matter of taste; we recommend all the sorts being kept separate; patches to be always distinct. It is far better than mixing them; and be it remembered that if the border be well drained, and the soil good, there will be no danger in leaving them in the ground two seasons. We should so plant them as to enable us to leave them the third season; when we should take them up, re-make the border, and plant them again. In the absence of a complete border or bed of bulbs, it will be found desirable to use the pots; but in such case, we should put out the pots and all into the borders. Then we might take them up safely; and for this purpose we should plant the gladiolus in six-inch pots, and the smaller bulbs in four-inch, or what may be understood as forty-eights and thirty-twos of the potteries. And so also with lilies and other larger bulbs; because where all other kinds of plants are grown in a border, the lilies and smaller bulbs would be overrun, and therefore damaged. But we repeat our advice to everybody fond of flowers,—cultivate bulbous-rooted plants extensively.

HEATING HORTICULTURAL BUILDINGS.

There has been more money wasted in hot-water apparatus misapplied than it would be possible to estimate; and this has arisen from various causes. First, the want of information as to the nature of the heat, and the length of time to be applied. Secondly, to the love of change and the number of theorists engaged in the trade. Thirdly, from its application in many cases where it is by no means applicable. It is no uncommon thing to see an enormous boiler, capable of heating a hundred yards of iron pipe, applied to a small house, that a conical boiler of a fifth of the cost would be sufficient for; and scarcely one in a dozen are appropriate. In our opinion nothing can be so good for a stove, nothing so bad for a greenhouse. In one we require a regular and continuous heat; in the other we only want the means of suddenly raising the temperature to keep out a frost, and the less we apply heat the better. If we have hot water, the boiler should be small, the pipes thin, the fire effective; but in working both, we pronounce in favour of a well-constructed flue as the best.

Now we come to the construction. Supposing it to be anything under fifty feet, let the furnace be at the back, let the flue be built above the ground on bricks put edgeways, at such distances as will receive the joints of a bottom of large paving tiles, on which make the flue without a dip, sacrifice a door, and make one do at one end rather than dip under one; make this bottom reach all round to the door way, and on this bottom, which should be two inches from the front wall, bricks are laid edgeways to make the sides of the flue, and another row of tiles on the top forms the bottom of a return flue. At the end where the return is made, the bottom of the top flue, and the top of the bottom flue are not carried home, but the edge is made rounding, and a six-inch opening is to be left for the smoke to return. The return flue is built like the bottom one all the way back and carried into the chimney, which may be built over the furnace. It will be observed that we have no flue at the back, and in lean-to-houses, the front is all that need be heated. The top of the flue is of paving tiles, well jointed, and it would hardly be credited how rapidly the houses are heated by a flue of this description; none of the warmth is lost. The inside, next the wall, gives out its surface-

heat as well as the front, the bottom, and top ; and this is perceptible a few minutes after a fire is lighted. A well-built furnace, with a proper damper, is capable of being banked up with ashes to last all night, when the severity of the weather requires it. The cost of this, as compared with a boiler and its pipes, is a great consideration, but the convenience is far greater. A greenhouse should never have a fire except to keep out frost or dry the place, for damp is a very destructive visitor. In this case, the superiority of the brick-flue is worth notice ; the heat is generated so rapidly that advantage can be taken of a few hours fine weather to light the fires and open the top windows, or rather sashes ; and it ought not to be lost sight of, that iron boilers and pipes take as much harm lying idle as they do at work. Besides, iron pipes are not sightly, while a well-built flue is an excellent support for the front stage on which generally the most delicate and valuable plants are placed.

We need hardly point out the advantage of generating the heat under the lowest part of the roof, and yet we go into some houses where the principal part of it is generated at the back, so that the heat, which rises perpendicularly, has to get to the top of the roof in the most direct way, and the front only feels the advantage when the house is absolutely full of the warm vapour ; whereas, if generated at the lowest part, it ascends the sloping roof, and when at the apex, falls as it cools ; so that where the heat is most required there is most of it. All that can be said against the flue is, that it may require more attention while it is in use ; but, as we before observed, this in a greenhouse is seldom.

If hot water is determined on, the conical boiler is by far the best, the most economical, the most rapidly effective, and requires the least attention, let the application be temporary or permanent, or large or small ; but the pipes should be placed under the lowest part of the roof, in the same way as the flue, and, in lean-to-houses, the heat at the back is but of little use. In stoves and houses, to be kept at a continuous high temperature, hot water saves a good deal of time, because it takes some hours to cool the water ; and if the fire happens to be let out for a few hours, the temperature does not fall so rapidly, but that lighting it again brings it up ; so that things do not materially suffer. Still there is no excuse for the extravagant, complicated, and costly apparatus that the hot-water doctors recommend and find simpletons to adopt. If some gentlemen were to look to their accounts for heating their houses, and could have a peep at the cost of others which are better heated at one-fourth the cost, they would not be so ready to adopt every fanciful theory that was brought under their notice. If we had to build fifty greenhouses, to be used as such, that is, used for the culture of hard-wooded and other really greenhouse plants, we would have nothing but a simple return flue ; and if we could get that along the front, we should care for nothing more. One fact ought to open the eyes of those who adopt this kind of heating. We allude to the astounding fact, that the same people scarcely put up the same kind of heating apparatus twice. Walk into any nobleman's or gentleman's place, and you will hardly see two of the houses heated alike. Hot-water tanks, hot-water open and close troughs, hot-water pipes, all shapes and varieties of boilers ; some heating a large house with a five or six gallon conical boiler ; another, of half the size, with a thirty or forty gallon boiler to supply it. The very Horticultural Society, adopting professedly the best plans, wear out a couple of boilers in a short time for their large conservatory, and then change to a totally different principle, to give place in turn, no doubt, to some other schemer's theory. In short, there is nothing worse managed, at this moment, than the heating of horticultural buildings. Let anybody wade through the stuff that has been written about the Polmaise heating, and the subject palls upon the senses. Thousands of pounds have been literally fooled away in plans under that title, but as widely removed from it in principle as a horse from a hen. The original Polmaise heating, though not all we like, was at least rational and economical ; but we have seen twenty houses heated upon what is now called the Polmaise plan, where there was hardly one feature of the original plan left ; still our principal objection to all the complicated plans is, that they seem studied varieties to increase expense ; and we repeat that the most simple and efficacious, the most easily managed, and the cheapest for hothouses, are the conical boilers, supplying pipes that range along the lowest part of the houses, that is to say, the part where the roof is lowest, as the front in lean-to-houses, and the sides of those with ridged roofs ; and brick flues for the greenhouse.

THE CORREA.

THERE is not a more deserving plant in greenhouse culture than the Correa and its varieties. The original *Correas : alba*, *pulchella*, and *speciosa*, are very old acquaintances, and there is a story told about the introduction of the latter that may be worth repeating :—A nurseryman was once standing at his door, in Islington, when a boy passed with a pot in his hand, carefully covered up

with paper to protect a small plant, and the man carelessly asked the boy what he had, and where he had been for it, when the lad showed him both the plant and the invoice, which he had been to fetch from Messrs. Loddiges, and was taking it —— no matter where. The invoice showed that the plant was *Correa speciosa*, and the price was five guineas. The nurseryman immediately went to buy all he could, but was only able to get one, and afterwards got another party to go and buy him a second. He immediately set to work, by grafting all the bits he could take off on stocks of *C. alba*, and before the plant was well known, had hundreds for sale; and we have ourselves heard the man say it was the most money-getting plant he ever worked, for the young ones went off at a good price, and nobody saw how they were worked or suspected they were worked at all. However, these three *Correas* have been favourites, and the whole family deserves to be.

Mr. Milner, of South Lambeth, took great pains to save seed, and succeeded in producing many very striking varieties, among the foremost of which was *C. Milnerii*, which was purchased by Mr. Glenny for twenty-five pounds, and afterwards let out to the nurseries at two guineas per plant. Mr. Glenny afterwards purchased a great number of seedlings, two of which, *C. Cavendishii* and another, he let out by cuttings to Mr. Groom. *C. rosea* was sold to Mr. Low, and is by far the best of the whole for habit and abundant bloom. *C. longiflora* and *grandiflora* were sold to other nurserymen; and *C. bicolor*, the true one, which is *speciosa* in miniature and brighter, was let out at the Clapton Nursery. Since that period a large batch of seedlings, the remainder of Milner's stock, came into the hands of Mr. Gaines, of Battersea, and have been named and sent out in all directions.

This family now affords some very pretty contrasts, and a dozen may be selected that will group well. The grand feature in the *Correa* is its blooming all through the winter, and its abundant and well-disposed flowers. It is not, however, half enough cultivated, and, except three or four, very little known. It is not a market plant, because it comes in flower at the time of year that flowers are not wanted; but it is a desirable plant in all private greenhouses and conservatories. It is raised from cuttings of the young wood, with a bell-glass over them, and in a cold frame; but the striking can be hastened with slight bottom heat. It grows best in loam and turfy peat, without dung, and requires cool treatment. A frame or greenhouse, without fire-heat, except in extreme weather, suits it; and it can, without any trouble, by constant shifting and careful watering only when required, be grown to any size; we have seen them ten feet high, and literally covered with flowers; and we should recommend everybody who has a greenhouse to select a dozen of the sorts, (for they are now reasonable enough to be within everybody's reach,) and grow them well, for they will enliven the greenhouse when there are very few flowers to break the monotony of the dreary months. We have seen several of the sorts at Lee's, and all of them at Gaines's—we are quite sure they will be appreciated the first season. When the bloom is over, the knife may be used to keep the plant in form, and check exuberant shoots, but it is generally graceful in its nature.

CAMELLIA HALFIDA.

This king of the rosy varieties is a foreigner, and of no very great price, but it is second to not one of the pinky or rosy tribe. It is a better form than the double white; it has thicker petals, smoother edges, stands better up in the centre, and is rounder in the outline. The plant is of fine habit, and if any person would only grow one of the red tribe it should be Halfida. The true colour of it may be called peach-blossom. We are not quite so much interested about the foliage of a plant as to describe its peculiarities when trifling; all we say of Halfida is, that the habit is as good as myrtifolia, and that the plant is as free a grower. The flowers are confined, as far as we saw any, to the ends of the shoots, and open freely. Tried on its own bottom, it did not grow so freely as worked on the single or semidouble red for a stock; and on reticulata a plant did very well indeed, but the Ghent nurseries sent it over well worked and in good condition, and all we have been able to get sight of among imported plants grew alike. It is unquestionably one of the very best of the reds or roses, looking at the proportions generally; and above all things we recommend every grower to obtain it, although we do not know where to direct anybody to get it in England. We have only seen it in private collections, except in one or two instances in which the parties had the wrong plant under the name. The Paris nurserymen have it pretty reasonable, and we believe the Ghent ones have it: the safest way to get it would be in bloom if possible, but we do not think the continental nurseries have any other under the name. It cannot be too much propagated, nor too generally grown. In point of money value it may be cheap, but it is worth a score of the other reds, and in form equal to the best of any colour.

Alstrœmeria pelegrina.

THE ALSTRŒMERIA,

ITS VARIETIES AND CULTIVATION.

This genus was named after one Alstrœmer, of whom the following brief biographical sketch will form an interesting introduction to the subsequent enumeration of the various kinds of Alstrœmeria known to botanists, and the accompanying outline of their cultivation. These particulars are, for the most part, a translation of a paper published in a recent number of the *Ghent Annales:*—

Jonas Alstrœmer was a Swedish merchant, whose varied knowledge, his probity, zeal, and constant industry, enabled him to acquire a handsome fortune. He had laid the foundation of his prosperity at London, in profiting by the example of a great people; but the spirit of commercial enterprise had not proved unfavourable to the expansion of generous emotions, towards the development of which intercourse in society is otherwise conducive. The counting-house had not absorbed the cares or dried up the kindly impulses of this man of wealth. Alstrœmer resided at London in 1696, and on his return to Sweden he lost no time in instituting proper measures for improvement in the breed of sheep. He was the first to import the rams of Angora towards this object; he also had works erected for refining sugar, and he had a vast number of the dye plants cultivated. He devoted himself entirely to the promotion of Agriculture in relation to the Arts.

A century before the time of the celebrated Parmentier* of France, Alstrœmer had perceived the value of the potato: having appreciated its economical properties in England, he had it imported to Sweden, where he caused a great quantity to be planted. This single action might have made him glorious, but he did more: in England he had learned the principles of association, and all his efforts were directed to the formation of those powerful societies, which, under the name of the Levant and the East India Companies, effected so much in the commerce of Europe. A long life of ninety-six years was wholly devoted to useful labours. After his death his countrymen erected a monument to his memory in the Exchange of Stockholm, on which is inscribed a short but eloquent testimony of the good he had done:—

"To Jonas Alstrœmer, Founder of the Industrial Arts in his Country."

Jonas left four sons, who inherited their father's love of progress, his talents, and his useful activity. One of these, named Claude, was born in 1736, became a pupil of Linnæus,

* Alstrœmer was born in the year 1665, and died in 1761. Parmentier was born in 1737, and died in 1813.

and was especially devoted to the study of the economical sciences. It was the earnest desire of the father that his sons should all be well versed in natural history, which he regarded as one of the essential bases of a complete education, especially with the view of being useful to mankind.

Claude Alstrœmer travelled in Spain, Italy, France, and other countries. In April, 1761, he landed at Cadiz, and was introduced to a lady who was fond of flowers, and in whose garden he found a magnificent unknown liliaceous plant, the seeds of which had been sent from Peru by the lady's husband a short time previous: its name had not been mentioned in the annals of the history of plants. Claude Alstrœmer lost no time in sending a parcel of dried plants, by the Swedish consul, to his esteemed Professor, and among them was a specimen of this new lilaceous one. He did not omit to send at the same time some of the ripe seeds, which were sown at the garden at Upsal; and from these, plants were obtained that produced beautiful flowers, which became generally called "Alstrœmer's lily." In 1762 Linnæus used this name as the basis of a new genus, and thus the illustrious name of Alstrœmer has ever since been preserved in botanical science to designate an elegant family of Amaryllids.

By thus consecrating the name of the individual who introduced this plant, Linnæus showed the importance of the exact history of those objects which contribute to the enjoyment of man, and that we are culpable when we do not seek to preserve the memory of such laudable actions from oblivion. Linnæus, in connexion with this subject, has cited De l'Escluse, who, with all the introductions of his time, did full justice to his contemporaries by connecting their names with the history of those plants which were introduced or cultivated by them, while this distributive justice had been but too much neglected by others. It is now a century since these just reflections were made at Upsal, but they are applicable at the present day; and it is not without the hope of their being useful that we bring them forward for the consideration of our own contemporaries.

Claude Alstrœmer introduced, described, figured, and propagated the Alstrœmeria, and therefore Linnæus named this genus in honour of him, and showed at the same time that the elder Feuillée, in his *Flora of Peru*, had described, under the name of Hemerocallis, three species of the same genus, to which the botanical reformer gave the respective names of *Alstrœmeria pelegrina*, *Ligtu*, and *Salsilla*. There was one feature of interest attached to these Hemerocalli that the Jesuit Father had but ill figured and as ill described: it is in speaking of the *Alstrœmeria pelegrina* that Feuillée relates how much value the ancient monarchs of Peru attached to gardens and flowers. These sovereigns were horticulturists; they possessed "Anthophylacies," as stated by Linnæus,—that is, gardens of pleasure; and flowers, as those of the Alstrœmeria, were so prized or admired, that, once faded or lost, they believed they could only be imitated by images of gold and silver. Hence Feuillée assures us, that in these gardens, artificial flowers, made of these precious metals and imitating the most beautiful natural flowers, were attached to the trees. Thus he saw, in this fairy land, a field of Indian corn or maize, each plant of which was formed of silver, and the large spikes were of pure gold (!) In the midst of these wonders, worthy of the dreams of the East, the *Alstrœmeria pelegrina* occupied the parterre of honour,—so beautiful it seemed to a people who nevertheless found the plant growing freely by the banks of the rivers or on the slopes of the hills.

The *Alstrœmeria pelegrina* was the first species of this beautiful genus that was known in Europe. According to Feuillée it grew, especially in Peru, on a mountain about a mile to the westward of Lima. Linnæus observed, in connexion with this subject, that a knowledge of the country of a plant, though valuable as furnishing an important index, was not however sufficient to enable us properly to understand its particular kind of culture; "for," said he, "the *Tagetes* and the nasturtiums, the first being from Africa, and the other from Peru, grow well even in the gardens of Sweden, but are susceptible of the least frost; while *Solanum quercifolium* and *S. radicans*, originally belonging to tropical countries, are not injured by cold if they are only slightly covered."

Alstrœmeria Salsilla was, according to Feuillée, who found mention made of it in connexion with the medicinal plants of Peru, employed by the natives of Chili for similar complaints to those for which other plants of like properties are employed at the present day. In Lindley's *Flora Medica* it is said to be diuretic and diaphoretic. As for *A. pelegrina*, the arguments of Linnæus go to prove that that plant can have but few active properties. He argues that, in her works, Nature expresses a profound sentiment of justice; she does not lavish on one and the same object all virtues and qualities; she gives to the nightingale an enchanting voice, but withholds from it the rich plumage of the parrot; the latter has a splendid robe, but a disagreeable voice. Hence it may reasonably be inferred, that since the Alstrœmeria is a model of beauty, it must be destitute of virtues. We do not know whether Linnæus sustained such a

theory in the presence of a beautiful person, or before his wife, who, it is said, had received a portion of Nature's favours in this respect. If the grasses supported the reasoning of the Professor of Upsal, the trees of the orchard, and the bananas of the hot-house, were evidently against him ; and in this philosophy of final causes the most attractive reasonings are often only so many paradoxes.

One species, called by Tussac, *Alstrœmeria edulis*, possesses roots containing a considerable portion of good fecula, thus constituting an article of wholesome food. This species is found in English gardens.

Alstrœmeria Ligtu, cultivated for the beauty of its flowers, which are of a rosy carmine, the two upper petals being varied with deeper tints, is not only remarkable for its perfume, but also for the nourishing fecula extracted from its roots, which Tussac, in his *Flora des Antilles*, relates to be as wholesome as it is plentiful.

Such are the economical and medicinal uses of this beautiful genus ; but some of the species possess another property, one which relates to the science of life, viz. physiology. In our climate the leaves of plants grow horizontally, consequently the under side faces the ground, and the upper the heavens. From this position is obtained that shade which is the principal charm of the forest. In New Holland the acacias and the eucalypti, which form such forests of large trees, have " no longer leaves, but phyllodia ;" that is to say, a sort of leaves which grow straight and narrow, " so that there are two lateral surfaces, and forests without shade." Now by physiology it has been proved that this position of leaves, or phyllodia, so diverse, bears a relation to the situation on these organs of those absorbent mouths called stomates,—singular openings armed with mobile lips, essential to the life of plants. Such plants as are quite submerged are destitute of these mouths, which have relation to the air : what could they have done in water ? Those plants that float with their leaves on the water, as the nuphars and nymphæas, have stomates in the upper surface of their leaves, which are in contact with the air, and none on those which are submersed in the liquid. This certainly proves that the stomates exercise their functions in relation to the atmosphere ; but this position of the stomates at the upper surface of the leaves of nymphæa proves also that these organs can be acted on without injury by the direct rays of the sun, since the rays fall directly on the surface of the water. With the great majority of our plants, however, the stomates are produced on the inferior surface of the leaves, and do not receive the solar rays directly, but by transmission. A stomate is not covered with a skin any more than the spongioles of the roots ; it is an organ submitted to the diffuse light, and which has relations with the ground beneath it ; the one, the spongiole, plunged in the soil ; the other, the stomate, placed in face of it, and parallel to its surface. When Linnæus saw *Alstrœmeria pelegrina* he was struck with the appearance of its leaves. " They are resupinate," said he ; that is to say, lying on their backs. By-and-by botanists observed that the leaves of some Alstrœmerias were whiter and paler above than underneath, and that when they were turned (that is, by untwisting their base,) so as to have their greener surface exposed to the sun, they assumed their wonted position by becoming re-twisted. Each of these leaves is then distorted by a spiral turning (*tour d'épier.*) Professor Lindley showed (*Introd. to Bot.*, p. 123, 3d edit.) for the first time, we believe, that the inverse position of the leaves of Alstrœmeria originates from their organization ; because with them the upper surface is organized as the inferior is in ordinary leaves, while the under surface is absolutely like the upper in the great majority of plants. This phenomenon is the more interesting the more explicable it becomes. Thus, Professor Lindley, in dissecting the leaves of Alstrœmeria, found that they possessed at their under surface, which is of course turned from the ground, a greater number of stomates than on that which would have been the upper surface, but for the twisted petiole.

The Alstrœmeria possesses, then, an obvious interest as regards its anatomy and physiology ; and there are none who, taking up such profitable studies in connexion with a garden, would wish to be without the representatives of so remarkable a genus.

The Alstrœmerias have been arranged in a group of the Amaryllids of an anomalous character, related to the group of Agaves. With the Ixioliron, a plant belonging to Mount Lebanon, and the Campynema, a genus originally from the Island of Van Diemen, the Alstrœmerias, which are distributed throughout the whole of tropical America, and the extra-tropical parts of Australia, approach, by the *Doryanthes excelsa*—that magnificent tree Amaryllid, especially found in New Holland,—to the luxuriant vegetation of the Agaves and the Fourcroyas, two forms of the American flora. This gradation of organization, compared with what represents the several forms of the various countries of the globe, is an object not unworthy the contemplation of thoughtful minds. Variety in the works of creation doubtless rests on fixed laws ; but in this idea of cosmos, we do not yet know what relation there is between the

world and its different regions; in one part studded with diverse vegetable forms, and in the other even with variations in these created beings. This subject will, no doubt, some day be examined more particularly.

THE SPECIES OF ALSTRŒMERIA.

The genus Alstrœmeria is characterized, at the present day, as follows:—

ALSTRŒMERIA, *Linnæus.*—Perianth, six-petalled, subcampanulate, regular, or nearly bilabiate, the interior petals narrower, and somewhat tubular near the base. Stamens six, inserted at the base of the perigonium; filaments erect or recurved; anthers oval, straight. Ovary inferior, three-celled. Ovules numerous, horizontal, anatropal. Style filiform; stigma trifid, with three replicate lobes. Capsules oblong or globular, with three or six ribs.

All the Alstrœmerias are herbs belonging to South America, or the intertropical parts of America and Australia. They are characterized by tuberous fasciculate roots, with a leafy stem, which is straight, climbing, or twining; and having their flowers terminal in umbels. The genus is divided into two sections: 1st, those with a straight or nearly straight stem; 2d, those which have climbing or twining stems. M. Mirbel, seeing that the first had erect or declined (bending) stamens, and oblong or globular capsules, formed a separate genus of them, to which he preserved the name of Alstrœmeria; while the second, having a depressed globular capsule, he considered as constituting another or distinct genus, *Bomarea*, in memory of Valmont de Bomare, the author of a Dictionary well known in Natural History. These sections are everywhere adopted as natural, but the proposition to form them into separate genera has not been entertained. At the present day nearly sixty species of Alstrœmerias are known; from which several true hybrids have been obtained; while others have produced varieties almost without limits; so that the genus has become in the hands of growers one of the richest and most interesting that can be cultivated for the ornament of the garden or greenhouse. We think it proper to give an enumeration of the species; because it has been pretended that they were for the most part merely nominal; that they were simple varieties obtained from the seed even of a single species. This opinion, which is evidently controverted by facts, was especially maintained, in 1842, by M. Jacques, Principal in the Gardens at the *Château de Neuilly.*

§ *Stem straight, or nearly so.*

1. *Alstrœmeria pelegrina*, Linnæus (spotted-flowered Alsıræmeria). — Stem straight erect; leaves linear-lanceolate, contorted; flowers from two to six; exterior petals obcordate, acuminate. Herbaceous. Originally from Peru and Chili; introduced in 1762 to Cadiz, and propagated by Claude Alstrœmer. Its stem attains a height of two feet. The flowers are charming, of a rosy purple, green at the extremity, and bright red at the centre. May be grown in the open ground under a frame, or in the greenhouse in winter. Flowers in July.

2. *Alstrœmeria Hookeriana*, Schultes (Hooker's Alstrœmeria).—This is known in England under the name of *A. rosea*, a name given to it by Sir William J. Hooker in his *Flora exotica.* Its stem is straight and verrucose or warty; the leaves are linear, glaucous, nearly twisted; flowers about six in the umbel, the leaflets of the perianth recurved, campanulate, sub-dentate, the three outer ones obovate-spathulate, the three inner linear-spathulate. Herbaceous. Native of Chili. The flowers at the exterior are purple, and spotted with purple of a deeper hue; two petals have a yellow line above the middle. Flowers in July, and is best grown in a stove. Introduced in 1822.

3. *Alstrœmeria pulchra*, Sims (fair Alstrœmeria).—Leaves linear-lanceolate; peduncles partially umbellate, with involucres, three-flowered; pedicels twisted, outer petals obcordate. This species has been called *A. Flos Martini* in the *Bot. Reg.*; and *A. tricolor* by Hooker. Herbaceous. Native of Chili. The four outer petals have a deep purple spot, and a white callosity at the summit; the two inner ones are white, with a broad purple band, parted in streaks towards the summit, which is yellow, and marked with purple lines and small yellow points or dots. Flowers in June, and is best grown in a greenhouse, or the open border. [Introduced in 1822.]

4. *Alstrœmeria pulchella*, Linnæus (pretty Alstrœmeria).—Leaves sessile, pedicels shorter than the involucre; perianth reflexed, open; all the petals pointed. There is a hairy variety of it. Herbaceous. Native of South America. The petals are white, red at the summit, striated at the base or spotted with purple. This is considered as a variety of *A. pallida* (Graham), and *A. Neillii* (Gillies), which, according to the *Flore des Serres*, form one single species. But this opinion cannot be sustained, as an inspection of the leaves, which are quite different, completely destroys it, even without reference to the character of the stem and the flowers. This species flowers in June, and may be grown in a greenhouse or in a bed in the open border.

5. *Alstrœmeria Ligtu*, Ruiz and Pavon (Ligtu).—Stem straight, leaves lanceolate, linear; flowers in umbels; petals nearly

conformable. This is the *A. Feuillæana* of Meyer. Herbaceous. Native of Chili. Not known by whom or when introduced. The petals are of a fleshy rose colour, the two upper ones somewhat marked or dotted ; and the odour of the flower is very agreeable. Flowers in March, and is best grown in a stove.

6. *Alstrœmeria magnifica*, Herbert (magnificent Alstrœmeria).—External divisions of the perianth apiculate, obovate, pale purple, two inches long, by one and a quarter broad ; under petals equally coloured, rounded, and obtuse, about an inch and a quarter broad ; upper ones straighter, three-quarters of an inch broad, and an inch and three-quarters long, deep purple at the base, striated, yellow at the middle, and rich purple at the apex. Dr. Lindley adopts this description of the late Hon. and Rev. W. Herbert, and considers this Alstrœmeria as new; but the diagnosis rests on the dimensions and the colours of the corolla, consequently deserves to have but little importance attached to it. The plant, we believe, was brought from Coquimbo by Mr. Bridges, and has been grown in England.

7. *Alstrœmeria chorillensis*, Herbert (Chorillos Alstrœmeria).—Stem nearly a foot high; leaves two inches and a half long, and three-quarters broad, resupinate, upper surface ribbed with two or four strong nerves ; peduncle two or three-flowered ; perianth an inch and one-eighth long, bright rose veins, green at the ouside, and at the summit ; external divisions spathulate, nearly equal, more than half an inch broad ; those of the interior straighter, pointed, the upper ones bright rose at the summit, yellow at the middle, and rose at the base, having some straight linear spots and freckles ; the reproductive organs rose, the pollen pale, capsules sub-spherical, the seeds small and roundish, of an obscure brown colour, closely tuberculated. This description, also adopted by Dr. Lindley, is hardly to be compared to some others which we have of this genus. This species is a native of the mountains of Chorillos near Lima, in Peru. [Introduction uncertain.]

8. *Alstrœmeria Curtisiana*, Meyer (Curtis's Alstrœmeria).—Leaves subulate ; umbel simple, few-flowered, petals pointed; perianth sub-bilabiate; the anterior petal, thrice as short as the posterior ones. Redouté has figured this species under the name of *A. Ligtu*, in his work on Liliaceæ ; and Hooker, Herbert, and Loddiges, regard it as a modification of the same species. Meyer has, however, ably shown that this opinion is not sustainable. It is a herbaceous plant. Native of Chili and Brazil. The large petal is entirely rose-colour ; the lateral ones narrower, white, except at the tips, where they are rose; the inferior ones are entirely rose. Flowers in March ; and may be grown in a cool greenhouse. [Introduction uncertain.]

9. *Alstrœmeria albiflora*, Presl (white-flowered Alstrœmeria).—Leaves linear, sessile, smooth ; umbel of from three to six flowers ; involucre leafy, longer than the pedicels, which are sub-bifid : the three upper petals obovate, denticulate ; the two exterior ones oblong, lanceolate, the anterior one uneven, lanceolate, denticulate. Native of the Cordilleras of Chili. Herbaceous. The flowers are white; the two exterior petals have lines and purple spots at the middle. This species is not known to us, and it is not grown in our gardens.

10. *Alstrœmeria caryophyllea*, Jacquin (clove-scented Alstrœmeria).—Leaves spathulate, sessile, appressed, with three nerves ; floriferous stem, subaphyllous : the sterile stems with more numerous leaves, longly lanceolate, petiolate and dispersed ; corollas bilabiate. It is a species introduced in 1776 ; it was thought the country was not known, but it has been ascertained, at the present day, that it comes from Brazil. Jacquin, in *Jardin de Schœnbrunn*, has described and figured it. It is herbaceous, and all the petals are red. It flowers in February and March, and the scent of its flowers is similar to that of cloves. This species well merits greater patronage than its receives. Its flowers would be highly attractive in February. [This should be grown in a stove.]

11. *Alstrœmeria pallida*, Graham (pale Alstrœmeria).—Stem weak, straight ; leaves linear - lanceolate, denticulate, subamplexicaul ; exterior petals obovate, the lateral ones broader, those of the interior longer and lanceolate, pedunculate, one-flowered. Herbaceous. Originally from South America. The four outer petals are of a bright rose-colour, the two inner ones lanceolate, winged at the base, denticulate, veined with red, and having a yellow spot. Flowers in June. May be grown in a bed, covered in winter, and exposed in summer. [Introduced in 1828.]

12. *Alstrœmeria spathulata*, Presl (spathulate Astrœmeria).—Leaves spathulate, mucronate, smooth, and with cartilaginous margins ; umbel with two or three flowers, involucre leafy, as long as the one-flowered pedicels; petals conformable, apiculate. Grows half a foot in height. Herbaceous. Native of Peru.

13. *Alstrœmeria plantaginea*, Martius (plantain-leaved Alstrœmeria).—Leaves narrow, lanceolate, smooth, on the sterile stems oval-lanceolate ; umbels of from five to six rays ; petals conformable, entire ; the outer ones obovate, spathulate, obtuse ; the inner

ones oblong, apiculate. Grows a foot high. Native of Brazil. We do not think this species is grown in gardens, and we are indebted for our knowledge of it to M. Martius of Munich.

14. *Alstrœmeria revoluta*, Ruiz and Pavon (revolute Alstrœmeria).—Leaves lanceolate; peduncles umbellate, two-flowered, petals reflexed, the inner ones smaller. Herbaceous. Native of Chili. Stem very simple; petals purple.

15. *Alstrœmeria versicolor*, Ruiz and Pavon (parti-coloured Alstrœmeria).—Leaves linear-lanceolate; umbel of from three to six flowers, inner petals narrower, under ones broader and shorter. Herbaceous. Native of Chili. Grows about a half-foot high. Petals yellow, spotted with purple. Introduced in 1833, and has produced numerous varieties, of which may be noted *aurantiaca*, *flava*, &c. It is from having been thought that these horticultural denominations represented species, that the opinion has been disseminated, that all Alstrœmerias were simply varieties of one common type or parent. This species flowers in June, and may be grown in an orangery or cool greenhouse, but better in a bed in the border, covered in winter with a frame, and surrounded by litter.

16. *Alstrœmeria hœmantha*, Ruiz and Pavon (crimson-flowered Alstrœmeria).—Leaves linear-lanceolate, ciliated; umbels with about six rays; peduncles two-flowered, outer petals dentate, the upper ones shorter. Herbaceous. Native of Chili. The outer petals are white and purple, having a large purple spot; those of the interior varied with white, yellow, and purple. Cultivated since 1829. Flowers in July. Requires a stove [or greenhouse].

17. *Alstrœmeria lineatiflora*, Ruiz and Pavon (lined-flowered Alstrœmeria).—Leaves lanceolate, bright green; umbel of from four to seven rays; peduncles two-flowered or one-flowered; petals obovate, cuneiform, acuminate, dentate. Herbaceous. Native of Peru. Grows from two to three feet high. Flowers, pinkish purple. [Introduced in 1842.]

18. *Alstrœmeria psittacina*, Lehmann (parrot-like Alstrœmeria).—Whole plant very glabrous; leaves oblong-lanceolate, nerved, peduncles in umbels, one-flowered; external divisions of the corolla lanceolate, the others oblong, spotted above. Herbaceous. Native of Mexico. Grows a foot high. Flowers disposed in an umbel. Sanguineous at the base, the tips spotted with green. Cultivated since 1829. Flowers in September, and may be grown in a bed covered by a frame in winter.

19. *Alstrœmeria braziliensis*, Sellow (Brazilian Alstrœmeria).—Stem straight; leaves lanceolate, pointed, nerved, very smooth; peduncles, one-flowered in umbels; divisions of the perianth lanceolate, pointed, very entire, and striated. Herbaceous. Native of Brazil. We do not think it is to be found in cultivation.

20. *Alstrœmeria monticola*, Martius (mountain Alstrœmeria).—Stem stiff, glabrous; leaves linear, lanceolate, pointed, distant, glabrous; umbel with six rays; the three exterior petals spathulate, obtuse at the summit, crenulate, the three interior ones lanceolate, pointed, the two upper ones a little longer. Herbaceous. Grows two feet high. Native of Brazil. [Not introduced.]

21. *Alstrœmeria longistaminea*, Martius (long-stamened Alstrœmeria).—Stem straight, glabrous; leaves linear, lanceolate, pointed, short; umbels with five rays, without involucres; outer petals obliquely oval, the inner ones shorter, oblong-lanceolate, acuminate, the under ones shorter; stamens a little exserted. Herbaceous. Native of Brazil. Not to be found in gardens.

22. *Alstrœmeria foliosa*, Martius (leafy Alstrœmeria).—Stem straight, glabrous, a little scabrous at the base; leaves linear-lanceolate, somewhat acute, with a mealy pubescence underneath; umbels from three to six-flowered; peduncles with one or two flowers; outer petals spathulate, crenulate, the interior ones lanceolate, pointed. Native of Brazil. Grows three feet high. Corolla red; white at the limb. [Not introduced.]

23. *Alstrœmeria glaucescens*, Humboldt and Bonpland (glaucous Alstrœmeria).—Stem straight, inclined, glabrous; leaves lanceolate, convolute, becoming green below; flowers umbellate; divisions of the perianth oblong, obtuse, glabrous. Herbaceous. Native of South America. Grows to about three feet high. The three exterior petals are of a flesh colour; those at the interior yellow, and spotted with a ferruginous brown. [Not introduced.]

24. *Alstrœmeria linifolia*, Humboldt and Bonpland (flax-leaved Alstrœmeria).—Stem straight, a little velvety; leaves lanceolate, glabrous, revolute at the margins; flowers in umbels; outer divisions of the perianth oblong, somewhat acute, pubescent at the outside. Native of South America. Grows one foot high. The three outer petals red, pubescent at the exterior; the three interior ones yellow, and spotted with red. [Not introduced.]

25. *Alstrœmeria distichophylla*, Sprengel (distichous-leaved Alstrœmeria).—Stem straight; leaves distichous, oblong, lanceolate; umbel with from three to eight flowers; petals equal. Herbaceous. Native of Peru; figured by Ruiz and Pavon, and named by them *A. distichifolia*. The stem is very simple, two

feet high. The flowers are purple. Not grown in the gardens of Europe.

26. *Alstrœmeria secundiflora*, Ruiz and Pavon (secund-flowered Alstrœmeria).—Stem pendant; leaves lanceolate, sharply pointed, white underneath; umbel with about five flowers, hairy. Native of Peru. Herbaceous. Grows two feet high. The three outer petals are purple, downy at the outside; the three inner ones yellow, spotted with black, and green dots at the tips. We do not think it is in cultivation.

27. *Alstrœmeria aurea*, Graham (golden Alstrœmeria). — Stem erect; leaves lanceolate, obtuse, glabrous, obscurely denticulate; leaflets of the perianth very entire, the interior one lanceolate, acuminate, straight. This is the *Alstrœmeria aurantiaca* of Don. Herbaceous. Native of Peru. It has orange flowers. Flowers in June. May be grown in frames. [Introduced in 1834.]

28. *Alstrœmeria dulcis*, Hooker (sweet Alstrœmeria).—Stem simple, straight; leaves linear, lanceolate, striated, revolute at the margins, glabrous above, pubescent below; umbels terminal, of from one to four inclined flowers; three outer divisions of the perianth oblong, lanceolate, obtuse; three interior broad and spathulate. Herbaceous. Native of Peru. Grows from six inches to a foot high. The three outer petals are flesh-coloured; the interior ones a greenish yellow, tinged with green spots. [Not introduced.]

29. *Alstrœmeria Neillii*, Gillies (Neill's Alstrœmeria).—Stem straight, weak; leaves spathulate, obtuse, glaucous, very entire, reflexed at the apex; three outer petals obovate, emarginate, equal, crenated, the three innermost a little longer, spathulate, nearly entire; peduncles umbellate, two-flowered. Native of Chili. Herbaceous. Flowers of a pale rose-colour, the three inner petals dotted with red. Flowers in June. May be grown in the orangery or cool greenhouse. Cultivated since 1830.

30. *Alstrœmeria declinata*, Pœppig and Endlicher (declined-rayed Alstrœmeria). — Stem very simple, recurved; leaves lanceolate, very sharply pointed, rounded at the base; glabrous at each side, terminal umbel, with from four to six bent or inclined rays. Herbaceous. Native of Peru. Grows to the height of a foot and a half. Flowers purple. [Not introduced.]

§§ *Stem, climbing or twining.*

31. *Alstrœmeria Salsilla*, Linnæus (climbing Alstrœmeria).—Leaves petiolate, lanceolate, acuminate; umbel branchy; peduncles shorter than the involucre, lax, and furnished with bracts. Herbaceous. Native of South America, especially of Chili. The three outer petals are reddish, and spotted with red; the three interior yellow and spotted with red. Introduced in 1831. Flowers in June, and requires a stove. It is the *Bomarea Salsilla* of Mirbel. Some botanists, Dietrich among others, connect it with *Alstrœmeria edulis*.

32. *Alstrœmeria torta*, Humboldt and Bonpland (twisted Alstrœmeria).—Stem twining; leaves glabrous, sessile, linear lanceolate, revolute at the margins, stiff; umbels many-flowered; pedicels one-flowered, glabrous; outer petals somewhat longest. Herbaceous. Native of Peru. The three outer petals are red, the three interior green, spotted with black and yellow towards the base. [Not introduced.]

33. *Alstrœmeria multiflora*, Linnæus (many-flowered Alstrœmeria).—Leaves petiolate, lanceolate, acuminate; umbel simple; peduncle shorter than the bracts; petals alternating, truncate. Herbaceous. Native of South America. [Not introduced.]

34. *Alstrœmeria anceps*, Ruiz and Pavon (two-edged Alstrœmeria). — Stem twining, two-edged; leaves lanceolate, sharply pointed; umbel with seventeen flowers; petals equal, coloured deep red. Native of Peru. Herbaceous. Petals of a deep purple. [Not introduced.]

35. *Alstrœmeria rosea*, Ruiz and Pavon (rose-coloured Alstrœmeria).—Stem twining, round; leaves oval, lanceolate, hairy underneath, petioles short; umbels with eighteen rays, the inner petals marked with black or dark lines. Native of Peru. Herbaceous. Grows five feet in height. Care must be taken not to confound it with the *A. rosea* of gardens, which is only a variety of *Hookeriana*, and is included in first section. [Not introduced.]

36. *Alstrœmeria crocea*, Ruiz and Pavon (orange-coloured Alstrœmeria). — Stem twining, round; leaves linear-lanceolate, sessile, pubescent below; umbel many-flowered, peduncles pubescent; petals equal, of a saffron-yellow. Herbaceous. Native of Peru. Not yet introduced.

37. *Alstrœmeria bracteata*, Ruiz and Pavon (bracteated Alstrœmeria).— Stem twining, pubescent at the summit; leaves lanceolate, linear, nerved, pubescent underneath; umbels with five rays, and about twelve flowers; peduncles with two or three flowers, bracts large, oblong-lanceolate; inner petals spathulate. Herbaceous. Native of Peru. The three outer petals are purple with the tips green, those in the interior green, with a yellow base; the margins and the points are of a violet colour. Not introduced.

38. *Alstrœmeria coccinea*, Ruiz and Pavon (scarlet-flowered Alstrœmeria).—Stem scandent, velvety; leaves oval, pointed; umbel with two or four flowers; petals oblong

cuneiform. Native of Peru. Herbaceous. The three outer petals red, green at the points: those of the interior greenish yellow, spotted with purple dots. [Not introduced].

39. *Alstrœmeria paùciflora*, Humboldt and Bonpland (few-flowered Alstrœmeria).—Stem twining; leaves glabrous, ovate, oblong or ovate-lanceolate, somewhat stiff; umbels few-flowered, pedicels with two or three flowers, lengthened, glabrous; outer divisions of the perianth longest. This species was found near Santa Fé de Bogota in Guadaloupe. The three outer petals are purple, the three inner ones orange. Introduced in 1823. Flowers in September. May be grown in a stove.

40. *Alstrœmeria setacea*, Ruiz and Pavon (setaceous Alstrœmeria). — Stem climbing; leaves lanceolate, pubescent beneath; umbel simple, rays numerous, peduncles pubescent, bracts setaceous; corolla small, petals straight, connivent. Native of Peru. Herbaceous. Grows from six to eight feet high; outer petals purple, the inner yellow. [Not introduced.]

41. *Alstrœmeria tomentosa*, Ruiz and Pavon (downy Alstrœmeria).—Stem nearly twining, glabrous; leaves lanceolate, the margins reflexed, somewhat downy underneath; umbels many-flowered with two-flowered rays. Herbaceous. Grows about four feet high. Native of Peru. The three outer petals are bright red, and those of the interior yellowish. [Not introduced.]

42. *Alstrœmeria orata*, Cavanilles (oval-leaved Alstrœmeria).—Stem twining; leaves petiolate, elliptic, acuminate, velvety above; umbel branchy or spreading; peduncles longer than the involucre, two-flowered, loose, and furnished with bracts; corolla campanulate-tubular. It is the *Alstrœmeria hirtella* of Sweet; the *Bomarea ovata* of Mirbel. Herbaceous. Native of Peru. The three outer petals are red, green at the points; the three inner ones green, and marked with dark or blackish dots. Introduced in 1824. Flowers in June. May be grown in the open ground with the protection of a frame in winter.

43. *Alstrœmeria hirtella*, Humboldt and Bonpland (hairy Alstrœmeria).—Stem twining, glabrous; leaves oblong, membranaceous, hairy on the veins underneath; umbels many-flowered, pedicels generally one-flowered, glabrous; outer divisions of the perianth somewhat the shortest. Herbaceous. Native of Mexico. The three outer petals are red, the three inner ones greenish, and spotted with red. [Introduced in 1824.]

44. *Alstrœmeria denticulata*, Ruiz and Pavon (denticulate Alstrœmeria). — Stem climbing; leaves lanceolate-oval, sharply pointed, undulated at the margins, denticulate, pubescent underneath; flowers arranged in an umbel or corymb, bracts subulate. Herbaceous. Native of Peru. Flowers reddish yellow. Not introduced.

45. *Alstrœmeria fimbriata*, Ruiz and Pavon (fringed Alstrœmeria).—Stem twining; leaves lanceolate, narrow; umbel many-flowered; interior petals fringed. Herbaceous. Native of Peru. Flowers yellow, varied with saffron. [Not introduced.]

46. *Alstrœmeria purpurea*, Ruiz and Pavon (purple Alstrœmeria).—Stem climbing, pubescent; leaves lanceolate, narrow, pubescent underneath; flowers in a corymb or nearly an umbel; peduncles one-flowered, lanuginose, and furnished with bracts. Native of Peru. Herbaceous. Flowers purple. [Not introduced.]

47. *Alstrœmeria macrocarpa*, Ruiz and Pavon (large-fruited Alstrœmeria). — Stem climbing; leaves oblong-lanceolate, pubescent below; umbel many-rayed, peduncles two-flowered, very long, many times longer than the involucre. Herbaceous. Native of Peru. Flowers of a reddish yellow. [Not introduced.]

48. *Alstrœmeria salsilloides*, Martius (salsilla-like Alstrœmeria). — Stem climbing; leaves petiolate, lanceolate, acuminate, glabrous on both sides; umbels from six to twenty-five rays, bearing from two to three flowers; outer petals ovate-oblong, pointed, those of the interior a little longer than the others, cuneiform, emarginate, punctate; filaments pubescent below. Herbaceous. Native of Brazil. [Not introduced.]

49. *Alstrœmeria grandifolia*, Humboldt and Bonpland (large-leaved Alstrœmeria).—Stem twining, glabrous; leaves oval, membraneous, slightly hairy underneath; umbel few-flowered; pedicels one-flowered, pubescent; divisions of the perianth equal. Herbaceous. Native of South America. Outer petals red, inner ones orange, spotted with red. [Not introduced.]

50. *Alstrœmeria cordifolia*, Ruiz and Pavon (heart-leaved Alstrœmeria).—Stem climbing; leaves cordate acuminate; umbel six-rayed, peduncles, with two or three flowers puberulous. Herbaceous. Native of Peru. Flowers of a yellowish red. [Not introduced.]

51. *Alstrœmeria latifolia*, Ruiz and Pavon (broad-leaved Alstrœmeria).—Stem twining; leaves oblong, acuminate, veined, pubescent underneath; umbels many-rayed, peduncles one to three-flowered; furnished with bracts; corollas greenish red. Herbaceous. Native of Peru. Flowers of a greenish red colour. [Not introduced.]

52. *Alstrœmeria hirsuta*, Humboldt and Bonpland (hairy Alstrœmeria).—Stem twin-

ing; leaves hairy underneath, oblong; umbels many-flowered, pedicels one-flowered, hairy; outer divisions of the perianth shorter than the inner. Herbaceous. Native of New Grenada. Flowers of a flesh colour. [Not introduced.]

53. *Alstrœmeria formosissima*, Ruiz and Pavon (most beautiful Alstrœmeria).—Stem climbing; leaves lanceolate, long, very glabrous; umbel semi-globular, peduncles one-flowered; flowers numerous, of a yellowish-purple, punctate. It is the *Alstrœmeria formosa* of Persoon. Herbaceous. Native of Peru. [Not introduced.]

54. *Alstrœmeria gloriosa*, Chamisso (glorious Alstrœmeria).—Stem twining, glabrous; leaves elliptic, lanceolate, acuminate, sharply pointed, slightly pubescent above, glabrous below, umbels of from seven to twelve flowers; the three outer divisions of the perianth irregularly crenulated, slightly hairy at the interior of the base. Flowers of a rose colour. Herbaceous. Native of the forests of Xalapa. [Not introduced.]

55. *Alstrœmeria acutifolia*, Link and Otto. (sharp-leaved Alstrœmeria).—Stem somewhat twining; leaves petiolate, lanceolate, lengthened and acute at the apex, pubescent underneath; umbels simple, peduncles pubescent; divisions of the perianth equal. A beautiful species. Herbaceous. Native of Mexico. The three outer petals are red within, and the interior ones yellow. [Introduced in 1829. May be grown in the border with slight protection.]

56. *Alstrœmeria Caldasis*, Humboldt and Bonpland (Caldasis Alstrœmeria). — Stem twining; leaves glabrous on both sides, oval, lanceolate, and somewhat rigid; umbel many-flowered, pedicels one-flowered, pubescent; outer divisions of the perianth shortest. It is doubtful whether this is not the *Alstrœmeria purpurea* of Wildenow. Herbaceous. Native of Quito [Peru]. The outer petals are of a flesh colour, the inner ones orange, spotted with red. [Not introduced.]

57. *Alstrœmeria floribunda*, Humboldt and Bonpland (many-flowered Alstrœmeria).—Stem twining; leaves glabrous on both sides, lanceolate, sub-membranaceous; umbels many-flowered, pedicels one-flowered, pubescent; outer divisions of the perianth somewhat shortest. Herbaceous. Native of South America. The outer petals are red, the inner ones yellow, spotted with red. [Not introduced.]

58. *Alstrœmeria Bredemeyerana*, Willdenow (Bredemeyer's Alstrœmeria). — Leaves oval-oblong, petiolate, acuminate, downy underneath, as well as on the stem; flowers in the form of an aggregate corymb; peduncles longer than the bracts. This species is little known. Herbaceous. Native of Caracas. [Not introduced.]

59. *Alstrœmeria oculata*, Loddiges (dark-eyed Alstrœmeria).—Stem round, glabrous, twining; leaves oval-oblong, obtuse, glabrous on both sides, petioles twisted; flowers umbellate, bracts obovate, crisped. Herbaceous. Native of South America. Corollas of a rose colour. Flowers in June; may be easily grown in an orangery or cool greenhouse. [Introduced in 1831.]

§§§ *Uncertain Species.*

The English Catalogues mention the *Alstrœmeria valparadisiaca*, a native of Valparaiso, introduced in 1836 to gardens; but it has not yet been submitted to a proper botanical examination. [It is said to be from Valparaiso, and to have orange-coloured flowers.]

The late Dr. Herbert mentions also an *Alstrœmeria Cummingiana*, introduced in 1831, and in like manner not described by botanists. [It is said to be from Chili, and to have yellow-and-orange-coloured flowers.]

[*Alstrœmeria nemorosa* is a species introduced from the Organ Mountains in 1840, and has red-and-yellow flowers in the autumn months. It is allied to *A. aurea*, but is distinguished by the structure of its seeds, by its broader leaves and shorter flowers, by a freckle or two on the lowest petal, and by the undulation and more dense ciliation of the base of the segments of the perianth. It is one of the hardier forms of the genus.]

The *Alstrœmeria Erembaultii, chilensis, Barclayana, bicolor, Reideli, Berteroana,* &c. are probably all garden varieties, or hybrids. With regard to *A. Erembaultii*, there can be little doubt of its hybrid origin, since it is said to have been obtained by a cross between *A. pelegrina* and *A. pulchra*, having itself produced a variety called *tricolor*. M. Erembault-Dumesnil, of Tournon, is said to have raised this production, so remarkable by the beauty of its flowers. The capability of yielding varieties of colour appears to be very considerable in the Alstrœmerias, if we may judge by what has been already obtained in this way by cultivators from chance sowings of the seeds of these plants. The palm has been disputed by Belgium, France, and England, in the production of these varieties.

CULTURE.

With regard to culture, there are two systems adopted. The Belgian growers maintain that they do not thrive in pots; whilst in England pot-culture is preferred for the purpose of flowering them well. We have seen magnificent Alstrœmerias in England, obtained by the following system of culture :—

It matters not whether the plants are grown from seeds, cuttings, or roots, the soil in which they are grown is always the same, and is composed of peat, light sandy loam, mixed with leaf-mould and silver-sand, the whole in the proportion of one-third of each. This soil should be well mixed up together, so that it may be perfectly uniform in its composition. The usual manner of crocking the pots is quite sufficient to ensure good drainage. On the substructure thus formed at the bottom of the pots, the soil, which should have been passed through a sieve, is placed, and at the same time the plants are also allotted the position they are intended to occupy. They will grow more or less rapidly according to their situation in the greenhouse. They require a moderate supply of water; but when they are about to flower, they must be watered much more copiously. If the buds are numerous, a little clear liquid manure may be added, which will enlarge and materially aid the development of the flowers. It has been asserted that the colours are brighter and more varied through its influence.

The Alstrœmerias require air, and as much as possible the direct action of the sun, in the absence of which the colours are pale; but when once the flowers are open, they must have shade, as the sun very much shortens the duration of their flowering season. After they have ceased flowering, the plants are taken out of the pots, and divided: one of the divisions slightly furnished with roots is sufficient for propagation. These divided plants are put into small pots, and placed in the greenhouse or a frame; as they grow, their pots are changed according to the rate of their development. They are then treated again in the manner just explained.

Many amateurs prefer to preserve their Alstrœmerias in pots during winter, in order to put them, on the arrival of spring, in a border in the open ground, in a warm sheltered situation. This is the practice of the Belgian growers: a border is dug about a foot and a half deep; a quantity of brick rubbish is laid at the bottom, and this is overlaid with a mixture of fine porous sandy loam, sandy peat, rotten dung, or well decomposed leaf-mould, which ingredients are well mixed together. The young plants are then planted about fourteen inches apart, and in quincunx order. In October, when frosts may be expected, the bed is covered with a frame and light, which is surrounded with a lining of spent dung. When the weather is frosty, mats are placed over the light; and air and sun are given as circumstances permit. In the spring, when all fear of frost has disappeared, the plants are supplied with some clear guano-water, when nature must be left to act for herself upon them. From June to September, the cultivator is rewarded for his pains by a profusion of flowers. If they are to be raised from seeds obtained either directly from America or by culture in Europe, the seed may be sown in the spring, in seed-pans, and in soil which has been made very fine; when sown, the whole should have a light covering of sand.

The Alstrœmerias are too pretty, too varied, and too interesting to be neglected by the lovers of nature and beauty; and we strongly recommend our countrymen to bestow that attention on them which they so eminently merit.

TAKING POSSESSION OF A GARDEN.

This commences the most important period of a man's gardening operations. So much has been done, that he must make up his mind to forego his own taste, or be prepared for infinitely more labour and expense than would form a new one. True, he may have materials on the spot, but wrongly placed; and he is debarred from the advantages of a new piece of ground, which he could have trenched, levelled, and rolled all over, and been at liberty

to form every thing after his own fashion. In an old garden we cannot do all this. The labour of disturbing well-made gravel-walks is immense. Then there are sure to be objects that we must retain : trees too good to lose, too old to remove ; buildings which we wish somewhere else, but not good enough to place there, or the change too costly. All these things militate against the incoming possessor of an old garden.

In most cases it is policy to retain all the main gravel-walks, and to adopt as much of the old plan as we can anyhow reconcile to our taste. It should be recollected, too, that the purpose for which the garden is to be used operates a good deal upon the disposition to alter or keep it as it is. For instance, if it be a flower garden, in which to grow collections, all beds should be of equal width, but the length is immaterial; therefore in whatever directions the main walks may go, it is easy to make cross-beds of the proper width from walk to walk, because if the main-walk be serpentine, or in a curve, the only difference it will make in the cross-beds will be in their length. However, there will always be found many subjects in the way of regular flower-beds, and all of these that are useful and removable should be taken up and carefully planted where they are to remain ; and such as are useless should be grubbed up and thrown away.

Before anything of consequence is done, the drainage should be examined. If the ground be not in its nature sufficiently drained, steps must be taken to find an outlet for a main-drain four feet deep, and small drains three feet or three feet six below the surface should be formed at proper distances ; for unless the ground be properly drained, there is not a single subject that will grow to the perfection that draining will enable you to produce it. These drains may be made of pipes or large stones, or bushes.

The first step having been taken, a clearance is the next. To this end, make up your mind where the shrubs, trees, &c. that are in the way shall be ultimately placed, and at once lay out and prepare the place for their reception; and having done this, take them up carefully with all their roots, and plant them at once. Then set about making your cross-beds four feet wide (unless they are already formed), the length being from one main-walk to another ; and as there may be straggling plants and flowers all over the place, dig up the clearest place, and plant every thing you find about the ground as your digging goes on in this selected place. You then get all your beds at liberty but the one you fill with the sundries, and from that you may select whatever you want for all the distant places. It is well to have a broad border of four to six feet wide on each side the main walks, to be planted with herbaceous and various other miscellaneous plants, independently of the flower-beds, which may stretch out right and left from such borders ; and as there is not, and need not be, any rule for the planting of these main borders, except the common rules of planting the lowest in front and the tallest behind, it may be the ultimate place for all that are worth growing of the plants you have taken up all over the ground. Having formed the beds, you have only a choice of having alleys between them, or regular gravel-walks, or walks of road-sand, or grass. Whatever is determined on should be done at once. If they are to be of grass, level and roll with a heavy roller, or tread very firmly, and lay down turves. If of gravel or road-sand, dig out a few inches, according to the thickness you can afford to fill up, tread the bottom hard, and fill in the space by wheeling to the further end of each alley first, while another with a rake levels it as far as it will fill, and so continue till all are filled and raked level. If nothing but the common alleys are to be left, and not even a change of soil, the alleys must be trodden as hard as possible, and properly levelled, after which they must not be disturbed at the digging of the beds between, but must be chopped down their sides as straight as a tight line can direct, and year after year the alleys must not be broken up. If it be determined to put an edging of box or thrift, nothing is more easy. The plants have simply to be pressed up against the side of the alley, which being already cut properly, forms a hard bank, against which small plants of box, or whatever else be chosen, may be pressed by the soil of the bed against their roots. These beds may be adapted for different purposes by variously mixing the soils. If the original edges of the great walks have been box, and it has become overgrown, cut it down within two or three inches of the ground, for undisturbed it will not fail to break well below, and at the end of the season of growth it may be all taken up and thinned properly ; whereas if you take it up in the tall, straggling state in which you find it, four-fifths of it would be wasted, from its being so naked at the bottom and so long in the stem, and if stunted to the old wood, it would not break half so well as it would in its old position.

The gravel-walks will not unlikely be overrun with weeds. There is no remedy for this but pulling them out or burying them, but generally the gravel is not deep enough for this ; in such case, the top must be picked up a little way down, just deep enough to disturb all the roots of the weeds, and all the large weeds can be picked up by hand, and the

gravel turned, for the smaller weeds and the dirty stuff picked up at top may be then placed in the bottom, and the better gravel brought up to the surface.

The ground being now cleared a little, you have only to trench the beds and examine the kind of soil you have to deal with. If it be very stiff, use peat-earth or sand well chopped in among it, and thoroughly decomposed cow-dung to lighten and dress it. If it be too light, add unctuous loam from rotted turves to mix up with it and give it heart; and in some cases you must make up a regular soil to fill a bed, and, of course, remove eighteen inches of the old earth to make room for it. These things will become evident as the separate flowers come under consideration.

If you are over-run with slugs, snails, and such-like pests, a good sowing of lime after a shower of rain, which brings them all out, will materially disturb and thin them, if it does not altogether destroy them. If you have old walls with holes in them and crumbling mortar, have them well scarified to get off all the loose stuff, and remove all the rotten mortar and get them pointed afresh; or if the cost deter you, have the wall well washed out and coated with a thick lime-wash, coloured somewhat of the brick colour, that it may not look remarkable, but that what there is left of the wall may be sound. Nevertheless, the first expense is the best and cheapest, if it be properly pointed; and besides this, the wall is saved for years longer, and the vermin that usually lodge in the mortar-joints are extirpated or buried by the filling-in of the joints. There is hardly a more encouraging receptacle for vermin than an old wall; and it is of the utmost importance that they be destroyed by such means as we have mentioned. It is, in some cases, almost impossible to secure a fruit of any kind in perfection upon a neglected wall.

With regard to the glass structures about the premises, the first thing to look at is the wood-work, to see that all this is made sound; for if there be any patching or glazing without this, the labour may be thrown away. The flues or pipes want thorough examination in all cases, and it is worth considering whether you intend to devote a house to constant firing or not, before you determine upon any alteration as to the construction of the place. If it be an old-fashioned flue that heats the house, and you adopt a hot-water apparatus for the sake of its requiring less attention, do not remove the flues if you can find room for the pipes without doing so; because you may fix your hot-water apparatus just the same, and turn the smoke of the furnace into the old flue. By this means the heat of the flue will aid the temperature a little, and the house is not much disturbed. Again, the simplest of all the hot-water apparatus, as well as the cheapest, is the conical-boiler, with the fire-place inside it,—nothing can be more simple, nothing wastes so little heat; but for all the purposes of a greenhouse, a flue is sufficient. It may be a little more troublesome in continued hard weather, but in a general way, if the flue answers well, it is quite as well to keep it. A stove also, with a good pit for a body of tan, wants but little aid from fire-heat, unless it be for pine-apples. Every thing should be well considered before we change from the flue of the old-fashioned stove to the hot-water of the moderns, not any two of whom adopt the same plan, and many of whom have altered their own plan as many times as they have had jobs. For the most part, it has turned out that the most costly have been the least effective and oftenest out of repair. It is not for us to point out the particular error which has been committed, and that, too, with large and public works; but we may refer to such matters, as strong reasons for not giving ourselves up to the hot-water gentlemen, who have experimentalised at the expense of a good many who had more money than judgment, and who, in fact, have not professed to have judgment, but have employed men they fancied they could depend on. The complication and the mystery called into being in the manufacture of heat are perfectly unnecessary. The principles are simple. An iron pipe running from the upper portion of hot water in a boiler and returning to the lower part of the boiler, will circulate slowly or rapidly according to the heat applied; and the more simple the boiler and the pipes employed, the better and the more effective.

In stocking the garden, if you do not already possess the plants and roots required, be careful of your purchases; buy nothing that is second-rate. The best of every tribe takes no more room than the worst. Avoid buying the stock of people going to decline growing; never hunt after bargains; apply to respectable florists and nurserymen for the best things that can be had, and you will not be hampered with rubbish; but if you buy anybody's stock, you have his accumulated rubbish for all the years he has been growing, and when he has sold you that, he will go to market with your money to buy every thing as different as possible to that which he sold you. People who are notorious for good things know where to find the best price for their best flowers; and having got this, they offer their entire stock at a great sacrifice, in the hope of some young enthusiast looking out for a bargain; who, being taken with the chance of buying the stock of a first-rate

florist for a mere song, finds afterwards that he has only picked up things that are far too abundant in every grower's hands, and that they might have been had at a gift had he sought for them. No; buy simply the very best that can be had of old and favourite varieties, and such of the new ones as are well authenticated, and recommended by persons to be depended on, and you will avoid throwing away your ground, your time, and your money, besides saving yourself many annoyances that would try your temper. Get a handy man to help you. Do not look for a first-rate professional gardener, if you mean to indulge in the recreation of gardening yourself; get a steady man who has worked enough in a garden to know a little what he is about, and you will have no difficulty in satisfying him and indulging yourself; besides which, such a man does not object to helping you at anything he sees you engaged in. Hundreds of gardeners, whom the professional heads would greatly disparage if they had a chance, are picking up single-handed places, and acquiring rapidly the information that will qualify them for head situations.

FLORICULTURE OF THE MONTH.

BY GEORGE GLENNY.

The Carnation and Picotee Show at the South London Society was very limited, compared with those of former years, and there is a manifest tameness among florists and amateurs that borders upon indifference. There are, however, many fair seedlings, which, for want of some arrangement with regard to names, we have no means of noticing. Nothing better than the Duchess of Sutherland has been shown among picotees: but we have mentioned this flower elsewhere. Lorrina is pretty, and will be useful. Lady St. Moore is a bold, useful flower; but in the specimen we have seen it was slightly barred, and there were stains underneath. May's Falconbridge, a pink-and-purple bizarre carnation, was a pretty and not badly formed flower; but the white must come better to make it good. The same raiser's Mary Glendower, a crimson bizarre, was much brighter and better, and is an acquisition. Norman's Prince Albert picotee, with an edge of lilac rose, was pretty; and there were others which would have borne a favourable notice, had we found any name by which to have designated them. With regard to seedlings, it is very bad taste to show without names. Men entrusted to judge new flowers may know all that is to be known. It is child's play to put numbers and letters; not but the scrambling way in which judges are appointed, at the last moment, gives those who are inclined an excellent opportunity of palming their own judges on the committee, as if accident or curiosity alone brought them to the spot; and it may seem a little security against partial decisions; but this is all a farce. Those who plant their own judges take care the judges shall know the stands or flowers they are to serve. But new flowers should have their names to them, for the good of the public, who, so far as the certificates are concerned, care no more for the flowers that obtain them than for those which do not; and it is vexing to those who go to use their own judgment, to find themselves in the predicament of admiring and wanting a rejected flower, and not to know its name nor its owner; for, stupidly enough, the man who has no certificate thinks his flower best in the shade, and does not care to have it known. Hollyhocks were shown to great advantage by Mr. Chater, who seems to grow them well. Those to which we would draw immediate attention, are Black Prince, a noble black flower, thick, firm, and quite in advance; Magnum bonum, excellent, and but a shade lighter; Queen, a beautiful rose-colour, of fine texture; Pallida, very fine; Comet, a seedling, fine deep blood-red; Purpurea elegans, a fine bright purple: Sulphurea perfecta, a bright sulphur; Mulberry, superb, a very fine variety. There were single blooms of others, but no name to them; and, consequently, much as we admired them, we were in the dark. Two Petunias, out of a good number, appeared to have certificates: Youngii, a fine thick-petalled crimson, pretty good; and Queen, good for nothing; thousands better have been thrown away. This brings to mind a fine dark mottled variety, which we have received from Stowmarket, which is novel as well as of tolerably good form. Of the many Fuchsias exhibited at the Garden, the very best in the place were—Ne plus ultra, well grown, and calculated to show off the flower in perfection, abundance of bloom, and every flower well reflexed; One in the Ring, Purity, Kendall's Elizabeth, the old Formosa elegans, and Riccartoni. Had these plants been picked out and placed by themselves, there were not half a dozen in all the Gardens that could have stood against them. The stove and greenhouse plants, heaths, and orchideous plants at the Gardens this year have been worthy of all praise; and the Roses at the last show were as good as they can be, while flimsy petals are tolerated. The growth

of those in pots has been much improved, and we do not despair of seeing them generally shown, by-and-by, without all those mechanical contrivances, which are a disgrace to British Floriculture.

The meetings of the Royal Society for the Encouragement of Floriculture and Horticulture have been well attended ; and numerous seedlings in fuchsias, verbenas, petunias, carnations, picotees, pinks, and dahlias, have been shown. The principal meetings since our last, have been at Kingsland, and the grand quarterly central meeting at Watson's hotel. The only flowers that have been really distinguished, during the year, have been four or five seedling crocuses, which are a decided advance on all we had before, but for which no certificate was awarded, as the raiser showed the inutility of it until he could get up a stock ; a seedling dahlia, shown by Mr. Robinson, which, although admired, and considered quite an acquisition, was not officially noticed, because there were not six blooms, which is the least number on which the judges will adjudicate ; and the seedling picotee of Mr. Turner, called Duchess of Sutherland, which was awarded what may be considered the maiden certificate—the only one that, up to that evening, had been awarded, although more than three hundred specimens had been exhibited. It has been thought that the judges were too particular, but when at one part of the town there are men combined for the express purpose of deceiving the public, by awarding certificates of merit to flowers that do not add one single property or novelty to those we possess, and are not worth growing, the judges of a respectable Society, to which distant gentlemen look up with confidence, feel they must be very cautious how they give value to new productions. To gain one of their first-class certificates, a flower must be new in colour, and as good in other respects as those we have already ; or if it be a colour we already possess, it must be a decided advance in form and other properties. Let any Fuchsia grower, who bought *Lord Nelson* upon the warranty of those certificate manufacturers just mentioned, judge for himself what the thirty flowers were worth that shared the honour with that coarse and worthless Fuchsia. Let the gentleman who helped to award himself the certificate look at his *Ne plus ultra*, which had an honest and well-earned certificate from a more respectable source, and ask himself whether he can find a Fuchsia *better* than his *Ne plus ultra*, or *worse* than his *Lord Nelson*, in the whole family grown and thrown away for the last ten years. It is the feature of the Society for the Encouragement of Floriculture, &c. that the judges are elected for the year, and nothing can displace them till the end of the term, and as they have no interest in the result, their decisions are impartial and authoritative.

NEW FLOWERS AND PLANTS.

Gaultheria bracteata, *G. Don* (bracteated Gaultheria).—Ericaceæ § Ericeæ-Andromedidæ.—A low-growing, but very handsome evergreen shrub, attaining a foot or a foot and a half or more in height, with round, somewhat rigid, and more or less hairy branches, clothed with alternate, ovate, or cordate-ovate acute leaves, an inch and a half long and an inch broad, minutely saw-edged, usually glabrous above, and sometimes hairy or rusty beneath. The flowers grow in simple racemes, which are either axillary or terminal ; they are attached by short stalks, at the base of which are comparatively large ovate acute bracteas of the same rosy colour as the flowers, which grow in a secund manner. The flowers are tubular-ovate, contracted at the mouth, close below the short spreading five-lobed limb. Native of South America, near Quito, in the elevated regions of New Granada, and in the Andes of Columbia. Introduced in 1848. Flowers in the summer. It is the *Andromeda bracteata* (Cavanilles) ; *Gaultheria erecta* (Ventenat) ; *G. odorata, cordifolia, et rigida* (Humboldt, Bonpland, and Kunth). *Culture.*—Requires an airy greenhouse in winter, and shade in summer ; light peat soil ; propagated by layers, or by seeds.

Camellia japonica, *var. Rubini* (Rubini's Japan Rose).—Ternströmiaceæ.—A fine variety of the Japan Camellia, of the imbricated class, remarkable for the uniformly bi-coloured markings of its petals. The habit is robust, the leaves large, broadly ovate acuminate, and shining green. The flowers are four inches in diameter, circular, raised in the centre; the outer petals broad, and slightly notched, the inner ones gradually becoming narrower, and at length pointed, the innermost not much exceeding the eighth of an inch in width; the whole of the petals are deep rose at the base, becoming almost perfectly white at the margins, with a prominent band of light rose and white in the centre ; the petals lie in such a position that usually these bands fall in a line with others, giving the flowers a rayed appearance, which, with the uniform and unbroken gradations in form and size of the petals, constitutes the peculiar features of this variety. Raised in Italy. Introduced to Belgian gardens about 1844, by M. A. Verschaffelt, of Ghent. Flowers

in May. *Culture*:—Requires a greenhouse; good turfy loam and peat; propagated by inarching, grafting, or budding on the single camellia.

Fuchsia corymbiflora, *var. alba* (white corymbose-flowered Fuchsia).—Onagraceæ § Fuchseæ.—A large-growing shrubby plant, with large broadly lance-shaped leaves, and bearing dense pendulous corymbs of long slender tubular blossoms. In the species these blossoms are crimson; but in the variety the tubes of the calyx and sepals are of a carneous whiteness, becoming pure white when fully developed, the sepals being well reflexed, and exhibiting a corolla of brilliant crimson. A French garden variety, raised by Mr. Salter, of Versailles. Introduced to England in 1848. Flowers during summer. *Culture*.—Requires a greenhouse; well suited for the border of a greenhouse conservatory; rich loamy soil; propagated by cuttings planted in sandy soil, and most readily with slight bottom heat.

Myanthus fimbriatus, *Morren* (fringed-flowered Myanthus).—Orchidaceæ § Vandeæ-Catasetidæ—A very fine epiphytal species, belonging to the curious group of catasetums, to which the name Myanthus has been applied. This species has ovate elongated pseudo-bulbs, and lance-shaped plicate leaves. From the base of the pseudo-bulbs grow the racemes of flowers on a drooping scape. The sepals and petals are of the same pale rosy purplish-tinged colour, speckled over with red spots, the sepals being narrow lance-shaped, and the petals somewhat broader and shorter; the two petals and the upper sepal of the fully expanded blossom are connivent; the lip is heart-shaped, plain, fringed around the margin; the back is produced into a blunt coniform spur; the colour is almost white suffused with rose. Native of St. Paul, in Brazil. Introduced to Belgium in 1847. Flowers in September. *Culture*.—Requires a hot moist stove; turfy peat soil; propagated by division of the plant.

Lacepedea insignis, *Humboldt and Bonpland* (fragrant Lacepedea).—Hippocrateaceæ.—A handsome evergreen large-growing shrub, or small tree, with numerous branches, and ample opposite ovate or oblong ovate, somewhat leathery leaves, dark green and glossy above, and paler beneath, and attached by long footstalks. The flowers come in a branched terminal panicle; they are ovate globose, about the size of, and in shape not unlike those of the berberry; they are white, of five obovate-oblong erect concave petals, and are deliciously scented. Native of Mexico. Introduced by Messrs. Henderson, 1848. Flowers in May. It is also called *Triceraia tinifolia* (Willdenow), and *Triceros xalepensis* (Sprengel). The genus, of which this is the solitary species, was dedicated by Humboldt and Bonpland, to the honour of the distinguished naturalist Count de Lacepede. *Culture*.—Requires a stove; free open loamy soil; propagated by cuttings placed in bottom heat under a bell-glass.

Kadsura japonica, *Dunal* (Japan Kadsura).—Schizandraceæ.—A twining or scrambling shrubby plant, with fleshy warted bark, and having alternate oval or oblong-oval leaves, acute at both ends, with a smooth surface, and of somewhat leathery texture. The flowers grow in the axils of the leaves, and are small, white, unisexual; the female ones are succeeded by a cluster of small round red berries, white within; Siebold describes them as viscid, tasteless, and uneatable. Native of Japan, about Nagasaki. Introduced about 1848. Flowers from June to September. It has been also called *Uvaria japonica* (Linnæus), and *U. heteroclita* (Roxburgh). *Culture*.—Requires a cool greenhouse; sandy loam and peat; propagated by cuttings of the ripened wood planted in sand under a glass.

Oxalis elegans, *Humboldt*, *Bonpland*, and *Kunth* (elegant Wood-sorrel).—Oxalidaceæ.—A very beautiful stemless species, forming a tuft of leaves and blossoms. The leaves are trifoliate, consisting of three broad, roundish-obovate, emarginate leaflets, which are smooth, and on the under surface violet-coloured. The flowers grow on longish scapes, each bearing from two to six blossoms, which are large, and of a rich rosy-purple colour. Both the foliage and blossoms are much finer when the plants are grown in the open border in genial situations. Native of Peru, near Loxa. Introduced by Messrs. Veitch, in 1848. Flowers towards the end of summer. *Culture*.—Requires a greenhouse or frame; turfy peat soil; propagated by offsets. It is probably hardy enough to stand in dry open borders, if covered during winter with a thick layer of dry frost-repellent material.

Nematanthus ionema, *Martius* (dark blood-coloured *Nematanthus*).—Gesneraceæ § Gesnereæ.—A handsome soft-stemmed, rambling shrub, with round stems, throwing out roots in their progress. They are clothed with opposite fleshy, very dark green, broadly lance-shaped acuminated leaves, themselves about four inches long, and attenuated into a thick footstalk about an inch in length. From the axils of the leaves hang the flowers, one or two from each axil, on slender stalks from six to twelve inches long; the corolla is obliquely tubular, ventricose beneath, with a wide open mouth, and recurved limb; it is clothed with hoary purplish pubescence, and is of a rich deep blood-colour; the calyx tube is turbinate, deep purple, ending in five lan-

ceolate greenish leafy lobes. Native of the woods of Brazil. Introduced in 1848. Flowers in the spring months. It is the *Nematanthus corticola* (Schrader), and *N. Morrelliana*, of gardens.—*Culture.*—Requires a hot moist stove; turfy peat soil, in pots, or in open suspended baskets; propagated by cuttings placed in a moist heat.

CAMELLIA HAFILDA.

At page 384 will be found a very laudatory article on *Camellia Hafilda*. Perhaps an account of the history of that plant will be acceptable to your readers. It was raised from seed in Milan, by M. Sacco, a celebrated grower of that genus of plants. It was introduced into commerce under the name of *Saccoi nova*, to distinguish it from another variety, raised some time before, by the same horticulturist, and named by him *C. Saccoi*. When *C. Saccoi nova* was first received in this country, the *S* of its name was mistaken by some people for a *J*, and in consequence it was sold as *C. Jacco*, or *C. Jacco primo*. Since that time, have successively appeared *C. Afilda*, *C. Hafilda*, *C. Alunia rosea*, *C. Alcina rosea*, *C. Augustina*, *C. Augustiniana superba*, *C. Amedina*, *C. Rosa nova vera*, &c., all which supposed novelties have proved so much identical with the original *C. Saccoi nova*, that I do not the least hesitate to bring them all under that last name. The flowers of *C. Saccoi vera* are well imbricated; their petals of a pale or more or less deep rose colour, sometimes translucid, now of a uniform hue, now variegated with white round spots. My next *prix courant*, which may be found at Mr. George Rahn's, 52, Mark-lane, will afford information about the synonymy of many other Camellias, the nomenclature of which ten years' observation has enabled me to elucidate.—*Louis Van Houtte, Nurseryman, Ghent.*

MYANTHUS FIMBRIATUS.

In a former notice of this plant, we stated, on the authority of the "Annals of the Ghent Horticultural Society," that little was known as to the native country of the species. The translated passage was, "We have no information respecting the native country of this species, nor any historical particulars respecting its introduction to Europe." We have since received a communication supplying us with some interesting facts, from which it appears we had unwittingly re-published a sentence which did an injustice to the enterprising individual who was the cause of its introduction; and this is the more to be regretted, as Mr. T. de Jonghe, of the Exotic Nursery at Brussels, says, in reference to that notice—

"The writer, Mr. Morren, knew perfectly well all the particulars concerning the country and the origin of the said Myanthus, the date of its introduction, the name of the discoverer, as well as that of the establishment which first received this new plant. In concealing all these particulars he has certainly derogated as a writer, and has acted in a very blameable manner as a precedent in thus concealing from his colleagues that information which is so extremely necessary for the acquirement of botanical knowledge. I think it therefore my duty to inform you that the Myanthus fimbriatus was found in flower by my collector, M. Libon, in November 1846, in a marsh not far from the Villa Franca, province of St. Paul, in the Brazils. This plant was sent to Europe the following year, and reached me ticketed No. 389, in a lot of plants from St. Paul in the month of Nov. 1847. It flowered for the first time in September 1848. Mr. Legrelle, of Antwerp, in visiting my collection of plants, particularly remarked this plant, and bought it in order to exhibit it at the great exhibition, both horticultural and agricultural, taking place at Brussels in the month of September, 1848, where it obtained a first-rate prize.

"The plant of Mr. Heynderycx, President of the Horticultural Society, was also among the lot of plants received and cultivated in my grounds. Mr. Legrelle paid for his plant 40 francs, and Mr. Heynderycx, of Ghent, whose plant was stronger, paid 50 francs."

We are glad of this opportunity of imparting the facts, and we feel greatly indebted to M. Jonghe for sending in the same communication a few particulars as to cultivation; and as his conclusion is quite to the point, we take this further extract from his letter.—

"This sort of Orchideæ is cultivated on wood, and comes kindly on in pots, or planted in rotten soil formed of tree-roots, &c. In the hot-houses they require a more shady situation, as well as more damp, than the other Myanthuses. These are the particulars, exact and precise, concerning the name of the place the Myanthus fimbriatus belongs to, the date of its introduction to Europe, and that of its appearance in the trade, as well as its cultivation."

We are exceedingly anxious to be accurate upon such subjects; and in these days, when too many are endeavouring by misrepresentation or concealment to deprive men of the credit which belongs to those who advance the science, we are glad of an opportunity of "giving unto Cæsar that which is Cæsar's."

The particulars we formerly gave will be found at page 281.

FAMILIAR LESSONS ON PRACTICAL GARDENING.

It is evident that instructions in the operations of gardening, intended for the use of persons who are not familiar with garden practice, ought to have at least a twofold direction; for such persons not only require to be taught when and where certain operations need to be carried out, in order to lead to a successful issue, but they equally need instruction as to the manner in which those operations may be properly executed, with the same end in view. That is to say, the classes of persons comprehended in the idea of those who are unacquainted with the practice of gardening, require to be informed, both *what* is to be done, and *how* it is to be done, before they can undertake to manage their gardens with any well-grounded hope of success.

We now intend to deal with the latter of the two divisions of the subject just referred to; and proceed at once with an epitome of the various operations, the due performance of which forms the basis of productive gardening.

AMELIORATION OF THE SOIL.

For gardening purposes, neither a stiff adhesive clay soil, nor a loose sand, is desirable. The best of all soils is what is called a deep free loam; that is, the medium state between clay and sand, the two extremes just named. Stony soil is not, on that account, objectionable, if the earth is of the suitable texture, and the stones do not form too great a proportion to the body of the soil; they may, at the outset, be allowed to form nearly a fourth part of the bulk of the soil without detriment; and this proportion will be gradually lessened by the continued addition of manure and composts.

Heavy clay soils are much in need of improvement and amelioration; they most especially require perfect drainage. The texture of such soils cannot be altered at once; it must be a work of time and perseverance. The manner and the materials for this work may be separately considered. As to the manner: such soils should be trenched, the surface being thrown up into rough ridges—the rougher the better. This should be done just before winter sets in. After frosts the surface should now and then be forked over, so as to expose as much of the soil as possible to the direct action either of frost, or of the sun or air, either of which is beneficial, but especially the first. The effect of this will be salutary; the rough adhesive lumps which have been exposed, will, after the drying winds of early spring, be found to have crumbled to pieces, when the addition of correctives will, to some extent, prevent the subsequent adhesion of the particles. Perseverance in this practice, year after year, will secure the disintegration of the whole mass. But if this crumbled clayey soil is afterwards submitted to pressure when in a wet state without any corrective addition, it will cling together again as firmly as before, and the beneficial effects obtained from its exposure will be lost. It is for this reason that those operations of gardening which involve treading on the soil, should, as far as practicable, in the case of heavy soils, be performed when the surface is tolerably dry, in order that the adhesive particles may not be again consolidated. All the heavier operations, which involve much trampling over the whole surface, should certainly be avoided while the surface is sufficiently wet to adhere to the feet; and those operations, such as planting and sowing, which are necessarily performed either after rain, or on a fresh-turned damp surface, should be prosecuted with as little treading on the soil as possible. It is not always possible to avoid treading, when the act of treading on the soil is in itself injurious, and opposed to whatever efforts may have been made to improve its texture; but it may always be kept in mind, that treading on clay soils when they are in a wet state, is an evil; and if this is borne in mind, the evil will less frequently occur. While the soil is dry, and the particles into which it has been reduced by the action of the weather are in a state of separation, the corrective materials to be presently named should be applied, and while the ground is in this dry, powdery state, they should be well intermixed with it by means of a digging-fork,—which implement is far preferable to the spade for all rough digging, trenching, and work of this kind. With this fork, the dry, crumbling ridges of heretofore stiff, adhesive soil, are to be turned over, and levelled down, a coating of the materials to be presently named having first been spread over them, the whole being well intermixed in the process of turning. The materials proper for the amelioration of adhesive soils, and which should be applied in a dry state, are such as finely sifted coal, or wood or peat ashes, small charcoal, charred sawdust, or refuse vegetable matter of any kind charred, the finer portions of old lime or mortar rubbish, or sand, especially the sharp drift-sand frequently met with by the road-

side, and clear, sharp river or sea-sand, or what is called shell-sand, which consists almost entirely of cockle and other small bivalve shells, more or less crushed and broken. Any loose, dry material, which, when worked amongst the disintegrated clay, will prevent it from again adhering as before, may therefore be used with advantage. Chalk is a beneficial application, where it can be exposed so as to become pulverized. Good dressings of manure are also very effectual in improving the condition of such soils as these; but, when manure is used, it should be deposited amongst the soil (not, however, entirely at the bottom of the trench), at the time of trenching. In trenching heavy soils (or, indeed, any others), if the top layer of good earth is scanty, it should be retained as near the surface as possible, and the lower soil merely broken up, but still kept beneath, a small portion being, from time to time, brought up to the top, so as to gradually increase the bulk of good soil. It is not an uncommon practice in trenching, to place the top-soil in the bottom of the trench, and the soil from the bottom at the top; but, unless there is a good depth of soil, this is a bad practice, as the good soil is placed, for some time at least, out of reach of the roots, and the seeds or plants which are put into the ground are placed amongst soil that is altogether uncongenial to their growth. Two feet deep of good soil there should be for the growth of superior crops of any kind; but if there is not this depth of good earth, the lower strata, or subsoil as it is called, must be mixed among the upper soil a little at a time, and that little well exposed to the atmosphere; and this must be continued year after year with perseverance until the necessary depth is at length attained.

For the improvement of sandy soils, treatment in many respects the opposite of that just detailed may be recommended. They may be wrought at any time, even, in many cases, immediately after or during heavy rains, and that without detriment, as the water passes away from them so readily. And instead of doing every thing possible to lighten up, or render open and pervious, the mass of soil, as is proper in the management of clays, here the object should rather be compression and consolidation. The operations of trenching and manuring require, indeed, to be performed, and the surface should be annually laid open as much as possible to the weather, but in this case rather to sweeten and become aërated, as it is termed (that is, that its particles may be exposed to the action of the atmosphere), than to cause its pulverization; and where the soil is very loose, that is, composed almost entirely of sand, it is advantageous to submit it to moderate and equal pressure before the crops are placed on it,—not, however, to render the surface cake-bound, for this is altogether a positive evil. The materials to be employed to improve these soils, are chiefly heavy loam, inclining to clay, marl of various kinds, and clay; these, especially the two latter, should be spread loosely over the surface, and forked in among the soil when moderately dry.

In sandy soils which contain iron, there is often a consolidated crust (or "pan," as it is termed) formed a little distance below the surface,—usually just below the depth to which the soil is generally stirred up; this pan should, wherever it exists within the range of trenching, that is, within three feet of the surface, be broken up, as it obstructs the free passage of the moisture, both upwards by capillary attraction, and downwards by percolation.

Calcareous or chalky soils are, in general, fertile, if the chalky matter is not in excess. They are not so liable to suffer from excess of moisture as many others, the strata being generally favourable for the passage of water. Wherever superabundant moisture is present, it must, however, be drained away. Those which are of a somewhat heavy texture, are most benefited by applications of light, sandy loam, or light earth of any kind. The lighter chalky soils, on the other hand, are more benefited by loam of heavier texture. Loam, it will be remembered, is a somewhat tenacious earth, less plastic and adhesive than clay.

Peaty soils contain the elements of fertility; they consist mostly of decayed vegetable matter impregnated with acids, and sometimes with irony matters,—which latter may be observed from their rusty-looking nature, wherever water accumulates. They are naturally wet; therefore the first thing must be, to drain them thoroughly. They may then be improved by the addition of calcareous matter in considerable abundance, which will neutralize the acid properties and decompose the irony matters existing in the peat; for the latter purpose, quicklime is preferable. Shell-sand is also an excellent material for application to peaty soils, being composed in great measure of calcareous matter, in the form of carbonate of lime. Farther than this, they may be improved by the addition of loams or earths, to give them greater body.

It may be useful to recapitulate, that clay imparts tenacity to soils to which it is applied; sand diminishes the degree of tenacity; and chalk or lime have an intermediate effect, rendering heavy soils more porous and easily broken up, and light ones more binding and retentive of moisture. The object in mixing soils, and in adding composts for their ameli-

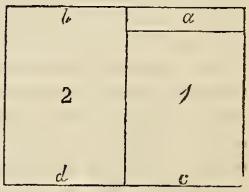
oration, is, to produce a staple earth as nearly as may be, intermediate between sand and clay; and of this earth a depth of from two to three feet should be provided. This may be effected gradually, by adding new soil of the proper corrective kind, and by trenching and bringing up annually a portion of the subsoil to be exposed to the atmosphere, where there are not facilities for doing so speedily, either by at once breaking up the staple to a sufficient depth, or adding a large bulk of good soil.

TRENCHING AND DIGGING.

These operations are the most laborious of the continually-recurring operations connected with garden cultivation. They are, however, very essential. The proper performance of them has the effect of lightening up the body of soil operated on, of pulverizing it, of intermixing its particles together, and facilitating the intermixture of composts, manures, &c., of exposing fresh surfaces to the action of solar heat, and of atmospheric influences, of favouring the percolation from above downwards of rain, which would otherwise pass away less freely, and saturate the soil, and of favouring the action of capillary attraction, by which moisture is sucked up, so to speak, from below, to supply the plants during periods of drought. The neglect of them, on the other hand, is conducive to consolidation in the mass of soil, by which means it binds together, and can be broken up only in large lumps; manures and composts do not get distributed equally throughout the bulk, heat does not penetrate deeply, nor the air play among the particles of earth; it becomes water-logged and saturated if much rain falls upon it; and in dry weather, when rain does not fall in sufficient quantities to nourish the plants, it is not in a condition to attract or suck up moisture from below. Thus, a well-wrought soil is essential to success in the tillage of the ground.

The various operations of this class, as trenching, digging, forking, &c., are essentially the same in their object, and differ only in degree, and in the manner of execution.

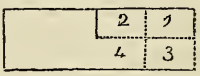
Digging is the most common. The instrument chiefly used is the spade, though sometimes the digging-fork may be employed. To commence: Dig out at one end an opening across the piece of ground to be dug, say of one foot deep by one foot wide; this opening is called the trench, and a mass of soil about a foot square, such as is lifted by one act of insertion, is called a spadeful or spit of earth; the trench, therefore, is to be a good spit deep and wide, to give room to turn over the successional spits in the process of digging. The earth so taken out is wheeled to the other end, to fill up the trench when the ground has been all dug. If the piece of ground is large, this is laborious and tedious; it is, therefore, customary and proper to divide the ground by an imaginary line (sometimes indicated by chopping a crevice with the spade, or by drawing a drill with the hoe) into two equal parts, thus. The earth taken out of the trench *a*, is deposited at *b*, close at hand; when the piece, No. 1, is dug throughout to *c*, an open trench is left; this is filled up in making an opening at *d*, and finally, the soil deposited at *b* fills up the opening when No. 2 is all dug. The same arrangement of work is followed, when necessary, in trenching. When the trench *a* is opened, the operation proceeds by thrusting into the ground, in a perpendicular direction, the blade of the spade, at six, eight, or ten inches backwards from the trench and towards *c*; the top of the spade-handle is then pulled slightly backwards, by which leverage the mass of earth before the blade is detached, and at the same moment the operator stoops, one hand holding the top of the handle, the other slipped about half-way down or rather more, and in this way the spadeful of earth is lifted, and thrown to the opposite side of the trench, the spade being turned sideways; in this process of lifting and turning the earth becomes reversed, so that, when deposited on the opposite side of the trench, it is upside down compared with its former position, the bottom being brought to the top, and the top placed at bottom. A fresh surface is thus obtained, and any weeds on the former surface become buried, as does also any dressing of manure which may have been spread over the surface before digging commenced. This continues regularly across the portion at the end of which the trench was opened, and back again, and so on till completed. It is desirable that the operation proceed evenly and regularly across the ground, so that the trench may be always of equal length; for if one side is worked forwarder than the other, so that the trench becomes diagonal in reference to the ground, it will be lengthened, and in the same proportion narrowed, and if this narrowing becomes considerable, the entire operation is less perfectly performed.

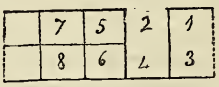


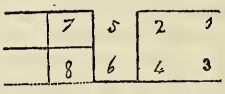
Circumstances must determine whether the soil should be laid roughly, or broken fine, and the surface levelled, as the operation of digging proceeds. In general, rough digging is best, as it exposes a greater surface to the air; and for this, each spadeful of the soil should be laid so that one side may lay up with a sharp angle if possible, a little judgment being exercised to lay it, so that the general level of the ground is maintained. If wanted at once for broadcast seed-sowing, or for sowing seeds in lines near together, or for planting any crops that go near together, the ground must be pulverized as the digging goes on; for this purpose it ought not to be too wet; the spadefuls of earth, after being laid, are to be struck once or twice with the edge and corner of the spade, by which they will be broken moderately fine, and an extra working of this kind will secure any extra degree of fineness or tilth that may be required. Where the ground is wanted for sowing or planting in rows wide asunder, it may be rough dug, and the part to be occupied by the rows afterwards made sufficiently fine with a fork. In general, the sowing and planting of all principal crops should take place on ground previously trenched or dug, and which may only require levelling with a fork at the time of cropping. In the process of digging, both the operator's hands should be at the top of the spade-handle when he is thrusting the blade into the earth by pressing his foot on the "tread"—a flat rim to the upper part of the blade; when the blade is pressed down, one hand should momentarily pass down the handle to lift it as soon as it is forced away from the mass by pulling back with the hand which retains hold at the top of the handle. It falls natural to some to pass down the left hand, some the right; but a clever workman should be able to pass down either. If the right hand is passed down, the operator is said to work right-handed; if the left, left-handed. A right-handed worker should begin on the left side of the piece of ground, and work towards the right; a left-handed worker the opposite. The operator is thus clear of his work. The same details of "workmanship" apply to all operations of this class.

Ordinary trenching might be called double digging, as it consists in the turning over of the ground two spades depth instead of one. It requires, however, a somewhat different process, in consequence of the greater bulk of soil that has to be moved. There are several kinds of trenching; sometimes the top spit only is removed, and the second spit merely turned up in its former place; sometimes the whole bulk of soil is removed to two or three spades depth; and the surface-soil and the lower-soil are variously placed with reference to each other, according as it may be required to intermix the different layers, or to bring up a fresh and unexhausted portion to the surface.

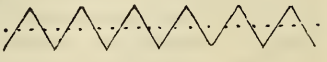
Trenching two spades depth may be thus performed: A trench is opened across one end of the ground two feet wide and one foot deep. The soil from this opening is disposed of as in digging. The details of the operation will be best explained by diagrams, in which each number may represent the width and depth of a spit or spadeful of earth. The opening made by removing the earth one spade deep and two spades wide, will be represented in the annexed longitudinal section of the ground, Nos. 1 and 2 being the parts removed. The next thing will be, to dig over No. 3 one spade deep; then No. 4 is dug out spit by spit, and laid on No. 3; a section of the ground will then appear thus. No. 5 is next dug out, and laid in the place of No. 4; and when this is done across the whole piece of ground, No. 6 is dug out and placed upon it, occupying the place of No. 2. The ground now lies thus. The same course is followed throughout. Either one or two persons may work at this mode of trenching; when Nos. 1 and 2 are removed, one may commence digging up No. 3, and as soon as he has advanced a little, another may follow and turn out No. 4; the first, when he has finished No. 3, then begins to throw No. 5 into the place of No. 4, and keeps ahead sufficiently for the second to commence No. 6 by the time he has done No. 4. Thus, two may continue working without interfering with each other. To the regular progress of the operation, it is essential that the ground be divided into equal spaces, and worked to an equal depth all over.





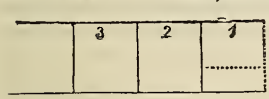


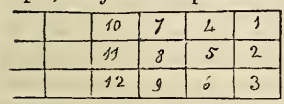
Trenching is almost universally performed at the end of one season, in order to prepare the ground for the next. For this purpose, the soil should be laid together as roughly and as lightly as possible, and the surface should be disposed in the form of ridges, in order that the greatest possible extent of surface may be exposed to the weather. These ridges should be laid as roughly and lightly as possible, and not patted up smoothly on the sides with the spade. The surface of a piece of ground thus trenched will have this appearance, the



original surface being indicated by the dotted line. As soon after the summer crops are cleared off, as possible, trenching should commence, and should be finished without delay. Late trenching causes the loss of much of the benefit that might have been derived from exposure.

This is one of the simplest modes of trenching. It is, however, supposed that the soil is sufficiently good two spits deep to admit of the bottom one being brought up to the top. If this is not the case, another plan must be followed. Dig out the surface soil of No. 1 a full spade wide, and as deep as the soil is good, say down to the dotted line; then break up the portion below this with a fork, and allow it still to remain at the bottom of No. 1. Dig and turn over No. 2, to fill up No. 1; and break up the bottom as before, filling up with No. 3; and so on. Trenching three spades deep is done on the same principle, only more space is wanted, and greater facilities are afforded for changing the relative position of the layers of soil, as regards distance from the surface. In ordinary cases the bottom would not be brought up, but turned over; Nos. 1, 2, 3, 4, and 5 being removed, No. 6 would be forked over into No. 3; No. 7 would replace No. 2, and No. 8, No. 1; No. 9 would be forked into No. 6; No. 10 replace No. 5; and No. 11, No. 4; and so on. In this way, the second spit would be brought to the top. If the top spit were required to be kept at top it might be done thus: Nos. 1, 2, and 4 removed, No. 3 forked up, No. 5 replace No. 2, and No. 7, No. 1; then No. 6 forked up, No. 8 replace No. 5, and No. 10, No. 4. To bring the lower spit to the top would be best done by removing Nos. 1, 2, 3, and 4; then turn No. 5 into the place of No. 3, No. 7 to that of No. 2, and No. 6 to that of No. 1; and again, No. 8 to 6, No. 10 to 5, No. 9 to 4. This may be varied in other ways, without any inconvenience in the operation. In doing all this the operator works lengthways the trench, the trench being opened across the ground.

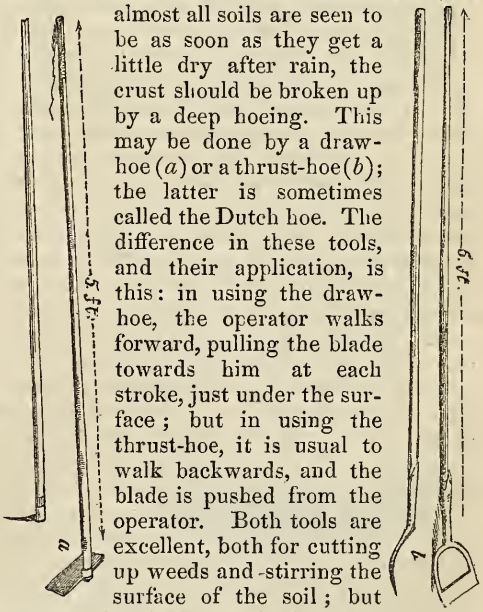




Any part of the operations of digging and trenching, which is usually done with a spade, may be done by means of a digging-fork, and in many cases the fork is the preferable implement. The levelling down before the planting season of the ridged surface of the ground should always be done with the fork, as it leaves the mass lighter, and more thoroughly pulverized, than the spade does. This operation should be done in drying, windy weather (or, at least, when the soil is dry), and with as little treading as possible; and it should be done as the ground is wanted for sowing or planting the crops. Another use of forks is, to turn over in winter, while frozen, the surface of the ridges into which the ground is laid when trenched, so as to expose a new surface to be mellowed by the action of frost; this should always be done, if possible, once in the course of the winter, and can hardly be too often repeated.

HOEING, RAKING, &c.

These operations are often misunderstood. Hoeing is looked upon as a means of killing weeds, and raking as a means of clearing them, and stones also, off the ground. As to weeds, the cultivator should remember that a weed is a robber, and not one should be allowed to grow up in the garden; there *ought*, therefore, to be none to kill, nor any to rake off the surface. As to stones, they are beneficial, if not too numerous, and should not be raked off; where there are any large ones, they may be picked off, but if of moderate size, and in moderate quantity, they ought not to be removed. The labour of hoeing is beneficially applied, when directed to the frequent breaking up and stirring up of the surface, amongst growing crops; this is wonderfully effective in promoting the luxuriance and fertility of the crops, and it has the additional recommendation of preventing the weeds—the robbers—from establishing themselves on grounds so treated. Whenever the surface of the soil becomes caked, as almost all soils are seen to be as soon as they get a little dry after rain, the crust should be broken up by a deep hoeing. This may be done by a draw-hoe (*a*) or a thrust-hoe (*b*); the latter is sometimes called the Dutch hoe. The difference in these tools, and their application, is this: in using the draw-hoe, the operator walks forward, pulling the blade towards him at each stroke, just under the surface; but in using the thrust-hoe, it is usual to walk backwards, and the blade is pushed from the operator. Both tools are excellent, both for cutting up weeds and stirring the surface of the soil; but the draw-hoe is also useful for other purposes, such as drawing drills or little gutters in

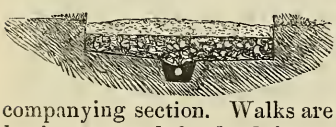


which to sow or plant, earthing up the crops, &c. When, through neglect, weeds are allowed to grow up, hoeing must be had recourse to as a means of destroying them. The Dutch hoe is preferable for stirring the soil among growing crops, as the operator, walking backwards, leaves no consolidated footmarks. A modification of it, made with flat prongs instead of the cutting-blade, is even still better for this one purpose, but is not so generally useful.

The operation of raking need only be performed when it is required to prepare a fine surface for sowing small seeds; or when seeds broadcast sown are required to be thus covered. Sometimes where neatness is an object, weeds and rubbish may be got together by it. In the two former cases, the surface is to be worked backwards and forwards with the teeth of the rake, but little, if anything, being raked off; in the latter case, stones, weeds, and litter are removed, but as free from soil as possible, all the larger lumps being broken with the back of the rake in the course of the operation.

WALK-MAKING.

As conducive to cleanliness and neatness in a garden, dry, solid walks should be provided. Good, dry walks may be formed thus: Dig out the soil eight or ten inches deep, and distribute it over the cultivated parts; make the bottom sloping to the centre, and there form a drain or gutter, which should communicate with some of the main-drains of the place. Fill up six inches of this with the roughest hard material at hand; either brick rubbish, broken crocks, rough stones, &c. will do; make up the centre rather highest with these materials; on this, place two or three inches of fine hard material, of which broken gravel stones, crocks, or clinkers are among the best, and old mortar, chalk, or any limy substance the worst; over this a thin layer of fine coal ashes, or of coarse sand, or of gravel, if attainable, should be spread, and pressed down firm. This will form a smooth, dry, serviceable walk, passable in wet weather and after frost, if the materials are of good quality. The surface should be slightly rounded, and made firm and smooth. The arrangement of the materials, &c. will be understood from the accompanying section. Walks are the better for having some defined edging; otherwise the soil will be found to be constantly rolling over on to the walks, rendering them dirty and unpleasant to walk on when wet. Boards or stones, or stout billet-wood, cut into short lengths and driven in thickly by the side of the walk, would each form a good, serviceable kind of edging. A row of some of the smaller cultivated plants or herbs may be sometimes adopted as an edging; but, for neatness, nothing is equal to a narrow line of the dwarf evergreen box-tree, known as the Dutch box.



WEEDING.

Weeds are injurious in a garden in two ways. In the first place, they take up from the soil the nutriment which maintains their existence, and thus rob the cultivated crop of a share of what should be solely devoted to its use; and secondly, they crowd and choke the plants, especially when they get the upper hand among small seedlings, and thus prevent them from attaining their full perfection. The injury done in both these ways, where weeds are allowed to grow unmolested, is immense; and scarcely less so, if they are allowed to grow almost or quite to maturity before they are displaced. The frequent stirring up of the surface by means of the hoe, which is much to be recommended for the advancement of all cultivated crops, is instrumental in keeping down weeds, vast numbers being killed while in the infant state; but there are always some patches of ground that are liable to escape this attention, and in these places the weeds are prone to establish themselves, and from thence scatter their seeds around. Large weeds are often allowed to run up to seed in the hedges, and from thence their seeds get distributed by the wind, by animals, and by other means. A very little neglect in the destruction of weeds large enough to have run up to seed, produces a great deal of trouble to destroy their progeny. The principle to be acted on is, never to let a single weed go to seed; and, if possible, destroy them all as soon as they are sprung up.

The hoe is the proper implement with which to destroy the weeds which occur in the open parts of the garden, among the permanent crops. From amongst seedling plants, yet in an infant stage, and yet remaining in the seed-bed, it is necessary to remove the weeds by hand, and so also where the plants are not growing at sufficient distance to admit of the hoe being used. Small hoes are, however, made, which answer nearly every purpose, so that hand-weeding may be almost entirely confined to seed-beds. Dry weather is the most favourable for the destruction of weeds, by whatever process is adopted, as they perish immediately; in moist, dull weather, many of the kinds tenacious of life are apt to strike fresh roots.

In the case of almost every kind of garden

seed which is sown, where the plants are to remain to come to maturity, more than enough seeds are used, in order to ensure a full crop of plants. The extra plants, in these cases, are to be regarded as weeds, and either cut up by the hoe, or removed by hand-weeding, unless it be any crop of which the plants may be successfully transplanted, either on to another plot of ground, or to fill up vacancies. The latter should always be looked to.

SOWING.

A seed is a plant in embryo. When seeds are placed in situations to which air has access, and where they are acted on by heat and moisture, they sprout or germinate, and thus produce young plants; darkness is also favourable to germination, but is not essential, like air, heat, and moisture, for seeds will germinate if the latter are supplied them, even though exposed to light. When seeds are placed just beneath the surface of the soil, they are therefore in the most favourable position for their growth, the soil supplying hem with the moisture it drinks in from the shower, transmitting to them the warmth it absorbs from the sun-rays, shielding them from direct light, and yet permitting the access of atmospheric air. The soil is in a proper state for the reception of seeds, when it is finely pulverized and in a friable condition, and moderately charged with moisture; it is then permeable to air; its loose texture, and the absence of excess of moisture, is conducive to warmth, while there is yet moisture enough for the purposes of germination. The soil is not in a proper state for the reception of the seeds, either if it is very dry or very wet, or (except for special purposes) very much consolidated, or very close and adhesive in its texture; but neither of these conditions will exist if proper attention has been paid to draining and pulverizing.

Different seeds require to be placed at different depths. It is a rule, that seeds should be covered by a depth of soil about equal to their own thickness; but this is generally exceeded. Very minute seeds, those of the tobacco for example, if scattered over even a tolerably fine surface, will fall down between the little protuberances of the soil, and thus, if not actually covered, will be sufficiently shielded both from light and drought; but in such cases it is advisable to cover the surface with some material to prevent evaporation, such as moss or litter, which must be removed as soon as the seeds begin to germinate. Larger seeds, but which are still but of small size, such as those of the cabbage, may be covered with an eighth of an inch deep of soil. Seeds of the size of those of the radish may be covered from about a quarter to half of an inch; the smaller garden peas about an inch, and the larger ones and beans from an inch and a-half to two inches. There is no advantage to be derived from placing any seeds at a proportionably great depth; and many of the smaller seeds, if placed an inch beneath the surface, would have their germination much retarded, if not altogether prevented, till they were brought nearer the surface.

It is seldom desirable to apply water to the soil between the periods of sowing and germination. If the soil is moderately moist, it will be in a fit state for the reception of the seeds; but if the weather is very dry, and the soil is deficient of moisture, the ground should be thoroughly damped previously to sowing, and then instead of subsequent waterings it is preferable to cover the surface so as to prevent evaporation, until germination has taken place. In the latter case, when the seeds are sown in drills, the drills should be well watered after being opened, and the seeds sown while they remain damp. Throughout dry seasons, too, the seeds themselves may be soaked in water for a few hours previous to sowing them, which will be of benefit by hastening their germination; it is the larger seeds especially which should be so treated.

There are two general methods of seed-sowing, viz. in drills or channels, and broadcast. The former method is preferable for nearly all the garden crops that are sown where they are to remain; the latter chiefly for such as are sown in one spot to be transplanted to other situations.

Drill-sowing in a garden is performed thus:—The garden line is stretched tightly across the ground, which is first rendered moderately fine on the surface, in the place where one row of seeds is to be deposited; the operator standing on the right of the line, with the draw-hoe in his hand, the right hand being lowest, (or on the left side if he works with the left hand lowest, the difference being that in the one case he begins at one end of the line, and in the other at the opposite end,) draws the corner of the hoe along the ground by the side of the line, the cutting edge of the hoe being in contact with the line; this act forces out the soil on one side, leaving a small channel parallel with the line; the workman proceeds in this way backwards across the ground, and thus forms what is called a drill, which may be of any depth, from the merest scratch suitable for small seeds, to two or three inches deep for the larger seeds, the depth being obtained by forcing the corner of the hoe down into the soil while operating. The line is then shifted to the position of the next row of seeds or plants, and the same is repeated; and thus the work proceeds till the whole is finished.

The operator should commence this work with his back towards the unwrought ground, so that he may not in drawing one drill, interfere with another. The distance between the drills or channels depends on the kind of crop to be sown, as also does their depth. Along these channels, the seeds are scattered, and the earth is then pushed in on them with the back of the hoe, so as to make the surface level. This completes drill-sowing.

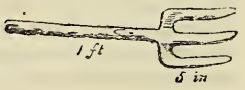
Broadcast sowing is done thus:—The surface is broken over tolerably fine with the hoe and a coarse rake; the seeds are then scattered evenly over, and so as to lie a little distance apart; the surface is then worked more or less with the teeth of a rake, according as the size of the seeds renders it necessary that they should be more or less deeply buried.

Vast quantities of seeds are wasted from being sown too thick; and the crops are often injured in consequence for want of early and sufficient thinning. As, however, every seed that is sown does not always grow, it is necessary to sow rather more seed than would otherwise be sufficient; and when the seed is old or not of good quality the proportion must be still more increased. The smallest seeds, such for example as those of celery, would be the better for germinating at the distance of half-an-inch apart, or should at once be thinned out to this distance. Larger seeds should be three-fourths of, or a whole inch apart; and such as peas and beans, two, three, and four inches, according to the size they ultimately grow to. Except with the latter, it is not possible to be so very exact in practice; but if the quality of the seed has been tested, the nearer it can be sown to grow up at these distances apart the better. When young seedlings are so thick as to touch each other, they are suffering injury, and should be thinned out, the plants that are removed being either destroyed or pricked out (that is, transplanted) elsewhere. Many crops, which are not sown where they stand till maturity, are purposely sown thick to save space, and are then transplanted almost as soon as they are grown up; in this way celery, the cabbage tribe, lettuces, &c. are treated.

PLANTING AND TRANSPLANTING.

Plants are endued with life, that life depending on the nourishment which they obtain, chiefly by the agency of their roots from the soil, but also in some degree by the leaves from the atmosphere. The parts of the roots which thus minister to the existence of plants, are the little delicate extremities of the fibrous branches into which the main roots become ramified; these are called the spongioles, from their having an absorbent capacity resembling that of sponge. If by any means these spongioles are destroyed, the plant suffers from lack of nourishment; and if new spongioles are not speedily formed (which, under certain conditions, is usually the case) the plant ultimately dies—sooner or later, according to its peculiar constitution. The secret of successful transplantation depends on the preservation of the spongioles uninjured—that is, not injured materially, for some degree of injury is unavoidable—in the process, or on the placing of the plants in a condition to produce fresh spongioles speedily. The former affects chiefly the lifting of the plants from the soil; and the latter, the replacing of them. We shall only refer to such transplantation as occurs in a kitchen garden, and in the removal of the commoner fruit trees.

In the lifting of kitchen-garden plants—cabbages for example—it is a general practice to pull them up by force. This is decidedly wrong; for nearly or quite all the spongioles will be broken off. Instead of being thus mutilated, the plants should be lifted with a small spud, by which means nearly every root may be preserved entire; there is not much advantage in retaining a quantity of soil about the roots; indeed the weight of a mass of earth often breaks the roots after they are otherwise safely lifted.



In taking up fruit-trees proceed thus:—Commence digging out the soil, at about as far from the trunk as the branches extend; then dig out the soil towards the trunk from amongst the roots carefully, with the digging fork in preference to a spade; do not strive to leave a quantity of soil about the roots, but be chiefly careful to preserve every root—as far as possible—unbroken. As soon as a portion of the roots are bared, have them covered with damp mats, that they may not become parched. If the tree be rather large and the roots numerous, the latter should be tied together, as soon as they are dug out, so as not to be damaged during the progress of the operation. Any very long roots from trees of this kind, may be cut back with a sharp knife, the slope of the cut being on the under side. No other roots should be cut or bruised or broken.

The conditions most favourable to a renewal of growth are these:—Do not let the roots get at all dry from exposure to the sun, or to the wind; but plant immediately, or if this cannot be done, keep the roots closely covered up with damp mats. Do not, more than can be avoided, allow the plants, of whatever kind, to be "laid in by the heels," as it is termed, when their roots are laid into sloping trenches so as to be covered temporarily with soil; but rather take but few at a time

and plant these again immediately. If it becomes necessary to "lay in" any plants, see that their roots are closely covered up with soil. Spread out the roots as far as possible in planting. Small plants should have a hole opened for their roots by the small fork. Trees or shrubs should have a shallow hole dug out, wide enough to admit of the roots being laid out in lines from the stem in every direction; the bottom of this opening should be highest in the centre, say six inches deep there, sloping to a foot at the outside of the hole; in damp heavy soil, even less depth than this is preferable; the roots are to be covered by laying up the soil like a small mound, but the collar (or that part whence the roots and stem separate in opposite directions) must not be covered with any depth of soil, except in the few cases of those plants which throw out roots freely from the buried portion of the stem. In general, plants should not be set deeper in their mature state than they were while young, or very slightly deeper—an inch or two merely—in the case of large plants. The soil, which is placed in contact with the roots, should be made very fine, so that it may envelop them completely, leaving no hollow open spaces; this close contact is necessary in order that the roots may be in a condition to produce new fibres and spongioles speedily after transplantation. In the case of trees and shrubs the soil is to be carefully shaken in among the roots, and gently but firmly trodden. This result—that of settling the soil closely about the roots—is often secured by giving newly planted subjects a good watering, which while it closes in the soil perfectly, also provides a ready supply of moisture to assist in refreshing the plants, until they have formed fresh active spongioles.

Avoid using the dibble in planting, except in the case of very young seedlings, or other small plants with few roots; it consolidates the soil too much, and bundles the roots into one mass, instead of facilitating their distribution on all sides as widely as possible. Most of the vegetable crops are in general finally planted out with a dibble, but the little hand-fork is far preferable.

Small dibbles may be used for planting out into nursery-beds—"pricking out," as the phrase is—young seedlings, raised thickly in seed-beds, and intended to be again removed to their permanent positions. This pricking out is thus performed:—A narrow bed of three or four feet wide, and sufficiently long, is prepared, by being manured if necessary, and well wrought with a fork so as to render the soil tolerably fine, especially that on the surface; it is then smoothed and levelled, and the plants placed at equal distances, from two to four inches apart, according to the size they attain, the length of time they are to remain, or other circumstances. The soil should be tolerably fine and moderately good, so as to induce them to root freely, but not so rich as to cause a luxuriant top growth. The plants are put in by making a hole with a blunt pointed stick, or dibble, large enough to admit the roots, which should be placed straight down the hole, and not bent up together,

as is often the case in careless planting; the hole is then filled up by pressing in the sides with the point of the dibble, using pressure enough to fix the plants firmly, and taking care that there is no hollow space left at the bottom of the hole beneath the roots. This is continued till all are planted; they may then be well watered with a watering can having a rose on the spout (unless the ground is damp and the season cool), and in bright sunny weather must be shaded till they have taken root. Planting of all sorts is best done in showery weather, if the soil is sufficiently porous in texture to admit of being worked under such circumstances: if planting is necessarily done on stiff heavy soils when they are too much charged with wet, they should be trodden upon and pressed as little as possible, as they so readily consolidate when in that state. Sometimes planting is of necessity done when the weather is dry; in these cases the evening should be chosen for operating, and water must be freely applied (and even shade where practicable) until the plants begin to grow. Trees and shrubs of all kinds are best planted in the fall of the year, when they are in the most dormant condition.

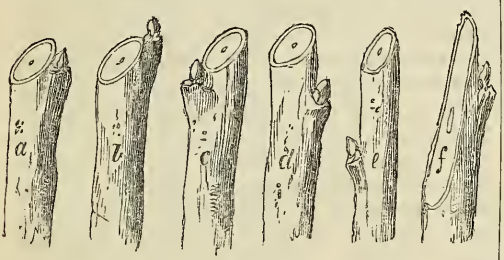
PRUNING.

Pruning consists in cutting off certain portions of a plant, for a certain purpose, chiefly, however, in order to aid its fertility, or to induce greater vigour in certain parts, or to alter or modify its form.

Fruitfulness is best ensured by a moderate degree of pruning, consisting in the thinning of the branches, so that light and air may have better access to the remainder; a crowded state of the branches is generally unfavourable to fertility. Vigour is imparted to the remaining branches when a plant is closely cut in, provided the roots are healthy and active; for in this case, the roots having but a limited demand to meet, are enabled to supply sap more freely to the remaining parts, which consequently push forth with much more than ordinary strength. Worn out branches may thus be made to give place to young ones full

of health and vigour, if the roots and stems are healthy. Pruning with a view to effect modification of form, must be varied according to the circumstances: any form may be imparted to a plant, if the pruning is commenced early, and followed up perseveringly.

It is exceedingly important to know how to make the cut in pruning, although this is a point not often thought about by the uninitiated, who are apt to consider that it is more important to know where to cut than how to cut; the knowledge of both is, however, essential. No matter what the subject may be, the cut should be made just above a bud, and in the case of plants which produce some buds that expand only leaves, and others that expand flowers, it is essential to cut just above a leaf-bud. When a plant produces these two kinds of buds, the leaf-bud may be known from the blossom-bud by its form; the latter being always of a rounder, blunter figure than the former, which is more elongated and pointed. The cut should be made at about an angle of forty-five degrees, commencing at the back of the bud, and coming out on the other side just above the bud; when cut thus, the wound is rapidly covered with new wood as soon as the bud pushes, and consequently



soon heals. This cut is shown in the sketch at *a*. The other figures, *b* to *f*, represent different modes of making the cut, which are all more or less objectionable, and not at all uncommon; they will be sufficiently understood without description, and the difference between each of them, and the proper way of making the cut (as at *a*), will at once be seen.

Pruning should not be deferred entirely till the season of rest. During the growing period, while the young shoots are forming, they should be thinned according to the principle by which the pruning of each kind of tree is regulated; those which remain are then more fully exposed to light and air, and not only acquire greater strength, but are more perfectly ripened—a matter of the highest importance, especially in plants which are cultivated either for their blossoms or their fruit. This thinning very much lightens the labour of regular pruning: it should be done—not too suddenly and severely, but gradually and moderately—while the shoots are still young and succulent, so as to be easily pinched off by the thumb-nail. It would be well if all pruning could be performed at this stage of development; much useless expenditure of energy would be avoided, and much would be gained by directing the development of the plants into a proper channel at the first. The young shoots must not be roughly torn off the branches; if they are a little too woody to be easily separated with the thumb-nail, it is better to use a knife.

ROOT PRUNING.

This operation is, in practice, especially applicable to fruit trees. The growth of a tree depends on the quantity or quality of the food absorbed by its roots from the soil. If the food is abundant or rich, vigorous growth follows, and vigour and strength are essential to the production of good fruit; but then vigorous growth has a constant tendeney towards barrenness, particularly in cold climates. In dry hot climates another agent is at work: the growth becomes well ripened. It is to check the barren vigour just alluded to, and at the same time to allow the application of a sufficiency of rich food to maintain the strength of the tree, and enable it to bring good fruit to perfection, that root pruning is resorted to. The same end of producing fruitfulness would be secured by planting in poorer soil, but then the general vigour of the tree would not be so well maintained, and it would not have strength to mature large crops of good fruit. Moderately rich soils, it must be remembered, are much better for fruit trees than those which are very highly charged with manure, being more conducive to permanent health and vigour; either of the extremes of rich or poor are alike objectionable. Root pruning is not therefore to be adopted as an excuse for planting in such as are overcharged with rich manure.

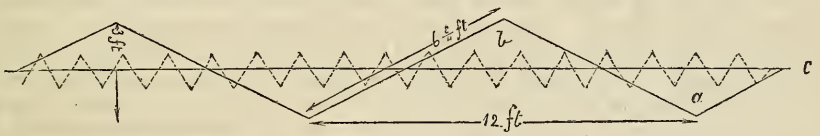
But root pruning has also another effect; it induces early fruitfulness and maturity, and prevents the trees from attaining a large size. The mode of procedure is this:—After a young tree has been two years planted, a trench is opened at about a foot from the stem, and eighteen inches deep, either half way or entirely around it; all the roots which are thus exposed are severed, the cut being made with a sharp knife, from below upwards. If a young tree, and the soil is good, it is merely returned again, and the check thus given is sufficient to cause the production of fruit-buds generally all over the tree. If the tree is older, and the soil is exhausted, a portion of fresh soil is applied as a refreshment to the plant. All roots that strike downright should on these occasions be at once cut off, by thrusting a sharp spade underneath the tree,

at about eighteen inches deep. If the trees are very vigorous they may be thus pruned all round; if less vigorous, only partly round: that is to say, more may be pruned away when the trees are very luxuriant, than when they are less so. Sometimes one side of a tree becomes over vigorous; in this case, if the roots on that side are pruned, the branches will be checked and become fruitful. The repetition of root pruning should depend altogether on the state of the plant. Sometimes one operation will serve to bring under the vegetative powers, so that for a series of years afterwards no luxuriant vigorous growth is made; in this case, it should not be repeated, but if necessary the tree may be fed by a supply of liquid manure while its fruit is growing. Sometimes the operation has less effect, and then needs to be repeated sooner, at two or three inches further from the stem.

The great objection to growing fruit trees in a garden is, that they shade the vegetable crops and prevent them from attaining their proper perfection. The great advantage of root pruning is, that it enables even those whose gardens are small, to maintain a set of healthy miniature trees, which while they are too small to do any injury to the vegetable crops, are yet capable of bearing a considerable quantity of fruit.

SLOPING BANK CULTURE.

If the surface of a level piece of ground is planted at one time with one kind of crop, the advance towards maturity will be equal, or nearly so, through the entire crop, unless local differences, such as a variation in the soil, or shade in some part, should interfere with this result. If the surface of the same ground is thrown up into sloping banks, running east and west, so as to present one face to the south, another to the north, and in that state is planted all at once with one kind of crop, a decided succession in the maturity will be the result; the plants on the one side being placed in a warmer position than those on the other, will grow most rapidly. The shady sides of these sloping banks are also useful in summer in raising salading of all kinds, which, if it can be kept moist enough, is always of better quality when grown in cool soil, than in that which is liable to become much heated from exposure to the sun. This fact may be turned to advantage in a variety of ways. Sloping banks are of most value in cold climates; in such they may be most usefully applied in accelerating spring crops, retarding summer crops, and preserving store plants (such as cabbages, lettuces, &c.) through the cold season. In England, for instance, the strawberry season may be much prolonged by planting an early variety on the south side of one of these banks, and a late variety on the north side; in which case, the former becomes earlier, and the latter later, than ordinary; and it is so with vegetables.



The ground is very easily arranged in this sloping form. Supposing it to be previously ridge-trenched, as shown by the dotted lines in the accompanying diagram, it will only be necessary to remove the soil at *a*, and cast it in a ridge form at *b*, the bottom of the slope being as much below the ordinary level, shown by the line *c*, as the top of the ridge is above it. This forms a slope of about $6\frac{3}{4}$ feet on each side; so that there is an actual gain of $1\frac{1}{2}$ foot in every twelve feet width of ground thus arranged. If it is required to form these banks at the time of trenching, the soil may be disposed in this form as easily as it can be laid in the smaller ridges, into which it is usual to arrange the surface of trenched ground. To dispose a level surface into banks, it is only necessary to throw up the soil from *a* to form the top of the ridge *b*.

This method becomes most important to the cultivator in cold climates; there it may assist in the preservation through the winter of his store plants of cabbage, lettuce, cauliflower, &c.; and his crops of spinach, of parsley, and of early peas. The shelter afforded by the ridges will partly effect this; and it will, moreover, often be experienced, in severe seasons, that, while the plants on one side the ridge have been injured or destroyed, those on the other side will have escaped unhurt.

EARTHING UP.

This consists in banking up the soil around the stems of various plants, and is done for different purposes. Thus a portion of the surface-soil two or three inches in depth and three or four in width is drawn up on each side of the lines of peas soon after they spring up, for the double purpose of steadying the plants and sheltering them from currents of wind sweeping along the surface of the ground; the same may be done with advantage to the crops of beans when just sprung up, and to

recently transplanted crops of all the cabbage tribe.

Potatoes are benefited by earthing up, but it should be done in another way. When the stems have grown up about six inches high or less, the soil between the rows should be drawn up with a pronged hoe, so as to cover about three inches of the stem (supposing them planted five or six inches deep), the soil thus wrought forming a broad, flattish ridge, with the potato plants in the centre. It is not uncommon to see this operation done by forming a high narrow ridge of earth ; but this is objectionable. The potato plant throws out runners from the lower part of its stem, and these runners bear the tubers, which are the esculent parts; these spread horizontally, or even have a tendency to grow upwards. The intention in earthing up, is, to provide a sufficient space for these runners to spread and bear their tubers underground ; because not only is the quality and appearance of the tubers deteriorated if they protrude through the surface,—for then they acquire a green colour, and a bitter, nauseous flavour,—but if they are much exposed at an early stage of their growth, the tubers are not formed at all, the runners growing away into leafy stems,—for the tuber of the potato is, in reality, neither more nor less than a stem, which has acquired a peculiar form by being developed underground, and having a tendency to succulency.

Other crops are earthed up for the purpose of blanching the stems, which renders them either crisp or mild, or both. The principal crops so treated, are celery and leeks. In the case of celery, the earth is adjusted about the stems from time to time, after the plants have grown six or eight inches high, the leaves of each plant being gathered up in one hand, while the soil—previously broken fine with a spade—is placed around it, but not so high as to bury its heart. This requires to be done at intervals throughout the period of growth, the few first operations being done by hand, and the later ones carefully by a spade, the bank ultimately forming a steep, sloping ridge, terminating sharply to throw off the rain. The leeks are banked up with soil around the base of the stem when they are nearly full grown; but, from the nature and habit of the plants, this is easily done by the spade. All operations of this kind should be done when the soil is moderately dry on the surface ; but, in the case of the celery, it is particularly necessary that the plants themselves should be quite dry, and the soil nearly so, when earthing up is performed.

MANURING.

Plants will not grow without a supply of food. In a garden, this supply of food is maintained for them by the application of manures. A good deal of chemical knowledge is necessary to the full understanding of the nature of manures, and the best means of applying them. We shall here only briefly enumerate some of the most easily attainable kinds of manure, and offer a few general remarks on the mode of preparing and applying them.

All green succulent vegetable matter is useful as manure, but not very lasting. This opens up an inexhaustible supply for every cottager ; green moss, the succulent tops of various shrubs, or green fern, are within the reach of every person who has a garden. These, together with weeds, or trimmings from plants of any kind, should be dug into the soil while fresh, and the crop sown or planted soon afterwards ; they should not be buried too deeply, and have most virtue when about the state of maturity.

Sea-weeds afford a very valuable, but not lasting manure. They should be dug in without delay, as in the case of green manure.

Wood ashes containing charcoal form a good manure, as also does soot; these should be sprinkled, the latter especially, in small quantities over the surface as a top-dressing, and then lightly forked in and well mixed with the soil, either before or after planting.

One of the most valuable of easily accessible manures is found by charring or smother-burning any kind of refuse or superabundant wood, such as old tan, saw-dust, turf, peat-earth, prunings, wood-chips, trimmings of vegetables, &c. Any kind of vegetable refuse may by this means be converted into manure; and not only these, but even sods of earth and clay, provided some wood is at hand to secure the ignition of the mass. The process is pretty much alike with each different article, and is something like the following :— First, raise a platform of earth, somewhat above the ground level, and cut across this two lines of drains four inches deep and wide, meeting and crossing in the centre, where they must be open, the remainder being covered over with tiles, and the outer mouth closed until their action is needed. In the centre, drive into the ground, at equal distances, in a triangular position, and about eighteen inches apart at the bottom, three stout billets of wood ; fix the tops of these together to form a chimney, inserting between them another thick billet, that may be drawn out afterwards to give vent to the fire. At the bottom, about these stakes, place some dry brushwood or other easily ignitible material, in moderate bulk. Then place a thickness of eight or ten inches of the refuse material to be charred, and over this another layer of the easily ignitible material; then more refuse,

and so on, till the heap is made to any size. To set it a-light, pull out the billet, and throw down the opening a shovel-full of red-hot cinders. The chimney is then to be left open for a quarter-of-an-hour, that the fire may get well established; it is then closed, and after this a pointed stick must be used occasionally to make a few holes through the heap, so as to give vent to the fire; these holes are first made near the top, and they are closed as the burning goes on, fresh ones being made lower down. If the materials are loose and open, the whole heap must be cased over with two or three inches of soil, to prevent the fire from bursting through in flames. If the fire does not burn well, the mouths of the drains must be opened, especially on the windward side, and these supply air, and, of course, accelerate the burning. Neither these, however, nor the holes made with the pointed stick, are to be allowed so to act as to produce flame; the materials must be smother-burned, not reduced to ashes.

The flesh of animals is a very powerful manure; this should be buried among layers of compost, and sprinkled with lime, to promote decomposition, the whole being well mixed together before it is applied. It should be used as a strong dressing to vacant ground.

Fish, like flesh, forms an active manure; it should be used as fresh as it can be had, and in moderate quantities.

Blood is a very powerful manure, and should be mixed up with earth before being used. The scum of the sugar-bakers, from the bullocks' blood employed by them, is a very strong manure.

Bones are excellent as a manure, and very durable. Bone-dust or fragments are the best forms in which to apply them, and they should be used at the time of cropping. The addition of sulphuric acid to dissolve the bones before they are applied, is an advantage. This is done thus: Place 100lbs. of bone-dust in a conical heap, and pour water enough to wet it through; let it stand for a couple of days; then spread it out in a hollow-cup form, trodden firm, and pour again as much water as the bones will absorb; then pour gently over the bones 30 lbs. of sulphuric acid; then mix all up together again into a conical heap, and let it stand for a couple of weeks, when it will be ready for use.

Horn, hair, woollen rags, and feathers are all excellent as manure, and should be mixed up with layers of soil, so as to be decomposed before they are applied.

The dung of animals, birds, &c., as is well known, forms the most useful class of manures; that of different subjects varies in quality, but we speak of them in the aggregate. Manures of this class should be mixed up with layers of earth, the urine being added, and in this state of combination well turned and mixed, and then applied as a winter dressing.

Nightsoil is perhaps the most powerful of all manures, and the most generally neglected. It should be mixed in layers with soil, sprinkling it with lime; and this, after being turned and mixed together, may be applied to the ground the same as other animal excrement. Or it may be mixed with enough powdered charcoal to render it dry and deodorous. The charcoal of peat is the best for this purpose.

Lime is an excellent application to soils which contain much inert vegetable matter, as is the case generally with the soils of old gardens; but it should never be applied along with animal manures.

These are some of the principal manures, vegetable, animal, and mineral; and they are sufficient to show that an abundance of materials for manuring purposes exist within the reach of all.

Wherever there is a farm or a garden, a manure-heap should always be in preparation. At the bottom may be placed a layer of weeds, grass, fern, or any kind of litter, and on this whatever manures can be collected should be spread in regular layers intermixed with layers of turfy soil of any kind. If it can be had, soil of a different texture from that of the garden, as explained under the head, *Amelioration of the Soil*, is preferable. Any turfy soil is preferable to soil without turf, on account of the vegetable matter it contains. On the layer of litter, about six inches in thickness of the soil should be spread, and then on this about the same thickness of manure of any kind, such as litter, dung from the pig-sty, cow-house, or farm-yard, and nightsoil (privies should be constructed so that the soil can be easily got out from behind, and scattered over with lime occasionally to destroy the disagreeable smell); the layer of dung should be at once sprinkled over with a little soil, and the rest of the layer may be added at any time before another layer of manure is thrown on. An occasional layer of litter or vegetable matter of any kind may be added, and the heap may be from time to time moistened with the slops from the chamber, or the liquid which drains away from the heap itself; enough of these may be applied to keep the mass moderately moist, but not too much saturated. In this way, manure may be accumulating from one season to another, and a large supply will in this way be provided with but little trouble, and at the expense of labour only. These materials should be turned over once or twice and well mixed together; and when the turning of the heap commences, another should be formed to take the fresh materials. When about twice

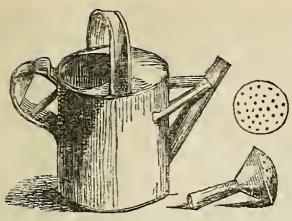
turned over in this way, the manure will be ready to put on the ground, as soon as the crops are cleared off and dressing and trenching up commences. The fresh heap will, in like manner, go on accumulating for another season. Manures should be mixed amongst the soil as much as possible in the operation of trenching, and not buried altogether at the bottom of the trench.

LIQUID MANURE.

In some convenient place a liquid-manure tank should be formed. An old hogshead or barrel sunk into the ground, with soft clay rammed round the sides, answers well; or even a hole dug out will do, if the sides and bottom are lined with a layer eight inches or a foot thick of clay wrought up like mortar; only if it is not kept always filled the clay will be liable to crack if exposed to the sun or air, and the liquid would then escape. This tank should receive all the slops from the dwelling, except it be large quantities of mere water; the chamber-slops and the soap-suds are the most important. Into the same tank should run whatever drains away from the pig-sty or cow-shed, together with any liquid that may drain from the manure-heap already spoken of. The contents of the tank may sometimes be thrown over the manure-heap with advantage to the latter. These various liquids thus collected are most valuable for forcing on the growth of the crops; but they must be applied in a greatly diluted state. No positive instructions can be given as to how much water should be mixed with the liquid from the tank, on account of the variation which will occur as to its strength. A few experiments should be made until an insight is obtained into this mode of manuring, and the knowledge thus acquired will be an unerring guide. It is best to err on the safe side; and this is, to make it weak enough. Strong liquid manure poisons instead of nourishing. In general, a very considerable quantity of pure water will be required to mix with the liquid from the tank. Colour will scarcely be a guide, though, if the manure liquid be nearly black, it should be diluted so as to do little more than colour the water; probably about six times as much pure water as manure liquid will, in most cases, be proper, that is, if very little pure water has run in. The liquid will, in such a case, be strong, and may be diluted with four or six times its bulk of water at the time of using it; but if, in consequence of rain, or from other causes, a good deal of water has run in, it will be weaker, and then may be mixed with about twice as much water as manure. It should mostly be applied to growing plants, though the ground while bare of crops may advantageously be soaked with the liquid undiluted. When applied to growing plants, it is to be thus given: Around each plant form a wide basin, by drawing up the soil into a ridge all round; this basin should be about as wide as the roots may be supposed to extend, or, practically, say, from one to three feet across, according to the size of the plants; the basin should slope outwards, as the manure is not required close around the stem; in fact, the basin should form a broad ring, as it were, around the plant, the soil next the stem being undisturbed. Into this a good quantity of the diluted liquid should be poured, and when it has soaked in, the soil should be levelled in again. Plants growing thickly together in rows may be manured by opening a space in this way on each side the row. If the weather be very dry, about two good waterings with the diluted manure may be given in a week, the soil being opened and replaced in the same way at each application. It is better to apply the manure much diluted, and to water with it only, than to give one watering of stronger liquid, and then follow this by one or two waterings with pure water. When applied, liquid manure should always be clear, like porter, for instance, and not turbid or like muddy water, which stops up the pores of the soil. Liquid manure is particularly valuable in producing quick and succulent growth in hot, dry weather, when vegetables are apt to become tough, in consequence of their slow progress.

WATERING.

In a vegetable or fruit garden, watering is only requisite in hot or parching weather. Rain, pond, or river water is the best for all plants. Soft water of any kind is suitable, but hard water, and especially hard well or pump water, is very objectionable. Where it is necessarily employed, it should be exposed for twenty-four hours, in flat open vessels or reservoirs, to the air, and to as much sun as can reach it. To the permanent crops water should always be applied by opening a kind of basin around them, into which enough should be poured to saturate the soil completely, and serve them for a week or so; after it has soaked in, the soil should be lightly replaced and levelled. Beds of small plants and seed-beds, which it may be necessary to water, cannot be so completely soaked, and they must consequently be watered oftener, but even then should be watered as thoroughly and as infrequently as they will admit. In this case, the water must be applied through the rose of a watering-can. In

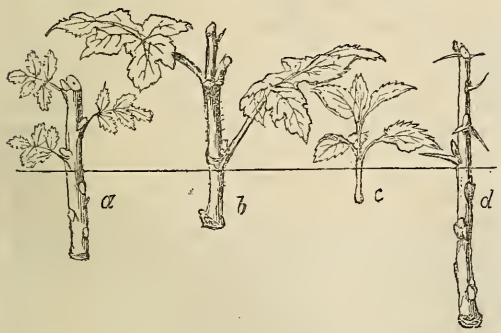


very dry weather, the drills in which seeds are to be sown should be well watered just before the time of sowing, the seeds being sown soon after, and the soil filled in while it continues damp. The watering of out-door plants in summer is generally best done in the evening, or towards evening. When it is necessary to apply much water for the support of any crop, it should be given at intervals of several days, the ground being saturated to a considerable depth, and not merely moistened on the surface. If a slight shower should fall, take advantage of the opportunity to apply the water at that time, as both the atmosphere and the plants are then naturally in a condition to benefit to the utmost by the application; but if no such opportunity offers, then the water should be applied in the cool of the evening, so that it may not be too rapidly evaporated. If a basin is not opened around the stems, and the surface-soil is at all run together by the operation of watering, it should be broken up next day with a hoe. A close, compact surface favours evaporation, and consequently soon renders the soil dry; whilst a loose surface has a contrary tendency.

ARTIFICIAL PROPAGATION.

The natural way of propagating plants is by means of seeds. It is, however, sometimes necessary to know how to increase plants by other means, such as by cuttings, by layers, by division, by grafting, and by budding.

Cuttings.—The principles upon which the simpler forms of propagation are based, are few. The cuttings should be selected from such shoots or branches as have not borne flowers, or at least the flowering part of the shoots should be rejected. There is considerable difference in the choice of cuttings from different



plants. Thus, for example, a cutting of a gooseberry bush or of a rose should be taken from the half-ripened young shoot (*a*), or from the same shoots when they have reached maturity and have shed their leaves (*d*); this should be cut from four or six to eight or ten inches long, the upper end being cut close above a bud, and the three upper buds being preserved, while all the rest are cut clean away, and the lower end of the cutting cut across, close below the point where the lowest bud grew. Other shrubby plants may be treated in a precisely similar way. The geranium, and a variety of other soft-stemmed plants, are usually propagated from the parts removed in cutting down the plants after their blooms are past, the upper portion of which consists of the flower-stalks, and the lower part of the main stem with more or less of the leaves and some young lateral shoots; these latter parts serve for cuttings, the stem being cut through, just above a leaf, to form the top of the cutting, and just beneath another leaf, three or four inches from the upper one, to form the bottom, one or two of the lowest leaves only being removed (*b*). Any young side shoots of half shrubby plants form good cuttings, when cut off at from two to four inches long, according to their habit,—one or two of the lower leaves removed, and the stem cut clean through, close below the lowest bud or joint (*c*). The same kind of shoots form good cuttings in such herbs as are increased by this process; as, for instance, pansies and pinks; and are to be prepared similarly.

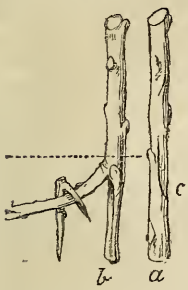
The preparation of cuttings should be performed with a sharp, keen-edged knife, so as to make a clean and not a ragged cut; in some cases this is highly essential, though not in all. Whenever a cutting, with leaves on, is being prepared for planting, as many of the upper leaves are to be retained uninjured as possible; in fact, only just so many—sometimes only one or two—are to be removed from the lower end as will admit of fixing this end of the cutting firmly into the soil. Sandy soil is favourable for all cuttings, and the degree of sandiness should be determined by the freedom or otherwise with which roots are produced; the more delicate and difficult-rooting plants being inserted either entirely in sand, or in soil very largely mixed with sand. The soil should be moderately moist, and pressed down firm and close; and the cuttings inserted by means of small dibbles, just large enough to make a hole slightly larger than the base of the cutting; the dibble should be inserted just so deep that the base of the cutting may rest on the bottom of the hole made by it, and the sides are then to be pressed in close about the cutting with the end of the dibble, so as to firmly fix it in the soil. When all are planted, they should be gently sprinkled with water, to settle the soil about them; and after

they have dried a little, the more delicate kinds are best covered with a hand-glass, which requires to be slightly lifted up occasionally, for an hour or so at a time, to allow the collected moisture to pass away, in order that they may not damp off. Free rooting plants require no hand-glass, but merely to be planted in a sheltered shady place. Leafless cuttings of shrubs —gooseberries, for instance, as they are in winter—may be planted in common soil, in any shady place, by chopping out an opening with the spade, placing the cuttings in it at the proper depth, and then returning and treading the soil firmly about and against them; the three buds retained on the cuttings should only be left above ground. Cuttings should, in all cases, be kept moderately damp, and are greatly refreshed by occasional light sprinklings over head, if they are leafy cuttings. The sketches will illustrate the mode of preparing different kinds of cuttings: the horizontal line indicates the surface level of soil after planting; the scars on the cuttings beneath these lines, the positions from which leaves or buds, or both, have been removed in the preparation of the respective cuttings.

Layering.—This operation consists in fixing a portion of the branch of a plant beneath the soil, with a view to the production of roots from that part so buried, while the entire branch remains as yet attached to the parent stem. It is generally practised on plants that do not grow very freely from cuttings, or else to obtain larger plants in a given space of time than could be raised by planting detached morsels as cuttings. If large and not very pliant, the branches are first secured to the ground by a strong hook-peg, and the several smaller branches are fixed each by a smaller hook-peg, or sometimes, where there is little resistance, by laying a stone across them. The twig to be layered is cleared of leaves in the lower part, and at that point which is to be fixed under ground (at a joint, that is, where a leaf had grown), a slit is made with a sharp knife; the slit is commenced a little below the joint, and continued upwards towards the point of the twig, through the joint, and from half-an-inch to an inch or more beyond it; the end of the slit portion is then cut off evenly, close beneath the joint. The ground being slightly lowered, the twig is bent down, and fastened by a hook placed a little distance behind the cut; the point of the twig is brought upright, or nearly so, which opens the cut, and the cut part is covered with an inch or two (or more, if a large subject) of soil, pressed down firmly. The leaves on the twig above the cut and buried part should not be shortened, or at all cut or broken; but sometimes, if it is a long, rambling shoot, the top may be altogether cut off, leaving three or four good eyes above ground, as in the case of cuttings. Layers root the more readily if the soil into which they are laid is sandy, and for all choice subjects it should be thus prepared. Various periods are taken by different plants to form roots under these circumstances. The carnation, for instance, when layered, will be well rooted in a few weeks; many shrubs layered in the midst of their growth, will be fit to transplant in the spring following; others require a full year and upward, and some even two years.

In the accompanying diagram, *a* is a twig prepared for layering; *b* is another twig, similarly prepared and fixed in the soil, the surface of which is indicated by the horizontal line. The roots would be chiefly produced from the cut or tongued part, *c*. When the layer comes to be transplanted, the soil should be opened, the peg withdrawn, and the branch cut asunder carefully, near that part where the peg had been placed, and the layer, then an independent plant, lifted carefully with its roots, and transplanted where required. The mode of preparing a layer is shown on a larger scale, in the annexed figure, in which *a* indi-

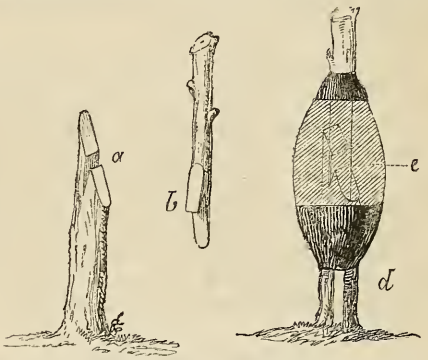
cates the position of the cuts, *b* the shoot after being cut; the part *c*, it will be understood, is cut away altogether. Tough-stemmed plants are often not cut at all, but the leaves are stripped off, and the stem merely twisted a little at the part which is to be buried, and then pegged down as in the other case. The growing season is generally the best for layering.



Division of the plant.—This is the mode of increasing all perennial plants with fibrous roots; tap-rooted plants do not in general admit of being propagated by this process. The plants should be taken up, the soil being shaken out from among their roots, and then separated into as many pieces as there are crowns of leaves (or into as many pieces as may be wanted), some share of the roots being retained to each division. The pieces are then planted as separate plants. It is in most cases an exceedingly simple and easily-performed operation.

Grafting.—This operation consists in removing a twig of one plant and fixing it on another, so that by the union of the two a new compound individual is formed. The twig is called a graft, or scion, and the plant it is fixed upon is called a stock; the operation is called grafting. It is a very useful art; for valuable, and delicate, and choice plants can thus be attached to more easily grown and commoner roots; and if the root or stock is properly adapted to the soil, the operation has much influence over the productiveness of fruit trees. Grafting is chiefly practised with fruit trees, especially the apple and pear.

There are many methods of grafting; but the most useful and simple is that here described, called whip or *tongue*-grafting, which is suitable either for young stocks, or for young branches on old stocks. The head of the young stock (from one to two inches diameter) is to be cut off, either an inch or two, or, to form a standard tree, at four or five feet above the ground surface; the former, however, is preferable, both for dwarfs and standards. The top of the stock is to be cut off with an oblique incision two or three inches long, the cut being made with a very keen, smooth-edged knife; the bottom of the graft is to be cut as nearly as possible to the same slope, and the top of the cut stock removed with a horizontal cut. A slit is then made downwards, about the centre of the sloping face of the stock (*a*), and a similar cut is made upwards in the sloping face of the scion or graft (*b*). The tongue (*b*) is then inserted into the slit (*a*), the use of the tongue being to hold the parts firmly together. The graft must be put so that its inner bark is placed in contact with the inner bark of the stock on one side; it cannot fit on both sides unless the stock and graft are exactly of the same size, which is seldom or never the case; but if one side is made to fit in this way, it will be sufficient. The graft must next be tied on; bass matting, soaked in water (used wet), is a good material for tying; a piece of sufficient length, and at least half an inch wide, must be taken, and the middle of this placed over the bottom of the graft, crossed behind, and again brought forward and crossed a little upwards; this is repeated until the whole is bound over firmly and closely, and is finished by tying a half-knot behind the stock. This is then rubbed well with a little grafting clay, taken on the forefinger, so as to fill up all the interstices of the tie; and the whole is then enveloped in an oval or egg-shaped mass of grafting clay, which should cover some distance beyond both the top and bottom of



the point of junction. The sketch (*d*) represents this, a portion of the mass being supposed to be removed at *e*, to show where and how the junction of the stock and graft occurs. This mass of clay requires to be carefully closed around the graft and stock, at its upper and lower end; and if it cracks, as it will sometimes do in dry weather, a little fresh clay must be rubbed into the cracks, so as to make it air-tight. It is sometimes desirable to graft the stock as low as possible, so as to admit of drawing up the earth on each side, after the operation, so as to cover the ball of clay, in order to keep it moist and to prevent its cracking. The clay may be removed, as well as the tie, when a little growth has been made; but it is well to make a loose tie, to keep the graft steady.

The commencement of the growing season is the proper time for grafting—when the sap is rising in the stock. The grafts should always be taken off a month or so before grafting time, and kept with their lower end in damp soil, in

a cool, shady place; for the stock should always be a little in advance of the graft, as respects growth, at the time of the operation. The grafts may be taken off any time during the resting, or winter season, provided they can be kept cool and moist, so as neither to start into growth nor shrivel. The well-ripened, medium-sized, one-year-old shoots should be chosen, and the grafts (used about six inches long) should be taken from the lower and best ripened end of these shoots; healthy shoots should also be selected.

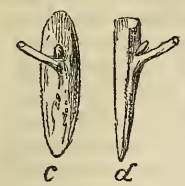
A variety of whip-grafting, sometimes more easy of application than that just explained, is thus performed:—First, head down the stock by a nearly horizontal cut; then pare one side of it for a length of about two inches, and just into the wood, making the cut rather deeper into the wood at the top than at the bottom of the cut; then pare down the lower end of the graft, by an oblique cut corresponding in length with the cut on the stock, commencing shallow towards the top of the graft, and much deeper—nearly through—at the bottom. The tongueing, adjustment, tying, and claying, are done just as in the other case.

Grafting clay is common clay worked up to the consistence of stiff mortar, all stones and lumps being removed, and a considerable portion of green cowdung and chopped hay, or the hair used by bricklayers, mixed with it, in order that it may keep moist and hang together: it is essential that it be thoroughly well mixed up. It is put on with both hands; but being very adhesive, dry ashes are occasionally dusted over the hands, to enable the operator to shape it to the form and position required.

A very useful application of grafting consists in working an established fruit-tree of an inferior kind, with scions of a superior variety of the same kind of fruit. Such trees soon come into bearing, and the process is much to be preferred before destroying old trees of bad varieties, and planting young ones of choice kinds. A different mode of grafting, called cleft grafting, is often practised in these cases; but the method already described is preferable. The trees should be cut in, almost to the trunk, the head being wholly removed: young branches will be produced, a few of which, well-placed, are to be selected to form the skeleton of the future head, and the rest removed, the selected shoots being grafted as close as possible to their origin, as soon as they acquire sufficient diameter, which in most cases will be after making one year's growth. When cleft-grafting is practised, the scions are placed at once into the main branches, after they have been headed off; but if they are large, as is generally the case, the union is never so complete as when the graft is attached to a part which comes nearer to its own diameter. If the tree to be headed off have any small branches, they may be at once grafted without waiting for the growth of new shoots. Such shoots might be induced to grow in readiness for grafting, if the main limbs were slightly cut round, a year or two before they were entirely removed. This plan is as economical of time as the method of cleft-grafting (which at once substitutes grafts for the lopped branches), and is much preferable in the end.

Budding.—This operation is performed by removing a bud, with bark attached, from one tree, and fixing it below the bark of another. It is performed in the midst of the growing season, it being essential to success in budding that the shoots should be full of sap, so that the bark may separate easily from the wood. The bud is to be inserted on a smooth part of the stock, free from knots, and close below a bud; the north side of the stock should, if possible, be selected, so that it may be sheltered from the sun during the hotter part of the day. The operation is best performed with a proper budding-knife, which has a thin, wedge-shaped handle, the end of which is required to raise up the edges of the bark without injury or bruising. Shield or T budding is the most common mode, and is also the most desirable for general purposes. It is thus performed:—having a shoot with a supply of buds in readiness, and having determined where the bud is to be inserted on the stock, proceed to make a longitudinal incision, about a couple of inches long, or rather more, and just deep enough to cut through the bark, but not into the wood: at the upper end of this make a horizontal cut, an inch or so in length (*a*). Then cut off a bud from the shoot, selecting one from about the middle, which is well ripened and plump; take the shoot in the left hand, and make a cut from below upwards, commencing about an inch beneath the bud, to about an inch above it, and passing nearly half way through the shoot, taking out wood and all. The leaf is to be cut off, but the leaf stalk retained; it serves as a convenient handle (*c*). Next remove the wood cut out with the bud; but this is a delicate operation, and it is quite indispensable that the bark should be in a condition to separate readily. Hold the bud on the forefinger of the left hand, with the cut surface upwards, placing the thumb upon it; then, with the thumb-nail of the right hand, gently disengage the lower end of the bark of the shield from the wood; and then, removing the thumb of the left hand, the wood will probably come away, leaving

the bark, the bud, and a small fibrous portion inside the bark, which portion is called the root of the bud (*d*). If this be so, the bud will be ready for insertion; but if instead of the fibrous portion at the base of the bud, on the inner side, a small hollow or cavity is perceived, the bud is spoiled, and another must be taken.



The bark on the sides of the longitudinal slit in the stock is now, with the thin end of the handle of the budding-knife, to be gently raised and separated from the wood, for about half-an-inch in width on each side (*b*). Both stock and bud are now prepared. The next thing is to slip one side of the little shield of bark, containing the bud, so far under one side of the raised bark of the stock, as to admit the other side of the shield beneath the opposite raised portion, and then the bud is shifted and adjusted so as to occupy the centre of the opening; in doing all this, the little piece of leaf stalk retained is found very convenient, for it serves as a handle. In this stage of the operation, the whole of that part of the shield of bark below the bud, and part of that above it, is inserted behind that part of the bark of the stock which was divided by the perpendicular cut; the top part of the shield, at the same time, will project upwards beyond the cut, and all that does so project upwards is next to be cut away, so that the top end of the shield may abut against the undisturbed bark of the stock, above the horizontal incision (compare *c* and *d*). The inner side of the shield of bark, containing the bud, must lie closely and flatly against the wood of the stock (*e*). When so adjusted, take a piece of soft bass-matting, well soaked, and bind up the part, commencing about an inch below, and continuing about the same distance above the incised part, just allowing the bud to peep out, but otherwise closely, so as to exclude the air; it is best to tie the end of the matting, and then wind it round, taking care to keep it flat and pull it close and firm throughout. This completes the operation. In two or three weeks' time, the plump appearance of the bud, or otherwise, will indicate the success or failure of the operation. If successful, in a month or five weeks the bandage may be loosened, to allow the parts to swell, and in another week be entirely removed. Early in the following season it is usual to cut away the head of the stock, above the bud—which then takes its place; this should be cut off clean, by a sloping cut, about half-an-inch above the bud; but it is well to cut half way through first, at a little distance upwards, in order to start the bud without making it the only outlet for the sap; and then, when it has made a little progress, remove the head entirely, as just explained.

Budding, like grafting, is most usefully employed in propagating choice kinds of fruit-trees; and of these it is usual to practise it chiefly on the stone fruits, as the cherry, plum, peach, and apricot.

The directions given under budding and grafting suppose it to be the object that the bud or graft should replace the head of the stock, and of itself entirely form the future head of the tree. But besides this, either of the operations may be had recourse to, as a means of filling up any bare parts of a tree, where it may not be convenient to cause the growth of young shoots by pruning. In this case the operation is performed precisely as already detailed, except only in what may refer to the removal of the head of the stock.

CROPPING AND ROTATION OF CROPS.

The admitted advantage of a rotation of crops has been explained to depend on different causes. It was once a very favourite notion that plants gave out certain matters which were called excrementary, or rejectamentary, and that the excrementitious substance left behind by one set of plants, became as it were poisonous to closely succeeding plants of the same kind, but innocuous in reference to plants of a totally different nature. This notion is however now very generally exploded; and with more apparent propriety, the advantage of a rotation of crops is explained by the doctrine that different plants take up different kinds of food, which being more or less exhausted by a crop of any particular kind, will not fully supply a closely succeeding crop of the same kind, unless the loss has been replaced—summarily by the application of manure, or more slowly by the action of the atmosphere during a course of fallow. The fallowing of soil is, however, now seen to be an unnecessary loss, inasmuch as a judicious rotation of the crops answers the same purpose, for different crops will follow each other successfully without manuring the soil for each, which may be done when each course of cropping is complete.

Another cause of the advantage of rotation may consist in the different habits of growth natural to different classes of plants; thus some roots spread near the surface, which is thus exhausted; others dive deeper, and thus the adjacent layer is made to furnish its quota of nutrition; while others, which go deeper still, are supplied by food which the former did not reach. This mechanical advantage of rotation is worth attention.

All garden vegetables may be made to grow

in well managed garden soil, but as some kinds have a preference for different kinds of soil, it may be useful to indicate these predilections, for they often admit of being to some degree accommodated.

Carrots, potatoes, beet-root, onions, leeks, &c. prefer a light soil, rather dry and deep.

Peas and beans prefer a well-enriched loamy soil.

The cabbage tribe throughout prefers a strong rich loamy soil.

Celery and the spinaceous plants prefer a light, rich, and moist soil.

Asparagus, sea-kale, and rhubarb prefer a light rich soil, and a warm situation.

A proper rotation of crops involves as a necessity, if any benefit is to be derived, that the succeeding crops should be dissimilar, not only in their actual constitution, but also in the mode of their root-growth. For this reason a classification of crops is desirable, so that one class may follow another over the ground. The peas, beans, and kidney-beans form one group; the cabbage tribe, as brocoli, cauliflower, savoys, and cabbage, another; fusiform roots, as carrots, parsnips, and beet-root, another; turnips, early potatoes, onions, leeks, garlic, shallots, &c. another; salading, as celery, lettuce, endive, cress, &c. another; potatoes, another. Two or more classes of crops may often be distributed with advantage over the ground at one time, and alternating in a more or less regular way; this often facilitates the very desirable practice of planting tall growing crops at extra distances, the intervening spaces being occupied with such smaller things as are rather benefited than otherwise by the shelter or shade afforded by the others. It is a safe rule, that none of the principal garden crops be suffered immediately to follow another of the same kind on the same ground; and safe also to lengthen the intervening space of time, between the occupation of the same ground by two crops of the same kind, as much as possible, even to two, three, or more years. These rules, in fact, form the practical basis of all proper rotations; but the actual details may be, and are, allowed to vary indifferently according to the wants or the influencing circumstances of each case.

To carry out this practice in a proper way, it is desirable that a rough outline plan of the garden be formed, and the whole surface thrown into beds or quarters, which should be numbered. A journal should also be kept, in which, by the aid of these numbers, a registry may be kept of all the crops planted on the ground, together with memoranda of such of the principal operations, as manuring, trenching, &c. The unaided memory, especially if the mind be much occupied by other matters, is liable to fail, but a permanent record of this kind is invaluable in carrying out a rotation of crops, its evidence being always accessible and indisputable. No one need be frightened by extravagant notions of planning and book-keeping: the rudest possible sketch of the ground, made so that a certain space can be identified with a certain mark or number, and the plainest possible record of the crops planted on those spaces, is sufficient for the purpose; and so that this is provided and understood, each one may go to work his own way in doing it.

Celery is an excellent preparation for cauliflowers, or onions, or carrots, or turnips, or parsnips; or for peas, with potatoes and winter greens and brocoli between.

Turnips and potatoes are found to be a good preparation for the cabbage tribe, including brocoli, cabbages, savoys, &c.

Cabbages and brocoli, &c. are a good preparation for beans or for peas.

Cauliflowers are an excellent preparation for onions, leeks, or turnips.

Old asparagus beds afford excellent accommodation for the cabbage tribe, for potatoes, or for carrots and parsnips; as also does ground from which any of the small fruits are cleared.

Peas are a good companion crop for spinach, the latter being sown between the distant rows of the former.

We shall add a few memoranda respecting the quantity of seeds required for a given space, and their duration in a vegetative condition. It is always better to have several succession crops of one kind, than fewer and heavier crops.

Beans.—Early and late crops: one pint for a row of eighty feet. Principal crops: one pint for a row of one hundred feet. The seeds will keep good one year.

Beans, kidney.—Half-a-pint for a row of eighty feet. The seeds keep good one year.

Beet, or Mangold Wurtzel.—One ounce for a row of 150 feet. The seeds keep for several years.

Cabbage, Borecole, Savoy, Brocoli, &c.—Half-an-ounce for a seed-bed of forty square feet, to be transplanted from. The seeds keep about four years.

Carrot.—One ounce for a row of 150 feet, well thinned. The seeds keep one year.

Cauliflower.—Half-an-ounce for a seed-bed of forty square feet. The seeds keep about four years.

Celery.—A quarter of an ounce for a seed-bed of twenty square feet. The seeds keep several years.

Gourds and Cucumbers. — Half-a-dozen seeds sown in pots. The seeds keep several years.

Leek. — Half-an-ounce for a seed-bed of

twenty square feet. The seeds keep two years.

Lettuce.—A quarter of an ounce for a seed-bed of forty square feet. The seeds keep three years.

Onion.—One ounce for a bed of eighty square feet. The seeds keep two years.

Parsley.—Half-an-ounce for a row twenty-five feet long. The seeds keep six years.

Parsnip.—Half-an-ounce for a row of 150 feet, the plants to be well thinned. The seeds keep one year.

Peas.—Early crops: one pint for a row of sixty feet. Principal crops: one pint for a row of a hundred feet. The seeds keep good one year.

Potatoes.—Sets (small whole tubers) planted at a foot distant, in rows two or three feet apart.

Radish.—One ounce for a bed thirty feet square. The seeds keep two years.

Spinach.—One ounce for a row of 120 feet. The seeds keep four years.

Turnip.—Half-an-ounce for a bed of one hundred square feet. The seeds keep about four years.

The duration of the vital principle of seeds depends in great measure on the manner in which they are preserved; they should be well ripened, always kept dry, and not exposed to a high or fluctuating temperature. New seeds always have the preference.

In all cases, the young seedling plants should be thinned early,—the earlier, the better; the plants ought never to stand so much crowded as to become drawn or lanky; such plants are delicate, and never thrive like sturdy plants which have had free exposure on all sides. Those plants which have to be transplanted are generally the better if "pricked out" into nursery-beds when quite young, and finally transplanted from these when of sufficient size.

PRESERVATION OF CROPS.

To realize the fullest advantage from a garden, it is necessary to understand what is meant by the "preservation of crops;" and this applies not only to such things as are grown in summer for winter use, and are consequently stored by for the latter season, but also to many articles which are quickly perishable, but in which decay may be arrested and postponed by a course of judicious treatment, which it is desirable to understand. The subject is naturally divided into what concerns vegetables and fruits.

Vegetables.—Here we have to deal with green vegetables and mature root-crops, the former of which may be preserved for a time, but scarcely without deterioration; while the latter admit of being kept without sustaining any injury.

The preservation of green vegetable crops is a consideration only when the supply is temporarily greater than the demand, and when the farther advance of the particular article would involve a deterioration in its quality, or when any part or all of any crop attains a useable state at a season when it is liable to sustain injury if left exposed. The situation in which this class of vegetables may be best preserved is a dark, cool, shady room, not damp and stagnant enough to encourage decomposition, nor dry and airy enough to cause exhaustion, but simply having a calm, almost unvarying, cool atmosphere, in which vegetables undergo change very slowly. It is essential that no decaying vegetable matter be suffered to accumulate; for this would soon ferment and produce a contaminated atmosphere, in which it would be impossible to preserve for any length of time fresh vegetable bodies in a sweet and wholesome condition. Cleanliness then is a first consideration. The vegetables themselves should not be crowded nor heaped up together; this would induce fermentation, and consequently decay. They should be placed separately as far as practicable; and all decaying parts should from time to time be carefully removed. A cold floor, such as one formed of brick or stone, is proper to lay them on. The vegetables themselves should not be made damp by the application of water. The crops should be collected when dry, and when in a perfect state. Three or four hours, or more, before they are wanted for use they may be freshened up, by having such trimming as may be necessary, and being then either immersed in fresh clean water, or sprinkled therewith, as may be most suitable. Peas, beans, and French beans should be spread out thinly over the floor, and may simply be sprinkled just before being used. Brocoli, cauliflower, and indeed any of the cabbage tribe, should be either pulled or cut with a good portion of the main stem, some of the larger matured or decaying leaves pulled off, and the rest removed from time to time as they begin to decay, the heads being trimmed in the usual way when required for use, and immersed in water. Cauliflowers and brocoli require a great amount of this attention, these crops being liable to attain maturity very rapidly, and as it were by a great influx, which requires to be stored. When the flower-heads of either of these crops begin to form, one or two of the leaves of the plants should be broken down over each, which serves as a protection, and becomes a means of blanching the head, thus improving both its flavour and appearance. In the winter season these crops

should be housed as they come to maturity, and so long as a calm cool atmosphere is maintained they will keep with scarcely any deterioration for a considerable length of time. Cucumbers and unripe gourds may be kept fresh by laying them on the floor of such a room as that alluded to. Other crops may be kept in a similar way. Where the storing principle is adopted with vegetables of this class, it is quite necessary to use them in the order in which they are gathered, or some will probably become spoiled; for storing, among this class of subjects, is to be looked upon as making the best of a disadvantage.

Root crops of all kinds are best stored in close cool rooms, sheds, or pits, where there is a low and as nearly as possible unvarying temperature, a very slight interchange of air, and no superabundant moisture. They should, in fact, when stored, be moderately dry, and by whatever means, if they can be preserved from material change, they will keep safely. The best means is, certainly, the surrounding of them by an atmosphere at once cool and still, by which no vital nor chemical agencies may be called into play, nor the inherent moisture of the roots themselves carried off by rapid perspiration.

Beyond a few general rules, the application of this principle is so plain and easy, that we shall pass on to the rules themselves:—The roots must be taken up when matured, and without sustaining contusions during the operation. A dry period should be chosen, if practicable, and the roots moderately dried by exposure to the air before any attempt is made to store them. If the season is wet, and this drying process cannot be carried out so far as is desirable, it must, nevertheless, not be neglected, but every thing that can be done should be done towards having the roots thus far dried before they are put away for any length of time. In all the removals which may take place between the periods of digging and storing, the bruising of the roots must be cautiously avoided. Large quantities should not be got together into a bulky mass; if this is done, they will certainly become heated, and this fermentation of the tissues of the roots hastens their ultimate decay, or excites them into premature growth, in either case deteriorating the quality of the roots. Frost and light should both be rigidly excluded from the roots or tubers, if they are for eating (especially in the case of potatoes); but if they are intended for replanting, they may be exposed to light. Potatoes for planting should be spread out in a dry airy place, so as to get hardened and greened; and none of the sprouts from them, if any are produced before planting time, should be rubbed off, but carefully preserved and planted along with the tubers; neither should they lie more than one tier in thickness. It is rather to be preferred to store roots and tubers of all kinds amongst moderately dry earth or sand; but a large bulk should never be got together. It is the cool unvarying temperature, more than anything else, which tends to the safe preservation of this class of vegetable productions; and provided this is secured, it is not material how it is accomplished,—whether in ordinary pits or ridges, in sheds, or in more highly finished store-rooms.

Fruits.—Fruit, like vegetables, requires a cool apartment for its preservation, and one in which there is little appreciable atmospheric change. The atmosphere at the same time should be free from damps, but not at all parched: in fact, a calm, moderately dry atmosphere, of which the temperature is not liable to variation, is what is required. Beyond this, it is not material whether it is a fruit-room, a loft, or a cellar which is made use of.

Fleshy fruits of every kind are best laid on shelves, in shallow layers, even in a single tier; they should be gathered and handled without bruising in the least degree,—in fact, they should be handled as cautiously as if they were eggs; and they should be gathered in before they have quite reached maturity, especially if they be of kinds which may be long preserved.

Apples, the principal and most useful of all fruit crops, require to be gathered as soon as the pips begin to turn brown, except it be the very late kinds, which, in cold climates, may hang as long as the weather will permit, and even then sometimes do not attain this state. Every fruit ought to be detached from the tree separately by the hand, and so as not to break off the little branch on which it is fixed, for on this branch there is a bud or buds formed, which, in the generality of cases, bear blossoms in the following season; when, therefore, these buds are carelessly broken off, the crops of the following, and often the next succeeding year, are more or less injured. The best mode of detaching the fruit, is, to lift them gently upwards. From the tree, the fruit should be transferred carefully to a bag or basket, in which they should go to the store place, for if removed from one basket or bag to another, they get bruised, which causes them to decay sooner than they should do. The fruit should be at once deposited in thin layers, where it is to remain, and not laid in heaps to "sweat." An open trellis-work shelf is best, and this without any covering of straw or litter. The apartment or store-house should be kept close; but, as the fruit approaches maturity, it is improved by exposure for a few days to a warm atmosphere. The store fruits require to be examined from time to time,

say once a fortnight, and all the faulty ones removed from amongst those which are sound. Every sort should be kept perfectly distinct, and the earlier kinds in the most easily accessible positions.

The fruit should be gathered when quite dry; and, for this reason, the middle of a dry day is the most proper time for the operation. There is also an advantage in not gathering the whole produce of a tree at once, at least, if the fruit be valuable; according to this plan, the best and most mature fruit should be first picked, and the later ones left to attain a further state of maturity. The different gatherings should be kept separate. As a substitute for the use of a fruit-room or cellar, late fruit may be packed close in boxes among dry sand, or even in vessels merely kept air-tight by covering the mouth with a piece of skin or leather; the names of the varieties being marked on the outside, so that each may be used in its proper turn. Those varieties which do not keep so long, may be placed in hampers among dry grass or fern-tops, and must be marked in a similar way. It is only the choice samples of fruit with which this amount of care can be taken. The refuse and commoner culinary sorts may be kept in heaps in a cool room, or buried in small ridges in the ground in a cool place, in the same way as potatoes. Those which are thus buried require to be well covered up, to keep them clean, and should only be taken out a few at a time as they are wanted, for they do not keep long after being exposed. For this reason, they should be buried in small separate heaps.

Pears may be managed in a similar way. Other standard fruits scarcely admit of being long kept in the raw state; they may, however, be kept over for a short time if placed in a close atmosphere; but these also require to be very tenderly handled in gathering, for bruises soon become blemishes.

Of the dry hard-shelled fruits, the principal are filberts, walnuts, and chestnuts. These require to be freed from their husks, and when perfectly dried put up in small quantities in boxes or casks where they will be excluded from the air; the boxes may be set into the same apartment where the other kinds of fruit are kept, or into any moderately dry apartment.

Walnuts, when properly ripened, may be shaken (they should not be beaten) from the trees, or will fall of their own accord. The first process is, to deprive them of the green husk external to the hard bony shell; and if they are fully ripe, this will be readily detached, either by brushing or by shaking backwards and forwards in a long bag. The nuts should then be spread out in an airy place until they are quite dry, and may then be packed in casks, or boxes, or jars, among dry sand, which should be perfectly cleaned away from them when they are taken out for use. When they have become shrivelled, they may be freshened up before being used, by steeping them in warm water; they then become plump and peel readily. Some persons prefer to place them amongst dry saw-dust or bran, and others amongst dry salt; a very dry place is necessary when the latter material is used. Others keep both nuts and walnuts in good preservation in open jars, in a *damp* cellar.

Filberts, after being separated from the husks, should be well dried by exposure to a current of air, and the finest should be then picked out for the purpose of being preserved. This may be done by placing them, when quite dry, in jars or boxes amongst dry sand, bran, or saw-dust, or in jars merely rendered air-tight at the mouth. They must be taken out a few at a time, as required for use, and well cleansed.

Chestnuts ripen in a fine season sufficiently to drop from the trees; but in a late and unfavourable season, in cold climates, they do not ripen so completely as to fall before the frost dislodges them with the leaves; in such seasons it is best to gather the nuts before they get injured by frost. When quite ripe, they separate readily from the husks; the best should then be selected and packed in jars or boxes among dry sand, or in jars rendered air-tight at the mouth. In those seasons and countries when and where they do not ripen early, and it becomes desirable to gather them, they should be laid in heaps in a dry shed for three weeks or a month, when they will be found to give off their husks readily; and then, after being well dried, they are to be put away, as in the other case. Full maturity is indicated by the dividing of the husk, and the brown colour of the outer skin of the nuts.

INSECTS AND VERMIN.

Almost every kind of crop cultivated in the garden is liable to suffer in some way from the attacks of some one of various enemies, the mere enumeration of which would be tedious. The principal sources of annoyance may be thus briefly stated:—

Snails and Slugs of every kind (except a rare kind of slug, which has a small shell) are voracious destroyers of vegetable bodies, attacking almost indiscriminately any tender vegetables or fruit which may fall in their way. The entire system of culture adopted in a garden should be offensive to these pests. The ground should be frequently loosened up with the hoe. No rubbish should be allowed to lie about, or to accumulate, except in some one reserved spot, and even here should be

frequently cleared away, the entire mass being charred or smother-burned to convert it into manure. Old walls, hedges, and old fences of all kinds, and all other similar harbours for these creatures, should be frequently searched, and those which are collected should be put into a vessel alternately with layers of salt or fresh slacked lime, either of which will destroy them. Hot lime, in the state of fine powder, should be thinly scattered over such tender crops as beds of seedling plants, or young transplanted plants generally; or a layer of lime may be placed around the bed so as to enclose the plants within a ring, which, as the slugs cannot pass it while the lime is fresh, will serve as a protection if the space is not too great. The lime loses its caustic properties after being wetted. The slugs often bury themselves under the clods of earth, so that besides this, in situations where they are abundant or in seasons favourable to their increase, other means should be resorted to for the purpose of destroying them. One of the best is to drop down about the garden, in the evening, (showery and damp days are preferable,) small handfuls of fresh brewers' grains; these heaps attract the slugs, and should be examined, either very late at night or very early in the morning, by candlelight, and some salt or lime strewn over them, the heaps being taken away in the morning. Perseverance in this practice, and in the other matters previously hinted at, will keep a garden as free from these pests as is possible.

Mice are very destructive to seeds, such as peas and beans newly sown. They should be caught in traps, of which the figure-of-four trap is the simplest, and quite effective, if enough of them are set. It is also a good plan when sowing the seeds to strew along with them some chopped fragments of any accessible spiny plant, as furze or gorse, which serve as a check upon their depredations.

Small Birds both pick up seeds and seedlings, and destroy the buds of fruit trees. An indiscriminate war upon these, however, is not proper, as some of them do much good in the destruction of injurious insects. The best plan is to scare them away from those objects they are likely to damage, of which the chief are newly sown seeds, ripening fruit, seeds approaching maturity, and the buds of fruit trees.

Caterpillars of all kinds are very destructive, as they feed chiefly on the leaves of vegetables or fruit trees, and in some cases entirely strip them. The kinds which attack garden crops are numerous, and very diverse. It should be remembered that the size of the caterpillars is no index to the damage they work, for some of the smaller kinds are so numerous as to do far more injury than larger kinds which are fewer in number. There are four stages in which these "pests of the garden" may be warred against: viz. in the egg, by searching the situations where the mother insects are seen hovering about; the larva or caterpillar, by handpicking; the pupa or chrysalis; and the imago or perfect insect, for the prompt destruction of the female insect prevents the deposition of her eggs. If the eggs are sought for (on the leaves or bark) and crushed, the young brood is destroyed in embryo. The young caterpillars, when first hatched, should be watched for and destroyed, which prevents the most part of their depredations. And finally, wherever the chrysalis can be detached and killed, the maturity of the insect, and consequently the deposition of eggs for a future generation, is prevented. If the caterpillars are suffered to become strong, and to disperse themselves, which they shortly do in most cases, it is much less easy either to destroy them, or to prevent their depredations. In all such cases, however, hand-picking is beneficial so far as it goes.

The Cockchafer in its grub or larva state is very destructive to the roots of plants. The grub is large, white, and fleshy, and is four or five years reaching maturity. Wherever the grubs are turned up, they should be destroyed; but the best means of lessening their numbers is to destroy the insect in the perfect or beetle state.

Wire-worms and some allied insects eat the roots of plants, especially those which are fleshy, as the carrot. They are difficult of extirpation: one of the best means is perhaps to bury slices of potato or turnip, as traps, and to examine these from time to time and destroy such as have been caught.

Earwigs often do considerable damage, but their depredations affect flowers more than vegetables. They are caught by placing any hollow tubular bodies, closed at one end, as traps, among the foliage. The traps have to be frequently examined, and this should be done in the daytime.

The Turnip-fly is a little skipping beetle; it eats up the leaves and so destroys or materially damages whole acres of this crop. There is no very sure remedy when the attack is once made. It is recommended to dash sharp dry dust among the plants while wet with dew, which renders the leaves uncomfortable to those which it does not beat off. The best way is to get the turnips to grow as fast as possible, and if they once get fairly started they seldom suffer; this is effected by sowing wood ashes along with the seeds, and moreover, choosing, if possible, a showery time for sowing.

No class of gardening operations requires to be more diligently followed up, than whatever

relates to the annoyance or destruction of noxious insects and vermin.

TOOLS REQUIRED.

There is good reason why those who have ground to cultivate should take care to provide themselves with all necessary tools, for both time and labour will be ill expended on the various operations if proper implements are not employed. The following are the most important to select:—

Spade.—The spade is after all the mainspring of cultivation, and is a resource when all other means of cultivating the ground fail. Those with the tree or handle perfectly straight are strongest, and most suitable for hard work; though many think those with the crooked tree rather more convenient to use; they are so when shovelling work has to be done.

Digging Fork.—A valuable substitute for the spade, and a much better tool than it for all the operations of loosening or lightening the soil; it is also required to dig up root crops for storing.

Pronged Hoe.—This is an important implement in earthing up such crops as the potato.

Hoes.—The draw-hoe, for cutting up weeds and drawing soil up to the stems of plants, and drawing drills for seed-sowing or planting, is quite necessary. The Dutch hoe is a better tool for stirring up the surface, which is an important operation, and should not be neglected where the labour can be devoted to it.

Rake.—Used chiefly for covering seeds newly sown, by combing, as it were, the surface backwards and forwards, by which means the seeds get beneath the surface.

Watering-can.—An important aid in cultivating fresh, vigorous and succulent vegetable crops.

Mattock.—Essential in grubbing up trees or fences, in doing which it is the chief tool employed.

Dibble.—Used in planting small plants; it is made from the upper part of the wooden handle or tree of a spade, the eye of which makes it much more easily used than a mere straight stick could be.

Garden-line.—Required as a guide in planting and sowing in lines, instead of broadcast. The iron spindle makes it more easily used, but the line, which is formed of strong string as thick as a quill, may be used with two sticks only, around which it may be wound when not in use.

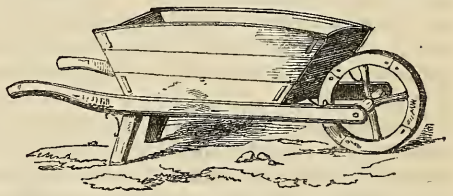
Hand-spud.—For lifting up seedling plants about to be transplanted, and also to be used in replanting them.

Knife.—Required for various operations connected with the garden; pruning is the most important. The clasp sort of garden knife, moderately strong, should be selected.

Hammer.—This is used in the operation of training fruit trees. Cast-iron nails are best, and shreds of cloth to put round the branches.

Bill.—A useful implement in various ways.

Barrow. This machine is useful in removing materials from one spot to another.



Every one who has a garden should have a place where to put the tools, when they are not in use. The tools themselves should be thoroughly cleaned after being used, and put away orderly, so as to be easily found when again wanted. There is an immense difference in respect to working, between well kept and neglected tools. Such implements as spades, hoes, &c., when in constant use, become bright, and in that state are much more easily worked than if allowed to get rusty from being put away damp and dirty in a damp place. After use, they should be rubbed clean and dry, and then put away in a perfectly dry place until again wanted. Besides the facility of working which is thus secured, there is great economy in thus taking care of the tools, as they last much longer than when they are neglected, and allowed to waste away gradually by rusting.

A STROLL THROUGH THE GARDEN,

BY A TUTOR AND HIS PUPIL, IN THE MONTH OF SEPTEMBER.

We will take advantage of fine weather now and go round the gardens, for this is a trying month. One slight frost would cut off all the dahlias, and they would be lost to us for the season. As early as the 7th, I have known every flower destroyed in some localities, and the plants cut down altogether. At present they are in full vigour and excellent condition. Those which are remarkable for two colours highly contrasted, are called fancy dahlias; those which are all of a colour, or only slightly edged with a colour darker than the ground, are not fancy ones. The plants have grown so large, that instead of one stake holding them in their position, there are four to each, three of them angularly placed; the other is the principal stake, to which they were originally fastened. All this involves trouble; but it is of no use attempting to grow any dahlias without trouble. The wind is so powerful on a large plant, that the strongest ties are necessary to keep them from destruction altogether. Auriculas, having undergone repotting, require nothing more but winter protection in their own cold frames, and to be covered against frosts. The seed that had been left on the plants has been picked off; but when the seed is not required, the truss ought to be taken off directly the bloom is over.

The choice geraniums, verbenas, and other tender plants in the borders, will not be safe long; therefore the gardener will take them up, pot them, and give them winter-quarters. All the camellias and greenhouse plants yonder will be removed to their houses almost immediately. Previously, however, to removing them, the pots will be looked over and cleaned, the dead leaves picked off, the drainage examined, and the plants prepared for their respective places in the pit, greenhouse, or conservatory; for some will be better there than any where else, such, for instance, as the early sorts of hybrid rhododendron, and the choice potted Americans. In the mean time, the houses are being cleaned out and washed all over inside.

In the borders we shall see the autumn bulbs, such as the colchicum, the *Amaryllis lutea* (or, as it is now called, *Oporanthus luteus*) now just ready to bloom. The late flowering annuals are in fine order. The chrysanthemums are showing their buds, and if the autumn be fine, they will make a good show. The layers on the carnations and picotees are rooted, and ready to cut off. I will just show you this layer; first, observe that I remove the earth from the surface down to where the stem is under ground, and take away the peg or hook that fastens it down; now I thrust this stick into the earth by the side, so that I lift the roots and soil altogether with the layer; you observe the fibres are strong, and that they come out from the part above where the notch is begun. Now, when this is taken off, the stem is cut through nearer to the old plant than is necessary; but when off, and we have the layer in our hand, we take all the stem off with a sharp knife close to the root, so that the plant is complete. These are all served in that way, and potted in pairs in forty-eight sized pots, with clean loam without dung, but with some crocks at the bottom, to secure a good drainage; they will then be put into the garden frames on a hard bottom, and covered with the glass from excessive wet and extreme frost.

The smooth-barked roses may be propagated now from cuttings, which may be placed a great many in a pot close together, and these that have been cut in have most likely been cut for that purpose. Considering the season, the gardens look still very gay. The Michaelmas daisies—and of these you observe many varieties—are in full flower.

The fruit garden is in high order. Many of the fruits are in perfection; the grapes in the open air are colouring; many of the apples and pears are now being gathered, but it is too early in the day for that work. Fruit ought never to be gathered until the sun has been out a while; for it ought to be thoroughly dry, or it endangers the keeping so much. The kitchen garden has produced some of the useful crops. The potatoes which the man has taken up are of the early kinds, but fully ripe enough to be preserved. Onions also are rapidly ripening; many of them have been pulled up and stored, others are lying on the surface to harden and dry. The man ahead of us is making a horse-radish bed; observe, he makes a trench eighteen inches deep, and sets at the bottom a row of pieces of the root indiscriminately cut about an inch long, and when he has put them in, he makes the next trench, as you will see, and fills up the first with the soil he takes out of the second; he will continue this to the end. It was once thought that the crown only of the horse-radish would grow, but this was a popular error; the root will grow at any part. The man you see gathering is securing the beans and peas for seed, for you will observe the haulm is quite dead. All the ground will be cleared after he has gathered the seed, and the whole space planted with the various sorts of winter greens, such as brocoli, cabbages,

savoys, kale, and Brussels sprouts. You observe, that you never see ground vacant long together, until the close of the summer, when some that may be intended for spring sowing, or that may be wanting amelioration, is dug, and left rough or in ridges for the frost of the winter to penetrate.

One look at the conservatory, and we will have done for the present. I would have you notice how differently it is furnished with plants to the class we saw here last; balsams, cock's-combs, phloxes, *Clintonia pulchella* with its brilliant blue flowers, and many other interesting annuals. A few of those extraordinarily formed flowers of the orchideous family are worth notice; that extremely gaudy purple flower is *Cattleya Mossiæ;* these with very long spikes of odd-shaped blooms, all speckled, are *Oncidium Lanceanum;* the large plants with funnel-shaped flowers, and the two other, yellow and orange, are the plants I before showed you in the hot-house—the Brugmansia family. The other plants have been furnished from the stove chiefly, but present nothing remarkable.

PREPARING DAHLIAS FOR EXHIBITION.

The cultivation of the dahlia has become common to most gardeners, both professional and amateur, and the mere excelling of others in the growth is often more attributable to the soil and situation than to any extraordinary means used by the grower. Generally speaking, the dahlia would thrive best where the most ordinary vegetables excel; and probably any one of the extensive and well-managed market-gardens, just removed out of the smoke and confinement of the great towns, would produce the dahlia as fine as they bring cabbages or onions. The dahlia should certainly be planted in May, June, and July, for exhibition; for when they arrive at their height of bloom, they do not remain long in first-rate strength and condition; so that there ought to be one set coming into perfection as another goes off. It is well known that strong rich soil agrees with most of them; but large and naturally coarse flowers come better in poorer ground.

The success of the exhibitor depends, however, much on himself as he approaches the bloom. Let the flower come as large and as free as it may, it wants attention. If we go over a fine collection in a garden that is not allowed to be trifled with for shows, and where the plants are carefully kept in ornamental order, at first sight we may fancy we could cut a thousand flowers, while, on close examination, nineteen of every twenty are useless. Of some, the petals are eaten by vermin; of others, the eyes are exposed or not fully developed; others, which have been all that could be desired, have been frayed by rubbing against the leaves or against other blooms; hundreds have gone by their prime, or not arrived at it; and it is sometimes difficult to cut a single good bloom from a plant literally covered with noble flowers. We have always said that dahlia growers omit too long the counteracting of these manifold evils. The destruction of the earwig, one of the most prolific sources of mischief, should commence from the time the plants are put out in May; and every plant being provided with a trap, somebody should examine them every day twice, and kill all they can take. Traps are of various kinds. A hollow tube of any sort would make a trap; bean-stalks, cut in lengths of eight or nine inches, are excellent; the most common is to put the small pot which is planted out of, on the top of the stake which is to support the plants, with moss in the bottom; this affords shelter from the heat, or cold, or wet, whichever may annoy the insect; and by examining them frequently they will be found under the moss, and may be disposed of by emptying them into a vessel of strong brine of salt and water. The bean-stalk is still better, for, by blowing them, whatever is inside is found out, and the operation quicker and safer than the pot, because, however active we may be, some will escape, and drop down only to torment us again. By attending to this from the first, we almost get rid of them before the dahlia comes into flower; nevertheless, it must be persevered in throughout the bloom, or they would get the upper hand again soon; and where people neglect them until flowering time, as many do, they cannot depend on a single flower, however promising it may be, escaping from the ravages of these insects, one of which can destroy a bloom for exhibition in a single night.

Supposing, however, that we arrive at the commencement of the bloom, and showing is our principal if not our only object, we have to set down two or three facts for our constant guide. First, as the flowers weaken far more than the growth, we have to remove every bud that is defective, the instant we discover that it will be useless for show, and to continue watching every advancing flower for the same purpose; consequently, flowers that have been fine and not used should be plucked the instant they have gone by. Secondly, as the rubbing of a branch or even a leaf against the finest bloom in the world would destroy it in a short time, therefore every flower intended to be saved must be so fixed that the wind can have no influence over it, and all the branches or leaves in its immediate neighbourhood that the wind could blow to touch it, should be shortened or fastened, to prevent

such accident. Thirdly, as all the growth of the branch that is above a flower weakens it, and all the buds beyond it deprive it of nourishment, the growth of the branch requires checking, and the buds should be removed. As a general principle, the pruning of a plant increases the strength of the remaining parts; but this may be carried too far, and by many persons extremes are adopted to increase the size of the flowers. We do no more, and recommend no more to be done, than removing the weakly shoots that come in many sorts too numerous, and taking away the branches that are in the way of others. The plant derives as much nourishment through the leaves as through the root, and therefore should not be deprived of more leaves than we can help. See what a world of good comes of a shower of rain that does not even wet the ground beneath the plant; and what does this suggest? Why, a garden-engine, well applied about the foliage of the plants, will be more beneficial at times than liberal waterings on the ground; and with regard to watering at all, it ought to be well understood that a good soaking of the ground, all over, once a-week, is better than such as they too frequently have would be twice a-day. While, therefore, we admit that judicious pruning may be beneficial, it is, generally speaking, done too much.

We come now to shading—for the burning sun of summer and autumn would almost dry up a flower. Various are the contrivances for this operation. The generality of growers for show, cover them up with a pot from the time the bud shows favourably. The bud is placed in the centre of a small slab of wood, which is supported by one stake or more in a horizontal position, and a flower-pot, with the hole stopped, put over it until it blooms out its best. The flowers, however, which are grown in the dark, lose, or rather never acquire, their natural colour, and are never so brilliant, nor do they travel so well, as a flower grown with all the advantage of the full air. Those who take extraordinary pains will uncover occasionally; and others have a pot with a false bottom, so that they can remove it and put glass in its place, by which they at least ensure light. The method of placing the bud in the centre is simple: a slit, wide enough to pass the stalk, is cut in the slab, half-way through or across it, so that the stem is passed along it with the bud at top, and the slit is generally stuffed up all the way with moss or cotton, to keep it in the centre. It is intended that this should be an effectual bar to the approach of earwigs, but not one pot in a hundred will fit close enough to do this unless the rim of the pot be ground on a flat stone.

The covering of blooms is supposed to prevent the checks which flowers sustain in all great changes of weather, in drying winds, burning sun, and any excessive wet. However, if the ground in which dahlias are grown is saturated with water, and the foliage sprinkled with the engine in the evening, there will always be good flowers on the shady side, that only require to be fastened to a stake that they may not blow about, and the adjacent branches trimmed or fastened back, that they may not be blown against the flowers. Blooms of this kind will be far more brilliant, not quite so large, but travel much better, and last longer, than any that have been shaded. Some growers place the bud into the horizontal table downwards; this effectually shades them, and keeps off wet and falls of any sort, but they are open to the attacks of earwigs and caterpillars, from which the pot well fitted will often shield them.

Independent of growing the flowers well, there is a good deal in the choice of them, and after that still more in the display or setting up. The stand of flowers should be as much varied as possible; and besides this they should be set up uniform, that is, if there be a light flower at one end of a row, there should be a light flower at the other; and if there be light, flowers at the ends of the top row, there should be dark ones at the ends of the second, and light at the ends of the lower or front row. Again, dark flowers should be placed next to light, except in the middle two of each row, which, to be uniform, must be dark or light, or nearly the same depth of colour. Those who take some pains with this may make a stand look very much better than the same flowers would do if differently arranged. But this has been so often urged, that it seems a work of supererogation to mention it again, although from its great importance it can hardly be too much brought forward, until it is made the aim of everybody who exhibits.

Dahlias should be carried in boxes, in their proper tubes, and so placed that they cannot be shaken. The very best mode of fixing them is to make stoppers of potatoes, cut into the form of corks, and with a hole through them to receive the stem, which may be wedged in its place by means of cutting off, in a sloping manner, a piece of the stem, and fixing it, wedge-like, in the under part; then thrust in the cork to its tube, and drop it into its place in the travelling-shelf or board, which should be the same size in the holes as the stands in which the flowers are to be shown; so that in setting up you have only to remove the flowers with the tubes and stoppers, and drop them into the holes of the stand you show in. The best way is to arrange them before you start from home, so that you have no care when you get to the place of exhibition. You have both time, and quiet undisturbed oppor-

tunity of arranging the flowers in the most effective way ; and more than this—as you do not want to do anything to them but lift them to their stand, you may put them up at the last moment, because twenty-four flowers can be removed, when you know their places, in five minutes or less, when it is too late for others to profit by your arrangement.

There are those who dress dahlias by working the petals open, so that a flower which quills awfully is very much aided in appearance. We cannot approve of this ; and if the judges used a glass to the flowers, they would invariably find some of the petals split in the operation, which would disqualify the flowers. As a rule, you should put in as few flowers of the same shade or colour as possible. The more distinct they are, the better. It is the endeavour of some growers to produce all three rows of the same size. This is decidedly wrong. There should be three sizes, but each row should consist of but one-sized flowers. The back may be large ; the second, middling, that is, rather less ; and the front still less. This enables you to show some beautiful gems in front, and if they are of a size the whole length of the row, there is no comparison as to the effect. The potato stoppers keep the flowers much the best, and especially if the hole is made to fit the stem a little, for the water is kept in the tube through the longest journeys.

PREPARING THE VERBENA FOR EXHIBITION.

This popular little flower is every season approaching nearer to the standard of perfection, and is becoming a great favourite at exhibitions, both in pots and in bunches of the cut flowers. There is no plant of which the varieties differ more in habit : some tower up a considerable height, and exhibit robust growth ; others creep along the ground, and lie as close as possible, rooting at every joint as they proceed, and covering the ground like a carpet ; others, again, take the form of a pretty shrub, and, if well managed, make excellent pot plants. If you desire to exhibit in pots, select those of the most shrubby habit, and as soon as you get your plant, which we will suppose to be fairly rooted, you must take off the top, so as to leave only three or four eyes ; or if it be early in the spring—say, January or February—take off the top two or three joints, and strike the cutting for your own plant. As soon as it roots, which will be pretty soon if placed in bottom heat, pinch out the centre eye. This will induce side growth, which may be regulated as you require. If any of the side shoots grow rather vigorously, and go out of bounds, they should be checked ; and by continuing to check the forwardest until the plant is both the form and the size you require, you may then allow all the ends of the branches to go on to flower, and the plant will be covered ; whereas if in the early part of the growth you allow a shoot to go to flower, it spoils the rest of the plant, and you can do nothing with it until it has been shortened, and an entirely new growth has been made. The pots have to be examined as you progress, and as they fill with roots, they are to be changed to larger sizes; thus the growth is excited continuously, so long as you wish to increase the size, because, by nipping off the buds as fast as they appear, the growth is promoted, and the result is, the whole of the plant blooms at once, which, if you are showing in pots, is just what is required.

If you are to show in a stand of cut flowers, by all means plant out in the open ground, and be content to select the particular trusses you are intending to show, and keep off the sun from the time the colour is beginning to show till the day you cut it. All the brilliance of a colour flies in the hot sun. A separate shade for each plant is the best. There is no comparison between a well grown truss in the open ground, in good soil, and the best that can be had from a pot, unless the single truss of blossom is encouraged, and the rest taken away before they grow too much. In fact, if we are to cut flowers, we ought to do with verbenas as we do by pansies : keep striking and putting out young plants in rich ground, that there may be a constant succession of blooms. The plan at some shows is to make large bunches. No justification can be offered for this, except the mercenary one of making a great show. A single truss is all that can show the judges the real merit of the variety or of the growth. Bunches may be patched up from various beds, and fifty pieces may go to make up the bunch ; whereas the form of a natural truss is altogether kept from view, and the merit of the plant lost. A single truss deceives nobody; you have not only the shape of the individual flower, but you have also the manner in which the flower lies as it grows; for it must be obvious that the form of a truss is as important as any property of the plant, and that the best-formed individual flower in the kingdom would be useless unless it forms a respectable truss on the plant.

With regard to the arrangement of the flowers for show, take especial care to be uniform : place darks and lights opposite each other, but with one different between ; lights at all four corners, darks between them ; or darks at all four corners, and lights between them. Let not one end of the collection be light and the other dark, for it is in the worst possible taste, and leads to a bad result.

THE USES AND PROPERTIES OF PEAT MOSS, AND THE VALUE OF PEAT CHARCOAL.

Charcoal has been long known to possess considerable merit as a fertilizer, although it has not attracted much public attention till within the last few years. We do not here open the inquiry as to how charcoal acts beneficially on the soil, but assume the fact as now abundantly attested by experience. It would appear, that, whatever the value of wood charcoal may be in this respect, (and past experience speaks for the most part of this form of charcoal,) that of charcoal made from peat moss is much greater.

At a meeting of the Botanical Society of London, on the 8th of July, the subject was introduced by Jasper W. Rogers, Esq., C. E., who exhibited various samples of the charcoal in different states, and well adapted for cultural purposes. Mr. Rogers says :—

"Peat charcoal possesses several advantages over wood charcoal. The small quantity of pyroligneous acid originally contained in the peat is entirely dispersed in the preparation; hence, no acetic odour arises, which is complained against in wood charcoal, and produces severe headache. Again, its light and pure blaze gives a greater extent of calorific effect, because it extends itself generally over the surface to be heated, and carries with it no smoke. Peat charcoal emits a blaze, which wood charcoal does not. But one of its great advantages is the power of fertilization in its individual state.

"In the year 1845, I first brought the fact under the consideration of the Relief Commissioners of Ireland, in a report I was called upon to make upon the subject of peat fuel. The theory was then smiled at, both by scientific men and scientific bodies; but it has happily outlived opposition. The Royal Agricultural Society offered a prize the following year for the best essay on the subject; and now, a great number of farmers save every bramble from their hedges to make charcoal, and by drilling it in with their seeds, produce great advantage to the crops.

"But I would draw special attention to that which I deem to be the main and grand advantage which peat charcoal possesses in so singular a degree, namely, that of *perfectly deodorizing and disinfecting animal excretiæ*. I say, *peat* charcoal, because the same capability does not exist in *wood* charcoal generally, and in several descriptions, not at all; for instance, the charcoal of lignum vitæ, teak, and hard oak, has, in fact, no deodorizing power. This capability increases as the wood becomes softer and more porous, and that which I have found to have most effect, is the charcoal of the willow. In addition to peat charcoal, specially prepared for deodorizing, being infinitely more porous than that of wood, it perhaps contains some other property not yet discovered, for I have no hesitation in saying we are all, as yet, strangers to its eminently useful powers, and that it is a subject particularly worthy of investigation."

For fertilizing purposes, the charcoal prepared from the peat in an uncompressed state appears to be best adapted, although a more dense material can be obtained. Indeed, by a particular process, "the density of peat charcoal can be made to exceed that of wood charcoal. It is only to make the peat as dense as wood, to produce equal density in charcoal; and this is very simply done by exhausting the chamber in which the piece of peat is compressed, at the same instant that the compression commences. The atmospheric air being withdrawn from beneath, the aqueous matter must follow, and rush into the air-pump; the resistance, therefore, presented to the power of pressure, is simply the fibre of the peat; while the vacuum produced underneath gives the aid of the natural pressure of the atmosphere, at top, to assist the operation. Thus, the imaginary difficulty of producing dense charcoal from peat has been overcome—so simply, that it is only to be wondered at that it had not been done long since. The present market value of peat charcoal varies from 4*l.* to even 8*l.* or 9*l.* per ton, the latter being the average price of wood charcoal sold in London for culinary purposes; it may be sold with large profit for much less."

"In its natural state, peat moss has several peculiarities. It delights in moisture, and yields it up most unwillingly. It contains, in different small proportions, ammonia, pyroligneous acid, tar, &c., and also a very singular production, a 'fatty matter,' which, when purified, closely resembles spermaceti, and makes a very beautiful candle. Mr. Reece Reece has recently patented a process for the extraction of these articles, carrying out the production of iron from ore which is upon the property. Possibly 'Price's patent wax candle' may yet be rivalled by 'Reece's bog spermaceti.' To speak seriously, the production is really beautiful, and gives a pure and strong light. The question to be solved, however, is, Can it be obtained in sufficient quantity to be profitable? It is found in its natural state, at times, in small quantities collected together by some peculiar local filtration, or, perhaps, affinity, which draws it from the mass around to one spot. The matter, when pure, is about the colour of butter. The superstitious tradition of the peasantry is, that the Fairies

hide it for their use, and hence it is called 'Fairy butter.' It is but rarely found in that state, and is then treated with great reverence. Another property of the peat moss is the singularly preservative nature of its water, which is of a dark brown colour, almost approaching to black. It has been said to contain a tannin quality, but analysis proves to the contrary. However, its power of preserving animal matter from decomposition is very extraordinary. Human bodies have been found in bogs, undecomposed, which must have been long buried."

Mr. Rogers, it will be seen, assumes that peat charcoal is not only valuable in itself as a fertilizer, but may be made even more so as a fertilizing agent, at the same time that it is employed to deodorize and disinfect putrescent animal fæces. On this point he observes :—

"The fact that the health of towns mainly or entirely depends upon the almost immediate removal of their refuse, is at present so well understood, that it cannot be requisite to enlarge upon it. All are now aware that in the ratio of the retention or removal of such matter, is the average of life or death; and the question on that score comes upon us now in so fearful a form, that it cannot need any adjunct to enlist our energies in the cause of our own preservation. It is singular, that that substance which produces the evil, and which has hitherto spread disease amongst us, should contain not alone the principles of health, but also of wealth; and perhaps it may be said that nature has provided in proportion to the mass of beings congregated together, the means for their subsistence, in the very refuse or matter which we permit, by our neglect, to produce so much evil.

"It has long been known to science, that the excretiæ of mankind contains a greater amount of the properties essential to the fertilization of plants, than any other substance. To its most careful preservation and use China owes the capability of supporting a population almost incredible, with reference to the extent of the soil under cultivation; and in the ratio of the introduction of excretiæ as a manure, on the continent of Europe, has been the increase of agricultural profit. There its use is now almost universal, while we, of England, neglect that which, perhaps, as in most other things, we should have led the way in using. But there have been many difficulties to contend with in its introduction as a marketable fertilizer.

"Firstly,—Its collection without annoyance and evil.

"Secondly, — Its deodorization, so as to admit of convenient transport.

"Thirdly,—Its preservation, in a manner to retain its valuable qualities as a manure.

"To obviate these evils several chemical deodorizers have been produced, but being liquids, the advantages proposed to be obtained became neutralized by the increased difficulty of reducing the matter to a sufficiently dry state for transport. Happily, however, nature has provided, by a production of the vegetable world, a simple remedy for this difficulty, in peat charcoal. It is perhaps the greatest absorbent known; it will take up and retain above 80 to 90 per cent. of water, and at least 90 or 100 volumes of those noxious gases arising from animal excrement and other putrescent matter. Hence its great value for effecting deodorization, and for retaining all the value of the liquid as well as its volatile products.

"Equal parts of prepared peat charcoal and excretiæ will, under almost every circumstance, accomplish this if properly intermixed—producing a manure of almost incalculable value. The proportion of charcoal may be less in some instances, even down to one-third—if very intimate mixture be made, and the charcoal be properly prepared.

"This mixture is quite dry, and can be transported in bags, or even in bulk, by almost any public conveyance. Its value as a manure cannot, I believe, be over-estimated. In all the trials made with it, both by myself and others, the effect is singularly great; but it cannot be otherwise, when we consider what the compound contains. Professor Phillips's analysis of peat charcoal (the same as on the table) for deodorizing purposes, is as follows :—

Carbon	79·24	
Hydrogen	2·20	
Nitrogen	0·54	
Oxygen	6·44	
Combustible matter	——	88 42
Sand and Clay	2·48	
Oxide of Iron	1.66	
Phosphoric Acid	0·34	
Silicate of Potash	0·98	
Chloride of Sodium	2·53	
Carbonate of Lime	1 85	
Sulphate of Lime	1·44	
Loss	0·30	
Incombustible matter	——	11·58
		100·00

"Now, add to this, ammonia, gluten, phosphates, urea, &c. contained in human excretiæ, and it will be obvious that it is perhaps impossible to produce a combination more perfectly adapted for the food of plants. All the elements for their nurture are interwoven, it may be said, into every grain of charcoal; carbon, the staff of vegetation, is the base, and the whole are yielded to the plant together. It is well known that the strongest affinity exists between the ammoniacal and other atmospheric gases, and carbon; and here again

a singular advantage arises. Every shower of rain that falls, gives a greater supply of the ammonia, salts, &c. contained in that rain, to the charcoal. Hence it is not only the means *itself* of giving health and strength to the plant, but every little grain becomes a *reservoir*, not alone of *manure*, but *moisture*, both of which never cease to act upon and invigorate the vegetable."

Mr. Rogers then enters into some very singular calculations as to the value of the refuse which is at present permitted to enter the sewers of the metropolis, and to pollute not only the river into which they empty, but the atmosphere, into which they evolve gases of the most deleterious nature. We shall quote some of his statements upon this matter :—

"If these be facts, why should we permit one ounce of that which now produces disease and death amongst us, to be lost? Why should we, for health sake—and why should we, for the sake of our pockets? For I shall undertake to show by a few figures that every one who has a family of six, may, if proper means be made use of, not only increase their health, but add to his wealth to the extent set forth.

"The average of excretiæ yielded by a human being per annum is 10 cwt. Six will therefore yield three tons: add to this, say three tons of charcoal, and you will have of manure six tons. Now although this manure must be infinitely superior to guano, which sells at 10*l.* to 12*l.* per ton, suppose we estimate it at 5*l.*; the gross value of the manure will therefore be 30*l.* per annum!

"From this we have to deduct the cost of the charcoal, which can be produced in London at from 2*l.* to 3*l.* per ton, say at 2*l.* 10*s.* Therefore 7*l.* 10*s.* and the expense of collecting and intermixing will be the whole deduction from the 30*l.* In order to be entirely on the safe side, add 7*l.* 10*s.* for these expenses, and by this very fair estimate it will be seen that the smallest possible value of the household produce will be at least 15*l.* per annum.

"That you would perhaps laugh at this I anticipated, for I smiled at it myself when I first worked out the figures; but though laughable, this is, nevertheless, fact, and I am willing to submit the whole to any public test that may be suggested. But figures in the aggregate are more startling still.

"The average number of houses within the districts of London, assessed above 10*l.* per annum, may be assumed as 200,000; consequently, the total of assessed taxes of that class may be taken as 2,000,000*l.* Now, if the inhabitants only determined on ridding themselves of the evils that encircle us by the present fearful sewage system, and saved that which nature intended as a means to produce food in abundance, they would not only confer a great boon upon the population generally, but the profit to be had in money would amount, at 15*l.* per house, to 3,000,000*l.* per annum; or, in other words, that class of the citizens of London who pay those taxes, may save them, and perhaps put into their pockets 1,000,000*l.* yearly, at the same time that they preserve the health of the city, and prevent the disgraceful and death-dealing fact of their noble river being converted into a monster cesspool."

Mr. Rogers has, it appears, placed before the Sanitary Commission a proposition founded on the facts above named, and has pointed out how, in his judgment, the whole of London may be freed from its present dreadful sewage evils, most ample profits being returned, in place of millions being expended in trying to get rid of that which should be carefully saved.

HORTICULTURAL NOTES.

Roses in Woods.—Many of the climbing and trailing sorts, and particularly the evergreen varieties of these, are well adapted for *undergrowths* in open woods; but in this case the timber trees should not be so close as to touch each other with their branches, and consequently exclude the direct rays of the sun from the roses. These should also be allowed in some places to climb to the tops of the highest trees where they will flower profusely, and in a few years hang down, occasionally forming festoons from one tree to the other, in a manner singularly beautiful and picturesque. The different varieties of *Rosa arvensis*, especially the *Ayrshire* and *evergreen roses*, are particularly well adapted for this purpose.—H.

Cabbage-stumps, left for sprouts, should be treated according to what you require. If you want a quantity of small sprouts, leave them all to grow; but if you would rather have a second crop of good cabbages, break off every sprout while small except one, and that must be the best. Your second crop of cabbages will in some cases be better than the first. They will even then do to plant close together in some niche, where they will furnish, in the winter, several good pickings of greens.—G.

Lettuce-sprouts make as good a salad as the lettuces themselves; but they do not go to hearts like the old ones, and therefore have to be shredded up before they are sent in. They do best for salads sent in dressed. By rubbing off all but one, they can be had larger than they would otherwise come.—G.

THE MAGNOLIA, ITS VARIETIES AND CULTIVATION.

The Magnolia is a family of most noble trees and shrubs, remarkable for their large expansive foliage, and cultivated extensively for purposes of ornament. The flowers of some of the kinds are very striking objects, and indeed, in the case of most of the species, the blossoms are sufficiently ornamental to render the plants desirable in garden scenery on their account. There are about a dozen species in cultivation, and besides these numerous varieties. In most of them, the blossoms are white or whitish.

Linnæus founded the genus Magnolia in commemoration of one Pierre Magnol, who was a professor of medicine, and was director of the Botanic Garden of Montpelier, and the author of some botanical works.

The greater number of the species of Magnolia are natives of North America, where they are conspicuous in the forests. Some, however, of those known in cultivation, are found in China and Japan. It has been remarked, that no plants of the natural order Magnoliaceæ have been discovered in Europe, Africa, or Australia; and, undoubtedly, the focus of the order is North America. Some of the species are evergreen, others deciduous; all are woody plants.

HARDY EVERGREEN MAGNOLIAS.

The most desirable plant in this division, and indeed in the whole genus, is the *Magnolia grandiflora,* one of this group long cultivated, and of which numberless varieties are mentioned. As in many other cases, however, many of these variations are trivial.

Magnolia grandiflora, Linnæus (large-flowered Magnolia, or big laurel of the Americans).—A fine evergreen tree, or large shrub, with oval-oblong leathery leaves, shining green on the upper surface, rusty beneath, the branches terminated by solitary large white cup-shaped blossoms, composed of from nine to twelve petals, and having a most delightful fragrance. Flowers from June to September. Native of North America, in the forests. Introduced about 1737. There are numerous varieties, of which the most important are:—

M. g. Exoniensis, an early and free flowering variety, forming a tall fastigiate bush, and the most desirable of all the forms, especially for growing as an exposed bush.

M. g. obovata, which has very fine obovate foliage, for which it is worth cultivating; but it does not blossom very freely.

M. g. præcox, which has large blossoms,

produced as early as May, and continuing during summer; this is considered the best variety for planting against a wall.

In the southern counties of England, this species may be grown as a tree or bush, distant from a wall or building, but in this case, it is best placed rather prominently on the sheltered side of a shrubbery. As a permanent evergreen covering for an ornamental wall, there is no plant so noble as the forms of this Magnolia; and this protection is required in the colder parts of the kingdom, together with, in some situations, a thick mulching over the roots.

HARDY DECIDUOUS MAGNOLIAS.

Magnolia glauca, Linnæus (glaucous-leaved Magnolia).—A small tree, growing twenty feet high, of sub-evergreen habit; the leaves elliptic obtuse, glaucous on the under side; the flowers two or three inches broad, white, very fragrant, of from nine to twelve ovate-concave petals. Flowers from June to September. Native of North America, in low swampy situations. In autumn, the tint of the leaves is yellow, brown, or black. Introduced about 1688. There are two distinct varieties:—

M. g. Thompsoniana, a form enlarged in all its parts.

M. g. longifolia, a handsome tree, with longer leaves, and smaller flowers.

Magnolia tripetala, Linnæus (three-petalled Magnolia, or umbrella-tree).—A deciduous tree, growing thirty feet high, with thin oval-lanceolate leaves, and terminal flowers from seven to eight inches in diameter, consisting of from nine to twelve petals, of a white colour, and having an unpleasant odour. Flowers from May to July. Native of North America, in shady situations. Introduced about 1752. The autumnal hue of the leaves is a dark brown or black. This is a very hardy species.

Magnolia macrophylla, Michaux (large-leaved Magnolia).—A deciduous tree, growing thirty feet and upwards in height, with very large oblong-obovate leaves, cordate at the base, and having terminal blossoms of from eight to nine inches in diameter, six to nine petalled, white, with a purple spot at the base of each petal, and agreeably fragrant. Flowers in June and July. Native of North America, in cool sheltered situations. Introduced in 1800. In this species, the fading leaves in autumn turn yellow, brown, or black.

Magnolia acuminata, Linnæus (pointed-leaved Magnolia).—A deciduous tree, growing from thirty to fifty feet high, with oval-acuminate leaves, pubescent beneath, and terminal blossoms slightly fragrant, yellowish within and glaucous on the outside. Flowers from May to July. Native of North America. Introduced in 1736. The leaves turn dark brown or black in autumn. A very hardy species, of which there are some varieties cultivated; the most distinct is—

M. a. maxima, which has considerably larger foliage.

Magnolia cordata, Michaux (heart-leaved Magnolia).—A deciduous tree, growing from twenty to thirty feet high, with broadly-ovate sub-cordate leaves, tomentose on the under surface; the flowers, of six to nine oblong petals, yellow, slightly streaked with red, seldom expanding fully, and having a disagreeable odour. Flowers in June and July. Native of North America, in mountainous situations. Introduced in 1800. The leaves become a dark brown or black in autumn.

Magnolia auriculata, Lamarck (auricled-leaved Magnolia).—A deciduous tree of from twenty to thirty feet in height, with large smooth spathulately-obovate leaves, cordate at the base, with blunt auricles; the flowers are three or four inches in diameter, of nine oblong petals, milky white, and having an agreeable odour. Flowers in April and May. Native of North America, on moist mountain steeps. Introduced in 1786. In the autumn, the leaves turn a rich yellowish brown.

Magnolia pyramidata, Bartram (pyramidal-headed Magnolia).—A low deciduous tree, with smooth spathulate-obovate leaves, cordate and auriculate at the base; the flowers white, of nine lanceolate petals, smaller than in *auriculata*, of which this appears to be scarcely more than a variety. Flowers in May and June. Native of mountainous places in North America. Introduced in 1811.

Magnolia conspicua, Salisbury (conspicuous-flowered Magnolia, or Yulan). — A deciduous tree of fastigiate habit, growing from twenty to thirty feet high, with obovate leaves, abruptly acuminate; the leaves are produced somewhat later than the blossoms, and when young are pubescent; the flowers are large, erect, consisting of from six to nine petals, white, and fragrant. Flowers from February till April. Native of China. Introduced in 1789. The leaves turn dark brown or black as they decay in autumn. This is one of the handsomest and most desirable of the deciduous Magnolias, owing to the period at which its blossoms are produced. In the climate of London, it is found sufficiently hardy to bear exposure on the sheltered side of plantations of shrubs, provided the summers and the texture of the soil are jointly favourable to the annual ripening of the wood. Planted here and there along a bank of dark-foliaged rhododendrons, the large white flowers of this plant are very conspicuous. The situation should be sheltered for this plant when grown as a standard, but should not be

such as to urge the development of the blossoms in spring, as they are liable to be cut off by early frosts. Owing to this circumstance, it is only against a wall that the plant will display its greatest beauty. There are some varieties, of which the most desirable is—

M. c. Soulangeana, which to the habit and character of its parent species adds beautiful large blossoms, more or less tinged with purple.

Magnolia purpurea, Sims (purple-flowered Magnolia).—A deciduous shrub, growing when exposed, in the neighbourhood of London, to the height of from three to six feet, or, planted against a wall, it will reach twelve or fifteen feet in height, and sometimes more; the leaves are obovate, and almost smooth, and the blossoms, of six ovate slightly incurved petals, are white within, and purple on the outside, fading to white at the tips. Flowers from March to May. Native of Japan. Introduced in 1790. The leaves become black in autumn. This species is very ornamental, especially when planted against a wall, but the blossoms require fine weather at the time of their development, or they become damaged and decay, to the disfigurement of the plant. It well deserves a wall. There are some interesting varieties, as—

M. p. gracilis, which differs in having paler and narrower leaves, longer and more slender flowers, the petals slightly reflexed at the points, and entirely dark purple on the exterior.

M. p. pumila, raised at Desio, near Milan, and growing only a foot and a half high.

HALF-HARDY MAGNOLIAS.

Magnolia fuscata, Andrews (brown-flowered Magnolia).—An evergreen shrub, seldom attaining more than eight or ten feet in height, and often much less; the leaves elliptical-oblong, somewhat leathery, smooth when full grown, but in the young state covered with brown tomentum; the flowers are small, numerous, erect, dull pale yellowish on the outside, brownish-purple within, and having a most powerful and delicious aromatic fragrance. Flowers in April and May. Native of China. Introduced in 1789. There is a variety, by some considered as a species,—

M. f. anonæfolia, which has broader leaves, and redder flowers.

These plants are best suited for planting out in a greenhouse conservatory, where they may have some shelter; and they form also very desirable greenhouse shrubs when grown in pots, associating well with camellias and similar subjects. Planted against a wall, and protected by a mulching over the roots, and a mat, straw, or fern covering over the branches, they will endure moderate winters after they get well established.

SYNONYMES OF MAGNOLIAS.

M. grandiflora, Linn.—Includes as varieties the names of obovata; exoniensis=lanceolata, stricta, ferruginea; angustifolia, præcox, vera, latifolia, rubiginosa, rotundifolia, elliptica, floribunda, and mogordensis.

M. glauca, Linn.=M. fragrans, and virginiana var.; and includes as varieties, sempervirens, Thompsoniana, Gordoniana, Burchelliana, longifolia, and Cardonii.

M. tripetala, Linn. = M. Umbrella, frondosa, virginiana var., and umbellata.

M. macrophylla, Michx.=M. Michauxiana.

M. acuminata, Linn.=M. rustica, pensylvanica, virginiana var., and De Candollei; and includes as varieties, maxima, striata, and latifolia.

M. auriculata, Lam. = M. Fraseri and auricularis.

M. pyramidata, Bartr.=M. Fraseri pyramidata, and auriculata pyramidata.

M. conspicua, Salisb. = M. Yulan, and Precia; and includes as varieties, Soulangeana, Alexandrina, citriodora, and speciosa.

M. purpurea, Sims. = M. obovata, and discolor; and includes the varieties, gracilis =Kobus, and tomentosa; denudata, liliflora, and pumila.

M. fuscata, Andr. = M. fasciata, meleagrioides, versicolor, and Michelia fuscata; and includes the varieties, anonæfolia, and parviflora.

UNINTRODUCED MAGNOLIAS.

M. Coco, De Candolle, found in Cochinchina.

M. dealbata, Zuccarini, found in Mexico.

M. Figo, De Candolle, found in China.

M. inodora, De Candolle, found in China.

M. mexicana, De Candolle, found in Mexico.

M. parvifolia, De Candolle, found in Java.

M. punduana, Wallich, found in East Indies.

M. sphenocarpa, Wallich, found in East Indies.

PROPAGATION.

The Magnolias are, for the most part, free growing plants, striking readily from cuttings, and rooting very quickly and with certainty from layers. The ordinary method of increase is by layers; but the half-hardy and tender kinds may be struck from cuttings. In putting down layers, remove none of the leaves, and by no means shorten the branches. If they are wanted dwarf, let the place inserted in the ground and notched be nearer the end. They are rather valuable, and are

therefore kept in pots until planted out where they are to remain. The best time for layering is the autumn, but it will do in any of the months until February. Let the wood of the branch to be layered be notched or slit just below a joint or leaf, and pegged down securely underground; by the next autumn they will have rooted well, when they must be cut off just below the notched part, potted in the usual compost, and the pots plunged; for that is the best protection against the frost reaching the roots. The tops may be hooped or otherwise protected, so as to admit of throwing mats over them during frosts. Many of the nurseries have pits built on purpose for these subjects, which are hardy when well established, but tender until they have abundance of root and have completely recovered their strength. The China sorts are inarched, grafted, and budded on *Magnolia purpurea*, according to the fancy of the propagator, there being no great difference in the plant when done, and circumstances only giving a preference as to the mode; for instance, inarching enables us to make a larger plant at once, than either common grafting or budding, and that may be a more desirable object than the advantages derived from either of the latter modes. The quantity of wood that may be required to make one good plant the first season by inarching, would do for half-a-dozen or more grafts, and perhaps a score buds, so that where, as in a nursery, numbers are the object, the latter plans are decidedly best, but in a private garden, where a duplicate plant is wanted as quickly and as handsomely formed as we can get it, we select from the plant we intend to increase, one of the branches that will make the best plant without damage to the original, and then getting a good strong stock, we have to place the two plants and fix them where neither can be disturbed, and where also the two can be so tied as to remain fixed without any violence to the one or the other. Then pare off one side of the branch to be inarched, so that it may have a flat surface for a length of two or three inches, and cut the side of the stock flat also, and fit them together so that the bark of each touches that of the other; bind them round firmly, so that they do not move, and they must afterwards not be disturbed till they are fairly united, which they will be in a few weeks. It very often happens that the stock and the branch to be inarched are not of the same size, and that therefore they cannot be made to fit very well. In this case, take care that the barks fit on one side, however much one may fall short of the other on the opposite side. The smaller of the two should not be put in the middle of the other, so that the bark on neither side touches, for if they were so fixed, it would be impossible for them to unite. Let this, therefore, be attended to particularly; for when the edges of the barks of both graft and stock are in contact at the cut part, it is enough to ensure the union of the parts, and the smaller branch will soon cover the larger space, however deficient it was when first put on. Of the various modes of grafting, any will do, but the following is a favourite mode:—Cut the stock as if for inarching, that is, make a flat side to it; then cut the graft, which should be some little length, also with a flat side, but not so low as the end of the graft; let these each be what is called tongued, that is, a slit cut upwards in one and downwards in the other, so that the tongues thus formed go into the slits, and it holds them together almost without tying. They are, however, to be bound round the same as any other graft, and the end of the graft below the tie is inserted in a bottle of water, which is to nourish the graft in part till it obtains nourishment from the plant itself. This is also a common way of grafting with the camellia. The proper season for grafting or inarching, is just before the plants move to make their growth, for the growing season is favourable for the flow of the sap, and the consequent ready union of the parts.

The China sorts may also be raised from cuttings, under a bell glass, in the same way as any other greenhouse plant, and when struck, potted off into small pots, one in the centre of each pot; these must be shifted as soon as the pots are filled with roots, and the shift should be only one size at a time, because no object is gained by rapid growth, and the frequent checks throw the plant sooner into flower.

The best way to propagate the hardy sorts in any quantity, is to plant a shrubby one in a well-sheltered place, with room all round it, and to layer every one of the branches that can be made to reach the ground. There will always be a succession of shoots to lay down as fast as others can be rooted and taken off. The original plants thus appropriated for propagation, are called stocks, and will never be fit for any thing else. But they, from their habit, become more and more prolific every year, for new shoots are thrown up in profusion, in consequence of the plant being partly relieved from the necessity of supplying its numerous branches when they are layered, and although you may be only able to lay down half a dozen branches the first year, there will be a dozen or a score ready for layering the second. Some that do not root very freely, are kept on two seasons, and when there are two seasons of layers, they must be distinguished by some mark; but when once you begin to take off layers, you

continue annually, and no plant pays better than the popular species of this noble genus.

GENERAL MANAGEMENT.

The greenhouse and frame varieties or species are by no means so valuable as plants as those which will grow in the open air, nor are the flowers so noble. The grandiflora family are the most splendid evergreens known in the country. The foliage is bright and large, forming a close and noble tree, of large dimensions in a few years. It is called hardy, but suffers from any great degree of frost, the same as the bay will; and we should say it is of much the same nature as to its power of resisting frost. This has led to its being much more frequently grown on walls and on fronts of houses than as standards, but as a noble object in shrubberies, a standard is far more interesting, and the wall does not always save it. On the contrary, we think the sudden changes, which are felt more acutely on south walls, frequently punish it more than it would be punished in a more open situation. We have seen the Magnolias and Bays matted in the autumn, but there is something so uncouth, and withal unnatural, in a tree in the open air being confined in mats, that we would always rather run the risk than see a garden so disfigured. We believe that when it is grown on walls, it suffers less when it does not get all the sun than when it does, yet a north or east aspect exposes it too much. The finest plants we ever saw of the *Magnolia grandiflora*, were at White Knight's, where a great many feet of wall were covered with twenty very superb plants, blooming freely, and emitting a perfume perfectly enchanting as the wind wafted it towards the visitor.

In planting out a specimen to grow up as a standard, it should be on ground well drained, and in a spot completely sheltered from the north and east winds. The ground should be prepared for at least three feet all round it, and be composed of half peat earth with the turf in it, and the other half the natural top soil; and this mixture ought to be two feet deep. The roots should be spread outwards all round, and if there be any that strike downwards like horse-radish or carrots, commonly called tap roots, they must be cut off close up to the tree; any bruised ends to the roots should be cut smooth, and all broken ones cut off, so that no damaged portion remain on the tree by any means. Plant nearly at the top of the soil; on no account let the collar of the root be under the surface, and drive in stakes to prop the tree against the slightest disturbance by the wind. Let it be well trodden in all round, and watered.

All the other species may be served in the same way, but some of them are more handsome as shrubs than trees. Some of the species are evergreen, others deciduous; and some of the deciduous kinds are remarkable for blooming before a leaf appears, and so abundantly as to cover the tree with flowers.

There is nothing showy in the favourite greenhouse species called *Magnolia fuscata;* but the flowers, which are a mixture of dingy pinky brown and dull yellow or cream colour, have a perfume so like that of a ripe melon, that nobody who was unacquainted with the fact, would hesitate at pronouncing it the smell of the fruit instead of a flower. There is nothing in the appearance of the plant to render it a favourite, nor in the flower, except its perfume, to retain for it a place among choice collections.

RAISING FROM SEEDS.

The North American species may be raised in spring from seeds saved in this country or imported. Let there be pans or large-mouthed pots filled with the kind of earth we have already mentioned; and after placing the seeds wide enough apart to give them room to grow, cover them half an inch, and put them, if you can, in a warm frame, or moderate hot-bed. When they come up, keep them clear of weeds, give them occasional water, and attend closely to them till they are large enough to conveniently pot off, one each into small forty-eight sized pots; water them to settle the earth about their roots, return them to the hot-bed two or three days to establish their growth, and then put them out in a cold frame, but let them have no cold winds or rain for a few days. After this they may have air in mild weather, and genial showers of rain, but not too much wet. As the autumn approaches, shut them down earlier at night, and open them later in the morning. Young plants like these in a growing state are very susceptible of damage. When the pots fill with roots, or the roots reach the sides, and begin to meet round it, shift them into size thirty-two, and plunge them into the ground, because it prevents the soil from drying so rapidly, and also protects against the operation of frost, which soon gets through the sides of a pot, and damages that part of a root that most easily takes harm—the points of the roots which come next the pot. They are to be plunged where the frame can be placed over them, and must be protected the second winter, through the vicissitudes of frost and too much wet. They must be watered when the return of warm weather demands it; and if it be an object to confine them to the sized pot they are in, they must be taken up, and the protruding roots cut off; and when plunged for the third winter, they must have more air, and be inured a little to the

cold and slight frosts. The pots too, should be turned round in their holes to prevent their rooting through, and to break off any that do protrude. After this, they may be planted where you please as established plants.

The raising of seedlings is an interesting process, not only with the view of obtaining a supply of young plants of the several species, but also to procure hybrid varieties. This has been already done in some cases, for the *Magnolia Soulangeana* is a hybrid so obtained, originated by accidental fertilization; and doubtless other instances have occurred. Loudon has appositely remarked, that when the attention of cultivators becomes more especially directed to this subject, many new varieties may be expected; and the late Dr. Herbert has intimated some of the channels which it seems desirable such experiments should take. He thinks that some beautiful and hardy varieties might be obtained by fertilizing the seeds of *Magnolia grandiflora* with the pollen of *M. tripetala*, or *M. conspicua*. Another cross which has been suggested, is between the hardy evergreen large white-flowered *M. grandiflora*, and the small brown-flowered, but richly odoriferous, *M. fuscata*. *Magnolia grandiflora*, and *M. purpurea* also, would probably yield a progeny, which would possess some interesting novelty in the distribution of characteristics; and in this way a great amount of variety may be imparted to the genus—naturally one of the finest in cultivation.

VEGETABLE PRODUCTIONS OF THE PUNJÂB AND KASHMIR.

The conquest of the Punjâb, the annexation of Sindh, and the colonisation of Labuan, have lately formed the fertile themes of discussion and dispute. In most questions discussion is compatible with a wide degree of knowledge, but in those matters connected with the wealth, the resources, the soil, the climate of a country, information would in all instances render controversy unnecessary. We hear from one quarter that a country is barren; from another, that it is fertile; from one, that it is a deadly swamp or a naked desert; from another, that it is a smiling plain, or a succession of verdant hills, with a rich and productive soil. Contradiction supplies here the place of argument, and facts only can arbitrate. On the subject of our policy in the Punjâb, discussion has been particularly rife. Two fields of dispute have been marked out: the one, the justice, the other the wisdom of annexation. With the justness of the affair we have now nothing to do; and as regards the wisdom of it, we can only interfere with a particular branch of it, which is, whether we have taken possession of a region whose soil is capable of returning fruit for seed, harvest for labour, reward for the toil of tillage.

Nature is in most new countries the most busy agent to cover the surface of the earth with vegetation. We shall now ramble over t[illegible]on, and take a few passing glances at its aspect, and from this the reader may form an opinion. It is well known that the Punjâb is formed of hills of considerable height, plains of wide extent, and deep valleys. In the vast flat solitudes, sweeps of jungle and large grass flats predominate, while an occasional desert tract lies between the greener portions and the wild provinces beyond its borders. Along the foot of the mountain ridges usually extends a fringe of cultivated land, covered with luxuriant verdure, dotted with towns and hamlets, and tilled by a peaceful and laborious population. Everywhere, indeed, over the surface of the country, groves of trees and patches of cultivated land mark the position of villages, whilst in the neighbourhood of cities the surrounding plain bears a rich harvest, with orchards, gardens, and expanses of bright green grass, affording pasture to herds and flocks, both numerous and valuable. We cannot, in a sketch like the present, endeavour to lay before the reader an account at once regular or complete, of the vegetation of the Punjâb. Nor, did circumstances permit, should we choose at present to do so. Descriptions, laborious in detail, square in outline, and minute in particulars, may be useful; but, for the general reader, it is only necessary that an impression should be left on the mind, that he may possess an idea of the aspect and vegetable value of the country, which, to all intents and purposes, is enough for ordinary purposes. The other mode may be more correct, ours we fancy is the more agreeable, and to instruct and please is now our object.

We enter now the outskirts of a city, where we find ourselves in the midst of fields, where crops of wheat of large and heavy grain, unequalled harvests of barley, and waving expanses of rice, constitute the principal features of the scene. The natives are at work digging wells, raising water, tending their oxen, or carrying on the other processes of agricultural life. The produce in grain of some districts is very considerable, and serves both for the consumption of the home population and the staple of a thriving trade. The aspect of the plain, immediately before harvest time, is most luxu-

riant. As we have said, wheat and barley crops stretch over a vast portion of the surface; at intervals a village, constructed of reeds, and situated in the shade of a bér, tamarisk or date grove, enlivens the landscape, and large patches of ground covered with the indigo plant vary the cultivation. Of this valuable product, seven hundred and fifty tons add annually to the wealth of the lower Punjâb, whilst the contiguous territory of Bahawalpure yields another hundred and fifty tons. Bahawalpure lies on the left bank of the Ghara, for a considerable distance above its confluence with the Indus, and, separated as it is from Mooltan only by the river, necessarily enters into our subject. It offers much variety of features, and corresponding varieties in the character of its soil and produce. Steering clear of native names, which the general reader will not be able to individualise, we may observe, that in one portion a plentiful irrigation covers the land with abundance; in another, a tract of country half desert half jungle, produces little save the prickly and saline plants on which the camel thrives, and herds of horned cattle fatten well. This portion of the region was once, doubtless, as rich as any other, for the beds of dried-up rivers may still be traced across its extent, and numerous vestiges of ancient towns long since abandoned to solitude and ruin, afford evidence that a population must have existed and been supported where now only herds of cattle, and their wild nomade proprietors, find either home or subsistence. In other portions, again, large and productive plantations of the sugar-cane, denoting a rich and prolific soil, meet the eye. Altogether the province of Bahawalpure is valuable and fertile. Its agricultural capabilities no doubt receive little impulse from the nature of the tillage employed. The husbandmen here know how to draw forth the richness of the earth, but not how to renovate it. Consequently, unless an improved system of culture be introduced, we may look for the relapse of wide tracts, now verdant, into expanses of sandy desert. It must be remembered, however, that throughout the present sketch we shall speak of the country as it existed previously to the annexation of the Punjâb. English rule may generate a certain degree of English science in the country; and where the skill of Europe is devoted to the cultivation of the magnificent soil of Asia, results the most noble follow.

Crossing the Indus, we transport ourselves to the once flourishing country, Dera Ghazee Khan, where, amid date groves and fields and gardens of unsurpassed luxuriance, a large and populous commercial town consumes the vegetable productions of the province. The inhabitants are fond of fruit, and not satisfied with the indigenous produce of their own soil, exchange the fabrics of their industry for fresh grapes, pears, and apples, brought from the abundant orchards of Kabul. Continuing our way northward, we skirt the western hills, where a purer atmosphere, a change in the nature of the soil, and distinct features in the people, mark the district bordering on Affghanistan. Turnips of large size, with many other vegetables, are grown here, and broad pasture lands afford food to thousands of buffaloes, which fatten on the tall rank grass of this region.

Along the river's bank, when the wheat is just appearing above the surface, the custom prevails of allowing the cattle to graze on the rising crops, and this, instead of causing them detriment, is said greatly to increase the strength and productiveness of the plants. Northward, in the vicinity of Dera Ismael Khan,* man has done little to improve the aspect of nature. Tillage is neglected, but the plain is not, as usual, covered with dark, dull, jungle. On the contrary, it is sprinkled with Karita bushes, whose bright red blossoms have a delightful appearance during the spring months. Bér trees, of which the fruit is eaten, and groups of the palma ricinus, with its tufts of brilliant scarlet flowers, diversify the scene, while the indigenous tuberoses, elsewhere cultivated as the chief ornament of the parterre, spring up here in thousands, and convert the untended waste into a garden of rare and varied beauty.

Proceeding a short distance to Tah, however, we again find ourselves among people to whom the culture of the soil affords a welcome employment. The district is famous for its fruits, which are cheap and plentiful. Grapes, oranges, pomegranates, citrons, plums, and apples thrive in abundance, while groves of mulberries, of superior size and quality, have formed the subject of observation to numerous travellers. The bér, too, is plentiful, and is never absent from the neighbourhood of a village. Nor are the people of Tah indifferent to the beauty as well as the value of their gardens. In some of these, a rich variety of objects, both of nature and art, contribute to the loveliness of the spot, which chiefly, however, derives its fascinations from the glories of the vegetable world. Flowers of a thousand hues, lakes along whose [illegible] margins may be seen reflected the graceful foliage of the pomegranate and orange tree, loaded with their superb fruit, and over whose

* The reader, on consulting the map, will find that we are now progressing up the strip of land lying at the western extremity of the region, from south to north, and thence sweeping to the right, we may continue our observations over the surface of the Punjâb.

glassy waters glide flocks of white geese; shady vistas, bowers full of perfumes, winding paths, and small groups of palms, allow the eye no resting place of monotony, either in form or hue. But leaving this magnificent place, the self-adorned plain alone meets the eye, and this soon degenerates into a sterile tract, where the beautiful karita only enlivens the surface. Even this at length disappears, and we enter upon a bare and inhospitable plain.

But we shall proceed no further in this direction, which would lead us into the mountains, with the small alternate plains, the towns, the villages, the gardens, and the groves intervening between the Indus and Candahar. They lie beyond the geographical range of this sketch. We, therefore, once more place ourselves at the junction of the Ghara and the Indus, in the vicinity of Mooltan. A visible distinction exists between the character of the soil in this district and in that of Bahawalpure. The tamarisks become scarce, and the lighter trees, as the karita, the bér, and the dwarf mimosa, more abundant. Highly cultivated lands spread in all directions; the cotton-plant is grown in great quantities, and immense fields of sugar-cane extend around the numerous fortified places. Around Mooltan, in particular, gardens planted profusely with the mango, the orange, the citron, and the lime, with dates, and a variety of vegetables, and fields of gram—a grain inferior to wheat, but still useful and nutritious—testify to the generous qualities of the earth.

This place is now invested with a melancholy interest for our countrymen. Its gardens and its groves, its pastures and its corn-fields, have been trodden down by the feet and illumined by the fires of a besieging army, and many are they in this country whose friends lie festering in their narrow homes under the shadow of Mooltan. A recollection of new glory acquired by the British arms will for ever cling to this place, but a few years will wipe away the melancholy feelings which the usual cost of glory—sorrow and slaughter—has spread through thousands of English and Indian homes.

Between Mooltan and Lahore the country presents few features differing from those already described. Under the blasting influence of native rule, the population has been enabled in a large degree to develop the resources of the soil, and even there travellers have been filled with admiration by the scenes of plenty and natural wealth there displayed. If our government has, as is universally admitted, exerted a fostering influence in other countries, we may look for the same result here; and the already productive plains of the Punjâb may be made to bear harvests second in abundance and beauty to those of no other region in the world.

The neighbourhood of Lahore is full of large and delightful gardens, planted with the fruit-trees and flowering shrubs common to most parts of Hindostan, while few of those which flourish in western countries are to be found. The mango, the mulberry, the plantain, the apple and peach, of inferior size and quality; the janson, the fig, the karinda, the quince, the orange, the lime, both acid and sweet, and the date, are plentiful, but the fruit of the last is seldom eatable. Pomegranates also abound, but are little prized, and a few vines climb up the sunny banks. Melons of indifferent quality grow in such numbers that they are scarcely considered as fruit. A large portion of the land near the city is devoted to the culture of vegetables for the consumption of the inhabitants. The badrisjar, an Eastern vegetable, gourds of several kinds, with cucumbers, are chiefly produced, whilst immense fields of sweet fennel are grown for the sake of the seed.

The flowers of this district are not very various, but are prized for their delicious odours. Chaplets of the blossoms are made and sold in the bazaars. Here, as is the case in most Eastern countries, gardens are open to the public; and any individual, preserving due respect for the fruits and flowers, may freely enter and stroll about them. The sale of the produce is a large source of revenue to the proprietors. Mr. Massar observes: "The mean practice prevails of selling the produce;" but the same might be said of the English gardener, who derives an income from his orchards, his flower-parterres, his conservatories, or his hot-houses.

The beauties of Shalimar,* a garden which was once the pride of the family of Timur, have now faded away, and scarcely enough of their magnificence remains to tell what once they were. Marble tanks and fountains, with their costly machinery, and stone-built pavilions, still exist, too substantial for quick decay; but a mass of rank and wild vegetation has overgrown walks and parterres, and almost effaced the beauty for which Shalimar was once famous throughout the continent of India. Still, however, magnificent shrubberies remain, and flowers and plants in great variety spread their clouds of perfume above and

* It has been said, after an elaborate description of these far-famed gardens:—

"Many a glorious spot is seen,
With flowery glades and groves of green;
Many a scene of rich delight,
Where earth is verdant and sky is bright,
With sunny bowers and shadowy dells,
Many a spot where beauty dwells;
But, ah! thy gardens are lovelier far,
Thou pride of the East, thou sweet Shalimar!"

around the spot where Runjeet Singh, who organized the armies lately defeated, lies in a humble tomb. The old chief created the host, and his successors led it to ruin and destruction, and in a few years a conquering British army was marching by the spot where his ashes lay, hard by the ancient gardens of Shalimar. Beyond Lahore, the country is essentially a grazing one, although around the villages patches of cultivated land extend. Over the jungle, and even the taller trees, the convolvulus major twines, and when in full bloom affords a pleasing spectacle. Dwarf tamarisks and mimosa, with a few cypress trees, constitute the chief objects of attraction above the monotonous surface of the plain, which, covered with luxuriant grapes, is of itself sufficient to show the capability of the country for the rearing of horses, horned cattle, and sheep.

A species of tree resembling the aspen, but still distinct from it, has been observed by travellers, but no accurate description has been written. Numerous trees and shrubs doubtless exist which have not yet been botanically described. Doubtless, however, with the establishment of our power, our knowledge will increase, and with the diffusion of information the value of our new possession will be more properly appreciated. Enough, however, is already known to show that the region of the Five Rivers will prove as important in a commercial as it is in a political and military point of view. Its climate affords all the variations between the temperate and the tropical, and is particularly adapted to the English constitution. Its vegetable productions are numerous and varied, and an improved system of tillage is alone needed to develop them in their full costliness and beauty.

No country of the same extent in the world is more favoured with regard to irrigation, or means of inland transit. One thousand six hundred and ninety miles of river navigation exist in it, whilst in the plains are several large pieces of standing water, with pools and small streams which water the valleys and slopes. We may thus sum up the vegetable productions. We use this expression in its largest sense, as signifying everything which springs from the earth, and is refreshed by water or nourished by sunshine. Of trees, we may enumerate the palm, various species of willows, numerous kinds of acacia and tamarisk, the bér apple or jujube (*Zizyphus jujuba*), the camel thorn, a tree called *sissoo* in Eastern Hindostan, and sometimes of twelve feet in girth, and much used in boat-building, with many others not commonly known here, but none of great height or size. Of fruits there are dates, oranges, pomegranates, mulberries, figs, peaches, apricots, plums, quinces, almonds, mangoes, and others of less importance, and the lime, the guava, the cardamom, and the grape. The narcissus and the rose of a hundred leaves are the most common among the flowers. The indigo and cotton crops are rich, and one small strip of land, noticed by Burrows, afforded its proprietor an annual income of seventy-five thousand rupees. Tobacco, of good quality, and in much abundance, is grown; and the flowers which bloom in so great luxuriance, afford nourishment to millions of bees, whose wax and honey are much prized, both as articles of home consumption and as materials of trade.

Of the magnificent and far-famed valley of Kashmir, we speak thus in a distinct portion of our sketch, because it appears to claim unusual attention. It is an elevated tract to the north of the Punjâb, in the centre of which a beautiful valley, once supposed to be submerged under the waters of a great lake, may be described as among the loveliest portions of the earth's surface. The soil is rich and productive, and, unlike that of the Punjâb, supports huge forest-trees, valuable as timber for building.

The vegetation of Kashmir is as remarkable for its richness as for its variety. From the Himalayan cedar to the delicate blossom, all kinds of green things flourish. This tree merits notice. It attains a great height, and a circumference of sometimes thirty feet. Its botanical elevation varies between seven and twelve thousand feet above the level of the sea. "When young, it closely resembles," says Thornton, "the real cedar, but never sends forth spreading branches. The cone resembles that of the cedar, and is preceded by a catkin of a bright yellow colour, so that the tree when in full blossom appears covered with a rich mantle of gold. These catkins are loaded with a golden dust, which the wind shakes from the branches in such profusion that the ground for a considerable distance about the tree becomes as it were sheeted with gold." This timber is so durable, that some wooden bridges over the Jhelum, which were examined four hundred years after their erection, were found little decayed, notwithstanding the exposure to the accidents of the atmosphere, of time, and of constant traffic. We also find in the forests of Kashmir, the *Pinus longifolia*, two other species of pine, the fir, and the juniper. The cypress is common in gardens, but appears to have been introduced. The chunar (*Platanus orientalis*), although it is in no region of the earth found in such perfection and luxuriance as in this delightful valley, is also looked upon as an exotic, but its importation must have been in a period long past. The tasteful caprice of the Mogul

emperors enacted a regulation that a grove of chunars and poplars should adorn every village; and accordingly, throughout the length and breadth of the valley this arrangement is to be observed. A heavy penalty protects them from destruction; but in Kashmir, as in all other countries, arbitrary power places itself above the law, and the Sikhs, during their period of unlimited power, destroyed many of these magnificent trees, whose wood is much admired for its tenacious grain. The poplar and the lime-tree attain a great height, the wild chestnut far surpasses in size the European variety. Baron Hugel saw some which, from the ground to the first spread of the branches, measured a hundred feet, while the uppermost foliage would overtop the tallest pine. Maples, willows, and wild thorns are common. The birch and alder flourish on the mountain sides, where a weight of perpetual snow continually rests upon them, so that, while their length is usually about thirty feet, they seldom rise more than five feet above the earth, being so bent down by the superincumbent mass. The inner bark of the birch, once used by the natives as a material to write upon, is now used for packing fruits, and to wind round the long and serpentine tube of the hooka.

Of ornamental trees and plants an abundant variety exists. The *sanjit*, a species of *Eleagnus*, is beautiful in appearance, with flowers of exquisite fragrance, and a fruit from which liquor not inferior to the juice of the grape is extracted. On the mountains, at an elevation of eleven thousand feet above the sea, we find the juniper and the rhododendron. There is one species of *Daphne* and several of berberry, one of which is covered with clusters of blue berries of considerable size and sweet taste.

To those who have seen the poetical praises lavished on Kashmir, with its green hills and bright lakes, its fairy vales and countless flowers, its gardens, groves, and floating islands, its balmy air and blue sky, its oval frame of hills, whose snowy summits never gave back the echo of a human voice, with its rocks and its rivers, its torrents, and the sublimity of its scenery, it may appear strange that the traveller should not oftener select it to be the scene of his wanderings. But so it is. Thousands of spots on this earth's surface lie untrodden save by the feet of their own rude dwellers, from year to year, and, like the flower of the desert, waste their beauty, either on the empty solitude, or the unadmiring eye of the savage. Other spots, far less attractive, are visited by wanderers from all parts of the world, trampled by the heels of uncounted travellers, and described until the ear is weary of their names. Kashmir is among the neglected beauties of the earth. One reason for this may perhaps be the fortification of mountains, lofty, rugged, and snow-clad as they are, which hem it in on all sides, and deny the sight of its beauty to all save the adventurous and the energetic.

The rose, wild and cultivated, flowers in vast profusion here, and frequently the breeze is literally loaded with its scent. Syringa, jasmine, ivy, and a species of *Smilax* also grow. Various kinds of *Chrysanthema* and *Primulæ* flourish wild, with the lily, the narcissus, the crocus, the iris, and countless flowers of annual bloom. Ferns are scarce, but funguses abundant. The edible kinds are gathered in large quantities for home consumption and for trade. The fruits of Kashmir are excellent and numerous. Those which attain most perfection are the apple, the pear, the peach, the apricot, the plum, the almond, the pomegranate, the mulberry, the walnut, the hazel-nut, the pistachio, and the melon. Oranges and lemons have on several occasions been introduced, but never with success, since the cold of winter has invariably destroyed them.

These fruits grow both wild and cultivated. But there is another species which affords almost exclusive subsistence to twenty thousand persons, which requires no attention from man. This is the singhara (*Trapa bispinosa*) or water-nut. It grows in the great Wulur lake in such immense profusion, that according to several writers, sixty thousand tons of the seeds are raised every year. The nuts are eaten either raw, boiled, roasted, or ground into flour and made into gruel.

Another article of food is the *Nymphæa Lotus*, or Egyptian water-lily, which, with its light foliage and large poppy-like rose-coloured flowers, spreads itself over the city lake, and presents a spectacle of singular beauty. Its flowers and leaves are never covered by water. The beans it bears are eaten unripe, and the stalks, boiled, are considered a palatable and useful food.

Rice, however, is the principal article of cultivation, as well as the staple food of the inhabitants of the valley. Great skill is employed in its culture, and this is generally rewarded with a full measure of success, in consequence of the genial climate, the rich soil, and the abundance of water. Thirty or forty-fold is the common return, but it is not unusually as high as fifty or sixty. Wheat, barley, millet, and Indian corn are also raised, with large quantities of gram, buck-wheat, and amaranth (*Celosia cristata*). But perhaps the feature most worthy of attention in the agricultural economy of Kashmir, is the practice of producing crops of cucumbers and melons, in floating gardens on the lakes. Thornton supplies an excellent description of the method pursued:—

"For forming these islands, choice is made of a shallow part of the lake, overgrown with reeds and other aquatic plants, which are cut off about two feet below the surface, and then pressed close to each other, without otherwise disturbing the position in which they grew. They are subsequently mowed down nearly to the surface, and the parts thus taken off are spread evenly over the floats and covered with a thin layer of mud drawn up from the bottom. On the level thus formed are arranged, close to each other, conical heaps of weeds, about two feet across and two high, having each at top a small hollow filled with fresh mud. In each hollow are set three plants of cucumber or melon, and no further care or trouble is required but to gather the produce, which is invariably fine and abundant. Each bed is about two yards wide; the length is variable; the bed is kept in its place by a stake sent through it at each end and driven to the bottom of the lake. The melons produced in this way are obviously wholesome, as those who live entirely on them during the season become very fat."

A small amount of tobacco of good quality is cultivated, and a large quantity of cotton for the manufacture of a species of cloth. Almost all Hindostan is supplied with saffron from Kashmir. This is produced almost exclusively in Pampur, a district on the right bank of the Jhelum, from three different varieties of crocus, of which the root of one continues productive for five, another for eight, and another for fifteen years. Vegetable oil being much in request among the natives as an ingredient of food, sesame, mustard, flax, hemp, and other plants, are cultivated for the purpose of obtaining it. From wild hemp a decoction of an intoxicating quality is procured. Grapes would flourish well in this sunny valley, but the culture and management of the vine, and the manufacture of wine, are not understood. Consequently, little care is bestowed on it.

Of vegetables, the kidney-bean, the turnip, the cabbage, the beet-root, the radish, with the capsicum, and, according to Hugel, fifteen sorts not known in Europe are grown. Grass and clover are abundant, so that in trees, in fruits, in grains, in vegetables, as in flowers and ornamental plants, Kashmir is equal in its wealth to almost any region on the face of the earth. But the blight of bad government, everywhere of such destroying power, has fallen like a curse on this fair valley, to obstruct the processes of nature, as well as to paralyse the industry of man, and prevent the free diffusion of knowledge. If, therefore, in Kashmir, as in the Punjâb, in spite of so many injurious influences, of so many counteracting agencies, we find the earth so abundant and fertile, supplying in neglected spots the culture of man by the lavish growth of nature, what a rich development of vegetable resources might we not look for, were the cultivation of the earth carefully watched, and the processes of agriculture improved. Whether in trees, fruits, grains, or vegetables, to support the people, or in flowers and shrubs for adornment, both regions are rich beyond description; and in this, perhaps, we may find some answer to the arguments at least of those who contend that in setting up the standard of our power in the Punjâb, we have extended our influence over unproductive wastes, whose lands are altogether incapable of bearing valuable crops to repay the labour of the husbandman. To enter into a description of the various processes of tillage, the gardens, the fields, the groves, and the other features of the valley, regarded from this point of view, would require more space than we can allot to it. Nor can we minutely or scientifically describe the various plants which are not commonly known in England. These rambling observations, however, may possibly not have been without their interest for those of our readers desirous of having their memory refreshed with respect to the character of the soil, and the aspect of vegetable nature, in the new province which has lately been added to their possessions in the East. Next to the knowledge of our own country, the knowledge of the dependencies of that country is most requisite, and the branch of information we have touched upon is not the least important in the list.

THE STATISTICS OF NUTMEGS.*

The statistics of nutmegs are very imperfect, but still we have sufficient data to enable us to form some estimate of the cultivation and production, in the different parts of the Indian Archipelago, where the plant is cultivated. In the Straits' settlements the cultivation is extending very largely, and the production of course keeps pace with it. It was only in the beginning of the present century that nutmeg-planting was introduced into Pinang, a number of spice plants having been imported from Amboyna by the East India Company. The government, after some time, sold their gardens, in which they had planted the clove and nutmeg trees; but the cultivation would appear to have made little progress at first, as in 1810 we find that there were only about 13,000 trees on the island, a few hundreds being all that were in bearing. In 1818 the number of bearing trees had in-

* From the "Journal of the Indian Archipelago."

creased to 6,900. In 1843 there were 75,402 trees in bearing, and 111,289 not in bearing, besides males, and 52,510 in nurseries. The cultivation has been steadily increasing since that date, and the greater part of the trees then planted out but not bearing much, must now be yielding fruit. The number of bearing trees in Province Wellesley in 1843 was 10,500; not bearing, 7,307, besides males and a number in the nursery. The total number of nuts produced by the Pinang and Province Wellesley trees in 1842 was 18,560,281, and 42,866 lbs. of mace.

Nutmeg trees were first introduced into Singapore in 1818. In 1843 the total number of trees was estimated at 43,544, of which 5,317 were in bearing, the produce being stated at 842,328 nuts. In 1848, according to the table given by Dr. Oxley, the total number of trees planted out was estimated at 55,925, of which the number in bearing were 14,914, and the produce 4,085,361 nuts, besides mace, which is estimated at about 1 lb. for every 433 nutmegs. In Singapore the cultivation is extending very rapidly. The increase does not take place gradually; but every now and then, when some person with capital enters upon it, it seems to receive a large impetus, the example set by one appearing to incite others to embark in it. In one district in Singapore this has been very apparent. The district of Tanglin, in the beginning of 1843, consisted of barren looking hills covered with short brushwood and lalang, which had sprung up in deserted Gambir plantations. Immediately upon the regulation for granting land in perpetuity being promulgated, in the middle of that year a great part of the district was cleared, and nutmeg plantations formed, and there cannot now be less than 10,000 trees planted out in it. A number of Chinese are at present forming plantations in different parts of the island; one Chinaman has commenced planting, which he intends doing to the extent of 5,000 trees, and we are aware of various other individuals who propose to form plantations of greater or less extent.

During the occupation of Bencoolen by the English, the nutmeg and clove were introduced from the Moluccas, and in 1819 the number of nutmeg trees was stated at 109,429. Regarding their present number we have no information.

The spice trade of the Molucca islands being a strict monopoly, very few particulars are known regarding the extent of the cultivation or the amount of the produce. The average quantity of nutmegs annually sold by the Dutch East India Company in Europe during the last century has been estimated at 250,000 lbs. besides about 100,000 lbs. sold in India. Of Mace, the average quantity sold in Europe was reckoned at 90,000 lbs. per annum, and 10,000 lbs. in India. The trade, although so jealously guarded by the Dutch, has never been a very profitable one to them, the expenses being heavy. In 1779 the charges at Banda amounted to 146,170 francs, and the revenue derived from the duties on imports &c. to 9,350 francs, leaving an excess for the charges of 136,820 francs to be deducted from the profit on the spices; and the large quantities of spices frequently burnt in Holland, on which heavy charges for freight &c. must have been incurred, must have also formed a serious deduction from the gross profit derived from those sold. In 1814, when in possession of the English, the number of nutmeg trees planted out was estimated at 570,500, of which 480,000 were in bearing, including 65,000 monœcious trees. The produce of the Moluccas has been reckoned at from 600,000 lbs. to 700,000 lbs. per annum, of which one-half goes to Europe, and about one-fourth that quantity of mace. The imports into Java from the Eastern Archipelago in 1843 consisted of nutmegs 2133·29 piculs, and of mace 486·63 piculs. The amount of nutmegs exported from Java during the ten years ending in 1834 averaged yearly about 352,226 lbs., and during the eleven years ending in 1845 about 664,060 lbs. yearly. The quantity of mace exported during the first period averaged 94,304 lbs. yearly, and during the last, 169,460 lbs. yearly.

FLOWERS THE LEADING EMBELLISHMENTS OF ARTISTIC DESIGNS.

Floriculture is becoming the universal favourite among all classes. Even those who cannot indulge in the practice aid those who do, and the adoption of flowers as ornaments in the designs for almost everything, says much for the advance of that taste which is conducive to the advancement of the garden interests. That civilized people should love flowers is not to be wondered at, for the richest perfumes and the most brilliant colours are associated with them, but it is a great step in advance when the manufacturers of all kinds of ware take flowers for their principal embellishments, and upon the most lovely productions of the garden, confer the honour of imitation. If we saw a vase for holding flowers ornamented with the rose, the tulip, or any popular subject in the *parterre*, we

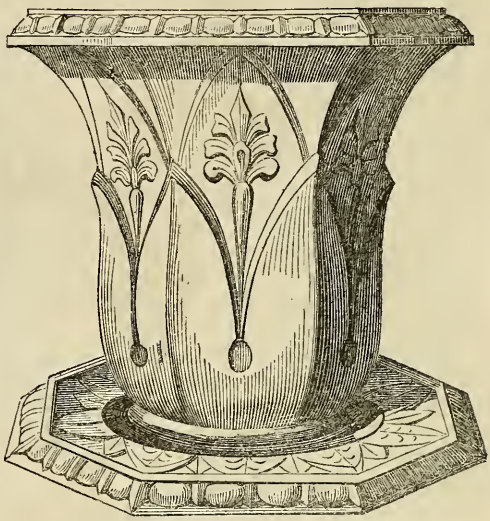
should think it rational, and rejoice that flowers were not at a discount; but when we see the School of Design adopting flowers for their foundation, and bringing them in alike for all things, we have to notice it as a proof of the increasing love of the subject, and we are glad to adduce it as one of the many evidences of the advance of floriculture. In noticing this subject we have to glance at a useful and important institution that is rapidly changing the whole system of our manufactures. The School of Design is producing hundreds of changes; by and by we shall have rational if not perfect designs for everything, and fortunately the *Art Journal*, one of the very best as well as cheapest of the periodicals, has taken upon itself the task of publishing all the better kind of designs. For some of the embellishments we are indebted to the proprietors of that work, who have liberally allowed us to take any of those relating to our subject, and who have in no instance been sparing of pains or cost to publish designs worthy of a place. One that is illustrative of the disposition to make flowers form the principal ornament of modern subjects is the annexed design for a candelabrum, or pillar light for the table, the sideboard, or the hall pedestal. It is a beautifully chaste group of lilies, with appropriate supporters, and shows off to great advantage the beauty of floral decoration; scarcely anything can be procured more graceful or more manageable than flowers for a subject like this. There is no want of a second subject, although we have the stem supported by children, emblems of innocence and purity like the lilies above them. We need not attempt to describe a subject which speaks for itself, nor ought we to criticise all the minute parts of a flower, for artists like heralds will, to a certain extent, sacrifice something for the sake of conventional notions of propriety as concerns their art, rather than copy the flowers from which they are taking their ideas. It wil be conceded that the design is, as a whole, very beautiful.

In the next design, which we take from the same source, we have a specimen of another kind, well adapted for a basket of flowers, to form a splendid ornament for the hall or the conservatory. Here the subject, being intended for flowers, is less indebted to those beautiful objects than the former one.

In fact, the only appropriation from the garden is a leaf or two, but nothing could be more adapted for a basket of flowers, or could form a prettier ornament in the conservatory or drawing-room, to be filled with plants and flowers. Whether the artists consider at the time they design a thing, any of the uses it may be put to, or not, is doubtful, but the most trifling alteration would make this do for twenty different subjects. It would

be as good for a font or a fountain; as beautiful in the centre of a table as the centre of the lawn; and, by the same reasoning, a wine-cooler would be quite as good for a flower-pot. As an instance of this, let us select from the *Art Journal* one or two more cuts to illustrate this position.

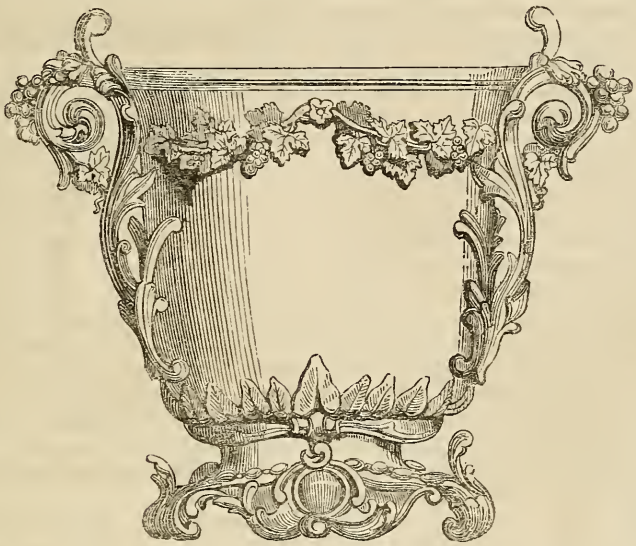
What can be more elegant, when well filled with a well-grown plant, than a well-proportioned ornamental pot; and be it remembered, that the design for anything may be altered in proportions to suit any subject without essentially altering its character. One of the following designs would be excellent for a flower-pot, whether shortened a little, or used in its present form, or modified in any way. We may take an after opportunity of exhibiting some other designs of the School, with a view of improving some of those things which are



in constant use, but which are common and tasteless, instead of being rendered appropriate. At the close of this article we have another specimen from the School of Design; and we seriously recommend all those who are not acquainted with the institution to seek information on the subject.

It is almost impossible to think of any article now, from a common bodkin to a door-post, from a pair of scissors to a pair of tongs, that is not the subject of sundry designs. The pattern of a snuffer-tray, and that of a salver, are alike the invention of many who try their hands at design, and we are glad to see so much talent engaged on subjects of no intrinsic value when produced, because a good pattern is as cheap as a bad one. Articles for domestic use—the poker, shovel, and tongs; the teapot, the butter-boat, the very plate we eat from, are no longer to be the common patterns we have been used to. They are the subjects of emulation in the production of new but appropriate forms, and the *Art Journal* teems with engravings of those considered the best and the most worthy to be followed in the manufacture of things hitherto only seen as plain and as ugly as common prices and bad taste can make them. Vases for flowers, stands for flower-pots, garden seats, and a thousand other things, testify to the improved taste among our manufactures, and the time is rapidly approaching when everything plain will be discarded. The present engravings are, as we have already said, from the *Art Journal*, in which the best novelties from the School of Design regularly appear, and soon will be the means

of changing the features of almost every article in use from common, plain, or familiar patterns to new and appropriate fashions; but in no case could there be more accomplished than in vases, flower-pots, flower-stands, and garden-seats, if the manufacturers would look about them, and profit by the lessons to be found in the *Art Journal*.



A STROLL THROUGH THE GARDEN,

BY A TUTOR AND HIS PUPIL, IN THE MONTH OF OCTOBER.

A SHARP frost has altered the appearance of many things; especially in the quarter wherein the dahlias are planted does the change seem remarkable. Those splendid flowers escaped through September, which is seldom the case, and but yesterday seemed more gay than ever. To be sure, when we went close to them the individual flowers showed weakness, but as garden ornaments they were literally covered with beautiful tints and were the brightest of all the remaining tenants of the borders. To-day what are they, a mass of black decaying foliage, and discoloured flowers scarcely indicate, except in the decided contrasts, what colour they had been. The Michaelmas daisies seem hurt but not killed, and the chrysanthemums, which were opening, seem scarcely to be affected at all. The gardener will at once remove the dahlias, for they entirely destroy the fine appearance of the garden. The soil of the tulip bed which we saw dug out and laid on each side is now being turned over; this is to sweeten the mould, as it lets air into it in every part; for it must be borne in mind that nothing is more essential to the healthy growth of plants, than stirring the soil about to let the atmosphere operate on every part. Ground worms are very troublesome where they abound, but they are excellent gardeners, for they keep the earth open when it would be otherwise run close together by the constant rains, and would be impervious to air altogether but for these busy but disagreeable looking creatures, who literally bore the ground in all directions and make their way through the top; when this tulip soil has been turned once or twice more, it will be returned to the bed ready for planting next month. The same operation is being performed on these long beds, which are appropriated to the surplus stock of tulips, and the offsets which are too small for blooming, and which will all be planted this month, because many are small and would shrivel up and die before the ordinary planting time, which round London is on or about Lord Mayor's-day, the 9th of November. Those further beds are preparing for the common ranunculuses which are planted in the autumn, and will be inserted in drills six inches apart.

In the broad border the man is taking off large pieces from the patches of lupines, phloxes, and other herbaceous perennials, and

he is parting the primroses and polyanthuses that he left undone last month. It is better to do this always directly they have done flowering, but every man has his own way of doing things. I approve of early parting, because there is ample time for the roots to spread, and the plants to get strong for blooming. That bed of wallflowers, two-year stocks, sweetwilliams, rockets, &c., is much too crowded, but they have only been nursed there for planting out; now while the gardener is making up the border where he is adjusting the size of perennials to be left there, he will plant out all these biennials for blooming. This would be the month for a general rout in the gardens, and for planting bulbs to bloom in the spring; but as gardeners are very unwilling to disturb anything while there is flower upon it, the border is not disturbed more than necessary; besides, there are the colchicums and other autumnal flowers yet underground, and it does not do to disturb things too much, for fear of damaging what is out of sight. Many persons plant nearly all these bulbs this month, but next is quite time enough.

Observe how the man is preparing all the winter quarters for the pinks, picotees, carnations, pansies, cinerarias, and other plants in pots. The former have all been washed, the bottoms cleaned out, and the plants half of them stored for the cold season, which may be looked for now every day.

You should take notice of the different degrees of hardiness in the different tribes of plants; the last night's frost, which has totally ruined the dahlias, and cut off all the geraniums in the garden, has no effect upon many things, which perhaps three or four more degrees of cold would kill altogether. Still plants are very badly described in catalogues; for instance, we see among hardy annuals some subjects which are cut down by the slightest frost; witness the common nasturtium,—the leaves of those are as black as those of the dahlia, yet that is called a hardy annual. I could go on with this subject some time, but it would seem that the only idea the seedsmen have of hardiness is, that when an annual will bear sowing in the open air, come up, bloom, and ripen its seed, it is called hardy. Now I have known the balsam to do all this, but that is nevertheless called tender.

The kitchen garden is in excellent order. All the places on which there were other crops that have been cleared, are filled up with the various kinds of vegetables. The man who is digging has just taken up all the carrots in that piece of ground, and is leaving it in ridges as he goes on, so that it is not intended to crop that for the present. It will, perhaps, have dung laid in the ridges early in the spring, potatos laid on the dung, and the ridges levelled to cover them. This will always give a heavy crop, but not always of the best quality. Or it may be, that the ground will be levelled, dung forked into it, and peas, or beans, planted on it; that, however, is unimportant, but it is very important to take care that long deep-rooted plants should not be sown on the same piece of ground twice following. Carrots, parsnips, beet-root, and such like, should never follow one another, but should be succeeded by peas, beans, spinach, lettuce, and other crops that do not penetrate the earth so deep. It is also well to dung the ground once in a season, but not for every crop. Observe how thickly the cabbage-plants are set together in the rows, not more than six inches apart. The intention of this is, that two out of three, or three out of four, may be drawn as soon as they are large enough to cut as greens; and they form excellent winter greens, while those left at proper distances to cabbage, are none the worse for having been pretty closely invested when young.

There is now coming a period wherein the practice in the garden is hardly varied by anything but weather. If the next two months are open and mild, there will scarcely be a change in the management of the garden, the whole time hoeing between the crops, earthing up young plants, clearing off the remains of crops that are going, or gone off, and such like. Covering tender things of a night, and other measures of protection to those subjects which require it, are things of course.

The greenhouse is again filled with its usual plants, many of them larger than they were last year, and in pots which give their roots more room. Every place under glass is crowded; indeed, greatly too much so. It is highly improper to place plants too close together; they want air and light, and they should not only not touch, but they should not be near touching. The consequence of crowding is, that every plant must have a dark side, and that side cannot grow as well as the light side. Nobody can grow plants handsomely without giving them room all round. The forcing-house has already some tenants; most of these plants were forced last year, and will naturally be ready to start sooner than if they had bloomed at the proper season. I see the gardener has occupied a top shelf there with French beans; this is purely an experiment, but the truth is, anything brought from seed is much easier put out of its way than grown plants. The conservatory now depends a good deal on chrysanthemums for its beauty, except to those who can admire plants out of flower.

COBBETT'S NOTIONS OF PRUNING.

The *Midland Florist*, albeit as much devoted to fruit as to flowers, thus describes Cobbett's notions of pruning :—

1. The inside of the tree is to be kept moderately clear of wood of any sort, which must be cut out for that purpose.

2. If the wood is considered as being too close or too crowded in any other part of the tree, part of it must be cut away to leave it more open.

3. All decayed or dead branches to be cut out.

4. All branches that cross one another to be also cut out.

5. All suckers to be cut close to the ground.

6. Prune the remainder of the tree by cutting the last year's wood down to the last bud upon it, or at most leaving not more than two buds.

Cobbett is a good authority for almost anything practical, unless his interest touches the question, hence his general gardening is good ; but he was not quite so honest in the praise of his Cobbett's corn. The above rules for pruning have been gathered by the writer in the *Midland Florist*, who may or may not have perfectly understood the author ; but we shall deal with them as they are put forth by a work that is read very generally, and give our notions of them seriatim.

First, then, " the inside of the tree is to be kept moderately clear of wood of any sort, which must be cut out for that purpose."

It is quite certain that one half our English orchards are ruined for want of attention to this one point. We see everywhere the heads of fruit-trees a mass of wood, so close that neither sun nor air can get to the interior ; and when in full leaf even the light can hardly penetrate ; brushwood like a thicket, branches crossing each other in all directions, and so close that nobody could climb the inside, and consequently the whole of the interior of the head barren, or with worthless stunted and blighted fruit, but often with none at all ; noble trees, bearing only on the surface, and even there bearing very inferior fruit. Common sense ought to inform us that light, air, and sun are absolutely necessary for the perfecting of fruit ; and we have for years endeavoured to inculcate the necessity of thinning out standard trees as carefully as we prune wall-fruit. Some kinds of trees have a tendency to grow upright branches, and it is a proper course then to make the head of the tree form a kind of basket ; that is, by keeping the inside quite clear, and regulating the branches all round. If we began with trees young enough, there are many sorts that would form a complete funnel, the branches growing outwards and upwards, but sloping out all the way round; and these well regulated will give fine fruit in every foot of their growth, because the sun reaches the inside as well as the outside, and there is a double surface to act upon; but, whatever be the habit of the tree, we would sooner see a clown chopping indiscriminately with his billhook, right and left, till he cleared the inside of the head, than see it crowded, as thousands are, to the detriment of the quantity and quality of the crops. Injudicious pruning is better than none at all. It is better to have half a tree bearing well, than a thicket of stunted and blighted produce, not fit for use. The pruning of a tree is a simple operation; and Cobbett's first rule cannot be disputed—" The inside of the head must be kept moderately clear of wood." The sun and air must be let in, and all the barren sticks and brushwood that crowd inside, must be cut out ; nor ought the size or supposed value of a branch to stop the operation : better have a mere skeleton, and let new and healthy branches grow, than allow limbs to cross and incommode each other. Let there be light. Set about your orchards in earnest. Cut out enough wood to keep you in firing all the winter ; reduce the old scrubby head one-half ; cut the middle of the tree out as clear as if you wanted to build a room in it. Never calculate how many less apples, or pears, or plums you may have, but think of how much larger and better they will be, and of half the number filling the bushel. The most difficult trees to manage are those which have upright trunks all the way to the top ; but here the work is straight before you. It is quite certain you cannot cut out the centre, but cut off at the base, close to the trunk, every branch that can be spared, and cut off all the shoots along those branches that are left on, for a good six feet from the trunk, because they cannot bear fruit of any value, as the light cannot reach them ; or it may be that by taking off all the shoots for six feet next the trunk, and thinning the others out even to the ends, the tree may be open enough without losing any of its main limbs. At all events, be not afraid of the knife and the billhook and the saw, for they are, in nine cases out of ten, the only requisites to renovate trees foolishly said to be worn out, when there is nothing the matter but want of air and sun, and a little curtailment of the work the root has to perform. We only wish Mr. Cobbett's first rule were at once attended to all over the kingdom. But a bad example has a sad effect; and when we see market-gardens full of fruit-trees which the sun cannot penetrate, we need not wonder at private gentlemen and holders

of ordinary gardens falling into the same error. In market-gardens too it is of more consequence than in common orchards, because where there is only grass, the consequence is not very great; but where every foot of ground has an under-crop smothered doubly by the denseness of the trees that might be profitably lightened and opened, it is the more to be regretted that men in business do not manage better. Upon the whole, then, we cannot impress too strongly on the minds of those who possess even a solitary tree, the propriety of at once conforming to the rule to keep the inside of that tree moderately clear of wood of any sort.

2. "If the wood is considered too close or crowded in any other part of the tree, part of it must be cut away, so as to leave it more open."

This is merely following out the principle to the ends of the branches. Besides the tree being crowded within, it may also be crowded throughout. The first thing to do, in this case, is to cut away all the small shoots; that is, those shoots which are thinner than usual, all the small spindly wood that cannot bear; this will sometimes thin it enough to give good daylight to the stronger and better branches. It is the crowding that causes weak shoots, and it is possible to neglect a tree till it is all weak together. We ought not to be deterred from very hard pruning by the notion that the tree will look naked and bare, because one year's growth will set that to rights, with much better wood. In a general way, when a tree has once been neglected until it is crowded, we may take out every other branch from the limbs, and every other shoot from the branches that are left. We must not expect from an old tree to be able to renovate it all at once, and form it into the shape we wish, but we may do something towards it, and every little helps. Every shoot we take off, gives the trunk and root less work to do; and the new wood induced by cutting away the old will be healthy and strong. How careful is the good gardener with his wall trees! He wants all the strength in the wood he is going to keep, and he rubs off the buds when they come where they are not wanted, that he may not lose the vigour which would be distributed among branches that he would have to remove. We wish one-half the attention were given to standard trees, especially in their young state; half an hour expended in rubbing off buds of young growing trees that are left to form, or rather deform, themselves as they may, would make a wonderful difference in the after-growth of the plant. When we consider that every bud rubbed off is the prevention of two or three feet of wood in a wrong place, and an encouragement to the increased growth of those in the right one, it is enough to make one wonder how young trees can be so neglected. At present, nobody seems to care how a tree grows until it has arrived at a considerable size; whereas very little attention, during the first stages of their growth, would make all handsome alike, for nothing is more easy to control while young, though obstinate when old, than a tree.

3. "All decayed or dead branches to be cut out."

This, we apprehend, wants no confirmation; but though it applies forcibly to old trees, there are seldom either decayed or dead branches to young ones. The first symptoms of injury or decay is the dying of the ends of the branches. It is manifest then that the supply of nutriment is insufficient, or that the roots have reached something they do not like. In a general pruning, the dead and decaying branches would naturally be the first we removed, but supposing the tree wanted, to all appearance, nothing more than the removal of decaying or dead branches, we ought, in all cases, to take the hint. When branches die for want of a proper supply of nourishment, we ought unquestionably to reduce the head, even if there were neither of the faults already anticipated; that is to say, if the head were open and the tree in proper order, as far as pruning was concerned. The only chance of preserving that tree in health some time longer would be to reduce the head very considerably. Independently, therefore, of cutting away all decaying and dead branches, cut rather vigorously at those that can be best spared among the living ones, that by giving the root less to do, the remainder may be done better.

4. "All branches that cross one another to be also cut out."

Nothing but gross neglect while young can overlook branches that cross one another, yet, strange as it may appear, it is as common in an old orchard to see such branches in a majority of the trees, as it is to see crowded heads. In following out this direction it is necessary to examine which of the branches can be spared best; but it will often be found that we cannot spare either. After a number of years, the branches conform to the general head to such an extent that it would be found to destroy half the tree; but Cobbett's rule must be taken to apply to pruning generally, and therefore he means that in their incipient or young state the offending branch must be removed, because it is a part and parcel of the management of young trees to train them from the first; and this, be it remembered, not after the branches have been giving way to each other, and reconciling their growth to their awkward position, but while quite

young, when you can save the one inclined to grow best, and destroy the intruder. But when we see, in the present day, plantations of fruit-trees growing some one way and some another, bending their heads towards the ground for want of a stake to hold the stem upright till it has attained strength enough to hold itself, we need not wonder that the essential parts of management are neglected in the pruning. Nor is this carelessness even of the trunk of the tree new ; scarcely an old market-garden but exhibits the effect of this in confirmed old trees, lolloping about in all directions, bending to the ground on one side or other, and being a complete nuisance to the labourers who have to work round them, and occupying half as much more ground as would be necessary for an upright stem.

5. "All suckers to be cut close to the ground."

We should carry things a little further. Cut suckers close to the ground, and they spring up every year stronger or more numerous, till there is a little forest of underwood to be got rid of periodically. Whenever a sucker appears, dig down to the root it springs from, and cut it back as close as you can to its own tree; you will see no more of that sucker or any of its progeny ; but if you only cut it off close to the ground, half a dozen will come from the same root, and you may keep on doing the work annually, as long as you or the tree live. If it were convenient, the root from which a sucker springs should be cut off close to the old tree ; but as this cannot be always done, we must go as far as we can. Suckers are very apt to grow more vigorously than the old trees, and they very naturally distress the old trees, when they are allowed to get the upper hand.

6. "Prune the remainder of the tree by cutting last year's wood down to the last bud upon it, or at most, leaving not more than two buds."

This is pernicious advice—a general rule, only applicable to particular things. What predicament would a gardener be in who cut away all last year's wood of trees that only bear on the last year's wood ? We can hardly think Mr. Cobbett had given such advice. If fruit-trees were like cabbage-roses, and bore their fruit on the new wood only, there might be some plea for pruning back to one or two eyes; but there are so many exceptions to such habit, that it would be actually destroying the crops year after year to cut away the last year's wood. Take the peach, nectarine, apricot, and many other trees, that not only bear exclusively on the last year's wood, but always towards the extremities ; that is to say, a shoot of two feet in length would bear only on the fifteen or eighteen inches farthest from the limb it sprung from : cut these shoots back every year to two eyes, and away go all the fruit buds. This leads us to a decided objection to any general rules for pruning; the pruning must be adapted to the tree, its habit of growing and bearing. The spur system—for it amounts to this—may be very well for some things. Pears and apples may do very well, currants and gooseberries may do very well, but, strictly speaking, each family wants in detail something more than a sweeping plan ; they cannot be served all alike with success. The first five rules may be generally applied ; they are good in all cases ; but the sixth is a blunder, and to counteract the effect of it was the principal object of our present interference. The pruning of all standard fruit trees must be different to that of wall trees or espaliers ; but no system that carries away the fruit buds can be right. We have, under the different kinds of fruit trees, given instructions for the pruning, and it will be seen from these that what is excellent for one family is destruction to another. We advise, therefore, the application of the first five rules, as unerring, to whatever fruit-tree they may be applied ; but we repudiate the sixth as a general rule altogether, and recommend the study of each subject, before we apply any further detail as to pruning.

It may be said that the person who quotes Cobbett in the *Midland Florist* applies his rules only to gooseberries and currants. This is not clear at first sight, because the article is headed, "Pruning Fruit-trees." But if Mr. Cobbett's rules apply to gooseberry-trees and currant-trees only, he only half instructs, because he does not say when we are to begin this pruning. If he means from the first, he is decidedly wrong : where are we to find main branches if the last year's wood is to be cut away always ? A currant or gooseberry-tree makes two or three shoots the first year, say eighteen inches long ; well, we are to cut last year's wood back to one or two eyes ; that is to say, two inches at the most. The next year we have more branches and the same growth, but we are only to advance in size two inches a-year. It is clear, then, that such instructions are vague. The currant and gooseberry, if we allow that they alone are intended, should be trained into a proper shape before any of the branches should be shortened. It is clear that the struck cutting is the only limb; when planted out first, this should be cut down within three or four eyes of the ground, and as these four eyes will only give four shoots, which are not enough to form a tree, they may be cut down to two eyes each, that we may have eight branches. These may form a tree, and, if so, all the *side* shoots may be cut off yearly to one or two eyes, because there is plenty of

tree or bush. However, there are some who will not agree that gooseberries should be cut so, though for currants it is universally admitted to be good practice. Cobbett's lessons have served us for a text; and in future notices of pruning, as regards particular fruits, we will endeavour to follow his example, in compressing the practice into a few fixed rules.

SELECT ROSES FOR LIMITED GARDENS.

Among the most splendid and yet most neglected flowers, we may unquestionably place the rose. There is not a plant which remains longer in bloom, nor one which gives so little trouble; yet the rose is quite subordinate to even the common annuals, which have a much larger space allotted to them than is allowed for the most lovely of all flowers—the rose. The old notions about the rose in June, when there were hardly any but summer roses in cultivation, may have given rise to the limited use of the Queen of Flowers; but now the garden could be kept in a continued bloom from April to December with roses alone. Let us, for instance, select from the perpetuals, and we will engage that the following list shall afford bloom from the beginning of the spring to the end of the autumn :

Crimson perpetual, bright crimson, fragrant.
Mogador, crimson and purple.
La Capricieuse, rosy and deep red.
Laurence de Montmorency, pink and lilac.
Madame Thelier, delicate pink.
Amandine, blush and deep rose.
Aubernon, bright crimson, fragrant.
Augustine Monchelet, deep crimson.
Baronne Prevost, bright rose.
Comte de Montalivet, red and lilac.
Contesse Duchâtel, bright rose.
Cymedor, heavy crimson.
Dr. Marx, rosy carmine, very large.
Duc d'Alençon, pink, very beautiful.
Duc d'Aumale, bright crimson.
Duchesse de Galiera, brilliant rose.
Duchess of Sutherland, mottled bright rose.
Géant des Batailles, very nearly scarlet.
Henry IV., brilliant deep pink.
Jaques Lafitte, deep bright rose.
Lady Alice Peel, deep pink.
La Reine, fine glossy large rose.
Madame Aimée, pale flesh colour.
Madame Laffay, bright crimson.
Marquise Boccella, pale blush.
Melanie Cornu, deep purplish crimson.
Mrs. Elliott, light lilac crimson.
Reine de Fleurs, light pink.
Rivers, red tinged with lilac.
Robin Hood, rosy pink.
Soleil d'Austerlitz, brilliant crimson.
William Jesse, light crimson.

All the above are as hardy as weeds, and they would form an excellent collection, for they are fragrant as well as perpetual; and the two or three which are marked fragrant are merely more remarkable for their fragrance than the generality of roses. Another recommendation is, that they are free bloomers, opening well, and forming good single blooms, to show as dahlias are exhibited. We do not recommend any body to grow the old cabbage rose; the room it occupies is as much as any of the varieties we have mentioned would take up, and there is this difference: the cabbage rose blooms once perhaps for nearly three weeks in June and July, whereas those we have mentioned will blow all the summer. We need hardly say that we consider all the room taken up by the summer roses—that is to say, those which bloom in June or July only—completely wasted; and they are, in fact, now excluded from all really good establishments, where perpetual flowering is kept up in all the beds and borders. But we can stretch our list to almost any length, and still keep to the constantly flowering kinds; for instance :—

Acidalie, large white.
Anne Beluze, pale rose.
Bouquet de Flore, deep carmine.
Comice de Seine et Marne, cherry red
Comte du Rambuteau, crimson and lilac.
Desgaches, bright rose.
Dumont de Courset, dark crimson.
Dupetit Thouars, bright crimson.
Edouard Desfosses, bright rose.
Emile Courtier, deep rose.
George Cuvier, rosy carmine.
Gloire de Paris, crimson and purple.
Kenny Lecoq, rosy carmine, beautiful.
Imperatrice Josephine, light blush flowers in clusters.
Julie de Fontenelle, crimson purple.
Lady Canning, fine rose colour.
La Gracieuse, fine rose, beautiful.
Lavine d'Ost, pale rose, fine.
Le Florifere, bright pink, very good.
Le Grenadier, fine light crimson.
Madame Angelina, creamy fawn colour.
Madame Aude, bright rose.
Madame Lachasone, white and blush, clusters.
Madame Margat, bright rose.
Madame Nerard, blush, very perfect.
Madame Souchet, blush and red.
Marquess de Moyria, carmine and scarlet.
Menoux, carmine.
Oscar Leclerc, bright crimson.
Paul Joseph, crimson purple.
Pierre de St. Cyr, pale rose.
Proserpine, bright crimson.
Queen, fawn colour.
Raymond, deep red.

Splendens, rosy crimson.
Souchet, crimson and purple.
Souvenir de Dumont d'Urville, cherry red.
Souvenir de la Malmaison, flesh and fawn colour.
Archduke Charles, rose and crimson.
Clara Sylvain, pure white.
Cremoisie Superieure, bright crimson.
Eugene Beauharnais, bright amaranth.
Madame Breon, bright rose.
Mrs. Bosanquet, flesh colour, fine.
Napoleon, blush, very large.
President d'Olbeque, cherry red.
Prince Charles, bright carmine.
Fellenberg, bright crimson.
Miss Glegg, flesh colour and white.
Ophirie, bright salmon and fawn.
Pourpre de Tyre, crimson purple.
Zobeide, brilliant rose.
Amie Vibert, white, noisette.
Lelieur, fine noisette.
Nankin, noisette.

We will venture to say that any one who orders the foregoing lists of roses will have flowers as early as May, and as late as the frosts keep off, even if it be Christmas ; and if they order standards, they will have them all bloom in perfection the first season. It is to be recollected, too, that as the time is approaching when roses are best moved, those who desire to grow roses should apply early, and have the best choice. Nurserymen generally send out the best plants they have, consequently those who are served first are served best. Make up your mind where you are going to place them. Have a little heap of well-rotted dung on the spot, and when you dig the hole for planting, put the dung into it ; cut off all the turned ends of the root with a sharp knife ; fork up the soil at the bottom of the hole, to mix the dung well in it ; then plant your rose on it, throwing the top soil that you have taken out in upon the top ; then drive down a strong stake, to which the rose-tree is to be fastened, to protect it from being stirred or disturbed by the wind, and then leave it till pruning time. The best stakes are iron; but strong ash sticks, such as are used for dahlias, will answer the purpose ; and the fastening should be with sack ties, which last longer than any sort of cord : but many persons use wire. In the spring, when the buds begin to swell, prune according to the form of the head at present, and the form you want it. If the head is pretty well formed, you may shorten all the shoots to three eyes or two, but take care that the end bud is below the shoot. Roses have too much disposition to grow upwards ; and many are exceedingly difficult to form into a good head, on that account; but by leaving the end buds under the shoot, they grow more favourably than they do if the end bud is upwards. If one side of the head is deficient of wood, let the shoots on that side be left with more buds, to fill up better; regard must must be had to the number of shoots already on the head and what you want. If, as is the case with new roses, there is but one strong shoot from the eye, cut that down to the last three eyes, which will push strong on different sides of the stock ; and when they are cut back after the summer's growth, they will make two or three shoots each, and the second year form an excellent head. But we will not conclude without strongly recommending the whole of the collection to be procured.

STOCK SEEDS.

The Germans are famous for saving all sorts of seeds, and for the pains they take to produce it in good order. Some of the most famous, save all their seeds in pots, and have then the opportunity of selecting only such plants as they consider will bring the best. Say they have ten thousand pots of Stocks, and they select, the instant they are in flower, such of them as are calculated to bring the best seeds, and place them in a garden or a compartment where they will remain undisturbed. All the while the enormous quantity of Stocks are blooming, the growers are picking out the best of them, and removing them to their destination. They are said to select none but very broad-petalled Stocks to save from, because such always run double. How far this is true we know not, because we never had any direct communication ; but we have had opportunity of knowing that they grow their seed in pots,—and certainly no method can be better, since it gives an opportunity of rejecting all that are unlikely to yield good seed, or of adopting such as are very promising. We have heard so much about the mode of saving seed that will come double, that we hardly know how to reconcile such contradictory statements ; and we are by no means convinced yet, that the cultivation has not much more than any thing to do with single and double flowers, because we have divided a packet of seed with a gardener, who has had them all double while we had them all single ; and we well recollect a nurseryman who was famous for double Stocks, and several who had his seed could make nothing of them.

THE DUCHESS OF SUTHERLAND PICOTEE.

The appearance of Enchantress a few seasons ago, was considered a great acquisition to the Picotee family, and this season we

have to record the addition of another beautiful gem that has appeared under the above title. It has been exhibited at the South London and perhaps other places, but it has received a first-class certificate from the Society for the Encouragement of Floriculture; the only one it has yet bestowed among the thousand things that have been exhibited there. The Duchess of Sutherland is an edged flower of striking qualities, neither heavy nor light, but it will be called light. The white is purity itself, not a speck or a mark below the well-defined edge; good size, bold smooth-edged petal, of thick and leathery substance and fine texture. We have not seen one so much entitled to general cultivation for years. All that we regret is, that while Societies have been recognising the claims of this flower, which they could not by possibility avoid, they have rendered their compliment worthless, by extending it to others which have not the least claim to merit as compared with it. Had the judges who considered it worthy of a prize, been content to give it one and leave less worthy things alone, it had been a well deserved compliment, but, to extend the same compliment to others not to be compared with it, was to render the compliment valueless; because, people who see the others to which the same compliment was paid, and do not see the Duchess of Sutherland, may think that it is not any better than those they have seen,—and the flower suffers. The Duchess of Sutherland is a splendid flower.

NEGLECT OF AMERICAN PLANTS.

Just as the hottest months of the year arrive, the rhododendron, kalmia, and other American plants are making their growth, and want the largest possible share of moisture; but as it happens to be at a time when the watering-pots are deeply engaged with subjects that show more immediately their distress, the Americans get neglected. They have done their bloom, afforded all the amusement and entertainment they could, but they no longer attract, and are forgotten. By and by, the owners will see their new growth stunted, the foliage unhealthy, and the plant destroyed; and they will wonder what it is in the ground that disagrees with these favourites. It will prove to have been caused by the want of water, and the penalty paid for this, is the loss of a year's bloom, for there will be none. No sooner does the rhododendron, azalea, andromeda, or kalmia, begin to develop their bloom, than there ought to be a copious supply of water, and this should be continued all the period that they are growing, for they cannot set for bloom unless they are well supplied. The Americans, as all know, thrive in peat earth, but they also want the natural moisture of it, and the shade. The hot sun, in gravelly or loamy soil, is soon overpowering, unless means be taken to counteract the ill effects of exposure and the distress incidental to a want of moisture. The best way to manage these plants, is to water constantly, from the time they bloom to the period they are set for bloom. Slight rains do not reach the roots; the shrubby nature of the plant throws off a good deal of wet; and they would literally bear flooding in a hot summer. Any trouble is worth encountering, rather than to lose our favourites.

THE ROSE OF JERICHO.

"De Rosa Hierichuntina liber unus; in quo de ejus natura, proprietatibus, motibus et causis pulchre disseritur (auct. Joa. Sturmio). —Lovanii, 1607. 8vo." (96 pp.)

The interesting description and illustrations of the *Anastatica Hierochuntina*, which lately appeared in the *Botanical Magazine*, induce us to notice the above work, which Sir William Hooker would seem not to have been acquainted with, and to which but lately, indeed, our own attention has been directed.

For what little we know of the life of our author, John Storms, ancient Professor of Louvain, we are indebted to a biographical sketch,* published by Dr. d'Avoine, President of the *Société des Sciences médicales et naturelles de Malines*, a physician of distinction in his native town, and who has lately retired from a successful practice, to devote the rest of his days to his favourite pursuits,—botany and researches in local history.

John Storms was born at Malines, on the 29th of August, 1559, and received his education at Louvain. Having graduated as Licentiate in Medicine, he greatly distinguished himself in his avocation, and at the age of thirty-one years, was made a member of the academical senate. Soon afterwards appointed Professor of Philosophy, he obtained in 1593, the degree of Dr. Med. At that time Prof. Adrian, subsequently Pope Adrian VI., held the royal chair of mathematics in the same university. On his promotion and removal to Würzburg, Storms was elected in his room; and having in the year 1634 been raised to the Professorship of Medicine, he died on the 9th of March, 1650, at the old age of ninety-one years, generally admired and esteemed.

* Notice sur Jean Storms, Docteur en Sciences et en Médécine, Professeur Ordinaire de Philosophie, de Mathématiques et de Médécine à l'Université de Louvain, Chanoine de la Métropole de Cambrai, &c. Par P. J. d'Avoine, Docteur en Médécine, &c.—Malines, 1848. 8vo.

Among the remarkable works which our author has published, his monograph on the so-called Rose of Jericho is not the least so. It would appear that Prof. Storms had cultivated that far-famed plant in his own garden since the year 1603; and the circumstances which gave rise to the publication of his interesting treatise upon it, are thus related by him:—"When a few years ago, in one of our public academical disputations (called *quotlibeticas*)," he says in his preface, "I had resolved three questions regarding the Rose of Jericho, proposed to me by the President, and, according to local custom, I had somewhat enlarged on my subject. I could not help perceiving that my auditory seemed much pleased with what they had heard; so much so, indeed, that some expressed a wish to have it in writing, others to see it in public print, (and among the latter number was Justus Lipsius, a man whose name is celebrated throughout the world, and who will for ever be remembered in history for his singular learning and piety,) pressing me hard, on the plea that my discourse deserved being made generally known."

The work is divided into forty-two chapters, and Storms finds occasion to quote in it the names of some fifty different authors, whose erroneous opinions on the subject of our plant he submits to his criticism; as he might have those of more modern botanists. The description which he himself gives, and which is very correct even to the details of the ovary, we will quote from the preface, in his own words. They read thus:—"Hierichuntis rosa frutex est palmaris altitudinis, inodorus, tribus ab una radice candicibus, raro pluribus, sed in plurimos ramulos lignosos, duriusculos ac lentos, rubri, subflavi aut partim utriusque coloris, divisis, constans; qui introrsum flexi ac convoluti quasi orbem quemdam constituunt: folia oleæ aut mali Punicæ similia: flores intus violæ candidæ; quibus succedunt folliculi oblongi, racematim cohærentes, fœniculi semine majores, in quorum singulis quatuor seminula parva rotunda, oblonga et depressa, semine milii majora, fulvi coloris, distinctis locellis seu capsulis continentur."

Our author refutes the opinion of those who class the Rose of Jericho, which he shows to be any thing but a rose, with either of the species Amomum, Amomis, Aspalathus, Convolvulus, or Erica; and then proceeds to state his reasons, why it should be comprehended rather in the species of violets: not that he commits the error of positively assimilating it to the latter, but "because, if both the *viola lutea* and the *viola purpurea*," he concludes, p. 49, 50, "are thus classified; it would seem not altogether inappropriate to include also the Rose of Jericho in the same species, and to call it rather *the Violet* than *the Rose* of Jericho. . . . I willingly admit, however, that thus not only the Rose of Jericho, but also the Amomum and other similar plants, might be comprehended in the species of violets," &c. He also treats fully of the different qualities of, as well as the popular superstitions regarding, our plant; and a discussion as to the time of its flowering concludes his monograph, one of the most ancient of the kind we possess.

Prof. Kickx of Ghent, has named that species of fern, which he separated in 1835, the *Acrostichum septentrionale* of Linné, in honour of our author: *Stormesia*;* and it is he, we believe, who, on that occasion, first directed attention to the work which forms the subject of our remarks. In a subsequent publication,† the same distinguished botanist has satisfactorily proved in regard to the *Anastatica Hierochuntina*, that Storms had "la gloire de définir le premier les notions sur l'espèce." He did so many years before Ray, whose definition is generally considered as the most ancient; but the monograph of Storms having appeared in 1607, and the work of Ray not till 1682, the prior claim of the Belgian *savant* to that honour cannot well be called into doubt.

It is deserving of notice, as remarked by Prof. Morren,‡ that so far back as the year 1633, the *Anastatica* appears in the herbal of the Abbey of Dilighem, among the culinary plants cultivated in the garden of that establishment. Nor must we forget that, at the period of which we speak, Belgium was the first horticultural country in Europe. Every inhabitant was an amateur of flowers,§ and no expense was spared to gratify the general taste.‖ These amateurs, we are informed by Matth. de Lobel,¶ imported plants and flowers from every part of the globe, and in Belgium a greater variety of horticultural produce was to be seen, than in the rest of Europe together. J. v. G.

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* Flore Cryptogamique des Environs de Louvain.—Bruxelles, 1835. 8vo. (p. 11.)

† Esquisses sur les Ouvrages de quelques anciens Naturalistes Belges.—Bruxelles, 1842. 8vo.

‡ Annales de la Soc. Royale d'Agric. et de Bot. de Gand.—Bruxelles, 1848. 8vo. (p. 457.)

§ Van Hulthem, Discours sur l'Etat ancien et moderne de l'Agric. et de la Bot. dans les Pays-Bas.—Gand, 1817. 8vo.

‖ Gorop. Becani Origines Antverp.—Antv. 1569, in fol. (in pref.)

¶ Plantarum seu Stirp. Historia.—Antv. 1576, in fol. (in pref.)

PLANTING AND TRANSPLANTING.

Planting is usually understood as an operation distinct from sowing, and differing in this particular, that while the latter consists in committing to the soil the seed or embryo of the future plant, the former applies to the fixing and adjustment in the soil, in the condition most favourable to its further growth, of the more or less developed vegetable which has resulted from the process of germination. It is well that this distinction should be maintained, as it serves to render more defined and explicit the terms which are applied to these operations of vegetable culture.

If we limit the meaning of the term "planting," as above applied, to the more or less developed plant only, even then planting and transplanting remain, in reality, synonymous. There is, in fact, no palpable difference in signification between them, each operation consisting in the adjustment of the living plant in the soil, with the view to its further growth and development. A separate conventional meaning does, however, attach to the term "transplanting;" it being often applied specially to distinguish the planting and replanting of small and young plants to and from nursery beds of rich soil, with the view to push on their development at a more rapid pace than ordinary, by means of the artificial stimulus thus brought to bear on the vital energies of the plants. This rapid development is by some considered to be occasioned by the production of a larger number of spongioles (that is, absorbing points) on the roots, in transplanted plants, than in such as have not been removed, but is perhaps as correctly referred, by others, to the presence of the fresh supplies of food, which are thus made available for their use.

There are certain general principles which are conducive to the success of transferring a living plant from one locality to another; and to these it will be proper first to advert. And, moreover, as the operation is one having direct reference to a vital being, it may be well to obtain also a notion of the constitution and character of that being.

A plant, then, is endued with life—vegetable life; it is an organized body, having functions to perform upon the exercise of which its health and continuance depend. For our purpose, as regards its nutrition, we may suppose a plant (confining ourselves to the more perfectly developed) to consist of three parts—an axis or stem, with which are connected a set of feeders (the fibrous roots and their spongioles), and a set of breathers or perspirers (the leaves); communications between these two sets of organs take place by means of the stem or axis, the leaves elaborating the crude sap absorbed and transmitted to them from the rootlets, this elaborated sap, as it is said, forming the plastic material to which the plant owes its increased size, or the accession of new parts. When nature is left to herself, these two sets of organs are so balanced as to fit the plant for its allotted position in the universal world. But when the plant is placed under artificial conditions, as it is in a cultivated state, this balance is easily disturbed; and hence it is that a knowledge of the functions of plants is so essential to successful cultivation. The act of transplanting at once destroys the equilibrium which has been referred to, by damaging the roots, and thus lessening the supply of food, while the perspiring apparatus is all the while at work; and if circumstances favour rapid perspiration, the plant is proportionally more or less distressed in consequence. The ordinary means of remedying this inconvenience consists in lessening the perspiring surface, in order to bring down the demand to the supply; this is done by pruning, so as to remove a portion of the leaves, or of the branches, which latter do perspire, though less rapidly than leaves. The branches perspire less than the leaves, and both less in winter, or in dull, close weather, than in summer, or when there is brisk motion in the air; and it is in consequence of this that deciduous plants are most successfully removed, as a general rule, when they are leafless, and also that all plants are best removed (taking it again as a general rule) towards winter, or in close, dull weather. All this is practised with the view of producing an artificial state of equilibrium, in compensation for that which the act of transplanting has disturbed; and the success is in proportion to the degree in which this is realized. And, moreover, transplantation may be successfully practised at any time that these conditions are attended to. Any plant may be removed at any time with perfect success, provided efficient means are used to counteract the disturbance of the balance between its two sets of organs, and to produce and maintain a state of artificial equilibrium until nature has re-established hers.

We may therefore deduce as general principles applicable to planting of every kind, whether on the mountain top, or in the sheltered nook, in the free soil, or in a flower-pot, —applicable whenever and wheresoever the operation is performed: 1st, *The least possible degree of injury should be done to the roots*, especially to the *spongioles* they bear; 2d,

In proportion to the degree of injury sustained by the spongioles, the exhaling surface must be reduced, or some other means be employed in order to produce an artificial equilibrium; 3d, This *artificial equilibrium must be maintained* by the favourable external conditions of quietness and repose (so to speak) *until the roots become re-established*, and enabled again to perform their part in the economy of the plant.

Next in importance to the principles which should guide the transplanter, is the season at which he carries them into practice. It has already been stated that any plant *may* be removed at any time with success, provided certain conditions are complied with. These conditions being chiefly the obstruction of the perspiration from the leaves and branches, so as to meet the deficiency of supply resulting from the mutilation of the roots; the supplying of abundant moisture, so as to aid the roots in meeting the demand upon them; and the careful performance of the operation. The processes thus involved are, however, too tedious and expensive for general application in the case of tree-planting; and hence it becomes essential, as a general rule, to select that season of the year for the operation when the evils which have been alluded to may be experienced in the least possible degree. That season is the autumn; for then the plants are in their least active condition; the leaves or perspiring organs of deciduous plants are then cast off, and those which retain their foliage are nearly inactive; the atmospheric conditions, moreover, are then most conducive to the inactivity of their organs, so that plants lifted at that period find themselves more or less established and ready for renewed action when the spring or season for action arrives. One reason of this is, that when trees are planted in the autumn, the warmth which the soil has acquired during summer not being quite expended, acts as a gentle stimulus to the roots, which soon form new spongioles or feeding-mouths, and thus the plants are placed in a condition to meet the demands made upon the roots by the expanding leaves and drying winds, which in the spring come upon the plants simultaneously. In the case of spring planting, however, the soil having been cooled down during winter, no such stimulus exists to bring the roots into play; the consequence is, that when the parching winds beat upon the plants, and the leaves burst from their scaly prison under the influence of the warmth of spring, the roots are unable to meet the demand, and the plant necessarily languishes in proportion to their incapacity, which, if excessive, results in its death. This refers principally to trees and shrubs. In the case of flower-garden plants, and culinary crops, which are required to be planted at various periods throughout the year, and especially throughout the spring and summer, the success of the operation depends a great deal upon the selection of favourable intervals, when the atmospheric conditions do not very greatly excite the perspiratory organs of the plants, and upon the careful removal of the plants, so as to mutilate the roots as little as possible. Showery periods are, therefore, the most proper to select in these cases; and if showery weather does not offer, then dull, calm weather; or if this does not happen to present itself, the only alternative is to plant towards evening, that the plants may have the benefit of whatever they may be able to do towards establishing themselves during the night. Sometimes shading must be resorted to; and at all times, if the weather and the soil be dry especially, water must be freely supplied. Plants which are planted out of pots are liable to but little of the checks which have been alluded to, and may therefore be operated on with a proportionately less amount of risk, or will succeed with a proportionately less degree of after attention, provided they are at first fairly planted.

Passing by these to the practical requirements of successful transplantation, the next in order of importance is the preparation of the soil, which involves draining, pulverizing, aërating, &c., by the means which we have often pointed out. On this part of the subject we may be very brief, inasmuch as what has been formerly advanced in reference to the healthy preparation of the soil, is of general application.

With regard to draining, no plants will thrive if the soil is filled with stagnant water, unless it be an aquatic or semi-aquatic. Plants of this water-loving character are, therefore, those only which should be expected to grow where perfect drainage is either neglected or unattainable. For every other description of plant, the provision of means for the passing away of superfluous water is essential to success.

The mechanical condition of the soil is of importance. Thus, soils should not be so loose and porous in texture as to admit of the too rapid evaporation of the moisture they are capable of holding; neither should they be so close and adhesive as to prevent the free passage both of fluids and of the atmosphere. Soils which are naturally of either of these conditions must, besides being drained and trenched, be corrected by the addition of earths of an opposite quality; which latter are to be blended with the original soil in the proportion necessary to produce a free, friable, and pervious medium for the roots. But when all this is done, the whole mass of soil

(unless it be very light) should be well broken up to a moderate degree of fineness; not, indeed, so as to render it excessively fine, or, except in certain cases, to remove stones of moderate size from among the earth, but so that there may be no large compact lumps of soil left in an undisturbed and unbroken state. The principal reason for this being done, is, that the whole body may be pervious to the air; and there is also another reason, namely, that the earth may be evenly and regularly placed over and among the roots,—that, in fact, the roots may be perfectly imbedded in the soil, which is not always the case when coarse, rough lumps are placed in contact with them. The pulverising of the soil, moreover, assists to hold the plants more firmly than would be the case under opposite circumstances. It should be made a rule, to cover immediately over and about the roots of a plant with a portion of the finest and best soil which is available; when this is done, the roots are just placed in the conditions most favourable to the production of new spongioles or feeding-mouths, upon which the success, or otherwise, of the plant almost entirely depends.

In connexion with the mechanical condition and preparation of the soil, it may be proper to observe, that in many cases it is practicable, and where practicable proper, to adapt the plants to the general character of the soil; thus, on barren sandy land, many of the coniferous plants would be found to thrive, while perhaps little else would grow. This principle is extensively applicable in the case of shrubberies and plantations. In gardens, however, whether for vegetable, fruit, or flower culture, and in the case of ornamental shrubberies, the principle cannot be acted on to any great extent; since, under such circumstances, certain kinds of products will be required, and the soil and situation must be made adapted to fulfil these requirements. To illustrate this, if a bed of American plants, as they are called (that is, azaleas, kalmias, rhododendrons, &c.), is required, it will be proper to make the soil for them, and to provide, in this case, that which is adapted to their wants. The same thing may have to be done with different kinds of vegetables, fruit-trees, or flowers, sometimes entirely changing the bulk of the soil, at other times merely adding what will correct it, and adapt it to the end in view.

A word or two may be said on the propriety or non-propriety of planting—we mean simply the idea of removing a growing plant from one place to another. We are inclined to the opinion, that, supposing the circumstances of soil and situation to be favourable, no plants thrive better than—we may almost venture to say, so well as— those which are sown where they finally remain. Many of our annual cultivated plants are so difficult to transplant, that it is seldom or never attempted, except as an expedient; and most persons can call to mind examples which are familiar to them, of extreme health and vigour in self-sown and undisturbed seedling plants. We should not, therefore, transplant from choice. But beyond the case of certain culinary crops, and a few kinds of flower-seeds, the idea of sowing seeds in the places the future plants are designed to occupy, is impracticable. With all other cultivated plants it is a matter of convenience—a necessary evil, as we should say—to sow the seeds in some allotted and appropriate spot, and from thence remove the young plants to such other positions as they may from time to time be required to occupy. And it is exceedingly conducive to the comfort and happiness, as well as prosperity, of mankind, that the nature of plants will admit of this artificial treatment. When plants are reared for the purpose of being transplanted, it is desirable that they should be finally planted out as early as possible; and essential that they should not be allowed to remain undisturbed for too long a period previous to their final removal. Annuals and suffruticose and herbaceous plants may be shifted once or twice at intervals of about a month, the former perhaps rather less; and trees and shrubs, as long as they stand in abeyance, at intervals of a year in some cases, and two years in others.

When plants are transferred from pots to the open ground, it is proper to loosen out their more or less entangled roots, and to spread them out in a radiating manner from the stem of the plant, carefully adjusting them in this way, and covering them with fine soil. This practice is very often neglected, from a prevalent idea that it is safer, in such cases, "not to disturb the roots," and that to break up the ball of earth in which the roots are imbedded would risk the life of the plants; the idea is, however, a fallacy. Instances must be known to every experienced person, in which the languishing existence, or the death of a plant, may be clearly referred to the practice of this untoward custom. The proper way to act in cases of this sort, is to break up the ball of earth completely, and to unravel the entangled mass of roots as far as practicable, avoiding, however, as much as it may be possible to do so, the breaking or bruising of the roots themselves. In all cases, however, whether it is possible or not to preserve the roots thus uninjured, it is more conducive to ultimate prosperity, to disentangle and "lay out" the roots in straight lines near the surface of the soil, than to suffer them to remain coiled up in the position they acquire from

confinement in pots. It may, therefore, be laid down as a rule:—Uncoil the roots of pot-plants in planting them out into the free soil—uninjured, if possible, but uncoiled, at any rate.

The position of the plant in reference to the surface level, is of much importance in a general way. The rule should be, to plant shallow, the cases in which deep planting is desirable being very rare. There is in plants a part called the neck or collet, which in seedlings is readily seen to be that which, in the young state, intervened between the proper roots and the seed-leaves: in plants raised from cuttings or layers, the corresponding part is found just above the roots. It is, therefore, most intelligibly defined, as the point whence the stem takes an upward, and the roots a downward direction—the point of junction, in fact, between the roots and the stems. This point should not be covered by the soil. Nature teaches this: a seedling plant, springing up under natural circumstances, elevates its seed-leaves just above the surface, and this point of the stem never alters its position with respect to the surface; so that naturally it does not become covered with soil. When, therefore, we resort to the unnatural process of transplantation, we should keep this fact in mind, and act upon it, by counteracting the tendency which exists to fix the plants deeper and deeper in the soil at each successive shifting. Some free-growing plants do not, indeed, refuse to grow vigorously enough when this matter is disregarded; but in the case of all those of more delicate habit, it is much the safest way to have it attended to; indeed, choice plants are (unless the soil and situation be very dry and liable to become parched) generally the better when their roots are spread out *on* the natural surface, the necessary covering being applied in the form of a slight mound about the stem, extending sufficiently on every side to cover them securely. This rule applies most particularly to ligneous or woody plants; and of these, to such as do not very readily throw out fresh roots from their stems. Herbaceous plants more readily produce roots from their stems; and in proportion to the facility with which this is done, is the advantage of planting them deeper than ordinary. In the case of such herbaceous plants as produce a crown or tuft of leaves from the roots, as in the common garden parsley for example, it should be considered as an absolute rule, that the heart,—that is, the growing point in the centre of the crown of leaves, must be kept more or less *above* the surface of the soil; but if this is secured, it is in general proper to set the tuft of leaves down close to the surface.

These are somewhat general considerations. We may now proceed to notice in detail the manner of planting large trees, smaller trees and shrubs, herbs, bulbs, aquatics, and seedling plants respectively.

Transplanting Large Trees.—This operation is one involving considerable manual labour, which it is important should be well applied. Before detailing the process, we may address ourselves to the correction of what, under most circumstances, is an error common in the execution of it. The error alluded to, is that involved in the notion of preserving a ball or mass of earth about the roots. We have already explained that the active agents in absorbing nourishment from the soil, are the spongioles which exist at the points of the smaller fibrous roots, these being chiefly present towards the extremities of the entire system of roots. The expanse of the roots is usually reckoned as being about equal to that of the branches. Now, it is seldom practicable to retain and move a mass of earth about the base of the stem larger than from six to ten feet in diameter; and even this is difficult, and the presence of such a mass of earth, generally, as a matter of necessity, rounded into as compact a form as possible, renders difficult the process of fixing the tree in its new destination. It must be obvious that trees of a large size, say with a diameter of branches equal to twenty-five feet, can never have the extremities of their roots secured in a mass of earth ten feet in diameter; in fact, not more than one-half of the length of the roots will be secured, and this half the most inactive and useless as concerns the immediate nourishment of the plant. It must be admitted, that, under any circumstances, few of the spongioles can, in such cases, be retained uninjured, so that new feeding-mouths must be formed after removal; but the greater the proportion and extent of young roots preserved uninjured during removal, the greater is the power which exists in the tree, and which can be exerted by it, for the production of these new spongioles, after it is replanted, and consequently the safer is the operation of removal. This will be best illustrated by an example. Suppose a large tree, whose roots may be calculated to occupy a space of about ten feet in diameter, is to be removed. The usual practice would be, to dig out a trench all round the tree, at from two to two-and-a-half feet from the trunk, with the view of retaining and moving the mass of earth thus circumscribed; in doing this, all the roots which cross the excavated trench would be cut asunder, and, of course, the portion exterior to the trench would be lost to the tree. A good ball of earth is, however, secured; and this is often dressed off by the removal of every projecting root. Such a tree would be

thought safe, but it would often prove otherwise, and even did it live, its progress would for some time be arrested. This results from two things: first, from the abscission of the younger portions of the roots; and secondly, from the drought to which the few remaining roots embedded in the compact ball of earth would be subjected; for, even supposing the overhanging branches of the tree not to obstruct the rain from reaching the soil beneath them, the compact mass would be more or less impenetrable to moisture, and the fresh moved and more porous earth around it would absorb the greatest share.

These remarks will form a proper introduction to a detail of the process which should be followed. In the first place, begin at about eight or ten feet from the trunk, removing the soil down to the roots with a fork, in preference to a spade. When any roots are discovered, follow them up carefully towards the trunk, clearing away the soil with a fork or a light pick-axe, and removing it with a shovel. In this way, all the soil is to be loosened from about the roots, and removed down to the lowest bed of roots, and up to within a short distance of the trunk, where a small portion of soil may be permitted to remain to steady the tree. Collect the roots together as they are cleared, and tie them up in bundles in a piece of wetted garden mat; the roots should *never* be exposed so as to become in any way dried or shrivelled. When the roots all round are thus cleared and secured, the tree must be undermined with a long-pronged pick-axe, the tap-roots, if any, being cut through; it is then to be pulled over on one side by means of a rope attached to the branches, and the other side is to be undermined and the tap-roots severed. A small embankment of earth is then to be rammed firmly against the under-side of the ball, and the tree is to be pulled over on the other side, and the embankment repeated against the part thus exposed. In this way, the ball of earth becomes fairly detached, and slightly raised out of its place. If of considerable weight, the tree must be removed by a machine; which may be a pair of wheels attached to a strong axle-tree, with a spire or pole for draught. Before the tree is pulled upright, a stout plank about six feet long, with an iron ring at each end, is placed under the roots; the machine is then backed close to the tree, and the spire or pole elevated to the perpendicular, and fastened in two or three places to the bole of the tree, taking care that wherever the tree and machine are likely to come in contact, plenty of matting, straw, or some other material, is placed, to prevent the tree from being injured by rubbing. Ropes are next run through the rings of the plank, which is made firmly fast to the axle. A strong rope is now tied to the ring at the end of the pole, by means of which a pair of horses draw it down. The machine should be so set, that when thus pulled down the longest of the branches are uppermost. When the head of the tree is brought down, it is caught by men ready at hand, to prevent its being smashed on the ground, or falling back into the hole, one of which it would do, according as the roots or the top preponderated in weight; it should be made nearly to balance on the axle-tree, so that if the ball proves too heavy, it is to be still further reduced, or else some men must ride among the branches, in order that their weight may assist to make it rest horizontally on the bar. Such of the branches or roots as require tying out of harm's way are then to be attended to; and then the horses are put to the machine, and the tree is drawn away, root foremost. Some care is necessary in the progress of transmission, as jerks arising from unevenness of the ground, or other causes, would disarrange the tree, and either throw it on its roots or top, either of which would sustain damage.

The excavation for the reception of the tree should have been prepared previously, and must be large enough to contain the roots when laid out straight. The machine bearing the tree is drawn to the side of the opening, which on that side should be made sloping, so that the wheels may run down to the level of the bottom of the hole. The horses are then removed, and the machine lowered down the inclined plane by the men, and the wheels are stayed firmly at the point which it is judged will bring the tree to the centre of the pit when the pole of the machine is raised; while this is being done, the lower roots are held aside, so as not to be doubled up beneath the ball, and then the pole is raised by means of the rope and the preponderance of the weight of the butt-end of the tree, which is thus set upright in the hole prepared for it. The various fastenings are now unloosened, and the machine drawn away; the tree is pulled aside, and the plank removed. It is then ready for planting, unless it happen not to be set in a right position, when it requires turning. This turning is to fix the tree in the same direction, in reference to the points of the compass, in which it has formerly stood. It is effected thus:—A man holds a rope fastened to the top of the tree, and others take hold of the stronger roots; then, by an united effort,—the top being pulled a little aside, and the butt twisted round,—the tree gets lurched into the required position. The stay-ropes are then held loosely, so as to show which way the tree leans, if at all; if it leans to one side,

it is pulled upright, and the men commence ramming earth under and against the faulty side, until the tree is enabled to keep an erect position independent of the ropes. The process of filling in the soil then remains, the men working by threes, one holding the roots, another throwing in fine soil, and the other ramming it down firmly under the ball on every side. A layer of good soil is then spread over the bottom of the hole, and the lower tier of roots laid out, and covered with fine earth, which is to be trodden firmly down. The next layer of roots is similarly treated, and so on, until the whole is filled up. The soil must be rendered close and firm, and especially about the larger roots, which are apt to spring up after treading on them, unless the soil is made very compact beneath and around them by means of the rammers. The manner of determining when the tree is upright, is thus:—One man standing at some distance holds the tree with a rope, another places himself so that his position forms a triangle with the tree and that of the man with the rope; these men, if they have a correct eye, are, from their position, enabled to see when the tree is upright. If the roots of a tree are firmly fixed in the manner above detailed, it will seldom, if ever, suffer from the action of winds, but may generally be left as planted; should, however, any of them be found to give way, they must be supported. The surface of the ground should be left fine and even after the operation, which is best performed in the month of October, when the soil is in a moderately moistened state.

Planting Smaller Trees and Shrubs.—The process in these cases, as compared with that just detailed, differs more in degree than principle; it is, however, much more easily accomplished. The first consideration is the preparation of the soil. It is not enough that pits should be thrown out large enough to receive the mass of soil removed with the roots, technically called the "ball," while the adjacent soil is left in a consolidated state. The soil should be well broken up, for some distance at least beyond where the roots will extend to in every direction; in planting masses of trees and shrubs, this will be most readily and effectually done by first trenching up the soil; although, even to this, in some instances, forest planting may be an exception; but, in the case of isolated plants, the ground should be broken up around each tree for a yard or more beyond the extremities of the roots. The openings should next be prepared; these should be large enough to admit of the roots being laid out straight in every direction, and just deep enough to allow the plants to be set a trifle higher than before; the fine soil should be laid by itself, where it may be easy of access to place among the roots at planting time, and the bottom should be well broken up, and made slightly highest in the centre; it is an advantage to have these openings made some time before planting, as the soil then gets well aërated. The plants should now be taken up. If they are choice and valuable plants, the plan is, to open a trench around them, leaving a circular mass around the roots about equal in diameter to the branches; this mass is then undermined, and then a portion of the soil is removed from among the roots, taking care not to break or injure any of the latter; in this way, the size of the "ball" is reduced according to circumstances. In transporting the plants, if the distance to which they have to be removed is considerable, a mat or two should be bound firmly around the "ball," to prevent its being loosened and broken; for the breaking of this mass of soil would involve the breaking-off of many of the spongioles, which it is most important to preserve. Previous to setting the plant in the opening prepared for it, the depth of the ball should be examined, so as that the plant may be set at once at the proper depth, all unnecessary removals being objectionable. It is then placed in the required position, and soil is thrown in and rammed against the lower part of the "ball," so that the plant will bear itself upright. The roots are then spread out in layers, and covered with fine soil, which is trodden or rammed firmly about them, the surface layers being left smooth and even, and also loose. With commoner and free-growing subjects the same routine has to be gone through, but the various operations are less carefully performed. The fewer roots cut asunder, the better. Some of the larger and longer ones are often necessarily severed; and where this is the case, the end should be cut smooth with a sharp knife, and a sloping upward cut, so as to facilitate its healing. Every care should be taken not to break off the smaller fibres from those parts which are retained. The plan of "watering in" is an excellent one in dry seasons, and in dry soils, but of much less importance and utility when the soil is either naturally or artificially moderately well moistened. It is done thus:—When about three parts of the soil has been returned over the roots, a quantity of water is poured in, enough to saturate the whole mass; this is allowed to stand till the water has soaked away, leaving the soil wet and compact about the roots; the remainder of the soil is then filled in loosely, to prevent the evaporation of the moisture. Should it be necessary to repeat the watering subsequently, the surface soil is to be drawn aside, and again returned after the water—which should be applied with a liberal hand—

has soaked away. With care, any tree or shrub may be transplanted successfully at almost any period; but the winter season, extending from September to March, is generally preferred. Early autumn is the best of all seasons; and mild open weather in the early part of winter is preferable to late spring planting for all kinds of trees and shrubs. It is important to prevent, by any and every means, the drying of the roots while the plants are out of the ground.

Planting Herbs.—Herbaceous perennial, biennial, and annual plants, are necessarily removed at various periods throughout the year. In spring and autumn, and dull showery weather in summer, they may be removed without being subjected to much inconvenience, owing to the limited area occupied by their roots; but when it is required to transplant them, during ordinary summer weather, it is necessary to adopt such means as may be available of protecting them from injury through exposure to hot sun-rays; this is done by planting towards evening, giving at the same time a good watering, in which case, if the plant was well rooted, it will almost establish itself in the course of the night, and, at all events, will not suffer materially in the following day. Or if a showery day intervene, it should always be turned to account, in forwarding all planting at that time requiring to be done. Shading by means of various contrivances, applied during the hotter portions of the day, is also a useful help, and should be adopted when practicable. Further than this, dependence must be placed on the free application of water, the removal of the plants without damage to their roots, and the careful re-adjustment of them in their new situations. The tools most generally used in planting subjects of this description, are the dibble and the trowel. For the smaller plants the former is the more expeditious tool; but in all other cases, the trowel is calculated to do its work better, and a modification of it, in the shape of a small hand-fork, is perhaps the most perfect instrument that can be used. Before the plants are taken up, the soil should be well watered, if at all dry naturally. The fork should then be inserted behind them, and the plants—roots and all—carefully lifted out of the soil, retaining as much soil about the roots, and as many roots uninjured, as may be possible. These roots must not be allowed to dry from exposure to sun or wind, but should be planted immediately, or as soon as possible after being taken up. For all plants with a little tuft of roots and soil, the trowel or fork should be used in planting; a hole should be taken out larger than the "ball," —the ground being either entirely dug or trenched, or loosened around for some distance,—the plant set into it, without having any of its roots bent under or cramped, and then the fine soil taken from the surrounding surface is to be filled in carefully around the roots, and slightly consolidated by pressure, either with the hand, foot, or back of the tool. If this takes place during dry weather or under circumstances in which watering is required,—that is, if either or both the soil and atmosphere be parched,—the water should be applied when about three parts of the soil is filled in; and when it has soaked away, the remaining soil is to be filled in loosely, and levelled. Enough water should be given to soak the soil thoroughly all round the roots. If after-waterings are required, the surface soil should be drawn aside, and returned again after the applied moisture has soaked in. A temporary shade of evergreen boughs, stuck into the ground on the sunny side, is, in dry hot weather, and in the case of choice plants, often very desirable. Very small plants may be transplanted after the method described under the head, *Planting Seedlings.*

Planting Bulbs, &c.—Bulbs and tubers are, with very few exceptions, planted when in their inactive condition. There are two plans followed in planting them; either the surface soil is displaced before and replaced after the bulbs are distributed over the ground; or holes are made with a blunt-ended dibble, and the bulbs dropped in, and then covered over. The latter is an objectionable plan, especially on soils inclined to be adhesive, and in all cases where the soil is at all overcharged with moisture; for by the compression of the soil at the sides and bottom of the hole, a basin is formed, which more or less effectually retains moisture about the bulbs, which is in all cases injurious, and sometimes fatal to them. When the bulbs are to be planted in detached patches, the soil should be removed to the proper depth by the hand-fork, and below this should be loosened up; the bulbs are then to be placed at the proper distances apart (which varies according to size and habit), and covered over with soil, which should be finished off neat and level on the surface. Where they are planted in a connected form, as in beds, there are two plans adopted. The bed is first to be dug up, or what is better, if practicable, laid up in rough ridges for some time previously, and then forked down level at planting time. Then, either broad flat-bottomed drills are made with the hoe, and the bulbs placed along the bottom of the drill, and covered by levelling the displaced soil with the rake; or, the whole of the surface soil is taken off,—either drawn off with the hoe, and removed with a spade or shovel, to the proper depth, the bulbs set at the desired distances, and covered by carefully replacing

the former surface soil, or some other fine compost substituted for it. This last plan is generally followed, with more or less of nicety in the execution, in the planting of florists' flowers, as it admits of a more even and regular distribution of the bulbs, both as regards position and depth. The smaller class of bulbs and tubers, such as anemones and snowdrops, should be planted about two inches deep; larger ones, as tulips and hyacinths, about four inches; and still larger ones, such as those of many kinds of lily, six inches beneath the surface. These depths admit of variation for special objects; thus, the bulbs may be planted a trifle deeper, as a means of protection from severe frosts in the case of those least able to bear its rigours. The distance at which the bulbs are placed admits of considerable variation; where they are planted in beds in a regular and formal manner, rather less than their respective heights may be taken as a good mean distance, but if they are planted in patches, they may stand much nearer together, the largest not requiring to be more than six inches asunder; and the smaller ones should be placed within an inch or two of each other, and so as to form large-sized patches. The smaller bulbs planted as edgings should form a close double row.

Planting Aquatics.—Such plants as are placed near the margin of water, may be planted in the bank by inserting a spade, pushing it in opposite directions to form a small chasm, into which the roots are to be forced, and the plants fixed by pressing the soil firmly about them with the foot. It is sufficient to fix merely such plants as these aquatics, for they grow with the greatest freedom. The chief difficulty lies in fixing those which, requiring deeper water, have to be placed at some distance from the bank; such are the various kinds of water-lily. A ready means of fixing them, consists in placing around their rootstocks a heavy lump of clay; they may then be dropped into the places allotted for them, and when once fairly started will take care of themselves. Another plan is, to plant them in wicker baskets filled with heavy mud, which are then dropped into the places where they are required.

Planting Seedlings.—By this is intended the nursery transplantation of seedlings while in their infant state; which operations bear the common designation of "pricking out." Where seedling plants have eventually to be transplanted, this pricking out is of much advantage to them in the way of preparation; it checks the formation of the leading or tap-root, which almost all plants naturally produce, and favours the emission of a much larger number of lateral roots and fibres, so that plants which have been pricked out, are in a more favourable condition for subsequent transplantation than they would be if allowed to grow on undisturbed from the first. In the case of vegetable crops intended for transplantation, it is customary to prick them out as soon as about a pair of leaves besides the cotyledons or seed-lobes are expanded. A piece of ground is wrought to a fine surface, and the plants being raised up with a thin-pointed and flattened piece of wood, so as not to break their roots, are inserted at equal distances all over the ground, at one, two, or three inches apart, varying according to the size of the plants and the length of time they are intended to remain in that position. If the subject be a choice one, the young plants are lifted carefully, so as not to damage any half-germinated seeds; and a second or third crop is transplanted from the same seed-bed, as the plants attain sufficient size. Sometimes, in the early part of the year,—the object being chiefly to afford protection and to forward particular crops,—seeds are sown either in a frame or in boxes or pans; and the seedlings also are transplanted or pricked out into other frames, boxes, or pans, in which they are protected in accordance with the object in raising them. The plants are inserted in the ground by means of a blunt-pointed stick large enough to form, when thrust into the soil, a hole fully as large as the diameter of the mass of soil and roots adhering to the plants; this is thrust into the ground in a slightly slanting direction, and deep enough to allow of the roots being laid straight; the plant is placed so that the seed-lobes are a little above the surface, and it is then fixed by pressing in the soil on the upper or front part by the point of the dibble; in doing this, it is necessary to take care that the hole is filled to the very bottom, or the roots become suspended over a chasm, and are thus in some measure prevented from striking into the soil.

The seeds of flowering plants are sown and the young seedlings treated in a similar manner to that just described; only, as they are commonly more choice, often smaller, and less numerous, the operation is perhaps performed with more nicety and care, finer soil and smaller dibbles being employed, and the plants removed as soon as their seed-lobes have become fairly expanded. The operation is not otherwise different in the two cases. When seedlings are raised of any kind of plant requiring peculiar soil, the seedlings should have that kind of soil, rendered more than commonly porous by the addition of sand; indeed, in all cases soil of rather a sandy texture is preferable for the purpose, as it

tends to check over-exuberance of growth, and to increase the proportion of fibrous roots —points to secure which the practice itself is resorted to. The surface soil must be fine in proportion to the minuteness of the plants, and should be made tolerably firm before inserting the plants. A medium state of moisture is most favourable for the operation; as, if too dry, the holes are made with difficulty, and the contact injures the roots; and if too wet, it is adhesive, or with difficulty adjusted about the plants, especially if they are small. The operation should close by a moderate watering, applied in the form of a light shower; larger plants may be watered through the fine rose of a watering-pot; smaller ones through the fine rose of a syringe held at some distance; and the most minute should be watered by throwing the water lightly over them from the hairs of a common clothes-brush.

THE CHISWICK AND REGENT'S PARK SHOWS OF 1849.

The Horticultural Society of London, after many years of fine weather, have had two or three reverses, and the effect has been very detrimental as far as the numbers of visitors are concerned. The Royal Botanic Society may be told that there is no prayer so appropriate and becoming for all those who wish the Society well, as the few impressive words,—

"Save us from our friends."

For one of their servants, in a public journal, has taken the very dangerous ground of comparing the number of visitors at the Royal Botanic Gardens with those at Chiswick; we say dangerous ground, because he provokes at once a comparison as to the quality; and however the quality may satisfy him, the pounds, shillings, and pence, may not be the only consideration at Chiswick. The Regent's Park is about a three-penny ride from the Strand and Fleet-street, and omnibuses run every two minutes or thereabouts. Mr. Marnock compares numbers, as if numbers were the only criterion of success; and we are bound to account for the advantage he claims, not merely by the quality of the visitors, but by the object of the Societies. The Horticultural Society of London aims at something beyond the mere grasping at crowns. So far as it is calculated to advance the funds and not detract from the object, the more company that attends the shows the better, but the number must not at any time be at the expense of quality. The boasting of numbers would be very well for the managers of Cremorne against the proprietor of the Grecian Saloon —both shilling admissions, without restriction. All turns then upon the locality and the attraction. In the Chiswick Gardens, there is no danger of meeting one's own servants, sent in with tickets from our own butchers, bakers, oilmen, grocers, and fishmongers. There is no forcing of tickets, nobody dreams of canvassing for visitors, no butlers, stewards, and ladies' maids, are sent to canvass all the straw-bonnet makers, and milliners, and drapers, and dressmakers, and tailors, and hatters, and greengrocers, to take tickets, to get up a number. If the love of the science and the certainty of meeting people of station does not attract, no other attraction is held out; and it needs not a conjurer to tell, that the lower you descend in the scale of society, the more thousands you have to work upon.

There is no doubt, that the locality of the Regent's Park opens the doors to thousands who would never reach the end of a five-mile journey. The Chiswick shows, on the other hand, are none the worse for the lesser number of visitors; and we hope the day will never arrive, when the Fellows will try to increase the number of visitors by invitations to people of a lower grade, in either property or intellect, than themselves. Many a Society has been lost by trusting too much to servants, by giving too much power to persons of grovelling notions and little minds, men who calculate success by the money taken, instead of the objects achieved; men, in fact, who have lived like a grub, eat their way like a grub, and who, being suddenly elevated to a butterfly, merely live to leave behind them a succession of grubs, to do as they have done, to live as they have lived. We do not think it worth while to originate comparisons, but if one side of the question is forced *upon* us, the other is forced *from* us; and though we have never touched upon the subject before, we cannot help asking those who boast of the number of their visitors, to take a glance at their quality—and to recollect, that if the Horticultural Society would be less scrupulous as to the rank and station of those they admit, they could nearly treble the number. It would be more becoming of the gentleman to whom the management of the Botanic Gardens is entrusted, to chuckle over his increased numbers quietly, *if that only is the good the Society is doing*, than by publishing the fact to all the world, proclaim the great extent of business done in matters which never even formed items in the excuses for establishing the Society, and which have now usurped the place of scientific research and useful information. Let the Royal Botanic Society set up against Cremorne Gardens, but let the public know that such

are its objects. Let the Council beat White Conduit House and the Eagle Tavern, but let all the world be made acquainted with the fact, that emulation to excel these establishments is the exalted aim of the executive. We quote from the journal the Society's officer writes in, and upon his authority say, that in one season no less than twenty-nine thousand persons visited the gardens in the Park ; but we can in the same sentence remind the Council, that ten times the number of persons have been to "Cremorne." We are told that comparisons are odious, and we therefore advise every body who thrusts them upon the public, to be very careful that the advantages they boast are not realized at the cost of something yet more valuable,—and especially to remember, that the number of visitors at places of amusement is no test of the usefulness or the respectability of the establishment.

THE FOREST TREES OF BRITAIN.*

THERE can hardly be mentioned a subject on which the public are more interested than the timber which will flourish in this kingdom. The flowers interest us individually, and a large class will not fail to give them precedence; but, when we consider the part trees occupy in our rural scenery, and the important share they take in our ships, our buildings, and our manufactures, they must take the lead in the vegetable kingdom. It was a happy thought of the reverend author to collect and put in order all the information extant, and to furnish the reading public with a general description of the inhabitants of our woods, forests, and plantations. There is in the volume we have already noticed, and the one before us, a concentrated mass of information conveyed in a pleasant style, and those who hardly know an oak from an elm will feel a pleasure in reading of their native trees, and of others that have been naturalized. Few persons can read the volume without learning a good deal that they did not know, concerning even the most familiar of our trees and shrubs. How few of the inhabitants of our "woods and forests" are really natives ! The chestnut, although familiar and of noble growth in England, was, according to the best authority, brought here by the Romans, and the Tortworth chestnut is believed to be a thousand years old. The horse chestnut, still more common, is a native of Asia ; the birch, from the coldest parts of Europe and Asia ; so also the alder. The walnut is not even a native of Europe, nor have we any evidence of property in the lime. The plane belongs to America, and of course the oriental plane to the East. The acacia is an American; and we could go on to great lengths, dismissing one by one many that we are proud of, and would wish to think our own. The reverend author of the present volume gives us an excellent history of all the trees of any consequence that flourish in this country, and conveys many deeply interesting facts connected with the introduction, the culture, the uses, and general habits, of all he mentions ; besides which, we have descriptions of particular specimens at home and abroad, with fifty little historiettes which are associated with them.

The style of these volumes is much to be commended. There is just enough of botany, and scientific terminology, to do away with any doubt in the identification of the subjects under discussion—a matter too often disregarded in attempts to popularize those branches of knowledge which are in any way connected with science ; and at the same time we have none of the dry technical details which tend to render scientific subjects uninteresting to the general reader.

One extract would be as good as a thousand to remind our readers of the nature of the work, but we do not promise that we shall confine ourselves to one only. We shall first quote what is said of the Deodar, a tree comparatively new, that is, introduced of late years, and by no means near its maturity in England ; we take this subject because very little has been written about it by disinterested persons ; besides, it is an elegant tree, which, though not twenty years old in this kingdom, is in great repute, and cannot be too largely cultivated.

"THE DEODAR.

"CEDRUS DEODARA.

"The deodar, holy cedar, or Himalayan cedar, is known to us only as an ornamental plant of exquisitely beautiful outline and graceful spray, giving an air of refinement to every lawn and shrubbery to which it has been admitted ; but in its native haunts it is a magnificent tree, of rapid growth and enor-

* "The Forest Trees of Britain," Vol. II. By the Rev. C. A. Johns, B.A. F.L.S. Society for Promoting Christian Knowledge. 1849.

mous size, with the evergreen beauty of the cedar of Lebanon when living, and affording, when cut down, timber not simply durable, but imperishable. No wonder, then, that the untaught Hindoos should look on it with reverence, giving it a name expressive of this feeling, 'the gift of God,' and in some districts using its fragrant wood as a material for their temples, and burning it as incense on occasions of great ceremony.

"The leaves and cones are very like those of the cedar of Lebanon; but the general habit of the two trees is different in every stage of their growth. When young, the deodar resembles a luxuriant larch with a leafy base, but the branches are more delicate, and thickly clothed with foliage, and the extremities of all the shoots, even the leader, droop most gracefully. What will be the appearance of the full-grown tree in this climate it is impossible to conjecture. If it succeeds, which it gives every prospect of doing, it will prove one of the most valuable additions that has ever been made to the trees of Britain, both for the sake of its picturesque beauty and its timber.

"In its native state, the deodar grows high up on the slopes of the Himalayan chain, attaining an enormous size and hanging the sides of the mountains with a perennial coat of verdure. It is not unusual to see it in favourable situations with a girth varying from twenty-four to thirty feet, with a proportionate height and vast expanse. No adequate notion can be formed of the majestic character of the tree from the small-sized specimens now in existence in England. The deodar varies in appearance greatly during its growth. The young tree looks a good deal like the larch, rising in an elongated conical mass, tapering off into a bold leading shoot. When it attains a height of fifty or sixty feet, the terminal leader withers, the top becomes flattened, the lateral growth is increased, and the tree drops the character of the larch, and puts on that of the cedar. So much does its appearance alter, that the English residents at the hill stations, like Simla, imagine that there are two species: the old tree they call the Deodar, and the younger one, the Kelon. Nothing can exceed the grandeur of an old deodar of thirty feet girth. The branches begin to spread horizontally close to the ground, rising flight above flight in successive sheeted steps into a rounded or slightly flattened top. Seldom or never is the slightest trace of decay seen

in the trunk, and the tree never, except when growing in very exposed situations, puts on the depressed abrupt character of the cedar of Lebanon. Others of the fir tribe may compete with it in height and dimensions, but in economic value, beyond all question, it occupies the first place. The wood is light, strong, and compact, straight in the grain, free from knots, easily wrought, and highly perfumed with a most delightful aromatic perfume, which it never loses. In durability it is certainly without a rival; Kyanized by the hand of nature, it defies wind and weather, resisting the soaking rains of the Himalayan mountains for ages. Rot, under any aspect, is unknown to it. You will see in the Himalayas deodar timbers built into the walls of old temples now levelled nearly to their foundations; the surface bleached and ragged, but the body of the wood undecayed, and emitting its characteristic odour fresh as ever. In Cashmeer the pillars which support the roof of the great Mosque, built in the days of our later Henrys, are formed of deodar trees stripped of their bark; they exhibit not a crack or sign of decay, and still smell like pencil-wood. All the boats in the valley are built of deodar, and when they get crazy at the joinings by age, the old planks have their weathered surface planed off by the adze, and are then undistinguishable from the new wood, along with which they are rebuilt. The wood is so straight and equal in the grain, that it gives planks three feet broad simply by the action of the wedge. Timber-saws are unknown in the Himalayas. It is hardly possible to overrate its value as a timber-tree, or the advantages that would follow from getting it established in Britain, where there is every prospect of its doing well. It grows fast in favourable situations, sometimes making shoots two feet long in a single season.

"Bishop Heber, in a letter to Lord Grenville, giving an account of a visit which he paid to the Himalayan Mountains, describes it as a 'splendid tree, with gigantic arms and dark narrow leaves, which is accounted sacred, and is chiefly seen in the neighbourhood of ancient Hindoo temples, and which struck my unscientific eye as nearly resembling the cedar of Lebanon. I found it flourishing at nearly nine thousand feet above the level of the sea, and when the frost was as severe at night as is usually met with at the same season in England.'

"Mr. Moorcroft gives the following proofs of the durability of the timber: 'A few years ago a building, erected by the order of the Emperor Akbar, probably about 1597, was taken down, and its timber, which was that of the deodar, was found so little impaired as to be fit to be employed in a house built by Rajah Shah. Its age must then have been two hundred and twenty-five years.' He also describes a mausoleum, which was erected nearly four hundred years since, the walls of which are of brick and mortar, strengthened with beams of deodar. In this last instance, the sap-wood, which had been carelessly left in some places, had been pierced by a worm to the depth of a quarter of an inch, but the heart-wood, notwithstanding this long exposure to the weather, was neither crumbly nor worm-eaten, the only perceptible effect being, that the surface was jagged, from the softer parts of the wood having been often washed by the rain. He also obtained specimens of the wood from a bridge in Ladakh, which had been exposed to the water for nearly four hundred years. It has a remarkably fine close grain, capable of receiving a very high polish; so much so indeed, that a table formed of the section of a trunk nearly four feet in diameter, has been compared to a slab of brown agate.

"It is readily propagated by seeds, and may be raised also from cuttings. It has also been grafted on the larch, but can scarcely be expected to attain perfection, while dependent on the roots of a deciduous tree, the duration of which, compared to its own, is very limited. It has also been grafted on the cedar of Lebanon, with a better chance of success. The country is indebted for the first introduction of deodar seeds to the Hon. William Leslie Melville, who brought home some cones in 1831, and supplied seeds to the Horticultural Society, &c. By the liberality of the East India Company they have since been imported in large quantities, and trees are now so abundant, that although they were sold in 1838 at the high price of two guineas each, seedlings two years old may now be purchased at the rate of four shillings a dozen.

"The largest plantation of deodars which has been made in Europe is that of W. Ogilvie, Esq., secretary of the Zoological Society, who, on his estate of Altinachree in Tyrone, has planted eleven acres."—Pp. 419—423.

The work is illustrated, as most of the works of the Society for Promoting Christian Knowledge are; that is, with a great number of beautifully executed engravings, (no less than a hundred and eighteen,) either specimens of extraordinary trees which have been connected with many historical events, or with explanatory sketches of the flowers and seed-vessels of the subjects under notice; and the work is neatly, or rather elegantly, printed, without which, indeed, many of the elaborate engravings would have been thrown away; and the reader will not fail to admire the

clever manner in which the reverend author has compressed so much information in so small a space.

Our further extracts, however, with the illustrations, will sufficiently recommend the work, without any further panegyric from us.

"THE CHILI PINE.

"ARAUCARIA IMBRICATA.

"When the numerous trees, which have been introduced into Great Britain during the last fifty or sixty years, have attained to perfection and in a measure altered the features of artificial landscape scenery, no tree will contribute so much to produce this effect as the araucaria, or Chili pine. Seen from a distance, it has just enough of the character of the fir tribe to point out its relationship, but is unlike them all; and when inspected more closely, it bears not the least resemblance to any tree known in Britain, and even, to any eye but that of a botanist, it no longer has any affinity with the firs.

"In its native haunts, the Cordillera chain in Chili, it is a lofty tree, exceeding a hundred feet in height, with a straight trunk, covered with a thick cork-like bark, which abounds with resin. The branches are longest and most numerous near the base; thus the tree has a pyramidal form. The leaves are broad, rigid, tough, and sharp-pointed, remaining attached to the tree for many years. The branches are cylindrical and thickly covered by the clasping leaves, resembling, as London happily remarks, 'in young trees, snakes partly coiled round the trunk, and stretching forth their long slender bodies in quest of prey.' The araucaria, as we are acquainted with it in England, is rather a singular than a beautiful tree, giving a foreign air to every place where it is planted, but not possessing elegance of form. On the steep rocky ridges of the South American mountains, it would seem to be no less majestic than singular. 'When we arrived at the first araucarias, the sun had just set; still some time remained for their examination. What first struck our attention, were the thick roots of these trees, which lie spread over the stony and nearly naked soil like gigantic serpents, two or three feet in thickness; they are clothed with a rough bark, similar to that which invests the lofty pillar-like trunks, of from fifty to a hundred feet in height. The crown of foliage occupies only about the upper quarter of the stem, and resembles a large depressed cone. The lower branches,

eight or twelve in number, form a circle round the trunk; they diminish till they are but four or six in a ring, and are of most regular formation, all spreading out horizontally and bending upwards only at their tops. They are thickly invested with leaves that cover them like scales, and are sharp-pointed, above an inch broad, and of such a hard and woody texture that it requires a sharp knife to sever them from the parent stock. The general aspect of the araucaria is most striking and peculiar, though it undoubtedly bears a distant family likeness to the pines of our country. The fruit, placed at the ends of the boughs, are of a regular globular form, as large as a man's head, and each consists of beautifully imbricated scales, that cover the seeds, which are the most important part of this truly noble tree. Such is the extent of the araucarian forests, and the amazing quantity of nutritious seeds that each full-grown tree produces, that the Indians are ever secure from want: and even the discord that prevails frequently among the different hordes, does not prevent the quiet collection of this kind of harvest. A single fruit contains between two and three hundred kernels; and there are frequently twenty or thirty fruits on one stem; and, as even a hearty eater among the Indians, except he should be wholly deprived of every other kind of food, cannot consume more than two hundred nuts in a day, it is obvious that eighteen araucarias will maintain a single person for a whole year. The kernel, which is of the shape of an almond, but double the size, is surrounded with a tough membrane, which is easily removed; though relishing when prepared, it is not easy of digestion, and containing but a small quantity of oil, it is apt to cause disorders in the stomach with those who are not accustomed to this diet. The Indians eat them either fresh, boiled, or roasted; and the latter mode of cooking gives them a flavour something like that of a chestnut. For winter's use, they are dried after being boiled; and the women prepare a kind of flour and pastry from them. The collecting of these fruits would be attended with great labour, if it were always necessary to climb the gigantic trunks, but as soon as the kernels are ripe, towards the end of March, the cones drop off of themselves, and, shedding their contents on the ground, scatter liberally a boon which nothing but the little parrot, and a species of cherry-finch, divides with the Indians. In the vast forests, of a day's journey in extent, that are formed by these trees, in some districts the fruits lie in such plenty on the ground, that but a small part of them can be consumed.

"The wood of the araucaria is white, and towards the centre of the stem bright yellow. It yields to none in hardness and solidity, and might prove valuable for many uses if the places of growth of the tree were more accessible. It has been used by the Spaniards for ship-building; but it is much too heavy for masts. If a branch be scratched, or the scales of an unripe fruit be broken, a fragrant milky juice immediately exudes, that soon changes to a yellowish resin, which is considered by the Chilians as possessing such medicinal virtues, that it cures the most violent rheumatic headaches when applied to the spot where the pain is felt.

"The araucaria was first introduced into England by Menzies, who accompanied Vancouver in his expedition to Chili in 1795. Living specimens were given by him to Sir Joseph Banks, one of which is still growing at Kew. It was at first supposed to be delicate, and was protected from frost during winter, but it suffered from this mode of treatment, and having been deprived of its lower branches, the character of the tree was destroyed. One of the finest and handsomest trees in England stands in the garden of R. Dawson, Esq., Tottenham. It is twenty feet high; the branches descend to the ground on all sides, and the main stem is densely covered with leaves down to the very roots. It was planted out at the height of four inches in April, 1832.

"A writer in the *Gardener's Chronicle* recommends that the seeds of this tree, when planted, should not be buried beneath the ground, but simply laid on the surface, with a small quantity of earth raised around them, but not so as to cover them.

"Young plants, which in 1838 were sold at from three to five guineas each, may now be purchased for about two shillings each.

"Although the Araucaria, of which we have been speaking, derives its name from the Araucanos, a people of Chili, and therefore, strictly speaking, is a South American tree, there are two other species which inhabit the Eastern world. One of these, the Norfolk Island Pine, *Araucaria excelsa*, ranks among the most magnificent of known trees, rising to the almost incredible height of two hundred and twenty feet, with a trunk thirty feet in circumference. Mrs. Meredith, in her entertaining *Notes and Sketches of New South Wales*, thus describes some young trees which grew near her house in that country:—'The Norfolk Island pine is certainly the most noble and stately tree of all the pine family that I have ever seen, beautiful as they all are. The tall, erect and tapering stem, the regularity of the circling branches, lessening by small degrees from the widely-spread expanse below, to the tiny cross that crowns the summit of

the exquisite natural spire, and the really verdant, dense, massive foliage, clothing the whole with an unfading array of scale armour, form altogether the finest model of a pine that can be imagined. The cones too are worthy to grow on such a tree; solid ponderous things, as large as a child's head—not a baby's head neither—with a fine embossed coat-of-mail, firmly seated on the beam-like branches, as if defying the winds to shake them. Mr. Meredith climbed very nearly to the summit of our tallest pine, and said he had never seen anything more beautiful than the downward view into and over the mass of diverging branches spread forth beneath him. He brought me down one cone with its spray, if I may so call the armful of thick green shoots that surrounded it, and I was gazing on it for half the day after; it was so different from anything I had ever seen before, so new, and so grandly beautiful. The rigidity of the foliage had a sculpture-like character, that made me think how exquisitely Gibbons would have wrought its image in some of his graceful and stately designs, had he ever seen the glorious tree. One grew near to the front verandah, and some of its enormous roots had spread under the heavy stone pavement, lifting it up in an arch, like a bridge. When the cones ripened, the large winged seeds fell out in great numbers; they require to be planted immediately, as the oil in them quickly dries up, and with it the vegetative properties are lost.'

"It was introduced into England in 1793, but as it requires protection during the winter, its dimensions must be limited to the size of the conservatory in which it stands. 'It is a highly interesting fact,' says Dr. Lindley, 'that a plant very nearly the same as this araucaria certainly once grew in Great Britain. Remains of it have been found in the lias of Dorsetshire, and have been figured under the name of *Araucaria primæva*.'"—Pp. 425—432.

"THE HORNBEAM.

"CARPINUS BETULUS.

"*Natural Order*—AMENTACEÆ.

"*Class*—MONŒCIA. *Order*—POLYANDRIA.

"Of all our indigenous forest-trees, perhaps no one is so little known as the hornbeam; nor is this surprising, for although it frequently reaches a height of fifty or sixty feet, it has no strongly-marked distinctive character, and is often mistaken for some kind of elm, to which its foliage bears a great resemblance. It is found in most of the temperate countries of Europe and Asia, and is far from uncommon in several of the counties of England; in some it is so abundant, that it forms (as Sir J. Smith observes) a principal part of the ancient forests on the north and east sides of London: such as Epping, Finchley, &c. By the Greeks it was called *Zugia*, or 'yoke-tree,' from the use to which its timber was applied; the Latins call it *Carpinus*, the name by which it is still known to botanists.

"It has a straight and tolerably smooth trunk, which is slender and very frequently flattened, twisted, or otherwise irregular in shape, and is subdivided into a large number of long tapering branches, which diverge in such a way that the main stem is generally lost in the confused mass at some distance below the summit. The branches are remarkably liable to unite when they touch in crossing, hence very curious appearances are sometimes produced. The outline of the head is round, and possesses little picturesque beauty. The leaves are shaped somewhat like those of the beech, but are rough and notched at the edge like those of the elm; they may be distinguished from the former by their roughness, and from the latter by their being plaited when young, and by having numerous, regular, strongly marked veins. Like the beech, too, they retain their withered foliage on the young branches all the winter. The hornbeam when young is also very similar in habit to the beech, but the latter may immediately be detected, on examination, by its glossy leaves. The flowers appear soon after the leaves, in April, growing in catkins of two kinds, of which the fertile are succeeded by clusters of small angular nuts each seated at the bottom of a leafy cup. When these are once formed, the tree which bears them cannot be mistaken, for no other British tree bears fruit of the same kind. The leaf buds are longer and sharper than those of the elm.

"Owing to its partaking of several of the properties of other trees, some of the old writers were puzzled to find its place in the system. Pliny probably saw some resemblance between its clusters of nuts and the keys of the maple, for he places it among the ten kinds of maple, but adds, that others considered it to belong to a distinct genus. Its second name, Betulus, would seem to imply that it was, by some of the early botanists, considered a kind of birch, and one of its old English names, 'Witch-hasell,' points to the supposition that it was a kind of hazel. Gerard says, 'It growes great and very like unto the elme or wich hasell tree; having a great body, the wood or timber whereof is better for arrowes and shafts, pulleyes for mils, and such like devices, than elme or wich hasell; for, in time, it waxeth so hard, that the toughnes and hardnes of it may be rather compared unto horn than unto wood; and therefore it was called hornebeam, or hard-beam. The leaves of it are like the

elme, saving that they be tenderer: among these hang certain triangled things, upon which are found knaps, or little buds of the bignesses of ciches (vetches), in which is contained the fruit or seed. The root is strong and thicke.'

"Evelyn is loud in his praises of the hornbeam; for the tree being, as it is called, 'tonsile,' or very patient of being clipped by the shears, it was highly prized in the formal gardens of his day. 'It makes,' he says, 'the noblest and stateliest hedges for long walks in the gardens or parks, of any tree whatsoever whose leaves are deciduous and forsake their branches in winter, because it grows tall and so sturdy as not to be wronged by the winds; besides, it will furnish to the very foot of the stem, and flourishes with a glossy and polished verdure, which is exceedingly delightful, of long continuance, and, of all the other harder woods the speediest grower, maintaining a slender upright stem, which does not come to be bare and sticky in many years. It has yet this (shall I call it) infirmity, that, keeping on its leaves till new ones thrust them off, it is clad in russet all the winter long. That admirable espalier hedge, in the long middle walk of the Luxemburgh garden at Paris, than which there is nothing more graceful, is planted of this tree; and so is that cradle or close walk, with that perplext canopy which lately covered the seat in his Majesty's garden at Hampton Court. They very frequently plant a clump of these trees before the entries of the great towns in Germany, to which they apply timber-frames for convenience of the people to sit and solace in.'

"Dr. Hunter tells us, that the hornbeam was in great repute at the close of the last century for hedges. The plants were raised from layers, and set in single rows in a sloping direction, so that they crossed one another like large network. The parts where the stems crossed were stripped of their bark and bound together with straw. By this process they united into a firm palisade, and throwing out numerous shoots, in a few years formed an impenetrable fence. It was not uncommon, he says, to see the sides of high roads thus guarded for many miles together.

"The taste for forming 'labyrinths,' 'stars,' 'alcoves,' and 'arcades,' happily having now passed away, the hornbeam is only admitted into gardens for the purpose of forming hedges to shelter tender plants, and for this its numerous branches and the property which it pos-

sesses of retaining its leaves during winter, well adapt it. Another recommendation is, that it grows well in the coldest and hardest soils, and may consequently be employed where other trees would not thrive.

"The wood of the hornbeam is white and close-grained, and though not flexible, surpasses in toughness the timber of any other British tree. The unevenness of the trunk described above is, however, communicated to the fibre of the wood, and hence it does not take a good polish. This defect does not exist in the young wood, which is exceedingly well adapted for the yokes of cattle and all kinds of wheelwright's work, especially mill-cogs. Selby recommends that it should be planted extensively in cold, stiff, clayey soils, for the staves of fish-barrels. It ranks among the best of fuels, burning freely, and giving out a great deal of heat; it is highly inflammable, lighting easily and making a bright flame. This property was known to the ancients, for Pliny speaks of its being used for marriage torches. Its charcoal is highly prized, not only for ordinary purposes, but for the manufacture of gunpowder. The inner bark is also used, according to Linnæus, for dyeing yellow.

"A number of trees are recorded by Loudon averaging from fifty to eighty feet high, with trunks from six to nine feet in circumference, but none requiring any particular notice. At Aldermaston Park, in Berkshire, is a group of fine hornbeams, which were evidently planted to form one of the quaint devices so much in vogue in the seventeenth century. They surround an elliptical area thirty paces in length and fifteen in width, and, crossing their branches high over head, form a leafy dome far more imposing than anything which the planter could have contemplated. The original intention probably was, that they should have been trained to form a hedge, such as Evelyn loved to look upon; but they have long escaped from this unnatural thraldom, and now rise to a height of fifty or sixty feet, with trunks varying from three to seven feet in circumference, and beautifully covered with lichens.

"The hop hornbeam, occasionally met with in gardens and pleasure-grounds, approaches the common hornbeam in character, but belongs to the genus *Ostrya*. It is not a native of Britain."—Pp. 127—132.

"THE LIME TREE.

"TILIA EUROPÆA.

"*Natural Order*—TILIACEÆ.

"*Class*—POLYANDRIA. *Order*—POLYGYNIA.

"The lime or linden-tree was well known to the Greeks under the name of Philyra; and the Romans, Pliny tells us, held it in great repute for its 'thousand uses.' The timber was employed in making agricultural implements, and was also considered to be well adapted for shields, as it was said to deaden the blow of a weapon better than any other kind of wood. Pliny states also, that it was not liable to be worm-eaten. The bark was a common writing material, and when split into ribands was made into head-dresses, which were worn on festive occasions. In medicine its supposed virtues were very great; the leaves and bark had a healing power, and decoctions of various parts beautified the skin and promoted the growth of the hair. The seed was said to be eaten by no animal. Evelyn mentions that a book written on the inner bark of the lime, 'was brought to the Count of St. Amant, governor of Arras, 1662, for which there were given eight thousand ducats by the Emperor; it contained a work of Cicero, *De ordinandâ Republicâ, et de inveniendis orationum exordiis;* a piece inestimable, but never published, and now in the library at Vienna, after it had formerly been the greatest rarity in that of the late Cardinal Mazarin.'

"In the Middle Ages the same honours were paid to the lime tree which belonged to the poplar, a tree which derived its name from being the emblem of popular freedom. During the struggles of the Swiss and Flemish to recover their liberty, it was their custom to plant a lime-tree on the field of every battle that they gained over their oppressors; and some of these trees, particularly those planted by the Swiss in commemoration of their victories over Charles the Bold, are still remaining, and have been the subject of many ballads. 'At Fribourg,' Loudon informs us, 'there is a large lime, the branches of which are supported by props of wood. This tree was planted on the day when the victory of the Swiss over the Duke of Burgundy, Charles the Bold, was proclaimed, in the year 1476; and it is a monument admirably accordant with the then feebleness of the Swiss Republics, and the extreme simplicity of their manners. In 1831, the trunk of this tree measured thirteen feet nine inches in circumference.' Another tree stands near the same place, which is supposed to be nearly a thousand years old; its trunk is thirty-six feet in circumference and is still perfectly sound.

"When too we recollect that the father of modern botany, Linnæus, derived his name from the Swedish lin (our linden-tree), we must allow that it is recommended to us by the most pleasing associations.

"The lime-tree occurs in Europe under three forms,* which are distinguished principally by the size and smoothness (or the

* *Tilia europæa, T. platyphylla,* and *T. parvifolia.*

reverse) of their leaves. They are all natives of the middle and north of Europe, but the small-leaved species alone is considered to be indigenous to Britain. Though all these kinds have long become naturalized, we rarely see them growing in places where there is no room for suspicion that they may have been originally planted; yet there is, in the neighbourhood of Worcester, on the authority of Mr. Edwin Lees, a wood, remote from any old dwelling or public road, of above five hundred acres in extent, the greater part of the undergrowth of which is composed of the small-leaved lime. There are also in the same part of the country, trees estimated to be upwards of three hundred years old.

"The lime is a large tree, characterized by its pyramidal shape, by the multiplicity of its long, slender, and upright branches, which start from the main stem not many feet from the base, and by the unbroken surface presented by its abundant foliage. These characters give to half-grown trees, in which they are most conspicuous, a stiff and formal appearance, especially if they happen to be planted in rows. In older specimens, the weight of the lower branches frequently bends them down to the ground, so as entirely to conceal the trunk; the middle part of the tree is thus thrown open, and the pyramidal outline destroyed; the summit too becomes somewhat more tufted. Under these circumstances the lime is a stately and even picturesque tree, especially when standing alone or in groups of three or four on a sloping lawn. It is very patient of clipping, and, consequently, in the suburbs of large towns it more frequently disfigures than adorns, sometimes appearing as a mere leafy hedge, unmeaningly elevated on equidistant columns.

"The leaf is bright green, pointed and heart-shaped at the base, smooth above, and either uniformly downy beneath, or bearing small tufts of down in the angles of the veins. The flowers are scarcely less profuse than the leaves, and rendered very conspicuous by large yellowish-green bracteas, from the centre of which spring three or more stalked flowers. These consist of a five-parted calyx, and five petals, which are nearly of the same colour as the bracteas. The stamens are numerous, and the whole flower is deliciously fragrant, especially towards evening,

—'At dewy eve
Diffusing odours.'

The seed-vessels are globular and downy, but

rarely perfect the seeds in England. While the lime-tree is in flower, it is frequented by myriads of bees which

> 'Sit on the bloom, extracting liquid sweets
> Deliciously.'

Honey from the lime is considered superior to all other kinds for its delicacy of flavour; it is to be obtained in a perfectly pure state only at the little town of Kowno in Lithuania, which is surrounded by an extensive forest of lime-trees. The pleasing sound produced by the busy collectors, joined to the fragrant perfume diffused by the flowers, frequently gives occasion for its being planted near houses, in preference to other more picturesque trees. Even after the flowers have faded and fallen to the ground, the odour is perceptible, the ground remaining for a long while thickly strewed with the withered stamens, which retain their fragrance to the last. Towards the end of September the leaves turn to a bright yellow, and in the course of the following month fall off.

"The custom of making avenues of lime-trees was adopted in the time of Louis XIV., and accordingly the approaches to the residences of the French as well as the English gentry of that date, were bordered with lime-trees. It subsequently fell into disrepute for this purpose, on account of its coming late into leaf, and shedding its foliage early in autumn, and was supplanted by the hornbeam and elm; but many of the cities of continental Europe still boast of their public walks of lime-trees, which in the hours of relaxation are numerously frequented by persons of all classes and ages. The Dutch, especially, plant them in lines along their widest streets, and by the sides of their canals, and the whole country is perfumed by them during the months of July and August. Evelyn, in whose time straight walks and formally grown trees were in vogue, recommends the lime as 'of all other, the most proper and beautiful for walks, as producing an upright body, smooth and even bark, ample leaf, sweet blossom, the delight of bees, and a goodly shade at the distance of eighteen or twenty-five feet.'

"The lime-tree, though not applied to so many uses as it was in the time of Pliny, is valuable for many purposes. In the *Belgian Horticulturist* it is stated, that 'the flowers infused in cold water are antispasmodic; and in hot water they make an agreeable kind of tea. The leaves and young shoots are mucilaginous, and may be employed in poultices and fomentations. The timber is better adapted than any other for the purposes of the carver; it will take any form whatever; it admits of the greatest sharpness in the minute details, and it is cut with the greatest ease. It is also used for sounding boards for pianos and other musical instruments. But the peculiar use of the lime is for the formation of mats from its inner bark. In June, when the leaves begin to develop themselves, and the tree is full of sap, branches or stems of from eight to twenty years' growth, are cut and trimmed, and the bark is separated from them from one end to the other. This is easily done, by simply drawing the edge of a knife along the whole length of the tree or branch, so as to cut the bark to the soft wood. It then rises on each side of the wound, and almost separates of itself. If mats are to be made immediately, the bark is next beaten with mallets on a block of wood, and children are employed to separate the inner bark, which comes off in strands or ribands, while the outer bark detaches itself in scales. If mats are not to be made for some time, the bark is dried in a barn or shed, and either kept there, or stacked till it is wanted. It is then steeped twenty-four hours in water, beaten as before, and put into a heap, where it remains, till it undergoes a slight fermentation. When this has taken place, the inner bark separates in ribands and shreds as before. With the shreds, cords of different kinds are twisted in the usual manner; and mats are formed with the ribands in the same way as rush mats. The ribands which are to be used in forming mats for gardens undergo a sort of bleaching for the purpose of depriving them of part of their mucilage, which would otherwise render them too liable to increase and diminish in bulk by atmospheric changes. The great advantage of lime, or bass mats, over all others in gardens, is that they do not so easily rot from being exposed to moisture.'"—Pp. 165—171.

FLORICULTURE OF THE MONTH.

BY GEORGE GLENNY.

September is one of the most interesting months of the whole year, and this interest is kept up till the very last, for every day that the frost leaves alone brings forth shows and seedlings. We, however, cannot follow the days much more than half-way through before the time arrives for us to finish our remarks. The small streams that feed the great river of Floriculture may be traced to every manufacturing town where men of com-

paratively humble means indulge in their gardens, and at social meetings show their flowers. In Bethnal Green, while we are writing, several of these Societies, which are independent of everybody, and the funds of which are subscribed by the members, are exhibiting dahlias, and we were at one where no less than seventeen prizes had to be awarded to seventeen stands of twelve. At the Dahlia Exhibition of the Surrey Gardens, seedlings were miserable. From Salisbury we had two flowers that will sell better than anything else there, because a great abundance of blooms were produced by the grower, although many were shown in threes only; we allude to *Magnificent*, which, besides being a good flower, is a perfectly novel colour, that, we presume, will be called amethyst; and *Sir Frederick Bathurst*, a bold, deep purple, of fine model, and great capacity. *The Premier*, a fine purple, with a capital centre, and altogether a good style of flower, was also shown in abundance, and will take high rank among the many novelties. A light flower, named *Sylph*, was pretty and promising, though quite in the style of some of our present light flowers. Of the fancy flowers, by far the best, because, besides being good, it was new, was *Elizabeth;* there were in all four blooms shown, and the eyes deficient in the whole four; but so slightly, and the construction of the flower rather favourable than the reverse, that if we could buy only one fancy flower, it should be that. A useful scarlet flower, number 44, but without a name, was noted down by almost everybody, and this number 44 was all we were permitted to know about it. The folly of withholding the names leads to great inconvenience; some of the scarlet flowers that were good for nothing will come out with high characters, and will be mistaken for the one we have mentioned. *Snowflake*, a white of some pretensions, took the prize for the best two blooms of a white dahlia against two flowers of *Antagonist*. A fancy flower named *Lady Grenville*, was also noticed a good deal, and will be purchased for its constancy; it is a good deal ribbed, and not the brightest colour in the world; but when people find themselves at a loss for a flower, among a vast number of plants, it makes them cling fast to a variety that is always ready. There were other seedlings, but we do not feel confident enough to say much with only three blooms to look at, when perhaps the grower has had a score plants to cut these from. We do not know whether any or what flowers had certificates, nor did any of the growers care to wait the result. Of the flowers of last year, the Queen of the East, Beauty of Hastings, Purple Standard, Fearless, Mr. Seldon, Keepsake, Rainbow, Miss Stephens, Miss Blackmore, Grenadier, Mrs. Bacon and Queen Dowager, were all shown more or less, and in excellent order, considering the unfavourable season. Two or three promising seedlings looked well for trial next year. Of all the verbenas exhibited in the Gardens,—and there were many,—the following were shown best; Cyclops, Psyche, St. Margaret's, Optimus, Louis Napoleon, Diana, Beauty of Stowe, Heloise and Duchess of Northumberland. New ones, *Desdemona*, salmon colour with red eye; and *Clio*, a curious pink; chiefly remarkable for their colours. Hollyhocks were exhibited fine, although, in all cases nearly, only the tops of spikes, showing they were nearly out. Those who desire to grow this now noble plant will, perhaps, be glad to know a few of the best; Defiance, Formosa, Rosea Grandiflora, Fireball, William Tell, Acme, Mount Etna, Bicolor, Mulberry Superb, Snowball, Magnum Bonum, Pallida, Blue Beard, Attraction, Black Prince, Rubra, Elegans, Delicata, Mr. C. Barron, Enchantress, Sulphurea Perfecta, Queen, Surprise, Comet, Rosea Alba, Model of Perfection, Aurantia, Coccineum and Obscura. They comprise the best of a vast number shown, and deserve a place in every garden that has room for them. We hear from many quarters of an advance in carnations and picotees, as well as pinks; several raisers have been very fortunate, so the growers may prepare themselves for some novelties next summer. The seedling fuchsias at the Surrey show were shocking bad, as if every one had gone back instead of forward. *Lord Nelson*, which came out last year, in spring, proves, even when well grown, the very worst that has come out for years, the coarsest and dullest, and most ragged formed variety that has been turned out for some time, yet turned out with a first-class certificate from the London Floricultural Society. Not one of the seedlings shown at the Gardens was worth the slightest notice, the very best of a score or more being two light ones, like many we have already, but inferior to those we have. A collection of variegated plants was interesting, and in our way along the tent to floral subjects, we could hardly help noticing two superb sticks of Cole's celery, and a dish of fine black grapes from Chapman of Vauxhall. The weather was unpropitious, and threw cold water upon the concern. The plants were fine. The Salisbury show was, so far as dahlias were concerned, very limited; but very rich in fruit and plants. A few good seedlings were, however, exhibited. The Northampton show was a good one, but the spirit of the Metropolitan Society is only just beginning to

move them. The cottagers' productions at both of these exhibitions, were highly creditable. September will hardly close the dahlia shows this year, ; for the Birmingham central exhibition, which will occupy all attention till the 27th, throws the Slough, which is the finishing one, over to the 2d of October. Dahlia showers, therefore, are praying for the continued absence of frost. After this goes to press, we shall have the Shacklewell, the two days at Birmingham, and several smaller ones to attend, before our notes on all the new dahlias can be made; and we hope we shall see six flowers of anything worth growing. If dahlias are to be grown again, the show must be for dahlias alone, and under the control of the trade alone. Another show in the mixed way, like the last at the Surrey Gardens, and the trade may leave off raising.

NOTES ON DAHLIAS OF 1849.

BY GEORGE GLENNY.

ALTHOUGH the exhibition of three blooms of dahlias instead of six has been persisted in at some of the floral Societies, and especially where the whole and sole object seems to be temporary gain at the expense of a permanent loss of confidence, we have been able to note a few dahlias, that will find a place in our annual descriptive list. But we earnestly beg of the dahlia growers to refuse showing proved flowers at all, unless six be the lowest number exhibited ; for there can be no confidence in the certainty of a flower that will not, in the year of proving, yield that number a dozen times over. On referring to our last year's notes, we find, that considering there were but three flowers to judge by, we have been singularly accurate. The Beauty of Hastings turns out a beautiful but uncertain flower. It was one in the second stand of twenty-two exhibited at one place, and greatly added to the effect ; but in a general way, it has a hard eye, which evidently does not come up well till late in the season. Of this flower, we said last year—

"If there be a first-rate novelty, it will be found in the Beauty of Hastings, the form of Radziwill, but small. The Societies, however, having departed from our rule of showing six blooms of the seedlings grown for proving—that is, the second year—*there is but little dependence even on those we have seen.*"

Then follow our descriptions of a few that we thought there was a chance of growing, selected from something like a hundred and fifty, comprising the veriest rubbish that ever discredited a show, and disgusting more people with the flower than ever abandoned it before in any three seasons. Always bearing in mind that we protest against the certainty in judging of three blooms, we gave the following report, for the guidance of our readers, in the annual list in our almanac ; and we call attention to the fact, because it has become evident to the growers for sale, that confidence in newspaper accounts, and catalogue descriptions, is on the wane, and that although there are more dahlia shows than ever, there are fewer buyers. People have been so often disappointed with new flowers, that hundreds who used to purchase the year they came out, wait till the season afterwards, and buy at one tenth of the price.

BEAUTY OF HASTINGS.—Form of Princess Radziwill ; good in every point, but reflexing, like its prototype ; colour white, edged with crimson rose, and size as shown, under average.

MR. SELDON.—A noble purple ; round and symmetrical, but eye confused, and rather flat.

NUNLEY HERO.—Shaded crimson ; good outline, general good form, common average eye, but well up.

FEARLESS.—Slaty lilac—in that point novel ; round outline, pretty good face, generally symmetrical and double, and good form.

DUCHESS.—White, apparently certain ; good outline, very double, but not symmetrical on the face and eye ; many blooms shown.

CHARLES TURNER.—In form, the counterpart of Andromeda, but colour white tipped with purple or rose.

MISS STEPHENS.—Fancy flower ; pinky salmon, tipped and shaded with white and blush ; pretty good outline, round face.

RAINBOW.—A fine fancy flower, scarlet and white, and good of its class.

MISS JANE.—Fancy flower, purple and white ; not in advance of its class, but a safe shower.

MISS BLACKMORE.—Fancy flower, with a splendid petal, more coarse than we like, but nevertheless novel and beautiful.

QUEEN DOWAGER.—Fancy flower ; bright sulphur, with white tips ; good petal, but large and rather open ; fair fancy flower.

SOL.—Orange buff ; round, full, symmetrical, except the eye, which seemed to us treacherous.

PURPLE STANDARD.—Very like the Standard of Perfection in all respects, but colour a heavy purple.

DR. HORNER.—A fancy flower, not very novel, but pretty safe ; rosy purple and white.

LOVELY.—A new colour, buff ground pounced with pink, but nothing like close enough for a good show flower.

PROVIDENCE.—Something in the style of Cornwallis, but more colour, and may prove an acquisition.

Mrs. Bacon. — Rosette outline, blush flower, good face, pretty good general form, and centre fair if not fine.

Grenadier.—Rosette outline, dark crimson, rather coarse, flat faced, and likely to be constant.

Queen of Yellow.—Rather coarse, but may be now and then used if not grown too strong.

White Perfection. — Yellow or green cast in the eye, high in the shoulder, round outline ; not very symmetrical on the face.

Keepsake. — Dull crimson and pinky white ; fancy flower ; a fair acquisition to its class.

Queen of the West.—Yellow roundish outline, petals rather coarse, eye close, but sunk, and face symmetrical.

Queen of the East.—A flower in all respects equal to the Marchioness Cornwallis, but with more colour.

But besides this description, which has proved, as usual, very close to the truth, we gave a general hint, by especially marking the Beauty of Hastings, Fearless, Rainbow, Miss Blackmore, Queen Dowager, Purple Standard, and Queen of the East, for those to which we should give the preference. We therefore reduced the task of selection to a small affair ; and if any of our selection prove uncertain, which in August and half way through September was the case with the Beauty of Hastings, it may be attributed to the officious meddling of inexperienced men, who have reduced the number to be shown from six to three ; and, if we have omitted to notice any that deserved mention, it must be placed to the account of another foolish innovation,—the showing of seedlings without their names to them, but simply with a number, so that we may take notes in vain, unless the showers place the names on *after they are judged*, which, if the flowers are not entitled to a prize, they very stupidly omit in many cases. Last year we saw and took notes of several, but never could get the names, and this year we are in the same predicament ; but the great show at Birmingham, which settles the fate of the seedlings of 1848 to come out in May, will perhaps set us to rights, as there will be no shuffling allowed there. Six blooms must be shown, and the name the flower is to bear must be placed on it. The metropolitan rules, which did more good to dahlia growers, and advanced the flower more, than all the other means combined, will be rigidly enforced ; and the result of that show will determine the list of flowers, which we shall strongly urge people to order if they want to run no risks. But of all the hundred and fifty varieties advertized to come out last spring, how many have proved good for anything ? Very few people who read our descriptive list ordered more than eight or ten ; and certainly the new ones of last spring have been very scarce in the stands of the present year,—few, if any, have proved as good as those we especially recommended. The dahlia trade is waning fast ; and if the growers do not make up their mind to decided steps, and get themselves fairly represented, people will rapidly fall off, and content themselves without new flowers at all. They will cease to follow floriculture as a science, and grow flowers as they did long since, insensible to anything but colour.

NEW FLOWERS AND PLANTS.

Dipladenia illustris, *Martius* (illustrious Dipladenia). — Apocynaceæ § Wrighteæ. — A very handsome herbaceous plant, with a tuberous wurtzel-like root, producing annual shoots a foot and a half high. The leaves are opposite, roundish-obovate, and as well as the stems clothed with a velvety pubescence. The flowers are showy, three or four produced at the extremities of the shoots ; they are large, funnel-shaped, rose colour, with the throat purple. Native of St. Paul's, and of Minas Geraes in Brazil. Introduced to Belgium, by M. T. de Jonghe of Brussels, in 1848. Flowers in July and August. It is the *Echites illustris* (Arrabida), and *E. insignis* of Belgian gardens. *Culture.* — Requires a cool stove ; light loam, leaf-mould, and sand ; propagated with some difficulty by cuttings. The tuberous roots should be kept dry in winter, and placed in a temperate greenhouse. In March they should be repotted in five or six-inch pots, and placed in a moderately warm greenhouse, being at first slightly watered. When the tubers begin to push out from the crowns, the pots should be set near the front of the house, where the plants may have plenty of air, to prevent insects from attacking the plant, which is milky.

Cœlogyne Lowii, *Paxton* (Mr. Low's Cœlogyne).—Orchidaceæ § Epidendreæ-Cœlogynidæ.—A very fine epiphytal species, with large pseudo-bulbs, and ample lance-shaped leaves two feet or more in length. The flowers grow in pendent racemes from the base of the pseudo-bulbs ; these racemes are sometimes as much as two feet or upwards in length. The flowers are very numerous and

closely placed, large, being as much as four inches in expansion; the sepals and petals uniformly cream-coloured, spreading; the lip indistinctly three-lobed, the lateral lobes longitudinally incurved over the base of the central lobe; it is cream-coloured like the sepals, but marked down the centre with a conspicuous blotch of bright orange. The flowers are very fragrant. Native of Borneo, in the low marshy grounds on the banks of the Sarawak River. Introduced in 1845, by Mr. Low of Clapton, by whose son, Mr. H. Low, Jun., it was collected. Flowers in May and June. *Culture.*—Requires a hot moist shady stove; chopped moss and potsherds, or turfy peat; propagated by division of the plant.

Begonia cinnabarina, *Hooker* (cinnabar-coloured Elephant's Ear). — Begoniaceæ. — One of the handsomest known species of Begonia. It is a bulbous rooted perennial species, of neat habit, with large palmate serrate unequal foliage, of a rich glossy green, with reddish veins, and slightly marked at the edges with a reddish tint. The flowers are borne profusely in racemes from the axils of the leaves, on long stalks that stand clear above the foliage; they are large, of a bright orange-red colour; in the male blossoms two of the four petals are large and roundish, two small and oblong, but in the females the petals are nearly equal. Native of Bolivia in South America. Introduced in 1848, by Messrs. Henderson. Flowers from July to the end of summer. It is the *Begonia aurantiaca* (Paxton). *Culture.*—Requires to be started in a mild heat in spring, and cultivated in a warm greenhouse; in winter to be kept dry and cool; rich free loam and peat; propagated by division of its tubers, or by cuttings of the young shoots early in spring.

Sida venosa, *Hooker* (veiny-petalled Sida). —Malvaceæ § Sideæ.—A large shrub, of handsome appearance where it has space to develop itself. The branches are quite smooth, rather straggling, and when young herbaceous. The leaves, frequently a span long, broadly cordate, palmately and deeply seven-lobed, the lobes lance-shaped, extended into a narrow point, and coarsely saw-edged. The flowers grow singly from the axils of the leaves, on long peduncles; they are large and drooping, consisting of a bell-shaped calyx, marked with fifteen longitudinal plates or striæ, and terminating in five large ovate-lanceolate segments, and a corolla twice the length of the calyx, formed of five concave somewhat incurved obovate-spathulate petals, of a golden orange colour, reticulated with reddish-brown veins. Native country not certainly known, probably Brazil. Introduced about 1847. Flowers in spring and summer. It is the *Abutilon venosum* of gardens. *Culture.*—Requires a greenhouse; better suited for planting out in a conservatory than for growing in a pot; loam and leaf-mould; propagated readily by cuttings planted in sandy soil, and placed in a slight heat.

Pentstemon cyananthus, *Hooker* (azure-flowered Pentstemon). — Scrophulariaceæ § Antirrhinideæ-Cheloneæ.—A beautiful perennial herb, growing erect, and unbranched, two feet and upwards in height. The leaves from the roots are spathulate acuminate, tapering into a petiole at the base; those on the stems broad and large, sessile, cordate, or cordate-ovate, extended into a long narrow point, all quite entire, and of a glaucous green colour. The flowers grow in pseudo-whorls along all the upper part of the stem, forming a dense spike a foot or more in length; these pseudo-whorls consist of two opposite many-flowered cymes, growing from all the axils of the upper leaves or bracts. The flowers are large, the tube swollen upwards, purple, the limb two-lipped with nearly equal segments of a bright azure blue. Native of the upper valleys of the Platte River, in the rocky mountains. Introduced by Messrs. Lucombe, Pince & Co. in 1848. Flowers in the summer months. *Culture.* — Requires a cold airy frame in winter, on account of its evergreen suffruticose habit; to be planted out in spring; rich free open loam; propagated by seeds, or by cuttings of the young shoots, planted in sandy soil under hand-glasses any time during summer. A succession of young plants should always be kept by one of these means.

Sauromatium guttatum, *Schott* (spotted Sauromatium) —Araceæ.—A curious plant, having a large almost globose tuber, from which grows up the singularly shaped, and no less singularly marked spathe, from a foot and a half to two feet long; almost cylindrical below, opening at the height of three or four inches from the base, and becoming dilated, lanceolate-subulate channelled, reflexed, and waved below at the margin; of a livid or purplish green colour on the outside, greenish-yellow within, palest below and there marked with copious small red-purple spots, the rest with larger blotches, except at the apex, where it is streaked. This spathe surrounds a spadix which is erect below and nearly cylindrical, densely clothed at the base with copious obovate ovaries; the apex is almost cylindrical, slightly attenuated, nearly a foot long, of a livid purple colour. The leaf is pedate parted, with oblong entire attenuated segments, having a spotted stalk; it is developed on the decay of the flower stalk. Native of the East Indies. Introduced in 1848. Flowers in the spring. It is the *Arum guttatum* (Wallich). *Culture.*—Requires a stove. The tubers lie dormant in winter, when they should

be kept dry; early in spring, they must be examined, repotted if necessary, placed in heat and watered sparingly; light loam and peat soil; propagated by offsets.

ROUPELLIA GRATA, *Wallich and Hooker* (Cream-fruit).—Apocynaceæ § Plumiereæ.—A very handsome and very fragrant plant, called the "cream-fruit" by Afzelius, probably from the use occasionally made of the cream-like juice of the fruit. It is a smooth climbing shrubby plant, of free growth, with the habit of the African Tabernamontanas. The leaves are opposite, large, leathery, oblong elliptic, shortly acuminate, and attached by a short petiole. The flowers grow in terminal sessile cymes of from six to eight flowers, arranged in a somewhat umbellate manner; they are large, full three inches across, with a funnel-shaped tube, and a broad limb of five obovate unequal wavy segments; the colour is white with a tint of rose, the coronet, which forms a ring of erect linear-lanceolate filaments, being of a pretty rose-colour. Native of Sierra Leone. Introduced about 1847. Flowers in May. The plant is the *Strophanthus Stanleyanus* of gardens. *Culture.*—Requires a hot moist stove; loam and peat in equal proportions; propagated by cuttings, planted in sand under a bell-glass and placed in heat.

ARISTOLOCHIA MACRADENIA, *Hooker* (large-glanduled Birthwort).—Aristolochiaceæ.—A curious smooth suffruticose climbing plant, with long slender stems, bearing alternate leaves, which are four or five inches long, and in form between heart-shaped and halberd-shaped. The flowers grow singly from the axils of the leaves; they are about three and a-half inches long, and of the singular form which prevails among the birthworts; they are monopetalous, with a tube about an inch and a half long, the lower half of which is much swollen, the upper half contracted, all of a greenish colour; above this it opens into a dilated, declined, ovate lip, the sides of which are revolute; the upper surface of this lip is rich brown with yellow reticulated veins, and it is beset with large stalked globose glands, which give it a peculiar appearance. Native of Mexico, about Real del Monte. Introduced in 1847. Flowers in the spring. *Culture.*—Requires a warm greenhouse; light loam and peat; propagated by cuttings, placed in a gentle heat. From its moderate sized growth, it is suited for growing it a pot.

CYRTANTHERA AURANTIACA, *Hooker* (orange-flowered Cyrtanthera).—Acanthaceæ.—A handsome soft-wooded shrubby plant, with erect acutely four-sided stems and branches, bearing opposite broadly elliptical lanceolate rather rigid leaves, and terminated by large dense bracteated ovate thyrses of large handsome bright coloured flowers. The flowers are labiate, the tube about as long as the limb, the upper lip of which is erect with a bifid point, the lower lip oblong, reflexed, and three-cleft; the colour is a full golden yellow at the first expansion, the tube and lower lip afterwards becoming orange-red. Native probably of South America. Introduced to England from Belgium, by Messrs. Henderson of Pine-apple Place, in 1848. Flowers ——? It is the *Calcostylis aurantiaca* of Makoy's catalogue. *Culture.*—Requires a stove; light loam and leaf-mould; propagated by cuttings placed in a gentle heat.

RHODODENDRON FORMOSUM, *Wallich* (beautiful Rhododendron).—Ericaceæ § Rhododendreæ.—One of the slender growing and elegant species of the extensive family of Rhododendron. It is a truly beautiful and rare species, forming a small slender shrub, with reddish brown branches, oblong-obovate obtuse leaves, tapering into a short foot-stalk, and flowers in pairs produced from the tops of the branches, but soon over-topped by young shoots and appearing lateral; the blossoms are large, well formed, delicate white, tinged with yellow and rose, and having five external stripes of red. Native of the Himalayan mountains of India. Introduced in 1837. Flowers in spring. It is the *Rhododendron Gibsoni* (Paxton), under which name it is known to cultivators, but it was previously known to science under Dr. Wallich's name. When cultivated to the perfection to which Indian azaleas are now brought, this will be a highly ornamental shrub. *Culture.*—Requires a greenhouse, and the ordinary management of greenhouse azaleas; light peat soil; propagated by seeds, which, being very small, should be scattered on the surface of peat earth kept moist; or by inarching on more common and free-growing kinds.

PLATYCODON AUTUMNALE, *Decaisne* (autumnal Platycodon).—Campanulaceæ § Lightfooteæ.—A plant described as being something in the way of *Platycodon grandiflorum*, the old *Campanula grandiflora*. This is said to be of compact habit of growth. The leaves are not described. The flowers are blue, the corolla being velvety at the bottom of the tube; the technical distinction of this species consists in the following character:—"Filaments dilated at the base, partially ciliated, bluish, marked with a demi-circular depression at the base of the linear portion which bears the anther, which is linear, pointed, and two lobed." Native country not stated. Introduced to the garden of the Museum at Paris, before 1848. Flowers in autumn. *Culture.*—Hardy in the climate of Paris; dryish loamy soil; propagated readily by division of the root, or by seeds.

TALAUMA MUTABILIS, *Blume* (changeable

Talauma).—Magnoliaceæ § Magnolieæ.—A fine shrub, growing six or eight feet high, with large elliptic leaves acute at both ends, and solitary drooping flowers growing at the ends of the branches; these blossoms are pale green or greenish yellow tinged with red and purple, becoming at last brownish, and they consist of about nine almost equal petals. There are some varieties of this species differing in the form of the leaves. Native of Java. Introduced about 1848. Flowers in May. *Culture.*—Requires a cool stove; turfy loam, peat and sand; propagated by layers, by inarching on the common magnolias, or by ripened cuttings planted in sand under a glass in bottom heat.

Calochortus pallidus, *Schultes* (pale Calochortus).—Liliaceæ § Tulipeæ.—A pretty hardy perennial plant with bulbous roots, growing up with numerous grass-like channelled leaves, several from the roots and some from the flowering stem, which grows six or eight inches high; little bulbils are formed in the axils of the upper leaves. The stem bears from two to four flowers, each on a rather long slender peduncle, arranged in an umbellate manner; these blossoms are somewhat drooping, and consist of six spreading petaloid divisions, of which the three exterior are the smallest, ovate-oblong obtuse, the three interior much larger, obovate, rounded at the apex and attenuated at the base; they are pale yellowish buff-coloured, with a broad angular blotch of dark reddish brown, in the centre, and three bearded with short hairs. Native of Mexico. Introduced to Belgium in 1844. Flowers in September. *Culture.*—Requires to be grown in a cool dry frame; sandy peat soil; propagated readily by means of the bulbils borne on the stems.

Metrosideros polymorpha, *Gaudichaud* (polymorphous Iron-wood).—Myrtaceæ § Leptospermeæ.—A pretty robust growing evergreen shrub, with opposite leaves assuming various forms, of leathery texture, and shining on both surfaces; sometimes the leaves are roundish-elliptic, sometimes ovate, sometimes oblong, sometimes lance-shaped. The flowers, which grow in terminal and axillary corymbs, are of a crimson colour, and rather ornamental. The hard heavy dark-brown timber which furnishes the South Sea islanders with their clubs and other weapons, is said to be in part furnished by this plant. Native of the Sandwich Islands, at an elevation of from 900 to 1,800 feet. Introduced about 1844. Flowers in July. *Culture.*—Requires a greenhouse; suitable for planting in a greenhouse conservatory, or against a conservative wall; turfy loam and peat; propagated by cuttings planted in sand under bell-glasses, or by seeds.

Escallonia macrantha, *Hooker and Arnott* (large-flowered Escallonia).—Escalloniaceæ.—A beautiful evergreen shrub, with numerous branches, which are covered with glandular pubescence and furnished with smallish ovate-elliptic rich green glossy leaves, which are bluntish at the apex, wedge-shaped at the base, and bluntly crenate on the margins; these leaves are full of resinous dots beneath. The flowers grow in somewhat drooping clusters at the ends of the numerous twigs, the lower peduncles being simple and axillary, and the upper ones racemose; they consist of five petals, which are connivent below, producing the appearance of a short tubular blossom having a short spreading limb; they are of a glowing rosy-pink, nearly an inch in length. Native of Chiloe, and also of Patagonia. Introduced by Messrs. Veitch in 1848. Flowers during the summer months. *Culture.*—Apparently hardy in the climate of Devonshire, where it has stood three winters unprotected, according to the statement of Messrs. Veitch; a beautiful plant for a conservative wall in less favourable situations; good free loamy soil; propagated by layers, or by cuttings planted in sandy soil, under hand-glasses, without heat.

HORTICULTURAL NOTES.

Rhubarb Preserves.—Rheum Emodi makes a most deliciously flavoured preserve, nearly if not quite equal to that of the Wine-sour Plum. It may also be made so as to nearly resemble Tamarinds, being a very fine acid. This Rhubarb was many years since distributed to the Fellows of the Horticultural Society from Nepal, but owing to its lateness and great acidity, it was generally soon rooted out, and is now seldom seen in gardens. It is however well worthy of a place in all, merely for preserving.—*Gardener's Chronicle.*

Lambs' Lettuce, or Corn Salad (*Valerianella olitoria*).—The merits of this homely plant are not so well known as they should be. It forms a first-rate ingredient in a salad, and is, I believe, an excellent purifier of the blood. Being a native of Britain, it is very hardy, and, if sown in July, August, and September, an excellent succession of it will be kept up during the winter. Then sow again in spring. If a large frame can be spared, the best plants might be taken up with balls and planted thickly in it. The cultivator could then have it at command. I have never blanched it, and therefore cannot say whether that would improve it or not. Sow in beds or rows six inches apart; thin out afterwards to six inches in the row. It will afford many cuttings, if not cut down too closely.—*Gardener's Chronicle.*

a. Petunia nyctaginiflora. *b. P. violacea, or, integrifolia.*

THE PETUNIA—ITS CULTIVATION AND PROPERTIES.

BY GEORGE GLENNY, F.H.S.

[The two figures in the wood engraving given above, represent the original species from which the race of garden or florist's petunias have sprung ; the larger, *P. nyctaginiflora* (*a*) bearing white flowers ; the smaller, *P. integrifolia* (*b*) flowers of a brilliant rosy-purple. This latter, under good cultivation, is, notwithstanding its small size, as compared with other petunias, one of the most brilliant and enduring of summer-flowering plants.]

The Petunia is one of the few perennials that form a principal ornament in a flower-garden, and which, if planted out in variety, make a great display during the greater part of the summer. The form and colour of the flower have been the leading attractions for some years ; but the style and habit of the plant is of some importance. It is a favourite among those plants which continue growing and blooming all the time it occupies the garden, from May till the frost cuts it off ; and therefore, like the verbena, it keeps the beds and borders alive and brilliant when other flowers are scarce. It is easy to propagate it by cuttings, and for that reason a really good one will bear a good price when it is first let out, and only becomes cheaper in consequence of its being multiplied. Originally, the character of the bloom was partly starry, because however wide the divisions of the flower were, it had as many points as divisions, and the indentations between the divisions were very conspicuous, a fault which began to improve from the period when the properties of a perfect specimen were published. The principal objection to the flower was its flimsy texture, which caused it to flag when the sun was rather powerful. The most desirable improvement, therefore, was a thickening of the corolla, without which the flower would have continued too fragile to be generally useful. It is needless to say, that when this property was acquired, a variety became a favourite even in the absence of other properties ; yet it could not be made a positive requisite to sustain a new kind, for while a flower is improving, any one property acquired is enough to cover many defects, not so much for itself as for the chances of improving future seedlings to be raised from it : hence the thick corolla, though of bad form, might give rise to thick corollas combined with a better form ; while on the other hand, a splendid form, with a very flimsy corolla, may yield seedlings which partake of the

thick substance with its own form. To get rid of the points is a great object, and it is as stubborn a blemish as the thin flowers; and of many hundred seedlings, very few, if any, will be found that has improved in more than one or two of the necessary qualities, and perhaps not half a dozen will be found sufficiently improved to be worth saving. It is quite certain that nothing but perseverance will ensure success; and as the flower is still far inferior to what it may be, our hints for the culture of the Petunia shall commence with the saving of the seed and the raising of seedlings, with a view to advance the quality.

RAISING FROM SEEDS.

The first object is to procure half-a-dozen varieties of the best that can be obtained. The variety called Punctata is a star amongst

Petunia punctata.

these flowers, because without being a very bad form, it is remarkable for its colour, and for a sort of variegated stripe of white, which forms a pretty contrast with the ground colour, which is a near approach to blue. As is the case, however, with many variegated flowers, they do not come striped at first, nor if they are grown very strong. This kind is also not so thick in the flower as we could wish, but it may be the origin of other variegated sorts, and should be one among those we seed from. There were three varieties let out by Mrs. Girling of Stowmarket nursery —Madame Celeste and two others—all of which have very distinct properties, chiefly, however, form and particular characters in the colour,—one has deep, rosy veins, another somewhat lighter, and the third is a rich purple, with remarkably fine texture. A fifth, called Jenny Lind, is somewhat thinner than we like, but is, without exception, the best form we know of. With regard to a sixth, there was an Essex flower raised a year or two ago of monstrous size, but not very good form; it had, however, vast thickness, rich texture and colour, and on account of its size might greatly assist in rendering the offspring of the others better in this respect.

With these, or any other striking varieties which had some property conspicuously in advance, we should commence growing Petunias. If we required more than half-a-dozen for the purposes of ornament, we should have two or three or half-a-dozen of a sort, rather than increase the number of varieties by the addition of any that were not desirable, on account of some peculiarly good property. These will be purchased in pots. Make up a little bed or clump for them with good loam from rotted turves, peat, and dung from a rotten hotbed, in the proportion of half loam, one-fourth peat, and one-fourth rotten dung. Mix these well together a foot deep, or if the garden mould already in the clumps is rich, and grows most things vigorously, use it instead of making it up on purpose. Turn out the balls of earth from the pots, by turning them bottom upwards, with two fingers across the pot to prevent it falling, and gently striking the edge upon the potting-table; plant the balls in the ground, so that the surface may be rather below the ground level; water them in, and if the weather be warm, continue to water them daily for a few days until they are fully established. Here they should bloom, and none of the flowers should be picked off: exposed to all the weathers some of them are sure to seed, and as the pods swell they must be watched, and picked off when they turn yellow. The seed-pods should be placed in some shallow vessel in the sun to dry, so that when they split the seed should not be lost; and when thoroughly dry, it should be rubbed out, cleaned, and stored in very dry paper. In February, this seed should be sown in the compost we have described: large pots are better than seed-pans for this purpose, because the body of mould retains the moisture longer than a smaller quantity. The pot should be filled, and by striking the bottom against the potting-table the earth sinks a little below the edge of the pot. The seed should be sown very thinly over the surface, and a little of the same sort of soil should be sifted through a fine sieve, so as just to cover it; place it in a slight hotbed, or a greenhouse, with firing in it, and if the latter, cover with a hand-glass. As soon as the seed has germinated, and grown large enough to

take hold of, it may be pricked out into pans or wide-mouthed pots, an inch apart every way, beginning all round the edge of the pot and working inwards. In these pots or pans, as the case may be, they may remain until they have grown large enough to be in each other's way. Now please yourself about whether you will plant them out or pot them, but if there be any considerable number plant them out, for it will save immense labour, not only in potting, but also in watering, for in the ground they will not require nearly so much moisture as they do in a pot. Here, as they come into bloom, you ought to root up the faulty ones, for it is no use keeping any that have not some decided advance upon present sorts, and by the banishment of the bad ones as fast as they open, the seed may be saved very good. The only advantage of potting them is, that as fast as they turn out good for nothing as new varieties, they may be given away or sold, whereas if planted out they are destroyed, because they would not move when in bloom. Florists by profession ought therefore to pot all, and keep them in a cold frame, and as fast as any show an inferior flower take them out and send them to market, or place them for sale away from those you prefer to keep and seed from: you must not expect one in a hundred that will be worth keeping, but a florist can always sell common ones at something, although not quite so much as good ones.

The proper time for autumnal sowing is September, in a greenhouse, and when they are large enough to prick out, put them as directed for spring sowing,—an inch apart, in wide-mouthed pots. They continue growing all the winter slowly, and are about ready to plant out by the time the weather will allow of it. Upon the whole, however, we prefer the spring sowing, when the proper attention can be given; but if the grower be not always on the premises, and ready to give proper air and moisture, twenty-four hours might burn up the whole lot, or they might be damped off, or a dozen evils might befal them, because in a hotbed vegetation is rapid, and they would draw up in twenty-four hours, therefore they must be watched constantly, and when they begin to vegetate they must have air to prevent their drawing up weakly. After they are pricked out, they want quite as much care as before, and four-and-twenty hours' neglect would spoil them, although it is to be understood that the hotbed must be no warmer than is usual for annuals. It is not safe to plant out in beds till the end of May, though they may be potted singly into forty-eight sized-pots as soon as you please when they are large enough, because the pots should be shut down in a cold frame by day, and be carefully covered at night against frost. In very mild days, the frame may be opened, or even altogether uncovered, but such young plants will be naturally tender, and must be regularly protected against high winds, frost, and heavy falls of rain.

PROPAGATING BY CUTTINGS.

Having selected such varieties as may be considered worthy of propagation, they should be cut down, and all the ends should be struck. The way to prepare the ends that are cut off is to take off two joints, cut the stem up close to the bottom joint, and take off the under leaves. Let these cuttings, after being thus prepared, be placed in a pot of the kind of earth we have described, and half an inch thickness of silver sand on the top; thoroughly wet the sand, and stick the cuttings in to touch the common earth at the bottom of the sand, but not to go into it; place a bell-glass over them so as to go a trifling way into the sand, and keep all the draught out. Let the pot be placed in a slightly heated bed, or pit, or propagating house. The glass must be taken off and wiped inside every morning. You will soon observe when they have struck, by their setting off to grow. As soon as they have fairly struck, pot them singly in large sixty sized pots, shut them down in the frame a day or two, and then give them air on mild days, and close them against frost and cold all the winter. In the spring, plant out some and bed out others, for they are as pretty bloomed in pots, as they are planted out in beds and clumps.

LARGE PLANTS.

When the Petunia is wanted to grow large, to cover a trellis or form a large bush, the ends of the shoots ought to be pinched out, and the lateral shoots induced to grow; these in their turns should be stopped when they have grown long enough, and all the bloom that shows itself should be pinched off. In this manner the plant may be kept growing, and when it has acquired branches enough it may be allowed to grow without any more stopping, and either train it or let it make a bush, it matters not which, except that the bush is the most natural and most elegant. It may be, however, that these, like the geraniums, may not be good without a forest of sticks to hold them. If so, we destroy the character of the plant, and it can be compared to nothing in its tribe, no more than geraniums can with three hundred wooden props. The petunia never blooms better than at one year old from a cutting, though some are so bent on training them that they force them over two seasons and keep them growing hard all the time. This can only be done, however, by picking off all the bloom buds as they come, and continuing their growth.

PROPERTIES.

1. A petunia should have strong stems and a close habit—large, thick, round, and flat flowers; abundance of bloom, while short and handsome.

2. The colour or shade is a matter of taste; but such is the fancy of people in these days, that a new ugly colour would be thought more of than an old handsome one.

Such is the state of inglorious confusion into which modern botanists have brought things by their silly antics, that when Mr. Tweedie sent home the purple variety, Dr. Hooker called it Salpiglossis integrifolia; Professor Don, Nierembergia phœnicia; and Dr. Lindley, Petunia violacea. Yet these are the people who pretend to teach the uninitiated how to know plants!

PROGRESS OF THE PETUNIA AS A FLORIST'S FLOWER.

This flower does not advance as it ought, and chiefly because the properties of the flower are neglected, and new varieties of no merit are put out from season to season only to disappoint the buyers. The raisers of Petunias do not read, or reading, they do not understand that substance is the great desideratum. If the flowers are flimsy, the variety is worthless; half-an-hour's sun will make the ordinary run of flowers flag and look as if they were dying; when the texture is thin, the warmth of an ordinary summer's day will make it shrivel, and nothing can be done with them; they always look untidy, and nothing will make them otherwise until we obtain thick corollas. We have said that nothing compensates for the bad form of a flower, —and if they are not well formed we should throw them away;—but the finest form is of no use if the flower be thin and flimsy; it has no power to hold its form against a puff of wind or half-a-minute's sunshine. It may be a stepping stone to thicker ones of the like form, but we should be quite as anxious to see a thick corolla as a fine form, because it would be an equally desirable stepping stone to a better form with the thick corolla. The best way to advance the flower would be to select the stoutest corollas that can be got, and the finest forms that can be procured, and seed from these indiscriminately, but away from all others, because it is the rubbish among general collections and seedlings that spoils all the seed for the next year. We would rather have none but those we seed from, or at any rate have those we had, placed too distant from all others to be damaged. It may be worth while, in a case like this, to save the seeds of the thick-petalled flowers separately from the others at the gathering, and also to save that of any other remarkable plant apart from the rest, merely to indulge a natural curiosity to know which yielded the best flowers. It would be well also to sow all these seeds in pans directly, that is, the same autumn it is saved, and to really grow them all the winter, so as to be able to turn them out in beds at the end of May, and see the flowering the first year.

Having due regard for the seed which we may be able to save from any remarkable flowers that may turn up among them, we must watch their opening, and, as rapidly as a single flower opens on a plant, decide upon its fate; nothing but a fine circular form, a very remarkable colour, or a thick corolla, should save it an hour from the dunghill. Ordinary varieties, things no better than we have, would be entirely useless, and should not be tolerated an instant; nor ought a moderately good flower to save a plant at all, unless there was a fine habit. Petunias, from want of attention to habit when selecting for novelties, have become weedy and bad; the most straggling ugly growth has failed to condemn a variety, if it were no better than scores that we have; and it is tiresome to be obliged to walk through gardens where the habits of the bedded-out plants completely spoil the intended effect, and give an appearance of carelessness to the whole place. The Petunia should be dwarf, shrubby, and strong in the stems, and not run, or rather lop about without strength to sustain its own weight, yet such is the majority of new varieties sent out.

Those who desire to begin growing the Petunia, with a view of raising good ones, should not begin by buying seed; it is completely losing all the trouble, time, and room devoted to the effort. Nobody will sell seed that is likely to produce anything better than we have; the only seed sold is that gathered from the general collection, or from a batch of seedlings, in both which cases most of the free seeders supply the bulk, and the worst and wildest of the plants are always the most free seeders. Go to a nursery where Petunias are grown in pots as well as in beds, see all you can see, and pick out two or three which are the most circular, and two or three, if you can find them, with good thick corollas; find one, at any rate, and if there be anything of a remarkable colour, you may add one of that sort, but reject any that are of bad habit. Get them home, plant them a foot a-part in an open bed, cut every pod and expanded flower off the whole, and you will be sure that you have no seed pods already spoiled by the general collection. From this patch of half a dozen, or even a dozen, if you have made it so, you will have seed which at least promises something better than themselves;

there will be, as there always is, a great many more about the same stamp, or worse, than there are better; but, having done all you can to produce varieties calculated to be an advance upon what we have, you can do no more. When you have gathered the seed, prepare pans or boxes, or large-mouthed pots, to sow it in; let these be filled with half loam and half peat well mixed together; sow thinly, because your seeds, being good, will all come up, and if too thick, will injure each other before they are large enough to prick out. Place the pots, pans, or boxes in the greenhouse, or, for want of that convenience, in a frame of which the heat has declined, such as an old cucumber or melon bed, and cover up of nights, but a greenhouse is the best. When these seedlings are large enough to handle well, let them be pricked out round the edges of pots an inch apart—a three-inch pot will hold eight or nine round the edge, and the proximity of the root to the pot is of the most essential service; they must be carefully watered, and placed close to the light; they must not be watered too frequently through the winter, as they are not wanted to grow fast. Short stocky little plants are far more desirable than tall ones, and when they once get drawn up they cannot recover their proper habit completely. The seedling plants ought, in fact, when once well established, to be what gardeners call starved, that is, have no more water than will just keep them from flagging, not that they are to have less when watered, but that they are not to be watered again till they are almost suffering, when they are to have as much as before. All the soil must be wetted whenever a plant is watered; less than this is mischief.

At the end of May all these may be planted out in a bed of ordinary mould or soil, and not made rich for the occasion; let them be planted about nine inches or a foot apart, and then await with proper watchfulness their blooming. The instant they commence they should be examined frequently. If any come like the parents, or any one of them, see if there be any improvement in the habit, for that is a point—if not, pull it up instantly, and so with every thing worse; do not let a single plant stand an hour after it has flowered, unless it gives you some point better than those you seeded from, because it is the worst possible taste to distribute any thing that is like a variety already out, unless there is such a manifest improvement in some point as will be at once seen by others. If there be any that exhibit a positive improvement, or any such distinct point as will warrant its being added to the general collections, take off slips at once and begin propagating it directly; a little bottom heat, and a hand-glass over the cuttings, will greatly hasten the striking, but they would in July, August, and September root in the common borders under a hand-glass. Look daily, if not almost hourly, to see what comes, and pull up, without remorse, all that are inferior, (or equal, unless of a different colour,) and discard them at once. Strike as many cuttings as you can of those that are worth keeping and adding to the present stock, but unless it is worth keeping, for the chance of raising others with its good points, send every other to the dunghill.

MONTHLY OPERATIONS.

JANUARY.—The plants are now in the seed-pot, the store-pots, or in small pots a single plant in a pot. The cuttings struck and potted off in the autumn, as well as old plants cut down—one and all, require but little water, as wet does not agree with them; they must have air in mild weather, the glasses must be down close of a night, and if there be any symptoms of frost they should be covered with straw-litter, or cloths, or mats; those in the greenhouse will do with the treatment other greenhouse plants require, not much moisture, plenty of air, and but little if any fire. Autumn sown plants now growing must be kept clear of weeds, and if not yet pricked out, they ought to be.

FEBRUARY.—The treatment of last month, subject to the control of the weather, may be repeated, that is, good covering against cold, plenty of air if mild, and very little moisture; prepare pots of the soil recommended, and fill up level with the edge of the pot, give it a blow or two on the potting-table, to settle it a little down; sow the seed very evenly and thinly, and sift a little earth through a fine sieve to cover the seed, and no more; place it in a hotbed which has declined, or which has been made up slight for the purpose.

MARCH.—Let the plants in small pots intended to bloom in pots, be now shifted into those of size forty-eight; take out the balls whole, put draining at the bottom of the pots, and enough mould to bring up the plant to the surface of the deeper one; put the earth in solid all round, and water them to settle the earth about the ball, round which the roots will have matted. Keep those which are for planting out, in the small sized pots they are wintered in, as they are better checked than allowed to grow, on account of the great additional room required by the change of pot, the additional labour of carrying them about the ground, the additional carriage if they are to be sent out. Let the fresh potted ones be shut up a day or so, after which they may have air, and in the event of very mild showers, they may have all the benefit of them. The seedlings will be advanced enough

to prick out an inch apart in pots or pans, and must be done accordingly, and be gently watered, and replaced in the same hotbed, which will have declined a little.

April.—Shift the potted plants into larger ones if not done last month, and as the plants will begin to grow fast, they will require occasional watering. The plants which were pricked out in autumn from the September sowing, may be potted into small pots, and be placed in the cold frame, or put back again into the greenhouse. All the plants in pots, shifted and unshifted, must be occasionally watered if the weather be at all warm, and if showery all the plants may have the benefit of a warm rain. Towards the end of the month the plants pricked out in pots and pans in the hotbed from the spring sowing, may be potted singly into the small pots if they are to be bloomed in pots; if they are to be planted out make up the beds, clumps, and borders for the reception of the plants, and let them be ready by next month to receive the plants —the ornamental beds for approved varieties, and large beds for trying the quality of seedlings.

May.—Continue the management of last month, until the middle, or towards the end of the month, when you may plant out all that are to be in the open ground; take the pans and pots that have the young plants in them, and with a piece of wood cut something in the form of the blade of a knife, lift up the roots, mould and all, separate the plants as carefully as possible, and plant them six inches apart all over the beds made for blooming them in, water them in gently to settle the earth about their roots. In the ornamental parts of the garden, when the clumps and borders are to be undisturbed, plant the approved varieties nine inches apart, and according to the way in which you wish the colours dispersed.

June.—Whatever was left undone of last month's directions must be completed without delay. Look well to the watering, and do not half do it by watering merely at the roots, but water the bed all over, as complete as if it were a shower of rain. The plants in forty-eight sized pots will require another shift if they are to be bloomed fine; the roots will be found completely matted round the balls, which should be carefully knocked out into the hand, and placed in the thirty-two sized pots, which should have crocks or other drainage at the bottom, and earth enough to raise the surface of the ball to the edge of the pot; fill the soil in well round, and water them; they may be placed in a sheltered spot in the garden a week after they are shifted, but a few days in the frames, pits, or greenhouse after they are shifted, will be of the greatest benefit; they ought not to be placed in the burning sun, but in some place where they may miss the hottest of it, or they must be sheltered. All the pricked out seedlings must be now planted or potted; there is no excuse for keeping them out of their blooming places.

July.—Little more is wanted this month than weeding and watering; stirring the earth between the plants is useful: when the plants are in ornamental clumps you may either let them have their own growth, or peg down their shoots to keep them dwarf. Any seedlings that come into flower must be adopted or condemned at once; harbour no doubtful thing: if it be not better than we have, or different from what we have, throw it out, and if necessary for appearance, mend the place with a potted plant; but it is better to have a place for the seedlings, where neatness and completeness are of no consequence. Look over potted seedlings as well as bedded ones, and the instant a flower of second-rate or ordinary qualities has opened, discard it, turn it out of the ground, whether to market or the dunghill is not half so important as the getting rid of it, so as not to spoil other seed. The potted named, or approved varieties may be removed to wherever their beauty is required, whether the dwelling-house, conservatory, show-house, or standing about in the garden.

August.—A continuance of last month's management is all that is required, for the progress and wants of the plants are much the same; mark any very desirable thing to seed from, and if any are worth naming and propagating, take off all the likely shoots in a young state, close to their base, and strike them as directed for the cuttings at the cutting down time, except that the young shoots may be taken off short enough to strike without any more preparation than merely taking off the lower leaves. Watering, weeding, pegging down, or tying up stragglers, will fill up this month's work well; if, however, you are saving seed, pick it off as soon as the pods turn yellowish.

September.—Sow seed as directed, and cover it with a hand-glass before putting it into the greenhouse; take care that it be not allowed to dry; continue picking seed where you are saving it, constantly watch for the opening of seedlings, that you may dispose of the worthless daily, as fast as they appear; towards the middle of the month cut down all those that it is desirable to propagate, and pot up the roots, strike the cuttings, and put the roots into a frame; carefully water, and shut them up a day or two well shaded, before they have air, so that they may be established in their new place; pot up all that you mean

to preserve, but where you have abundance, let the main ornamental places be undisturbed, for it not unfrequently happens that no frost of importance interferes with the garden till after Christmas.

October.—If the seed sown in the beginning of September has germinated, and is large enough to prick out, let them be placed in pots an inch apart; if not large enough, let them go over till next month, but the younger they are pricked out the better, if they can be handled well. Look well to the cuttings under glasses; whether in the greenhouse or a slight hotbed, the glasses should be wiped, and great care must be taken that they do not want water, as a short time of drought would settle them past striking; in other respects continue last month's management.

November.—Prick out seedlings to remain in the greenhouse through the winter; pot off cuttings that are struck, and place them in the frames, pits, or greenhouses. Look well to the potted-up plants that have been in the open ground, and see that they have water; pot up any that are not spoiled, and that may be wanted. If the cuttings are wanted put them in to strike.

December.—Protect from frost at night, give air if mild weather, cease watering except when necessary; do everything that has been left undone, and attend well to the growing seedlings; too much damp would injure them more than they would suffer if kept dry; continue potting off struck cuttings, and pricking out seedlings that are not already out, as they get large enough, and keep the frames and greenhouse free from damp, weeds, and dead leaves.

A STROLL THROUGH THE GARDEN,

BY A TUTOR AND HIS PUPIL, IN THE MONTH OF NOVEMBER.

The Tulip bed is the first object we shall visit this time, because I know the gardener plants the best collection to-day. Observe, he has filled the bed some days, and is now taking off enough of the top to make the soil level with the edge, which has been lowered by removing three inches of the boarding, made on purpose to take off and put on again. With a wooden frame which hooks over on both sides of the board, and with seven pegs in the top, one man on each side draws it along, and thus makes seven very shallow groves or drills; besides which, the trifling inequalities of the surface are completely regulated. With a straight piece of wood, that is in length just less than the width of the bed, they now make cross marks six inches apart — which distance they find marked on the edge-board—by pressing the straight rod a little into the soil, all the way down, so that they mark the bed in cross lines; every angle where the lines cross being six inches from the next. The boxes in which you see the bulbs, are made to match the marked bed, that is, there are seven partitions for bulbs across, and all the rows numbered. These numbers correspond with the names in a book, so that no labels are required.

We will stroll on a little, while he places these all in their ranks, and return to him. Those men planting in the borders, are inserting crocuses, snowdrops, lilies, and other bulbs. The pink and pansy beds have plenty of litter lying near them; if there be any chance of a frost, the litter will be put loosely on them six inches thick, and be removed again when the frost disappears, or when the days are fine. The flowers are a good deal cut up with frost now; even the chrysanthemums have suffered; yet see how some of the autumnal roses keep on blooming, though many of the half-opened flowers have been turned brown. All the small delicate roses from this bed have been potted, and placed under the stage in the greenhouse; they are not wanted to grow in the winter, but they cannot stand a hard frost. Where the dahlias were growing, the ground is all trenched up, and will probably lie so all the winter. The gardener will have to prune all the large heads of the roses to half their size, in order to prevent the wind from having too much power, but he will not attempt to prune them close, because hard frosts often kill the ends; at present there are shoots four feet long, and the power of the winter winds would probably break off the head altogether, so it is better to shorten now and prune in spring.

The greenhouse is much as it was last month; but the conservatory looks quite brilliant with the hundred varieties of chrysanthemums, in addition to the carpet of Russian violets; these have all been turned out from pots.

Let us now take a turn to the tulip bed again. You see he has placed all the bulbs in their proper situations, and pressed them in half their height; and now he fixes on the tops of the boards three inches in height; by this means he is enabled to place the tulips exactly three inches deep all over the bed, if

he chooses to strike the mould even. He will sift the mould in to fill up the bed, so that the tulips will not be disturbed; but instead of making the top quite flat, he makes it rather round, so that the centre row, which is always the strongest, will be rather deeper than the outside row. Here he will let them remain for the present, indeed until the beginning of the spring. The next bed is for hyacinths, and they will be planted in the same way.

The fruit garden is very desolate; but the men are winter pruning, as it is called, that is, taking away all useless shoots, and making fast in the best positions all that are wanted to bear. If this were neglected, the trees would soon become mere thickets of wood growing out from the wall, and would bear nothing in perfection. The hotbeds are all done with for ordinary forcing, and are filled with potatoes; of course there is but little heat left in the beds, but that little is enough for potatoes. The new heap of dung there, is preparing for a new hotbed, in which only cucumbers are to be raised.

We will return to the house, for there are some things we can talk about there, which we only glanced at out in the garden. For instance, you saw a man planting a quantity of straight upright sticks. Now these were common wild briers, torn out of the hedges and copses, and their roots dug up and brought into the garden for the purpose of grafting or budding roses on, as we saw them last July. They will make many shoots all the way from top to bottom; as soon as these appear, they are rubbed off all but the top two or three, which in consequence grow very strong, and at the base of these strong shoots, near the top of the brier, they insert the buds, as I explained to you in the summer. The carts and horses are engaged drawing in the fallen leaves from the lanes, for when they are rotted they are excellent for mould, and before they rot they are used to supply heat, for they ferment like so much dung, and do well to mix with dung for hot-beds, or ferment quite enough of themselves to bring forward sea-kale, asparagus, rhubarb, &c. Vegetable mould is the most enriching soil we have, and to plants the most natural. Many use leaves instead of tan, but I do not approve of them—they are not half so effective.

I have now to give you a few hyacinths and narcissus to grow in water in the glasses on the shelf. Fill up the glasses enough to make the water touch the bottom of the bulb, and always keep it that height. I recommend you to put them in the cupboard in the dark, till you see the roots spring half way down the glass, when you may bring them to the strongest light you can; the window itself all day, but at night they would be better in the interior,—not that frost would hurt the bulbs, but if the water were to freeze, the glass would burst. These will grow nearly as well as those in the hothouse and greenhouse, but not quite. It is very curious that the hyacinth is the most useful of all flowers for dwelling-houses, and that in the darkest, the worst of all situations, it will bloom, and often surprise the owner with much better flowers than could be expected. I hardly know any circumstance under which the hyacinth will not grow, if there be but moisture enough, and this is the case with very few plants.

SELECT ROSES, AND THEIR MANAGEMENT.

It is our object, in this paper, to offer various details connected with the management of the Rose garden, including descriptive particulars of the most conspicuous varieties of this favourite flower.

SOIL AND SITUATION.

First, as to the most suitable soil and situation for growing roses in the open air. If you have the choice of a situation, select a spot where trees or shrubs in the vicinity grow freely, and are clear of lichens on the stems and branches; and one which is out of the influence of the late frosts of spring, and the early ones of autumn. If such a desirable spot can be chosen, there will be little difficulty in growing first-rate roses, even by the most careless. But, as such a natural situation can very rarely be secured for the rose garden, the cultivator, must, of necessity, in the majority of cases, imitate such a place as nearly as he can. This may be done, or at least a very great deal may be done, by draining, and by altering the soil.

The best soil is a strong loam on a dry subsoil. If it is not sufficiently deep, it must be made so by deep trenching; three feet is a good depth, but not too deep. For such a soil, the only thing wanted is a little manure, and that should be of the best quality, so that as little as possible need be used; for the purer the state in which the soil can be kept the better. If the subsoil is wet, or of a cold retentive nature, draining must be resorted to; and it must be effectually done, for without a dry bottom, success is next to an impossibility in soils naturally cold and adhesive. To such soils, some light sandy earth,

or peat earth, such as American plants grow in, is of the greatest benefit; or any such materials as will alter the texture of the soil, will be beneficial. In light sandy soils, good strong loam, or even clay, may be used with advantage; but it will be requisite to get it well pulverised before using, which may be effected by exposing it on the surface of the ground, either in summer or winter. If it is laid on in summer, so as to become well dried by the heat of the sun, the first rains that fall will cause it to run like lime, when it should be dug in, and well mixed with the soil. If it is laid on in winter, the frost will disintegrate it, after which take the first drying weather that comes, and dig it in, well mixing it with the soil. In all cases, make the soil good, so that the plants may grow luxuriantly, and dry, so that the wood may get well ripened in the autumn.

MANURING.

The dung that has been used in a hotbed, if not too much exhausted, is as good as any manure for a fresh plantation; but for manuring those that have been planted several years, something stronger is required. In large gardens, where plenty of hot dung is in use, a drain should be made from every place where it is laid, in order to collect the water that runs from it; and care should be taken that no other water gets mixed with it, to weaken it, as it should be used of the fine dark colour of treacle. Where water of this description can be procured, it may be used at any time, by pouring it over the surface of the ground, as wide as the roots are likely to extend; and it should be used while quite fresh. If this liquid cannot be had in sufficient quantity, any other strong liquid manure may be used in the same way. Night-soil, diluted with water, makes an excellent stimulant. Perhaps, the very best manure is pigeons' dung; but as this can only be had in limited quantities, it must be used very sparingly; break it small, and sow it on the surface of the ground, lightly stirring it in with a spud, and leave the rain to wash it into the soil. All roses ought to have some manure once every year; the quantity must depend on the nature of their growth, whether strong or weak.

PLANTING.

When the ground for new plantations has been well prepared, the planting may be proceeded with, if the ground is dry enough to work well. Do not place the plants deeper than they have been planted in the nursery, as deep planting has a tendency to make them throw up suckers. November is the best month in the whole year to transplant the hardy kinds of roses; nevertheless they may be safely planted from that time till the middle of March. When roses that have died are to be replaced, take all the old soil and put in fresh, as roses, like many other things, do best in entirely fresh soil. After planting, every standard, and such of the dwarfs as are strong enough to be blown about, should be fastened to a stake, to keep it firm. Iron stakes, although by far the most neat in appearance, are objectionable, as they do not hold in the ground well. The second year after planting, they should be sufficiently established to do without stakes; if they are, remove the stakes, and let them do without: they will look neater. Some of the very long shoots may have about one-third of their length taken off, at planting-time, which will lessen the chances of their being blown about. Planting, tying, &c. being completed, stir the surface of the ground with a spud, and leave it till spring.

PRUNING.

From the beginning to the middle of March (as the season may be early or late), is the best time to prune the hardy kinds of roses: from the beginning to the middle of April will be soon enough for tender kinds—such as Noisettes, Isle de Bourbons, Teas, and Chinas. When the pruning is going on, any moss or lichen should be cleared from the stem or head; and when it is finished, and the rubbish removed, the ground should be dug, the surface being laid up rough, for the sun and wind to pulverise it; the longer it remains in this rough state the better, even if it be till the flowering season is at hand, as the going over the plants to pick off the multitudes of insects that infest them, taking off the suckers, hoeing, and other necessary operations, are sure to work the surface fine enough. Special directions for pruning will be given hereafter.

INSECTS.

These pests must be constantly picked off. The buds must be watched as soon as they begin to burst in the spring, to see if they are eaten by a species of beetle, which is the first that will attack them, particularly during cold north-easterly winds, with a bright sun; it will often eat the bark as well as the buds. This beetle may be found in the ground, near the stem of the tree, where the soil is lying in rough lumps. A good trap for it may be made by hollowing out a place in the ground, round the stems of the trees that are attacked, laying some small dry lumps of mould, stones, and such things, level with the surface, and on the top a good-sized piece of tile, or broken pot, to keep the whole

dry ; on looking amongst the dry lumps under the tile, you will be sure to find them ; but it is necessary to look very close, as they are so nearly of the colour of the ground, and have their heads so bent down, and their legs doubled close under their bodies, that they are easily overlooked.

The next is a grub which makes its appearance about the end of April. This rolls itself in the young leaves, and the heads of the shoots, and is very destructive to the flower, as it eats its way down the stem. If closely watched, this may be detected, before it has had time to do much harm, by a small web about the buds where it is. The grub may be taken out of the buds with the point of a needle. About the middle of May, a long-tailed dark fly may be seen busy amongst the roses ; and as it does not fly swift nor far at a time, it may be easily taken. No opportunity should be lost of destroying this fly, as its grub is very injurious to roses.

A green caterpillar will make its appearance about the middle of June. This, perhaps, is more destructive than any other insect : it can be found in the evening and morning, feeding on the upper surface of the leaves, and if not destroyed will eat the cuticle of every leaf ; and the death of the tree must follow. They must be hand-picked ; and if this is constantly followed up, the trouble will not be great, as the numbers will be kept low.

The green-fly, or aphis, will in some seasons be very injurious, if not destroyed. This may be done by fumigating, or by the ammoniacal water from the gas-works, diluted with ten or twelve times its bulk of pure rain-water, and used in the evening over the leaves ; two or three applications will destroy the fly, and stimulate the plants.

It will always be found the least labour to make it a point to destroy all insects as soon as they make their appearance. When the numbers are suffered to become very great, of course the growth of the plant is checked, and more or less injured for the season, and perhaps for ever ; besides, it is unpleasant to look at unhealthy trees.

MANAGEMENT OF STOCKS.

The selection, planting, and future management of stocks, for the following year's working, must have good attention. About the middle of October is soon enough to begin to collect the stocks. Take care that they are quite straight, of clean growth, and not bruised. Sort them according to their lengths and stoutness, as it is much better to work the very strong-growing kinds on the strongest stocks, whatever may be the height they are required. For planting, prepare a piece of ground as already recommended for new plantations ; and as they are brought in, trim and plant them at once. For trimming, have a very sharp hand-bill, a sharp saw, and a good solid block to lay them on ; cut off, with a clean cut, all the large nobs, very close to the stem, so that when they are done, they may be little more than walking-sticks. The object of cutting so close is to induce roots from the main stem, which are seldom thrown out unless these coarse parts are cut very close. Plant them immediately they are ready ; and if the ground is very dry, as it will be sometimes, give them a good watering as they are planted, and before they are trod in. They will often throw out roots before the winter sets in, and very few of the stocks will die. When all are planted, which under any circumstances should not be later than the end of November, go over with a sharp saw, and cut the tops off, to within about four or six inches of the height the future tree is required ; and after they are all cut, lightly stir the surface of the ground, and leave them till they commence growing in spring. When the shoots have grown about two or three inches long, they must be looked over, and all but three taken off, which three should be left if possible anglewise with each other, so as to form the basis of an equally balanced head. Of course the shoots that are left should be such as appear likely to make the strongest, smoothest, and most healthy wood; and should other shoots be afterwards produced, they must be taken off. The stocks will require no other attention until they are budded.

ROSES FOR EXHIBITION.

As to the selection of roses for exhibition, and the prizes which should be offered by Societies for cut flowers of roses, our opinion is as follows :—

Moss Roses should be shown by themselves, in six and twelve varieties, and excluded from other classes. China, Tea-scented, Isle de Bourbon, Noisette, Microphylla, and Macartney Roses, should be shown together, in twelve and twenty-four varieties. Provence, Gallica, Damask, Alba, Hybrid China, Hybrid Provence, Damask Perpetual, Hybrid Perpetual, and Hybrid Brier, should be shown together, in twenty-four, forty-eight, and one hundred varieties. The roses in these three divisions should be shown on single footstems. Austrian Briers and Rosa sulphurea, or Yellow Cabbage, should be shown in six varieties, in bunches of not more than three stems in a bunch.

In selecting roses to grow for exhibition, first determine the sections you intend to compete in; then choose some of the finest of each class, taking care to select a good proportion of such as have bright glowing colours ; for

such flowers as the (Hybrid China) Chenedole and La Meteore, make a more rich display than more perfect flowers of the same colours could do. A very double flower cannot show to advantage that peculiar warmth of colour, on account of the number of petals. Select also as great a variety of colour as possible.

In the early part of the summer, as soon as the bunch of buds has become fully developed, cut out some, about three or four, of the forwardest buds. By so doing, a greater number of flowers will be had open at the same time. Do not cut away the latest buds, as it improves the appearance of the bunches of expanded flowers, to exhibit them accompanied by unexpanded buds.

SELECT ROSES.

In the selection which follows we have been guided by the old classification adopted in the principal rose catalogues; the selection can of course be made to accord with any improved and more simple arrangement that may be hereafter suggested. Our object will be to select the finest-shaped and most conspicuous varieties of each class; and to give such hints respecting their peculiarities as we may think likely to be useful. It is customary to divide roses into summer-flowering, and autumnal flowering: we shall take the former first.

Provence Roses.

1. Common Cabbage, rose.
2. Cristata, rose, buds beautifully fringed.
3. Unique, or White, white.
4. Unique Panaché, white, with pink stripes.
5. Wellington, deep rose.
6. Wilberforce, vivid cherry pink.

Numbers 1 to 5 are very double flowers, of large size, and beautifully scented; 2 and 4 ought to be in every collection; 6 is a very large flower, with large firm petals, and is very conspicuous on the plant: before coming into flower, it ought to have some support, as the weight of the flowers bends the shoots down too much; 1 to 5 make neat standards or dwarfs; 6 is a more robust grower; 2, 4, and 5 are fine show roses, and 6 makes a distinct one to show in 50 or 100 varieties.

Moss Roses.

1. Blush, delicate blush.
2. Common, deep rose colour.
3. Comtesse de Noé, bright crimson purple.
4. Celina, brilliant crimson.
5. Lancel, deep reddish rose.
6. Princesse Royale, salmon pink.
7. White Bath, white, occasionally striped with pink.
8. Unique de Provence, pure white.
9. Laneii, rosy carmine.
10. De Meaux, blush.
11. Oscar Foulard, purplish crimson.
12. Etna, light rosy crimson.
13. Scarlet, bright carmine.
14. Mossue partout, rose, the leaves are covered with a rusty moss.
15. De Metz, bright rose.
16. Eclatante, brilliant rose.
17. Luxembourg, crimson, tinged with purple.
18. Mossue presque partout, rose.

Numbers 1, 2, 5, 6, 7, and 9, are fine double roses, of large size; 3 and 4 are very fine dark varieties, but rather small, and semi-double. 8 is sometimes deformed, like the Provence Unique, but is abundantly mossed. The bloom of No. 9 hangs on the plant but a very short time. 10 is very small, and short-lived. No. 11 is a slender-growing dark variety, more double than 4, but not so bright. 12 is very free-growing; not very double, but very beautiful. With the exception of 10 and 11, they all make neat standards, and all are well adapted for dwarfs, either for beds or mixed borders. 13 is very striking, till about half blown; and 14 is worth growing, as a curiosity.

The Provence and Moss roses require close pruning, leaving from two to four eyes from the previous year's cutting. Cut out all weak shoots, bearing in mind that it is requisite to get strong shoots as well as flowers. For six first-rate show varieties of Moss, take Nos. 1, 3, 5, 6, 7, and 9; for twelve, Nos. 2, 4, 8, 10, 12, and 13. Moss Princess Adelaide is a rose worth growing in a large garden, on account of its robust half-climbing habit; it should be grown to a six-feet pole, and only the tips of the shoots taken off at the winter pruning. Nos. 15 to 18 may be grown in a collection, where more varieties of moss are wanted; and they would occasionally come in to show. Moss roses should always be shown by themselves, and in a great many places they are so. Where that is the case, at least double the number of sorts ought to be grown, and two or more plants of some of the finest sorts should be planted, so as to afford plenty to pick from. All Moss roses are finely scented.

Hybrid Provence Roses.

1. Aspasie, silvery blush.
2. Blanche Fleur, creamy white, with beautiful shade of pale blush.
3. Comtesse Plater, cream, tinged with fawn in the centre.
4. Glope White Hip, creamy white.
5. Gloire de France, deep rose, very large.
6. La Volupte, deep rosy red.
7. Laura, rosy blush.

8. La Ville de Londres, pale bright rose.
9. Pompone de Laqueue, blush, shaded pale rose.
10. Princess Clementine, pure white.
11. Pauline Garcia, delicate straw-colour.
12. Rose Devigne, pale pinkish flesh.

Nos. 1, 2, 6, 9, and 10, are very fine shaped, very double, and first-rate show roses. For delicacy of colour, and constancy of flowering, 2 is hardly equalled by any other rose ; 5 and 8 have very large flowers ; 10 is an early rose with large flowers ; 9 has small neat flowers ; 12 is a very robust grower, and wants but little pruning ; 5 requires support while in bloom, as the shoots are not strong enough to bear the weight of the flowers ; 8 and 10 are strong growing kinds, and with 5 and 12 make large heads. All the rest make very nice heads of neat growth, suitable for standards or dwarfs. The flowers are generally erect and nicely scented.

Gallic, or French Roses.

1. Adele Prevost, silvery blush.
2. Boula de Nanteuil, velvety crimson purple.
3. Bizarre Marbrée, rose marbled blush.
4. D'Aguesseau, crimson.
5. Duchess d'Abrantes, pale rose.
6. Nelly, blush tinged with fawn.
7. Phaericus, deep reddish rose.
8. Sanchette, deep pink.
9. Scipio, rosy crimson,
10. Shakspeare, bright deep reddish crimson.
11. Triomphe de Jaussens, brilliant deep velvety crimson.
12. Télémaque, brilliant crimson.
13. William the Fourth, bright rose.
14. Nero, violet purple, spotted slate.
15. Le Prince, purple, spotted crimson.
16. Renoncule Ponctué, crimson red, spotted white.
17. Œillet Parfait, whitish, with bright-red and rose stripes.
18. Perles des Panachées, white, striped bright red.
19. Tricolore d'Orleans, bright reddish purple, striped with white.
20. Assemblage des Beautés, brilliant velvety scarlet crimson.
21. Eclatante, brilliant scarlet.
22. La Moskowa, very dark velvety crimson.
23. Feu Brillante, crimson scarlet.
24. Leon the Tenth, pale rose.

Nos. 1 to 13 are very double flowers, of most perfect shape and good size, without being too large. They are all fit to exhibit in ever so small a collection. For six of the best take Nos. 3, 5, 6, 7, 8 and 10. 14, 15, and 16, very distinctly spotted roses, are worth growing as curiosities ; 16 has very small flowers, hardly so large as a Ranunculus ; 17 and 18 are good distinct striped roses ; 19 is very singular and distinct ; 20 and 22 are of the old Tuscany habit and shape ; 20 is some seasons very vivid ; 22 is very rich, and when particularly fine is almost black ; 21 is a very brilliant-coloured flower, and double ; 23 is large, firm-petalled, like the petals of a fine Camellia, the flower is very large and vivid, but only half double, on the tree it is very conspicuous ; 24 is one of the largest of roses, very double, and occasionally of a good shape. Except No. 24, which is a stiff grower, and not much branched, all the rest are adapted for standards or dwarfs.

Damask Roses.

1. Coralie, white, rosy centre.
2. Déese Flore, white, blush centre.
3. Chateaubriand, cherry red.
4. La Fiancée, creamy white, flesh-coloured centre.
5. La Ville de Bruxelles, bright rose.
6. Madame Hardy, pure white.
7. Pompone Toussaint, deep lilac rose.
8. Semiramis, rose, fawn-coloured centre.

Nos. 3, 5, and 6, are very double, first-rate show roses ; 1, 4, and 8, are rather slender growing ones, and require support while in flower ; 2 has small flowers, and is a most lovely little gem ; 5 is a very robust grower, with fine shining leaves ; 7 is a small flower of perfect shape ; 8 is one of the most taking colours among roses. 2 and 7 are only fit for dwarfs or low standards. Except 5, these make handsome standards or dwarfs ; all are finely scented.

Rosa Alba.

1. Félicité Parmentier, French white, rosy-pink centre.
2. La Séduisante, rosy blush.
3. Madame Campan, deep rose, very distinctly spotted with white.
4. Madame Audot, pale flesh.
5. Princesse de Lamballe, pure white.
6. Queen of Denmark, blush.

The above class partakes of the characters of the old maiden's blush, both in the colour of the wood, leaves, and scent. Nos. 1, 2, and 6 are first-rate show roses ; 3 is a good spotted rose ; 4 is a very robust habit ; 5 has small flowers, in fine clusters, and early. All but No. 4 make handsome standards, or dwarfs.

The Hybrid Provence, Gallica, Damask, and Rosa alba, require the same mode of pruning. From four to six eyes should be left on the young wood.

Hybrid China Roses.

Those marked thus *, in this and the following classes, are scented ; those without the star are either almost, or quite without scent.

1. Beauty of Billiard, vivid scarlet.
2. Brennus, bright crimson red, large.
3. Charles Duval, rosy pink.
4. Chenédolé, vivid light crimson, very large.
5. Comptesse de Lacépède, silvery blush.
6. Coupe d'Hébé,* delicate bright rose.
7. Coupe d'Amour, deep pinkish rose, small, early.
8. Gloire de Couline, bright carmine, shaded crimson.
9. Lady Stuart,* silvery blush.
10. Louis Foucquier, bright deep pink, large.
11. Lord Mahon,* bright rosy crimson.
12. Rouge Admirable, red shaded purple.
13. Aurora, crimson purple, striped white.
14. Blarii,* changeable rose.
15. Camuzet Carnée, rich pale rose.
16. Decandolle,* brilliant crimson scarlet.
17. Duke of Devonshire, lilac rose, whitish stripes.
18. Elizabeth Plantier, crimson shaded purple.
19. Henri Barbet, brilliant deep pink.
20. La Météore, dazzling ruby red.
21. Magna Rosea,* fine blush, large.
22. Triomphe d'Angers, brilliant crimson, sometimes striped with white.
23. À Odeur de Paté d'Amande, cherry red.
24. Stadtholder Sinensis,* pale rose.
25. Charles Louis, pale rosy lilac, small, early.
26. Daphne, reddish salmon, small.
27. Dombrowski, bright reddish scarlet, small.
28. Fulgens, deep rich crimson scarlet.
29. Madame Plantier, pure white, small.
30. Great Western, deep crimson red, very large.
31. Lord Nelson, deep velvety shaded purple crimson.
32. Marshal Soult, brilliant deep salmon pink.
33. Ne plus Ultra, bright fiery red.
34. Riego,* rich rosy red.

The Hybrid Chinas are certainly the most magnificent of roses we have. There are several others of this class well worthy of being grown. Nos. 1 to 12, except 4, are very double, of first-rate shape, and with 4 they are very fine roses for exhibition, indeed 4 and 6 ought to be in the smallest collection ; 13 to 22 are remarkably fine large firm petals, the flowers not so double but that the central stamens are seen, all are very showy on the plant ; 23 is very showy, but the flowers are thin; it is worth growing on account of the singular scent of the opening flowers ; 24 has good double flowers which have a rich fruit-like scent ; 25, 26, and 27 have small flowers, but are very handsome, 25 looks more like a Ranunculus when in flower ; 28 is a bright coloured flower ; 29 blooms in large clusters ; 30 is a large coarse-looking rose, but is very much admired ; 31 is a rich dark rose, but is rather sparing of bloom ; 32 is a neat distinct coloured flower ; 33 is showy on the plant, being a very free flowering one ; and 34 has large, globular flowers, which are rather pendulous, and very highly scented. Nos. 9, 11, 15, 18, 23, 25, 26, 27 and 33, are neat growing varieties ; all the rest are of robust-growing habit, and capable of forming heads of the largest size. Twelve very superior varieties of this class are Nos. 1, 4, 6, 7, 9, 10, 14, 19, 20, 21, 25 and 34. The robust growing ones of this class, grown on short stocks and tied to four or five stakes in the manner of Dahlias, make splendid objects. In pruning the strong kinds, thin out the weak shoots, and cut about a third off the strong ones. On standards the very strong shoots should have the tops cut off early in summer, which will keep them in due bounds. The moderate growing ones may have their shoots left from four to six eyes in length. In all cases cut out the weak shoots.

Hybrid Briers.

1. Double-margined Hip, white shaded with light and deep pink.
2. Scarlet, bright deep red, small.

No. 1, in dull rather moist weather, is most beautiful, but soon fades in hot dry weather ; when in its prime it is a beautiful show rose ; 2 is a pretty little variety. Prune the same as French Roses.

Sweet Briers.

1. Carmine, brilliant carmine.
2. Rose Angle, bright pink.
3. Superb, bright rose.
4. Splendid, light crimson.

The flowers of these have the scent of the common sweet brier, and on that account are worthy of being grown. They require but little cutting at the winter pruning ; not more than one-third should be taken off, but if they require to be made smaller, cut them in as soon as the bloom is over.

Austrian Briers.

1. Single Copper.
2. Single Yellow.
3. Harrisonia, sulphur-yellow.
4. Persian Yellow, deep golden yellow.

No. 3 is nearly double, and is very graceful on the plant; 4 is quite double. Nos. 1, 2, and 4 should be grown in bushes, as from their erect habit of growth they soon become unsightly as standards; 3, from its half-weeping habit, makes a first-rate standard. At the winter pruning, all the Austrian Briers should have only the extreme tips taken off, and the very weakest shoots thinned out; immediately they have done flowering they should be cut back to where they are likely to make vigorous shoots.

Rosa Sulphurea.

Yellow cabbage, sulphur-yellow, with deep yellow centre. Those who wish to grow this fickle beauty should plant it against a wall, in as many different aspects as possible; it is most likely some will then flower every year. Plants trained on both sides of a wall, will sometimes open the flowers on one side and not on the other, and perhaps but once in many years open them alike on both sides in the same season. At the winter pruning cut it the same as recommended for the Austrian briers.

CLIMBING ROSES.

Where the climbing roses are grown as pyramids young larch or fir trees, about ten feet high, should be taken up with roots, the side shoots trimmed to within about two inches of the stem, leaving the leader uninjured, and they should be planted where the roses are wanted. After they have been planted a few days the roses may be planted against the larches. At the winter pruning the young shoots of the larch may be cut nearly to where they were cut the previous season. The advantage of having a living larch is, that it makes a very neat pole; it does not rot, and consequently does not break, and the top is covered with green leaves instead of being bare. The roots are not found to be injurious to the roses. When the larches have grown as high as they are wanted the tops should be cut off. The Ayrshire, Sempervirens, Boursault, and Hybrid Climbers, make very fine pyramids, and are very hardy. In some very favoured places many of the fine free-growing Noisettes and Isle de Bourbon roses may be planted against pillars, and where such is the case nothing can exceed their beauty; still some of the others ought to be grown, as they make a most magnificent show in the months of June and July, and may be grown to a much larger size than the Noisettes and Bourbons.

Ayrshire Roses.

1. Alice Grey, creamy white.
2. Dundee Ramble, white, edged with pink.
3. Myrrh Scented, creamy blush.
4. Queen of the Belgians, white, creamy centre.
5. Ruga, pale flesh.
6. Semi-double, white shaded pink.

No. 2 is very double; 1 comes into leaf very early in spring, and makes an interesting plant for a rock-garden on that account; 3 has a distinct scent of myrrh; 5 has a scent something like the Tea-scented Odorata. All are very rapid growers, and abundant bloomers. The Ayrshire make the best roses to plant on shady banks or under trees, as they stand the drip of large trees better than any other roses.

Sempervirens.

1. Adelaide d'Orleans, pinkish rose.
2. Banksiæflora, white, yellowish centre.
3. Brunonii, vivid bright pink.
4. Félicité Perpétué, creamy white, back of the petals pink.
5. Ranunculacea, pale blush.
6. Princesse Marie, pinkish rose.
7. Rampant, pure white.

No. 3 is only semi-double, but is very showy; the whole of this class are remarkable for their bright shining green leaves, which they retain on the plants till winter, and for their large clusters of flowers.

Boursault Roses.

1. Amadis, bright purplish crimson.
2. Elegans, bright purple, striped white.
3. Inermis, vivid rich rose.

No. 1 is a splendid pyramid rose; 2 is a most abundant bloomer; 3 is very fine, but not a fast grower.

Hybrid Climbing Roses.

1. Indica Major, pale blush.
2. Madame d'Arblay, or Wells' White, white.
3. The Garland, changeable creamy white.

Nos. 1 and 2 are very strong growers, and bloom in fine clusters; 3 is a moderate grower, and is one mass of very small flowers.

The above classes of climbing roses require but little winter pruning; merely the old weak wood should be taken out, the previous year's shoots should be left the full length, or should only have the extreme tips taken off. In summer the climbers are inclined to make very strong shoots from the bottom near the ground; these should be taken off as soon as they make their appearance.

Banksian Roses.

1. Jaune Serin, bright yellow, nearly double the size of the old yellow Banksia.
2. Odoratissima, white, very fragrant, and double.

3. Old White.
4. Old Yellow.

The Banksian roses require a wall to bring them to perfection. They should not be cut in the winter or spring, but the shoots left the full length till they have done flowering, when they may be cut as much as is requisite. The shoots that are made after this must be nailed in; but should too many shoots push out, all the unnecessary ones should be taken out, while it can be done with the thumb and finger.

Multiflora Roses.

1. Alba, or Old White, white.
2. Grevillei, or Seven Sisters, bright rose, variable.
3. Lauré Davoust, pink, changing to white.
4. Rubra, or Old Red, pale rose.
5. Superba, pencilled rose.

The shoots of this class are very liable to be injured during winter, which frequently cannot be seen till April, which month would be the best to prune them. Leave as much of last year's wood as possible. These flower in very large clusters. Nos. 1 and 4 are very small, but pretty; 2, 3, and 5 are larger.

Prairie Roses.

1. Baltimore Belle, pale blush.
2. Caradori Allan, brilliant pink.
3. Queen of the Prairies, bright reddish pink, with whitish stripe.
4. Superba, pale pink.

In pruning this class the shoots should be cut about half-way back. They are very hardy, but our climate seems too damp for them to open their flowers well if planted away from a wall.

AUTUMNAL, OR PERPETUAL ROSES.

Roses that flower more or less from June till November. The roses of this section have now become very general favourites, perhaps hardly deservedly so, as only a few of them show their greatest beauties till late in summer, particularly in dry seasons; they appear to require longer nights and cooler weather than we wish to have in the months of June and July. For small gardens there can be no question that it is best to have such as continue flowering throughout the summer and autumn; but in gardens, where upwards of thirty varieties can be grown, a judicious mixture of summer and autumnal flowering ones would be preferable; for however splendid the present autumnal flowering ones may be, they do not compensate for the gorgeous display made by the summer flowering kinds in the months of June and July.

In dry summers all perpetual roses should have the ground stirred about four inches deep, (taking care not to injure the roots,) and well soaked with manure-water just before the first lot of bloom is over, and should the season continue dry, they will require watering once a week at least throughout the season. As the flowers drop cut off the old flower-stems.

Perpetual Moss Roses.

1. Perpetual Crimson, brilliant crimson.
2. Perpetual Red, deep rose.

Here we certainly have two moss roses that give a second crop of flowers. They partake very much of the character of some of the damask perpetuals in the formation of their bark and buds. No. 1 is a very strong grower, and in colour is very like the moss Celina; No. 2 is a dwarf compact grower, and blooms in fine clusters.

Damask Perpetual Roses.

1. Bernard, rosy salmon.
2. Billiard, bright rose.
3. Duchesse de Rohan, deep red.
4. Julie de Krudner, light pink.
5. La Capricieuse, rose, changing to bright red.
6. La Favourite, pale blush, tinted with fawn.
7. Mogador, brilliant crimson purple.
8. Rose du Roi, brilliant crimson.
9. Torrida, rich dark crimson.
10. Thiers, deep rose, lighter centre.

Nos. 1, 7, and 8, are without rivals. The scent of the whole of this class of roses is not surpassed even by the moss and Provence roses. They are all well adapted for beds or standards, being of neat compact habit. No. 9 is very dwarf. All are good roses for autumn exhibitions; and for bouquets, the scent will generally give them the preference.

Hybrid Perpetual Roses.

1. Baron Prevost, bright rose.
2. Clementine Seringe, pale rose.
3. Comtesse Duchâtel, brilliant rose.
4. Dr. Marx, rosy carmine.
5. Duchess of Sutherland, mottled bright rose.
6. Géant des Batailles, bright crimson, nearly scarlet.
7. Lady Alice Peel, deep veined pink.
8. Louis Bonaparte, rosy crimson.
9. Madame Laffay, brilliant crimson.
10. Marquisa Boccella, pale rosy blush.
11. Marquis of Ailsa, rosy crimson.
12. Mrs. Elliot, bright lilac crimson.
13. Robin Hood, deep bright cherry red.
14. William Jesse, light crimson.
15. Cornet, bright deep pink.
16. Cymedor, at first opening the colour is something like the scarlet ten-week Stock, but fades of a purple hue.

17. Standard of Marengo, crimson scarlet.
18. Lady Sefton, glossy lilac rose.
19. Clementine Duval, bright rose.
20. Comte d'Eu, brilliant carmine.
21. Dr. Marjolin, rosy carmine.
22. La Reine, brilliant pale rose.
23. Lady Fordwich, deep rosy crimson.
24. Prince de Galles, lilac rose.
25. Prudence Rœser, pink, fawn centre.

There are still some fine varieties of hybrid perpetuals worthy of being grown, but they are unfortunately of the prevailing colour of the class, viz., crimson of various shades—happily a colour with which every one is pleased. No. 1 is one of the best roses known, being very constant, very large, full, and a very free bloomer; 2 is very large and double, and scented of the Provence rose; 3, 4, 7, to 14, are fine shaped roses, and full flowers; 5 is very beautiful, particularly in autumn; 6 is a fine shaped rose at first opening, and the colour is fiery for some days after it is opened, the flower is of a moderate size, and is almost always in bloom during summer and autumn; 15 is large and showy, but only semidouble; 16 is most splendid at first opening, but soon becomes shaded with rosy crimson; 17 is more brilliant in colour than 6, but not so double; 18 is very showy on the plant, but is only semidouble; 19 is small, very double, first rate in shape, a free bloomer; 20 is of a dwarf free blooming habit, it would make a fine bed by itself,—for this purpose young plants should be struck in autumn, and kept in small pots during winter, and planted in the bed about the beginning of May; they will flower well from August to October; 21 is very dwarf, but a very free bloomer; 22 is very large and generally coarse, but sometimes most lovely—it does not always open well; 23 flowers in fine clusters, and is very double; 24 is rather flat, but is distinct in colour; 25 has the Noisette habit of flowering, and would form a good bed of itself. With the exception of 19 to 21, they all make first-rate standards, and are equally well suited for dwarfs or any intermediate height; 19 to 21 are best as dwarfs, or on stems not more than two and a half feet high. For six first-rate show varieties, Nos. 1, 5, 6, 12, 13, and 14; for twelve, add 2, 3, 4, 7, 8, and 10; 22, when good, will always do for show, even among a small number. The most conspicuous on the plant, are Nos. 1, 6, 9, 12, 13, 14, 15, 16 and 17; 5 is liable to be injured by a very low temperature, so that when the thermometer indicates above 20° of frost, it would be best to tie some heath or fern among the branches; 6, 16, 17, 19, 20, and 21, are the better for a little protection during low temperatures in winter. This and the foregoing class should be cut back to about three or four eyes, and the weak shoots should be cut out.

Isle de Bourbon Roses.

The Isle de Bourbon Roses are among the finest of the autumn roses; in fact, very few of them flower fine till autumn or during a cool cloudy summer. They are hybrids from the rose from the Isle of Bourbon and the Noisettes and Chinas; they have generally very fine foliage. Unfortunately very few are fragrant; those which have this property are marked.*

1. Acidalia, blush white, slightly tinted with pink after the flower has been open a day or two.
2. Augustine Lelieur, deep fulgent rose colour.
3. Bouquet de Flore,* rosy carmine.
4. Cérès, bright rose.
5. Desgaches, bright rose, with a slight tinge of salmon.
6. Emile Courtier, deep rose.
7. Georges Cuvier, brilliant rosy carmine.
8. Henri Plantier, bright light rose.
9. La Gracieuse, fine rose.
10. Le Grenadier, bright crimson.
11. Madame Despres, rosy lilac.
12. Menoux, brilliant carmine.
13. Paul Joseph, rich crimson purple.
14. Proserpine, deep bright velvety crimson.
15. Reine des Vierges, pale plush.
16. Souchet, crimson, shaded purple.
17. Souvenir de la Malmaison, pale blush, centre slightly tinted with fawn.
18. Splendens,* rosy crimson.
19. The Queen,* pale buff, shaded fawn.
20. Armosa, bright pink.
21. Grand Capitaine, velvety scarlet.
22. Gloire de Rosomène, deep bright velvety crimson.
23. Julie de Loynes,* white.
24. Madame Angelina,* pale cream, fawn centre.

Nos. 1 to 19 are all fine show roses, and have no fault of not opening their flowers well; 2, 4, 8, 13, 14 and 16, are very dwarf growing varieties, and would make a rich bed if planted thick; as standards, on neat small stocks from two to three feet high, they are very handsome; 1, 10, 11, 15, and 17, are vigorous growers, and would, in very good soil, make good pillar roses, or standards of the largest size; 3, 5, 6, 7, 9, 12, 18, and 19, are neat growing varieties; they make very handsome standards on stocks from two and a half to three and a half feet, or as dwarfs for beds they are well suited; 17 has very large flowers from four to five inches over, and very double; 19 is the most constant flowering rose we have, having a mass of bloom from June till November; 20, 21, and

24, are neat growing roses,—each variety by itself would make a handsome bed, they also make neat standards from two to three feet in height; 22, to see it in its greatest beauty, should be planted against a wall on its own roots, and cut hard in at the winter pruning; this will cause it to throw out strong shoots, at the ends of which will be produced gorgeous bunches of flowers; as a standard it makes a great show, but the flowers are only semi-double; 23 is a small very fine shaped rose, of neat growth; 12 is a new rose that, from its exquisite colour, will find its way into every collection. For six distinct colours and good shapes, take Nos. 1, 3, 12, 13, 17, and 19; for twelve, add 2, 4, 5, 7, 14, and 15. In pruning, cut to about three or four eyes. The beginning of April will be soon enough for pruning. In summer, if any very strong shoots are pushed out, top them at four or six inches off the stock.

Tea-scented Roses.

These are so named from their possessing more or less the scent of green tea.

1. Adam, blush rose.
2. Comte de Paris, pale rosy blush.
3. Caroline, rose.
4. Devoniensis, straw, buff centre.
5. Elisa Sauvage, sulphur, orange centre.
6. Eugénie Desgaches, bright pale rose.
7. Goubault, bright rose.
8. Josephine Malton, shaded white.
9. Julie Mansais, white, lemon centre.
10. La Sylphide, pale blush.
11. Moiret, rose, deep fawn centre.
12. Niphetos, pale lemon, sometimes pure white.
13. Grandiflora, deep pink.
14. Hamon, bright pink and buff.
15. Odorata, blush.
16. Buret, bright deep crimson.
17. Safrano, bright fawn colour.
18. Vicomtesse de Cazes, yellow, deep orange centre.
19. Yellow, or Yellow China, sulphury yellow.

Nos. 1 to 12 are fine show roses, that open their flowers without being deformed; they have all good double flowers and firm petals. As standards, on two to three feet stems, they are very handsome; 13 to 15 are worth growing for their fine scent; the flowers are loose when fully blown, but the buds the day before fully blown are very highly scented; 16 has the tea scent only in a slight degree, but its deep colour makes it desirable; 17 and 18 require to be grown in the open air, or the colours are pale and insipid; they are very fine as standards; 17 being a vigorous grower, and 18, will grow well as standards, but in dry seasons they only make short shoots; 19 is the old Yellow China, which is too well known to need any comment. If grown as standards, the tea-scented roses require protection in winter, for as they are continually growing, they are very liable to be injured. The best way is to take them up, and lay them in a bed, in a slanting direction with their heads to the north; they may be laid very thickly in rows across a bed, with their heads almost touching the ground, and the roots just covered, and when the bed is full, some sticks should be bent over the whole for mats to rest upon; they may then easily be covered when they require it, which is only during frosty weather. In this way, a dozen mats cover a bed containing about 400 plants. In very severe weather, say 20 or 25 degrees of frost, it is advisable to throw a little litter over the mats, unless there is snow. They are planted again some time between the middle of March and the beginning of April, as the season may be early or late. Dwarfs on their own roots, planted close to a south wall, stand the winter well, if a little mulching is laid about the roots and over the ground; should they get covered with insects so as to stop their growing, cut them down, and they will soon grow up again from their base, and flower fine during the latter part of the summer and autumn. In pruning, leave about three or four eyes, and cut out the old weak wood. For six distinct varieties, take Nos. 1, 4, 5, 8, 11, and 12. Except 13, 14, 15, 17, and 18, they all make fine roses for pots or planting in the conservatory.

China Roses.

1. Cameleon, very dark velvety crimson, and sometimes rose, very changeable.
2. Cramoisie Supérieure, bright deep velvety crimson.
3. Eugene Hardy, creamy pale blush.
4. Lorrainii, pale waxy rose.
5. Marjolin du Luxembourg, deep velvety crimson.
6. Madame Bréon, brilliant rose.
7. Mrs. Bosanquet, pale waxy flesh colour.

No. 1 is like the old common blush China in growth, and worth planting with that variety; 2 is a very great improvement on the old dark China; for a bed by itself or for pots, it is most beautiful; 3, 6, and 7, would also make good beds on their own roots, either separately or mixed; 5 is a large rose of this class, a good one for pots, or to plant against a wall; 4 is only fit for pots, being a shy grower, but is very handsome in flower; 7 ought to be in every collection, it is suitable for standards or dwarfs, or any intermediate height; 2, 3, and 6, make neat standards of from two to three feet, and require the same treatment as recommended for the tea-

scented varieties ; 1 and 7 are about as hardy as the common China. None of this class have more scent than the common China.

Noisette Roses.

1. Aimée Vibert, pure white.
2. Clara Wendel, straw, lemon centre.
3. Cloth of Gold, rich yellow.
4. Eclair de Jupiter, vivid bright crimson.
5. Fellenberg, bright rosy crimson.
6. Jaune Despres, bright fawn.
7. Lamarque, straw, yellowish centre.
8. Ophirie, bright salmon and fawn.
9. Solfaterre, bright sulphury yellow.
10. Vitellina, creamy white, buff centre.

Nos. 2, 3, 6, 7, 8, 9, and 10, are excellent varieties for a south wall, being rather tender ; as standards they require some protection in winter, if the situation lies low ; 1 is well suited for a standard or dwarf, or against a wall is highly ornamental, retaining its shining green leaves nearly all the winter ; 2 is a very dwarf grower, and as a standard from two to three feet, is very handsome ; 3 has a very robust habit, but is a very shy bloomer ; the flowers are produced at the points of the very strong shoots, consequently it is necessary to cut it very hard in spring, and it must be grown very strong ; it is certainly worth taking a great deal of trouble with ; 4 is a semi-double flower, in the way of Isle de Bourbon Gloire de Rosomène, but not so dark—like that variety, it is very showy at a distance ; 5 is a neat compact grower, makes a good bed if on its own roots, or as a standard is very neat ; 6 and 7 are very strong growing kinds ; 8 is singular in colour, the shape is bad ; when cut and placed in a stand among others, it is very distinct ; 9 is more graceful in its growth than 3, which it somewhat resembles ; it flowers freely, and although not so deep a yellow, it is very beautiful, and will be grown long after 3 is gone into oblivion ; 10 is a neat grower, well suited for standards or dwarfs, and is constantly in bloom throughout the season. The beginning of April will be soon enough to prune noisette roses. Cut them rather hard, so that they make vigorous shoots, as they flower at the points of the shoots ; if, therefore, the shoots are not strong, the clusters of bloom will be small. A little heath or fern tied among the shoots and close round where the buds were inserted, in very severe weather, will generally be protection enough for this class of roses. With the exception of Nos. 1, 4, and 5, they are all fragrant, with something of the tea-scent.

Macartney Roses.

1. Old Single White.
2. Lucida Duplex, delicate blush.
3. Maria Leonida, white, pale rosy centre.

Microphylla Roses.

1. Alba Odorata, creamy white, semidouble.
2. Common, deep rose.

The Macartney and Microphylla roses are only suitable for a south or south-west wall. Prune them the beginning of April, leaving as much of the strong old wood as possible. It is a great pity the single white Macartney has been so much neglected, as nothing can be more beautiful than its shining green leaves, even without its singular flowers. In extraordinarily severe weather, a mat would be required over them.

POT CULTURE.

Situation.—It is of the greatest importance to pot-roses, to place them in a good situation while in the open air. Too much care cannot be taken to make that situation what it should be ; for on their management while there, will depend in a very great measure the quality of the future bloom. Having decided on the number of plants to be grown, select a piece of ground in a sheltered part of the garden, fully open to the sun ; mark out a bed large enough to receive the pots, and take out the soil about six inches deeper than the depth of the pots, in order to make a good permanent bed. The sides of this bed should be built up with bricks and cement, and should have an oak curb at top ; some iron rods should be fixed in the curb and bent over the bed, ready to support the covering when required. The pots should be set on slate shelves, or on inverted flower-pots ; and moss should be filled in lightly between the pots up to their rims. In severe weather, the hardy kinds must have some moss, to the thickness of eight or nine inches, covered over their tops ; but the tender kinds must be placed under glass.

Soil.—Good strong hazel brown loam, that has laid in a heap at least twelve months and has been turned over several times, should form the staple of the soil, to which should be added a little pigeons' dung, and some well rotted hot-bed dung. The proportions should be, about one bushel of loam, one peck of hot-bed dung, and half a gallon of pigeons' dung ; they must be well mixed together, and kept dry till used.

Potting.—About the end of October is the best time to pot them. In doing this, place a large piece of potsherd (that is, broken flower-pot) over the hole in the bottom of the pot, and lay over it some potsherds, charcoal, or any similar material broken up, so as to act as drainage ; from one to two inches in depth of this drainage should be used at the bottom of each pot ; add a layer of turf or moss over the drainage, to prevent the fine particles of mould from washing down and clogging it. Next,

put in some of the prepared soil, introduce the roots of the plant, which should be easily disposed in a spiral manner, and work in the soil among them, using some lumps of charcoal, or broken oyster shells, or some such materials, among the soil to keep it open. It is important to lay the roots out easy and clear of one-another, by working the soil carefully between them, after which it must be shaken down firmly, by tapping the bottom edges of the pot on the potting-board. Set the pots in the bed at once, giving them some water to settle the soil firmly down. During winter, very heavy rains should be kept off them. All the varieties of China, tea-scented, noisette, and Isle de Bourbon roses, should be placed under glass about the end of November; but they must have plenty of air day and night, except during frosty weather. The moss on the top of the bed where the hardy kinds are plunged, will be sufficient protection for them, unless the temperature gets very low, when a mat may be thrown over the iron rods provided for the purpose of supporting them; here they may remain till they are wanted for forcing. About a fortnight before they are set in the forcing-house, they should be cut over, the top of the soil broken up, and if need be, some of the old soil taken away and fresh added; they should then be set in a cold pit or greenhouse.

Forcing-house.—The best form of roof for a forcing-house, is the span roof; and the house should be provided with a hot-water tank down the centre under a plunging bed, with a walk round it, a platform at the sides and ends of the house two or three feet wide, and a door in the centre at each end. As the roof of such a house would not require more than one light in length on each side, every light ought to be made moveable, and the side lights also, so that every facility may be secured for giving plenty of air when the weather permits. One of the best kinds of tank is that constructed of galvanised iron; the covering is better if made of cast iron in the form of a net; over this should be placed a layer of stones, just large enough to prevent their falling through the openings in the cover; on these another layer of smaller ones, and above the latter, the plunging materials. In this way a fine moist heat is constantly kept up, without the necessity of pouring water between the pots. The flow in the tank should be from the end nearest the boiler to the other end, and the water should return in pipes under the side platforms.

Temperature.—At whatever season roses are grown in-doors, they should be kept in as low a temperature as possible, so that the plants are kept growing; 45 degrees at night, and 55 degrees by day is high enough, unless it be during sunshine. Advantage may be taken of every moderately still day to give air; but keep up the temperature. As nearly all the insects which infest roses in the open air attack them when grown in-doors, they must be very closely watched, and destroyed as soon as they make their appearance.

Training. — As the shoots advance in growth, set them out in the form it is desired the plant should have when in flower. The most pleasing shape is the form of the well-grown bush in the open garden, but when in flower no sticks ought to be visible.

Watering.—While the plants are growing, whether in-doors or out, water freely with clear manure water; a little dusting of guano should also be laid on the surface of the soil, so that the water may carry its fertilizing properties with it into the soil.

After the plants have done blooming, take off some of the old soil, and add fresh with some guano in it. When the spring frosts are over, they may be set in the bed in the open air. Examine them through the summer, to see they do not get dry at bottom. About the middle of October, re-pot them for the next season, and manage them as before; the second year they ought to be stronger than before.

FINE ROSES FOR POT CULTURE.

For early forcing, the Common and Prolific Moss, Crimson Perpetual, Common Cabbage Provence, and Crested Provence, are the best. For a later bloom, select the Hybrid Perpetuals with double flowers; even those that do not perfect their flowers in the open air, force exceedingly well. To ensure well coloured flowers of the Hybrid Perpetuals, they must have plenty of sun and air.

The following is a selection of thirty-six varieties to flower in April, May, and June; for exhibition, or to adorn the conservatory or greenhouse: *Moss.*—Celina, Princesse Royale, Unique de Provence. *Provence.*—Cristata, Wellington. *Hybrid Provence.* — Blanche Fleur, La Ville de Londres, Princess Clementine. *Gallica.*—Boule de Nanteuil, Duchesse d'Abrantes, Feu Brilliant, Triomphe de Jaussens. *Damask.* — Madame Hardy, La Ville de Bruxelles. *Alba.*—Félicité Parmentier. *Hybrid China.*—Beauty Billiard, Brennus, Charles Louis, Charles Duval, Chenedole, Coupe d'Hébé, Gloire de Couline, Lady Stuart, Riego, and for a large coarse rose, Great Western. *Hybrid Perpetual.*—Baron Prevost, Duchess of Sutherland, Louis Buonaparte, Mrs. Elliot, Robin Hood, William Jesse. *Isle de Bourbon.*—Souvenir de la Malmaison, Menoux. *Tea-scented.*—Adam, Devoniensis, Niphetos.

The *Noisettes*—Solfaterre, Lamarque, and

Clara Wendel, are very fine when grown well; they require a great deal of sun and air, or the colours will not be bright and clear.

PROPAGATION.

Cuttings of the Hybrid Perpetual, Isle de Bourbon, Tea-scented, China, Noisette, Macartney, Microphylla, and the climbing roses, strike readily in a hot-bed, with a gentle heat, during July and August. Take as cuttings the half ripened shoots, with a heel where practicable; if not, cut the shoots even through close up to a joint, and plant them firmly round the sides of the pot, in sandy loam; give a little sprinkle of water, and put them in the frame. The care they want is, to see they do not get too dry or too wet, to shade from the sun, and when the air is not too drying, to give a very little air. As soon as they are rooted, pot them separately into very small pots, set them in a *gentle* heat till rooted round the pot, when they must be gradually hardened to bear sun and air. They will require to be kept in a greenhouse, or in a pit that is provided with fire heat in some way, for they are very apt to damp off, when covered up in cold frames during long-continued frosts. The same classes may also be struck under hand glasses, with a gentle bottom heat, during the same months.

Cuttings put in about the middle of October, in a warm, sunny, dry situation, under hand-glasses, will strike root in the course of the winter; they merely want all the air they can have in mild weather. If the weather is damp, the glasses should be tilted up with small pots. During frost, the glasses must be shut close, and covered.

Cuttings prepared in any of the above ways, if planted out into beds about the middle of May, or a little later should the season be backward, will flower beautifully during the latter part of the summer and autumn; and if protected in winter, will flower finely all the following season. In planting, take care to range those of the same habit together.

Grafting.—This mode of propagating roses is only fit for dwarfs, and may be practised on the budded stocks that have failed the previous season, or on such as were planted very early in autumn. Select the scions before they begin to push at all in spring; name them, and "lay them in" under the shade of trees, or close under a wall at the north side. The middle or end of April, the period when the sap is in full flow, is the best time for the operation. Clear away the soil from the stocks down to the fibres; cut the stocks off as the grafting proceeds, but do not let them be cut off many minutes before they are grafted. Rind-grafting, when it can be done, is best, but common whip-grafting will do very well. As soon as they are done, close them over with clay or grafting wax, and draw the soil about them so as to cover the wax or clay, as they will sometimes root out of the scions. When they have grown enough to require tying up, put a stick to them long enough to serve for their growth throughout the season.

Budding.—This is the best mode of propagating roses for standards or dwarfs, when they are wanted on stocks. It may be done at any time during the summer, when the bark of the stocks will "run" well,—that is, separate easily from the wood; but if the stocks are the least inclined to be dry, or the bark is found to adhere to the wood, they should have a soaking of water at the root, at least twelve hours before they are worked. The best way to get the water down to the roots, is to break up the surface of the soil with a light spud, and draw the soil away on every side into a ridge, so as to form a basin round the stems, when they may be thoroughly watered with manure water sufficient to get to the roots; if this is once well done, they will not require any more. In selecting the buds, choose young free-grown shoots of moderate size, on which the buds are well formed, and from the ripened part of such shoots, with a very sharp knife, clear off the leaves (leaving about an inch of the footstalk) and the thorns, without bruising the bark; then take off the bud, in doing which, hold the shoot in the left hand, and the knife in the right; place the thumb under the shoot where the bud is to be taken off, and begin to cut about three quarters of an inch above the bud; draw the knife about half way through the shoot and clean under the bud, and bring the knife out about an eighth of an inch below the bud; then, with the point of the knife just remove the bark from the wood, and cut the bark and the wood clean asunder, leaving the small piece of wood in the eye without injury, and even with the inside bark, so that when it is inserted in the stock, it may touch the wood of the stock. Next, with the point of the knife open the bark of the stock; select the smoothest part of the shoot, begin the cut nearest the base of the shoot, and cut towards the point; let the cut be long enough to admit of inserting the bud without a cross cut; raise the bark on each side of the cut, either with the flat end of the knife handle, or the thumb nail, just sufficient to let in the bud, which must then be pushed down close to the stock, and bound over with a small piece of bass, or, what is better, some carpet worsted; begin to bind at the base of the shoot, and finish above the bud; in binding, close down the bark on each side, and leave the eye clear. In about a month the bandage may be loosened, and in

about two months may be taken off altogether. The advantage of having only one cut to let in the bud, over the plan of budding with a cross cut, is very considerable, as the tops of the shoots do not require cutting off, and consequently there is no check in their growth, and no accumulation of sap under the bud; so that the bud is not so likely to start in autumn, and the plant will be altogether of a more vigorous habit.

It is best to insert two or three buds in each tree intended for standards. It will sometimes happen, when buds are brought from a distance, that the wood will not part freely from the bark; in that case, pare the buds down as close and even as possible without removing the inner wood, and insert them in that state; though they do not make the neat union that those do which have had the wood taken out, and are very liable to be blown off during the first summer's growth. After the bandages are taken off, they will require no attention till the following spring; when, about the beginning of March, the tops must be cut off to within about four eyes of the bud; cut off also all the eyes on each shoot about the bud, except that at the top, which may be allowed to grow two or three inches, when its top must be taken off; and as it grows through the summer, it must be nipped whenever it has made a little advance in growth. The object of keeping this shoot alive and growing is, that when they are cut back the following season, they may be cut close to the shoot of the bud; and the wood being alive will callus over, and so form an entire living plant, which is seldom the case when the shoots are cut back to the bud at once. When the buds have made a growth of four or six joints, pinch off the tops; this will cause them to throw out lateral shoots. If, as they grow, there is any chance of the wind blowing off the heads, they must be tied up. Nothing more remains to be done but the ordinary work, as the seasons come round.

When very fine heads are wanted in the case of standard roses, in preference to the bloom for the first season or two, the trees must have peculiar management. Supposing each plant has two or three buds that are growing: select the one that is most likely to make the finest head, and pinch off the top of the shoot when it has made a growth of about four joints in length; it will soon push out laterals, which should be allowed to grow on for the rest of the season. The shoots from the other buds may be allowed to grow for the season, unless they are very thick, when some may be taken off. The second season, those shoots that are not wanted must be cut off close to the stock, and the stock cut to where the head is formed. The shoots that were made last season may be shortened to three or four eyes from where they started, if they are very strong-growing kinds; but to within two or three eyes, if they are of weakly habit. Should any of them afterwards throw out very strong shoots, these must be topped. Of course, when they are cut back so hard, there will be little or no bloom the second season; but you have a finely-formed head, and the third season there will be plenty of bloom. At all times care must be taken to remove, or tie in a proper direction, all irregular-growing shoots.

Layering.—This is done about Midsummer, on the shoots of the current season. When these shoots are long enough, trim off some of the lower leaves; draw them to the ground, so as to see at which joint it will be most convenient to make a tongue (which is a piece of the shoot at one of the buds, slit about half through); the bud you intend for the tongue should be uppermost, when the shoot is drawn to the ground. With a sharp knife, begin about the eighth of an inch below the eye; cut nearly half way through the shoot, sloping towards the eye, and, with a steady turn of the knife, cut towards the top of the shoot; let the cut be about an inch or a little more in length. Then gently bend the shoot at the place where the cut is made; bring the top upright, and the tongue pointing down; make a hole in the ground with a trowel, to let in the shoot; peg it down firmly, with a small peg; replace the soil, and make it firm. During the summer these layers will form roots, and in the following spring they may be taken off and planted in beds. After one or two seasons' growth, they will be strong enough to transplant wherever they may be wanted.

In conclusion, let it be observed, that whether roses are grown or purchased, it is very injudicious to cut them to bloom the first season after planting; it is much better to get a good head first, and leave the bloom to chance, until a good-shaped head is obtained. Always keep the plants clear of suckers, weeds, and vermin; and by maintaining the soil in good heart, if the subsoil is dry, the merest tyro in rose culture will be successful.

THE BEAUTIES OF THE ROSE.

We have had rose books enough, in all conscience; and yet another appears,* with all the freshness of originality, and much more value for the money than is usual. Messrs. Curtis & Co. of Moorend, near Bristol, have commenced a quarterly work, at half-a-crown a part, each containing four splendid portraits

* Curtis's Beauties of the Rose. Part I. 4to London: Groombridge.

of first-class roses. This is to be continued quarterly; and if the future numbers, or parts, equal that which now lies before us, they will indeed form, in time, a handsome work. The drawings have been made by Mr. Curtis, on stone, and their chief merit is their great likeness to the original; there is no affectation or assumption; as you see the rose, so you see the copy; the faults, as well as the beauties, are faithfully portrayed. Mr. Curtis's notions on the subject of floral portraits are like our own; he says, "The illustrations are attempted without the aid of a professed artist, merely from the fear that literal portraiture is too often sacrificed to pictorial effect (frequently causing unintentional disappointment); besides the difficulty which must have existed of effecting that which has been found so essential, the enabling of these favourites 'to sit for their portraits when in their best trim.' Thus, any seeming defects of style being raised simply in the pursuit of truth, will, it is trusted, be leniently judged." The roses comprised in the first part are established favourites, with which we are all well acquainted: Duchess of Sutherland, the Cloth of Gold, Devoniensis, and Armosa, all admirably represented.

The literary portion of each chapter, devoted to a particular rose, commences with the description given in the popular rose catalogues, and followed by the description given by the author; for example:—

"DEVONIENSIS.

"(*Family—Tea-scented.*)

"Rivers—Creamy white, tinted with rose.

"Lane—Creamy white, buff centre, beautiful.

"Wood—Straw colour, buff centre, large, splendid.

"Paul—Pale yellow, superb, very large and full.

"Curtis—Creamy white, centre changing to pale straw colour, tinted with pink, petals thick and camellia-like, very large and powerfully scented."

This little feature is interesting, because it gives us, at a single view, the distinctions which are manifest to the leading rose growers, and the notions that each form of their colours and shades. It is evident that these gentlemen have described the rose in different stages of bloom. We learn from the work before us, that "the fortunate raiser of this rose was the late George Foster, Esq. of Oatland, near Devonport, whose brother, Edward W. Foster, Esq. has kindly favoured us with the following information as to its parentage, &c. 'The Devoniensis was raised by my brother, a genuine lover of horticulture and a true florist. His opinion was that it was produced from the Yellow China, by an impregnation of the Yellow Noisette Smithii, which was growing alongside it, as he was in the constant habit of impregnating his roses. One of some seeds saved at the same time produced a rose much like the Yellow Noisette, but greatly inferior to Devoniensis. It flowered the first year from the seed bed, but was small and weak, and the second year, on being budded on a strong stock, it grew to a very fine flower.'" In the following year Mr. Pince, it seems, gave the raiser twenty guineas for it. The popularity of the rose seems rapidly on the increase; and a work like the one before us is calculated to give a refined taste to the cultivator, not only by the selection of the finest varieties for its pictorial illustrations, but of explaining in detail the peculiar merits of whatever is under notice; nor is the work without claims on account of the instructions it contains. To revert to the notice of Devoniensis, which is perhaps as noble and beautiful a rose as need be grown; the author says:—

"Our experience, from growing it largely, proves how well it repays high culture; for against a wall facing south-east, we have a fine specimen plant worked on the Boursault stock, five years old, upwards of eight feet in height by twelve in width. In May it had more than forty expanded blossoms at one time, many of them upwards of five inches in diameter, with a proportionate number of buds: we must leave our readers to imagine the beauty and fragrance of such a plant. This rose is hardy in the neighbourhood of Bristol, but in the northern counties we find it requires a south wall, and protection through the winter. In light soils it may be well grown on its own roots, but for greenhouse and general culture worked plants are decidedly preferable, combining the advantages of greater hardihood and increased luxuriance; beds of dwarf plants and for potting worked on the Crimson Boursault or Celine, we find more desirable than the brier. It luxuriates in a rich loamy soil; but when this is not attainable, we advise that strong manure be forked round the roots in spring; so soon as the blossoms are over, that the blossoming shoot be cut back to two or three eyes, which will induce a vigorous growth, terminating in flower; thus, a bed of Devoniensis would continue to bloom, with short intervals, from May till November; but it should be borne in mind, that in proportion to the regularity of the supply of liquid manure (soap suds, guano water, &c.) during dry weather will be the increased strength of the plant and abundance and quicker succession of the flowers; for, delighting in a fertile moist soil, the Devoniensis, perhaps, more than any other rose, amply recompenses the cultivator for all the assiduity he bestows on it."

If the work be continued in the present size, and at the price now charged, it will be the most beautiful, and the cheapest, of all the works pictorially illustrating roses.

ROSE CATALOGUES.

This subject has been frequently under notice in a former portion of our work, and we have strongly advocated a complete change in the arrangements which now prevail. The subject appears to have been taken up in the *Gardener's Chronicle*, and is undergoing a very fair discussion, in the hands of very competent writers. One writer advocates an entire change in the arrangement of families, and proposes a very sweeping reform, reducing the present great number of assumed families to about half a dozen. Of course, such a change as this cannot be popular among dealers; but we are glad to see that one of the most extensive, and perhaps most rational of the cultivators for sale, admits the necessity of an alteration, though not to the extent proposed by the Rose Catalogue reformers who started the subject. Now, this is just what we wish. The attention is called to a great evil, and a sweeping remedy is proposed. The writer makes out his case against the present system very complete; those who have been so long in error admit the existence of the evil, and object to some of the proposed changes; giving, however, excellent reasons for and against the proposed alterations, and suggesting some changes which they admit may be beneficially made. Messrs. Curtis & Co. have begun reforming, and their catalogue is a step in the right direction. These gentlemen cultivate the autumnal roses extensively, and exhibited at the Birmingham show a hundred varieties, including the very best in cultivation. They have reduced the number of sections, and given only the best in each family; so that it is impossible, almost, to select a second-rate rose from the whole catalogue; while they describe the peculiarities which entitle the various families to their particular classification. Nobody can doubt that many of the divisions into which roses were separated, were "frivolous and vexatious;" while it is universally admitted that they were only slight differences which gave them to one family or another, and that the distinctions had almost ceased, from the distances to which new varieties strayed from the parents. We trust that the discussion in the *Chronicle* will lead to a complete revision of the Rose Catalogues, and that the trade will adopt such changes as shall simplify the task of selecting, and disperse the mysterious clouds which almost prevented a young beginner from seeing his way through one of the trade lists. Mr. Rivers should undertake this task; and let the distinctions of each family be so plain that a tyro may be able to read and understand.

BRITISH WILD FLOWERS.

MYOSOTIS SUAVEOLENS.

Myosotis suaveolens, Kitaibel (rock Scorpion-grass).—Boraginaceæ.

This plant has been known to English botanists under the names of *Myosotis alpestris*, and *M. rupicola*. It is a very rare and pretty dwarf plant, emulating in the pure beauty of its blossoms that common species of Myosotis, of much larger growth, which abounds by the sides of water courses. The latter, *M. palustris*, is the true Forget-me-not.

Myosotis suaveolens is a perennial herb, with somewhat creeping root-stems, from which rise a profusion of root-leaves, of an elliptic form, on long slender stalks. The flower-stems grow several from the same root, and are from three to six inches high, erect, unbranched, clothed with spreading hairs, and furnished with alternate oblong lanceolate leaves, which are almost sessile. The flowers appear in terminal racemes, which grow in pairs, often with a solitary blossom in the axis; they are large, handsome, of a delicate clear blue, with a yellow eye, pale pink in the bud, fully as large and showy as those of *M.*

palustris; the racemes are sometimes slightly compound at their bases; at first they are densely crowded and revolute, afterwards they become elongated, the pedicels elongating as well as the common stalk, until they at last become longer than the calyx. The hairs of the common stalk and of the pedicels are short and close-pressed. The corolla, which is hypocrateriform, has a flat limb, which consists of five rounded lobes, longer than the tube. The technical characters which botanists select, by which to distinguish this from other species of Myosotis, are these:—"Calyx attenuated below; limb of the corolla longer than the tube; root leaves on long stalks, pointed." These points taken in connexion with the further character, "calyx deeply five-cleft, open, when in fruit shorter than the ascending pedicel, with straight and a few curved adpressed bristles,"—all matters that are easily recognised—are sufficient to identify this particular species, which is one of the prettiest of its family, scarcely yielding in this respect to the more universally popular Forget-me-not. The flowering season with *M. suaveolens* is July and August.

For rock-work, for flower borders, or for pot culture, this plant is desirable. It is especially suited for the latter mode of culture, being small in stature, and flowering freely. A very pretty adaptation of it would be to grow it in pots as a substitute for its more robust neighbour, the Forget-me-not. For this purpose it would require no other than the ordinary treatment of choice alpines, with which in every particular it would well associate. The plants should be repotted immediately after they have done flowering. If increase is wanted, that would be the time to divide them; each portion furnished with roots would form a separate plant. But if they were to be grown for ornament, it would not be desirable to divide the plants too much, or too often, as the larger patches would be more ornamental. This, however, has its limits as to convenience. Alpine plants in pots can hardly be grown in pots larger than those known as forty-eights, which are five inches in diameter. The nearer a tuft of this, or of any other dwarf plant so cultivated, filled out this space, so that the soil contained pasturage for the roots, the more ornamental it might be expected to be, from the greater number of flower stems that would be produced in the mass. The soil should be three parts of peat earth, of rather a fat or greasy texture, to one part of sandy loam; and the pots must be well drained, so that the soil does not become soddened. In winter the pots may be protected from frost by plunging them in dry sawdust or coal ashes; and provision should be made to throw off heavy rains at that season. They need no other protection. In spring they may be taken up, and the pots set in an open situation, where they may stand till they come into bloom. During their season of growth, they must not want for water.

CYPRIPEDIUM CALCEOLUS.

Cypripedium Calceolus, Linnæus (common Lady's Slipper).—Orchidaceæ § Cypripedeæ.

To whatever interest this plant may excite in respect of its beauty,—and of this quality it has by no means an inconsiderable share,—it adds the additional zest of extreme rarity.

Cultivation or spoliation have so far reduced its numbers in natural localities that a wild example of the species is but rarely seen; and indeed, even in gardens, though its beauty entitles it to rank high among the fair forms there associated, it is far from a common plant. Ray records it as growing in the woods of Lancashire, and in woods near Ingleborough, in Yorkshire; whilst Hudson, Curtis, and Withering record other localities of a similar character in the county of York. In Withering's time, however, Ray's Yorkshire locality was searched in vain for the Lady's-slipper, "a gardener of Ingleton," as we are told, "having eradicated every plant for sale." This practice of entirely eradicating, from the few spots where they are found, the rare plants of the flora, for any purpose, and espe-

cially for mere gain, whether followed in Withering's day, or in our own, deserves to be strongly reprobated.

The genus Cypripedium, of which *C. Calceolus* is the only species indigenous to England, is one of the race of Orchids. It bears the name of Lady's-slipper, in allusion to the pouch-like form of the lip. The derivation of the name indicates this; it is constructed from *Kypris*, one of the names of Venus, and *podion*, a slipper; hence Lady's-slipper.

The root-stock of the English Lady's-slipper is perennial, creeping underground, with numerous simple fleshy fibres. The stems grow erect, and are striated and downy, reaching from twelve to eighteen inches high; at the lower part they are invested with three or four alternate leaves, the bases of which embrace the stem and overlap each other. The leaves are ovate, or elliptical, somewhat pointed, longitudinally ribbed, and slightly downy, especially on the back or under surface. Near the top of the stem, almost close to the flower, there is usually a smaller leaf, which may be considered as a bract. The flowers, which terminate the stems, are for the most part solitary; they are large, very handsome, and conspicuous, though dull in colour. Sometimes very strong plants produce two blossoms on the same stalk; in this case each is attended by a bract. The corolla is brownish purple in the sepals and petals, and yellow in the lip; the sepals are lanceolate, extended into a lengthened point, and are from an inch to an inch and a half in length, the upper one growing erect, and bending forward, the other two pointing downwards, united behind the lip, and appearing as a single one with a bifid point. The two petals are nearly of the same general form as the sepals, but narrower, and somewhat longer, and they have the margins undulated. The lip is large, oblong, obtuse, inflated, somewhat compressed at the sides, with an irregular longitudinal fissure above, thus having some resemblance to a wooden shoe; it is yellow, netted with darker veins, internally spotted, and is about an inch long. The column, or that part in the centre of the flowers of the orchidaceæ to which the anthers and stigma are attached, in this species terminates at the back by a petaloid lobe, which is elliptic, obtuse, and channelled, and is theoretically taken to represent a barren stamen, the two real anthers being separated by it. These flowers are generally produced about the month of June.

The English Lady's-slipper, together with some species of the family which are natives of North America, require peculiar treatment. They do not thrive if planted promiscuously in gardens, but require to be placed in a cool, shady, dampish spot. Dryness and exposure are fatal to them. Hence, where a few of these plants are brought together under artificial cultivation, it is a usual and an excellent practice to set apart a cold frame for their especial use. In this case, a bed of soil may be made up in the bottom of the frame, and the plants planted out in the soil; for in this way they are less influenced by the vicissitudes of management, and require little attention after planting; in this way, too, they may be kept sufficiently moist without such frequent applications of water as are necessary when they are planted in limited masses of soil confined within a garden pot.

To form a bed of this kind, there should be a depth of three feet six inches from the glass sash which is to cover the frame. Two feet of this space is to be allowed for the growth of the plants above ground; one foot for soil, and six inches for drainage materials, which should not be laid into a mere hole dug out the proper depth from the surface, but should have a sloping bottom, connected at the lowest point with a drain or outlet for the water percolating through the soil, which would otherwise be stagnant and sour the soil. The drainage materials may be broken bricks, potsherds, or similar porous matters, which will lie hollow, to facilitate the passage of moisture. The soil should be turfy peat, chopped fine with a spade, but none of the fibre removed; this, being of loose texture, will require moderate consolidation. In this the roots should be planted, in autumn or spring. The moisture of the soil should be moderate and uniform. If the roots are planted in autumn, and the soil is damp, they will not then require watering; but if it is dry, they should have one thorough watering. If they are planted in spring, they may at once have a good watering, and may then be shut down close until they begin to grow. During their growth, the watering may be repeated, perhaps once a-month, when the soaking should be thorough; they will not require it more frequently, in consequence of evaporation being in great measure prevented; for the frame should be opened but very little,—that is, to a very small extent daily,—during the growing period, in order to maintain a calm moist atmosphere, in which these plants delight. The frame should be shady; a north aspect is preferable.

The propagation of these plants is a very slow process. They seldom admit of division, by which mode perennials are generally increased with the greatest facility; and seed is but seldom to be obtained. There is a proverbial difficulty in raising plants of the orchis race from the seed, but it has been accomplished in some few cases, and therefore if seed of this plant can be had, it is worth

sowing. It should be sown in pots of peat soil, which pots may be set into the frame where the other p'ants are grown; the seeds being fine, should be sprinkled on the damp surface of the soil, and covered with a bell-glass; if they require moistening, water must not be poured over the seeds, but should be afforded them by capillary attraction through the soil, the pots being set into pans, in which a supply of water should be kept long enough to moisten the soil.

These directions apply rather to a collection of kindred plants, with which the common Lady's-slipper may be associated, than especially to that plant. It may be grown in a shady bed of peat earth, in situations favourable to the growth of Rhododendrons and other "American" shrubs, as they are called.

THE CHRYSANTHEMUM: ITS PREPARATION FOR SHOW.

The Chrysanthemum is so hardy, so obedient, and endures so much ill usage, that it would almost seem a work of supererogation to say how it ought to be managed; and yet the growing and showing are such different things,—or rather, the growing for ornament in a garden, and the growing for exhibition, are such different matters,—that we shall be excused for making a few remarks on growing them for show.

The habit of the Chrysanthemum is bad; it grows tall and gawky; its lower leaves generally turn yellow or fall off altogether, and the whole plant looks untidy in our English gardens. Still, the flower comes after everything else has been disposed of by the frost, which, unless very severe indeed, does not interrupt the bloom of this hardy plant. But when the Chrysanthemum is designed for exhibition, much care has to be taken that the plant is not ugly, if the plant is to be shown; and that the flowers are of good size, if the cut specimens are to be tested.

If the plant is to be shown in pots, you have these things to consider;—whether you intend to sacrifice the plant for the bloom, or the bloom for the plant, or will be content with both moderate. The excellence of a pot plant may be decided in three ways; a bushy plant with many blooms, none very large; a small plant with only two or three blooms, very large; or a sort of middling specimen, in which neither extreme shall be attempted, but a moderate plant with a moderate flower presented for judgment. The Society, however, at which the show takes place, should always settle these points.

If you want a bushy plant with many blooms, take your struck cutting or healthy sucker early in the spring, and take off the top within two or three eyes of the ground; if the pot in which you receive it is full of roots, change it to two sizes larger, and let it be placed in the cold frame and so that it can be covered from the sun. It will begin to push out, and if one shoot pushes further than the others, take off the top. At the beginning of May put the plants out of doors into the shade, or at least where the mid-day sun is shaded off, for a little early and late sun will not hurt them. Here they will require watching and watering sometimes, and removing from the ground lest their roots should strike through. As the shoots push out again, they must be shortened until your plant is as bushy—that is to say, has as many branches—as you think there ought to be, when you have nothing to do but to let it continue its growth till September, when it must be taken to the frame, that it may be covered from frost. Before it is put into the frame, it must be examined to see how it is for pot room, because it is essential to good growth that there be no cramping for pot room, especially as the growth of the flower pips progresses; any check at that time would cramp them. Repot them therefore in good time, and in the frames they will continue their growth. They may in blooming time, if a little behind the season, be placed in the greenhouse, where they will be hastened a little, and be kept from the ill effects which frost always has on a blooming plant, however hardy it may be. During the opening of the blooms, water with a little liquid manure once or twice. Let the liquid be made with a shovelfull of decayed cow-dung to three pails of water; let there be as much of this given as there would be of plain water, and then water with plain water the next three times or four times, when the cow-dung water may be repeated, but no more given until after the flowering is over. This mode of showing gives a fine noble plant, with flowers two-thirds their proper size, but many of them.

The second way of showing is to strike the top cutting of a plant in July, and to pot in a small pot, and place it in the open garden. Let the pots be changed as often as the roots fill them, and continue them out of doors. These will be earlier in flower than the others. In September the plants must be placed in the frame, after being well shifted and watered. Here they may wait for your general shift to the greenhouse, where they

will have a little more warmth, and where the blooms will be developed of a much larger size than on the bushy plant, and the plant would be much shorter than if it had not been a late cutting; because when the plants or early cuttings are allowed to grow on and the tops are not used, a variety which by means of a July cutting could be grown and flowered a foot high, would be nearer three feet if grown without topping. These cuttings taken in July may either be grown in small pots and changed from time to time to larger ones, or placed at once into six-inch pots and not changed at all. The result of changing from time to time is, that wholesome checks to luxuriant growth can be given by protracting the move from first to second, and second to third.

To show the largest-sized blooms, perhaps there is not a better means of attaining size than growing the early suckers or cuttings as luxuriantly as possible, without caring what height they may reach, because in reality, as the bloom is to be cut, the figure of the plant is nothing. The early suckers may be placed in pots size thirty-two, as soon as they are fairly rooted and established, and in rich soil; these may grow until they fill the pots with roots, and then be shifted to size twenty-four; and if they do not bloom before they fill these pots also with roots, water them after that with liquid manure, made as we have already described, about every fourth time they are watered at all. All blooms intended for show must be kept from the frost, and therefore a pit or a greenhouse is indispensable. The size of the bloom is considered the great merit, if in other respects flowers are of equally good properties; but form in the Chrysanthemum is a great point, and yet there is no flower in which the form of the bloom is so diversified, some curling one way, some the other, some growing over towards the centre, others reflexing towards the back. The only thing to care about is the roundness of the outline, the half-roundness of the face, and the closeness of the eye; the manner of making up this form is of secondary consideration. The colours are not much diversified: yellows, whites, dirty reds—for there is hardly a clear shade of pink or red among them,—and dirty purples, are the principal, and there does not seem a prospect of improvement in this respect.

FLORICULTURE OF THE MONTH.

BY GEORGE GLENNY.

The Dahlia shows closed brilliantly. The largest by far was the great central show for all England at the Town Hall, Birmingham, where the prizes amounted to 163*l.*, and the subscriptions and entries to about 180*l.* or 190*l.* The flowers were the best of the season, and nearly all the seedlings of the year were placed in their proper ranks. From their allotted places they were not removed at the last show of all, the closing one at Slough. The first-class show-flowers were Magnificent, Sir Frederick Bathurst, Mrs. Seldon, Snowflake; and a doubtful one as to first or second, being occasionally placed in both classes, was Premier, which has some exceeding good properties. Of second-class flowers there were perhaps a dozen. The three shows that settled the fate of seedlings were Shacklewell, Birmingham, and Slough, and the varieties that were not shown at one of these three may be dispensed with, unless they come with a strong recommendation from acknowledged judges, and good reasons for not being exhibited. The three shows in question made a proper distinction between first and second-class flowers, selecting those that were exceedingly fine and a decided advance for the first class, and useful flowers, such as are an acquisition in their classes but not so good as the others, as second class. We are quite well assured that some of the second-class varieties will be found in every stand; that is, if the owners judiciously charge a less price. The mistaken notion that a variety is worth half a guinea or nothing must be abandoned. The difficulty of cutting twenty-four blooms to please a fastidious exhibitor is so great, that any variety that will come to the stand even tolerably good may be one day very useful, so that second-class flowers may be generally esteemed pretty nearly as good as one half the first-class flowers of former years. The first-class Dahlias of the Floricultural Society of London last year, with one exception, were inferior to many second-class ones at Shacklewell, Birmingham, and Slough. The fancy flowers made a start this year, and Procter's Elizabeth, a sort of amethyst colour and white, of exquisite form, but probably a hard opener, is the only first-class flower of the fancy varieties; but there are many that have had first-class certificates at different places, though not deserving them. A ribbed petal, a rough outline, an open face, or some other blemish puts them out of the highest class, but a new colour or an improvement upon an old one

many of which are at present very deficient, entitles them to places among the new varieties that may be adopted safely. We do not think there is a single flower that had a certificate first or second at the three shows in question, but it may be safely purchased at the proper value. We are glad to see the Dahlia upon the move again, and we think the plan to be adopted at the great annual show next year is likely to cause many to purchase new flowers. One of the principal classes is to have twenty prizes for the best six new flowers let out in May 1850, and that all men may exhibit, the entrance is to be nominal—only one shilling. The Birmingham Town Hall has been considered by exhibitors to be by far the best adapted place for a large exhibition, but nothing is decided on at present, except that it will be under the same direction as the last. The Shacklewell show is to be renewed upon the same scale as the last. The Stoke Newington exhibition will be continued, and in Bethnal Green and Poplar nearly a score of Societies for the Dahlia alone are formed or forming. At the meeting of florists and amateurs in the town of Birmingham, consequent upon the central Dahlia show, it was unanimously resolved that we should take the lead of a garden newspaper; and eighty-four nurserymen, gardeners, and amateurs, pledged themselves to support any paper that we should conduct. Of course, eighty-four persons would do very little towards supporting a newspaper, but such a body of persons, comprising the leading florists and amateurs, with some influential gardeners, form no bad Committee to collect other names; and as far as we have had time to inquire into the matter, not a single refusal has been given. It may be just mentioned here, that having been induced by fallacious promises to abandon the *Gazette* for a newspaper that was to support them in old age, the gardeners themselves have evinced as much anxiety as anybody to see us at the head of a paper, now that the bankruptcy and sale of their own journal has opened their eyes to the deception that was practised on their credulity by the few who alone derived a benefit from the concern. There is no longer any doubt of our resuming our place on a garden newspaper that will be second only to the *Gardener's Chronicle*, and so far as we have yet been assured at public meetings, those two papers will be the only ones supported by the leading persons among florists and amateurs. Meanwhile, until our arrangements are complete, those who cannot do without a newspaper will find all the leading advertisers use the *Gardener's Chronicle*. When the new one appears, the only rivalry will be an endeavour to surpass it in usefulness. The show of roses at the Town Hall, Birmingham, was extensive and unique. They were exhibited chiefly by Curtis & Co., of Moorend, Bristol, and call for especial notice. While in Birmingham we fell in with a Fuchsia very little noticed there, but quite a gem in its way. It was called Roseola, (scarlet outside, purple corolla, and sepals prettily reflexed,) and was in many hands. Another not yet out, raised by a Mr. Stoaks at West Bromwich, was very pretty; the sepals white outside, pinkish inside, the corolla a good contrast, and the blooms reflexing very gracefully; but as we only saw a bloom, we can say nothing for the habit. Antirrhinums have become weeds. Scores of scratchy varieties, without any striking feature about them, are plentiful as blackberries. The style that is valuable should present a striking contrast, like Pictum, by some called Bicolor, but pure white up the tube and bright crimson scarlet at the mouth. Yellow and scarlet, white and purple, sulphur and orange, are all pretty and striking, but the hundreds that are now produced with merely scratches of different colours on a light ground, are worthless. Their character cannot be seen at a few feet distance, whereas when the two colours are well defined and contrasted, they are useful. Of the hundreds we have seen, Brilliant (orange and red), Surplus (pink and yellow), Diana (salmon and yellow), Meadow (blush rose and white), and the old Pictum (crimson-scarlet, and white), are decidedly the best; but it is only a fine border perennial at the best, and has no business in a pot. We venture now to recommend those Societies which meet early enough, to give prizes for the best hyacinths; for although there is no merit in producing the flowers, there is more difference as to the quality in the hands of different growers than any one who has not seen it would believe. The management of a hyacinth is a very nice affair, and there will be many degrees of quality even among the dealers who affect to grow them for show. There is not a flower produced so truly valuable in close manufacturing towns as the hyacinth. The simple means by which the flower can be produced, under the most adverse circumstances, entitle it to the consideration of everybody who has a window. Bulbs in general have this characteristic, but there are exceptions, while the hyacinth knows none. In reverting once more to the Dahlia, we ought to observe that if any have escaped us, it may be attributed to that false pride which induces men to depend on their own recommendation rather than submit the blooms to a competent authority. All we have seen we shall give a list of, together with a notice of their qualities, at the close of the year.

THE AMERICAN ALOE.

THERE is a popular notion respecting the Amerian Aloe, that it blooms but once in a hundred years; but this, like many other popular notions, is an error, though based upon a semblance of truth. The facts are these;—the climate of England does not serve to keep the American Aloe in a state of rapid development; and the treatment that it gets rather retards it than otherwise. Thus it stands from year to year with but little perceptible change, until at last, under the influence of some extraordinary check, such as a thorough drying, enough to kill any less enduring subject, up starts the heart, elongating into a flower stem, which going through its allotted functions, perishes, and with it the plant that nurtured it, leaving behind a progeny of suckers which spring from its roots. Now this fate awaits the plant at some period or other of its existence, and it can happen but once; and just according as the circumstances under which the plants are placed accelerate or retard this final result, so will the plant bloom at an earlier or later period from the time of its infancy, or original development, as a sucker from some former flowering plant. No doubt in many cases, the plants which bloom in English gardens are veritably a hundred years old; some probably attain even a greater age.

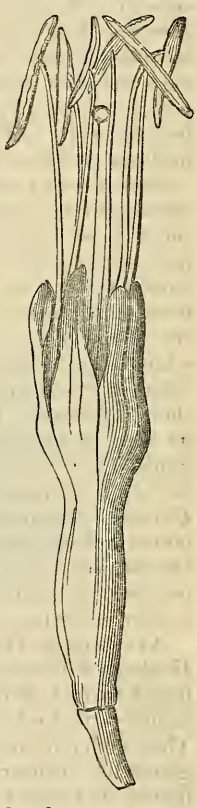
During the present autumn, one of these remarkable plants has been flowering in the ancient botanic garden of the Society of Apothecaries, at Chelsea. This plant, however, is not the common American Aloe, *Agave americana*, but a different species, supposed to be the *Agave mexicana*. We are indebted for the following account of this plant to Mr. Moore, the Curator of the Chelsea garden:—

"The general aspect of this plant, before it gave evidence of flowering, was not dissimilar to that of *Agave americana*, but in its flowering state it proves quite different from that species, especially in the arrangement of its inflorescence, which, instead of forming a pyramidal head, with horizontal branches, has the branches ascending and forming a dense head, which becomes thicker and broader upwards. There seems little doubt that this plant has been reared, and probably from its very infancy, in this garden; and it is therefore to be regretted that no record of its origin, nor any historical particulars respecting it, appear to have been preserved. Under these circumstances, it is impossible to form even a conjecture as to the actual age of the plant. But considering that it has naturally a somewhat less massive appearance than the common Agave, it would appear to be a full-sized specimen, the spread of its leaves being about seven feet, their height four feet, and the height of the flowering stem, measuring from the base of the plant, nineteen feet six inches. This stem has twenty-four branches, and these are again subdivided into eight secondary branches, terminated each by a cluster of flowers; the number of flowers may be estimated at about 4,000; thus, $21 \times 8 \times 24 = 4{,}032$. The expanded flowers are found on examination, and especially when confined,

to have a strong and very disagreeable odour, which I can compare with nothing but that of decomposing cabbages. They contain also a clear liquid, the taste of which is a compound of sweetness and nauseousness.

"The flowering stem became visible about the middle of June, resembling in the first stages of its progress a giant head of asparagus. Its growth was rapid for three-fourths of its height, and until the branches became developed, when its progress was less marked. The first blossoms, those of the lowest and least vigorous branches of the panicle, were developed in the first week of September; and the apex of the panicle expanded its flowers in the first week of October. No particular record of its rate of growth was preserved, in consequence of an impression that it was merely the common species, whose progress has been already often registered. The plant had no shelter during the summer beyond what was afforded by the situation of the garden; and but some very slight assistance from a small quantity of decaying leaves and grass laid around the tub in which it was growing; but it is probable that this slight stimulus may account, in some measure, for its more rapid growth in its earlier stages, than afterwards, when that stimulus became exhausted.

"The following is a more detailed description of the plant in its flowering condition: Stem short, terminated by thick fleshy leaves, as in *Agave americana*. Leaves numerous, the central ones erect in the early flowering stage, all becoming flaccid and drooping by the time of the expansion of the flowers; narrower and more attenuated than those of *Agave americana*; the largest about four feet long by four and a half inches wide, the sides nearly parallel to within a foot of the apex, then gradually tapering to a point; nearly plain above, convex beneath; the smaller ones towards the centre about three feet long by three inches wide, concave above, convex beneath, tapering almost regularly from the base to the apex; the smallest gradually passing into bracts. The colour of the leaves is a pale glaucous green. Their margins are not indented, as seen in *Agave americana*, but are set with small distinct chestnut-coloured spines, which project about an eighth of an inch (half the size of those of *Agave americana*, on vigorous plants), and are usually set at a right angle with the margin, but sometimes curved, and pointing backwards or forwards, slender and tapering from a broad base, as in the prickles of the dog-rose; each leaf is terminated by a strong dark-brown spine, an inch long. Flowering-stem erect, from the centre of the leaves, furnished throughout with alternate bracts, which become smaller upwards, the lower ones gradually passing into leaves. The bracts are sessile, half encircling the stem by their base, and lengthened out into a narrow taper point. The flowering-stem, from its base above the insertion of the central leaves, is seventeen feet six inches high; at this base, which is the thickest part, one foot three inches in diameter, and ten inches in diameter just below the flowering branches, the stoutest of which are two inches and three-quarters in diameter. The lower half of this stem bears only a few abortive branches, but the upper half is densely panicled. Flowering branches ascending, again alternately branched, the secondary branches forming dense corymbose panicles, of from eighteen to twenty-five flowers; lower primary branches thin, with fewer flowers, the upper ones becoming larger and more crowded with blossoms; the apex is simply branched. The outline of the inflorescence thus becomes somewhat club-shaped, slightly lengthened out at the top. Perianth erect, funnel-shaped, with an erect limb, yellowish-green, three inches long, including the germen, which it equals in length. Sepaline divisions linear-lance shaped, petaline divisions linear-oblong obtuse, with broad thin margins, otherwise of the substance of the sepals, which are thick and fleshy. The sepaline divisions overlap the thin margins of the petaline segments in the bud state, in which state the former appear twice the width of the latter, which is seen not to be the case after expansion. Stamens protruding beyond the perianth, about its own length; anthers versatile, yellow, an inch long. Pistil equalling the perianth in the earlier stages of the development of the blossom, subsequently becoming elongated, and ultimately equalling the stamens in length."



NEW FLOWERS AND PLANTS.

Nepenthes sanguinea, *Lindley* (blood-stained Pitcher-plant).—Nepenthaceæ.—This is one of the many beautiful forms of the very curious and interesting race of Pitcher-plants. They are all more or less scandent in their habit of growth, but the most remarkable feature about them is the odd-shaped pitchers, or ascidia, as they are called, which dangle about from the end of the leaves, by a cord which appears like an extension of the mid-rib of the leaf. In this species the ascidia are oblong, with two fimbriated wings down the front, and a broad repand plaited collar around the mouth of the pitcher; the colour is a deep crimson, and the petiole is smooth. Native of Mount Ophir in Malacca. Introduced in 1848. Flowers ——. *Culture.* Requires a hot moist stove; to be potted in loose material, as chopped sphagnum, fibrous peat, charcoal, and potsherds; propagated by layers, or by cuttings, planted in a similar medium, and kept very close.

Nepenthes albo-marginata, *Lobb* (white-edged Pitcher-plant). — Nepenthaceæ. — A small growing, but very graceful pitcher-plant, the ascidia of which are narrowly oval, with two narrow toothed wings down the front, and a narrow plaited collar round the rim of the orifice of the pitcher, close beneath which is a broad band of silvery wool; the colour is green, and the petiole is woolly, with short soft hairs. It is one of the prettiest of its race as yet known, and one of the most graceful. Native of Mount Ophir in Malacca. Introduced in 1848. Flowers ——. *Culture.*—Requires a hot moist stove; to be potted in loose material, such as chopped moss, fibrous peat soil, charcoal and potsherds; propagated by layers or by cuttings planted in a similar medium, and kept very close.

Nepenthes Hookeriana, *Low* (Sir W. Hooker's Pitcher-plant).—This is one of the larger species of pitcher-plant. In its native country it climbs to the tops of the trees. The ascidia are of two kinds, the broader one generally crimson, the longer one (nine inches in length) trumpet-shaped, and green spotted with crimson; the broad ascidia are produced near the base of the plant. These ascidia have two broad ciliated wings, and a plaited collar. Native of Borneo and Mount Ophir. Introduced in 1847. Flowers ——. *Culture.*—Requires a hot moist stove; to be potted in loose fibrous peat, chopped moss, and potsherds; the branches carefully supported—they do not like to be much handled; propagated by cuttings, kept closely covered in a moist atmosphere.

Gonolobus Martianus, *Hooker* (Dr. Von Martius' Gonolobus).—Asclepiadaceæ § Gonolobeæ.—A fine showy soft-wooded climbing plant, spreading over a large space, with numerous hairy branches. The leaves are oblong-ovate, with a cordate base, hairy on both sides; from their axils grow the solitary peduncles, bearing the many-flowered umbels of blossoms, the calyx of which is red, of five lance-shaped segments, the corolla white, with a green radiating ring at the base, the central staminal crown being also greenish. Native of the island of St. Sebastian, Brazil. Introduced in 1846. Flowers in the summer months. It is the *Fischeria Martiana* (Decaisne). *Culture.*—Requires a stove; loam and peat soil; propagated readily by cuttings in a hot-bed frame, or close moist heat.

Cupania Cunninghami, *Hooker* (Mr. Cunningham's Cupania). — Sapindaceæ § Sapindeæ.—A large-growing shrub, or rather a tree, adapted only for planting in very large conservatories; there having a fine appearance from its large pinnated leaves, from one to two feet long, consisting of four or five pairs of glossy elliptic leaflets, rather than from any beauty in its blossoms, which grow in large terminal panicles, but are so small and scattered as to be inconspicuous; the colour of the small petals is white, but these are nearly concealed by the green calyx. It may be kept small for many years by cramping its roots, but does not then acquire the noble character it assumes when growing more freely. Native of New Holland, on the east coast. Introduced in 1820. Flowers in summer. It has hitherto been known as *Stadmannia australis* (Allan Cunningham). *Culture.*—Requires a greenhouse — rather warm, to induce it to flower; loam and peat; propagated by seeds when obtainable, very sparingly, if at all, by cuttings, as it does not produce lateral branches.

Niphæa rubida, *Lemaire* (reddish-veined Niphæa).—Gesneraceæ § Gesnereæ.—A dwarf tuberous-rooted herbaceous plant, growing three or four inches high, with a few spreading ovate veiny velvety leaves, with a cordate base, mostly situated towards the top of its short stem; from the axils of these leaves grow up an abundant succession of small white flowers, individually neat but simple, though in the mass somewhat showy; they are rotate, that is, having a spreading limb connected to a very short tube; they are five-lobed, the two upper smaller than the others, nearly an inch across, pure white, with a yellow stain at the base, and yellow anthers. Native probably of Guatemala. Introduced in 1847. Flowers in the autumn.

It is altogether a smaller plant than its close congener, *N. oblonga*. *Culture.*—Requires to be started in spring in a very mild hot-bed, or warm pit, and to be grown during summer in a greenhouse-stove, that is, in a temperature below that usual in a stove, and then in autumn removed to a light stove to blossom; turfy peat and loam; the tubers should be planted in broad pots or small-sized seed-pans, so as to get a broad mass of the flowers; propagated readily by its scaly roots, which require to be kept dry and free from frost in winter.

Crowea saligna, *var. stricta* (upright-branched willow-leaved Crowea).—Rutaceæ § Boronieæ.—A very desirable variety of the well-known *Crowea saligna*. Like that species, it is a dwarf evergreen shrub, of branching habit, with lance-shaped leaves, and a profusion of large rose-coloured starry blossoms from their axils. In this variety, however, the branches have all a remarkable tendency to grow erect, so as to give the plants quite a different aspect. The flowers are about an inch across, consisting of five pointed spreading petals, which give it a star-like form; they are deep rose-colour, and are produced freely along all the branches. Probably a native of New Holland. Introduced —— ? Cultivated in 1848. Flowers for several months of the summer and autumn. *Culture.*—Requires a warm greenhouse, and should have a little extra heat in spring; turfy sandy peat; propagated by cuttings planted in sand under bell-glasses in a mild heat.

Nuttallia cerasiformis, *Torrey & Gray* (bird-cherry-like Nuttallia).—Rosaceæ § Quillaiæ.—A neat-looking dwarf deciduous shrub, with something the appearance of the bird-cherry. It grows two feet high, with thin half-transparent smooth foliage, of an oblong-obovate, or oblong form, pale green above, rather glaucous beneath. The flowers grow in nodding racemes, which spring from the base of the young shoots opposite one of the earliest leaves; they are small, greenish white, and have five petals, which soon fall. Native of California, in the woods near Monterey. Introduced in 1848 by the Horticultural Society of London. Flowers in February and March, before the leaves are produced. *Culture.*—Hardy; good garden soil; propagated by suckers, by layers, or by seeds.

Azalea ramentacea, *Lindley* (ramentaceous Chinese Azalea).—Ericaceæ § Rhododendreæ.—A neat dwarf distinct-looking evergreen shrub, possessing the general characters of the ordinary Chinese Azaleas. The leaves are flat, very obtuse, "often nearly round, and at the most only oblong." The flowers grow in spare umbels from the tips of the branches; they are small, white, and have but five stamens; the calyx and pedicels are without glands or setæ, but are furnished with ramentaceous hairs; these hairs form a fringe to the sepals, which are naked on the back. Native of China: said to be from Hong Kong. Introduced in 1846. Flowers in spring. *Culture.*—Requires a greenhouse; turfy peat soil; propagated by cuttings planted in sand under bell-glasses and set in the greenhouse.

Echeveria laxa, *Lindley* (loose-flowered Echeveria)—Crassulaceæ § Crassuleæ.—A distinct-looking and rather pretty perennial tufted succulent plant, with concave ovate-acuminate leaves, of fleshy texture, very glaucous when young, becoming yellowish green with age; they form a sessile rosette. The flowering stem is about two feet high, dull purple, having a few stalkless triangular-heart-shaped scales, and yellow flowers arranged loosely on little stalks along one side of the long drooping arms of a racemose panicle; the flowers are in appearance "like those of *Sempervivum arboreum*." Native of California, in woods near Monterey. Introduced in 1847. Flowers during summer. *Culture.*—Requires a cool airy greenhouse, and to be kept rather dry; sandy loam and leaf-mould well drained; propagated by seeds, or by the offshoots planted as cuttings, and kept rather dry until they have taken root.

Pinus Fremontiana, *Endlicher* (Nut Pine).—Pinaceæ § Abieteæ.—A small evergreen tree, in its native country seldom growing more than twenty feet high; the branches are numerous, the principal ones being ranged around the stem in a whorl. The leaves, which are glaucous green, from one inch and a half to three inches long, stout, rigid, more or less curved, and ending in a spiny point, are generally found growing in threes, but not unfrequently in pairs, or even solitary. The cones are about two inches and a half long, and in the widest part, near the middle, one inch and three quarters broad; they are light glossy brown, with from six to seven rows of scales, which are thick, bluntly pyramidal, slightly angular, and more or less recurved. The seeds are oblong or ovate, half an inch long, with a thin shell easily broken between the thumb and finger, and contain a pleasant and nutritious kernel, which constitutes a principal source of the subsistence of the Indians of its native mountains; they are produced in great abundance. Native of California, on both sides the Sierra Nevada, "extending over the top of the great Snowy Chain for a distance of 300 miles." Introduced in 1847. *Culture.* — Hardy; sandy mountainous tracts; propagated by seeds. The beautiful almond-flavoured nuts

of this pine may be grown in England, as those of the Stone pine are in the south of Europe.

Echeveria farinosa, *Lindley* (mealy-leaved Echeveria).—Crassulaceæ § Crassuleæ.—A dwarf caulescent succulent plant, bearing at the ends of its stems a tuft of leaves as white as if they had been powdered with flour. These leaves are acutely linguiform; those of the flower stems triangular, sessile, and sagittate, with the basal lobes turned upwards so as to rub against the stem just above the origin of the leaf. The flowers are a pale lemon-yellow, and grow on stalks along one side of the branches of a corymbose panicle. It is a distinct, though not very showy species. Native of California, on rocks near Carmel Bay. Introduced in 1847. Flowers during summer. *Culture.*—Requires a cool airy greenhouse, or dry cold frame; sandy loam and leaf mould; propagated by seeds or cuttings. It must be kept rather dry at all times, and fully exposed to light.

Cupressus macrocarpa, *Hartweg* (large-fruited Cypress).—Pinaceæ § Cupresseæ.—An evergreen tree, one of the finest yet introduced. In its native country it forms a tree sixty feet high, with a stem nine feet in circumference, and with far-spreading branches, flat at top, like a full-grown Cedar of Lebanon, which it very much resembles when old. They have ovate imbricated leaves, lying in four rows, bright grass-green; on old plants these are closely set, but on younger ones they are more expanded, awl-shaped and sharp pointed. In the younger plants the branches are irregularly spiral, but sometimes they are opposite, or alternate; the young ones and laterals are opposite, dense, and quite green; the older ones dark brown and nearly horizontal from the main stem. The cones grow in clusters of three or four together; they are oblong, one inch and a half long, one inch broad. It is known in gardens as *C. Lambertiana.* Native of Upper California, in the wooded heights near Monterey. Introduced in 1838. *Culture.*—Hardy; common garden soil; propagated by seed, or, in lieu of these, by grafting or by cuttings.

Vagaria parviflora, *Herbert* (small-flowered Vagaria).—Amaryllidaceæ § Narcisseæ.—A neat little bulbous plant, six or eight inches high, with oblong somewhat plaited leaves, eight inches long, two inches and a quarter broad, tapering into a distinct petiole, dark green above, paler beneath. The flowers grow about five together in an umbel at the top of a slender compressed solid scape, to which they are attached by little stalks about an inch long; they are small white, with a greenish tube, and have a weak agreeable odour like that of new hay. Native of Bogota. Introduced in 1847 by C. B. Warner, Esq. Flowers in August. It is the *Pancratium parviflorum* (Redoute). *Culture.*—Requires a greenhouse; sandy loam, with a little decayed manure; propagated by offsets from the parent bulb.

Cupressus Goveniana, *Gordon* (Gowen's Cypress).—Pinaceæ § Cupresseæ.—A beautiful evergreen shrub, forming a dense bush from six to ten feet high, with spreading slender somewhat pendulous branches, which are very irregularly set on the main stem, some being opposite, others alternate; the laterals are spiral, frequently opposite, very dense, and of a beautiful bright green colour. The leaves are imbricated, blunt, thickly set in four rows on the old plants; expanded, awl-shaped, sharp-pointed, very distant, and more or less reflexed on young plants. The cones are borne in large clusters, and are globular, half an inch in diameter. Native of Upper California, on the western declivity of the mountains of Monterey, within two miles of the sea-shore. Introduced in 1847. *Culture.*—Hardy; common garden soil; propagated by seeds, or temporarily by grafting or by cuttings.

GLOXINIA FIMBRIATA.

Gloxinia fimbriata, Hooker (fimbriated Gloxinia).—Gesneraceæ § Gesnereæ.

This is a pretty plant, with more the appearance of an Achimenes, than of a Gloxinia; it is, however, referred to the latter genus, and is a form worthy of cultivation.

From the ordinary forms of Gloxinia, this species differs in its slender and upright mode of growth. The roots are elongated and scaly, as is common among this class of

plants, and these are during a portion of the year in a state of dormancy. The stems grow up a foot, or a foot and a half in height, and are erect and simple, the colour being a pale green, slightly tinged with red; they are described as being obscurely tetragonal. On this stem the leaves are produced in pairs opposite each other; they are acutely ovate, attached by a short stalk, and serrated along the margins; they are smooth, and green on the upper surface, but considerably paler on the lower side. The blossoms come out, one from each axil of a leaf, along the upper part of the stem; they are large and showy, the colour being French white, with yellow at the throat of the tube of the corolla. The calyx divides into five largish wavy leafy segments. The corolla is bent downwards, as is the case generally in this genus; the tube is somewhat funnel shaped, but is so slightly increased in size upwards as to approach a cylindrical form; the outside of this is the most deeply blush-tinted part of the flower, the inside being deep yellow, sprinkled over with small red dots. The limb of the corolla is divided into five large rounded unequal-sized lobes or segments, of which the margins are waved, and very prettily fimbriated; these lobes are spreading, and quite white, the inner surface being sprinkled with very fine short hairs.

The history of this Gloxinia does not appear to be well known, at least in England. It appears to have been received from Paris. Sir W. J. Hooker, in the *Botanical Magazine*, states that the Kew collection received it from M. Ketelier of Paris, and that he knew nothing more of its history. We regret to be unable to give any better account of its origin. The plant comes into blossom towards autumn, and continues in a blooming state for a sufficient length of time to render it worth cultivating as an ornamental plant. 1848 seems to have been the date of its introduction to England.

The temperature of a stove is requisite to its successful cultivation. Being herbaceous, the stems die away annually, leaving only the scaly tubers or underground stems. During this period of the repose of the plant, the tubers ought to be kept dry, and the period of rest should correspond to our winter. In the spring the tubers must be started into growth, by placing them in a temperature averaging about sixty degrees, and supplying them with continual, but limited supplies of moisture: young shoots will soon appear, and, as soon as it can be observed which of them are strongest, pot them into wide-mouthed shallow pots, in which they will flower. A warm pit, or dung frame, is a proper place for them at this stage of their growth, as they now require a moist and heated atmosphere, not too closely confined, but moderately airy. They require a light open compost, such as would be formed by mixing together equal parts of leaf-mould, turfy peat, and sandy loam; this compost may have sand added or not, according to the quantity existing in the loam and peat; the mixture should be sufficiently sandy to be porous, and admit the ready percolation of moisture. As they grow, they must have more air, and less exciting heat at the root, which latter, if continued too long, would force them into weak lanky growth. They grow best in a rather moist and shady, but airy stove, during all the maturer stages of their progress. While growing, they require regular supplies of water; but when the flower declines, and the growth is completed, this element must be restricted, until, in the course of three or four weeks, the stems become ripened thoroughly. If this ripening process has been sufficiently gradual, the tubers will be plump, in which condition they will keep till planting time; but if it has been too much hurried, they will shrivel, and be liable to decay. The dry tubers must be kept in a moderately warm place, beyond the influence of damp or frost.

The plants of this race increase freely in most cases by means of their tubers. In ordinary cases, it is sufficient to separate these tubers, and plant them singly and entire; but, if very extensive propagation is needed, they may be broken into pieces, every scale being capable of producing a separate plant if placed under circumstances favourable to its development, which is, in the atmosphere of a hot-bed frame, where there is slight warmth for the root. Cuttings, and leaves of these plants, will root and form plants; but these modes of propagation are seldom resorted to in the case of scaly-rooted species.

NIGHT TEMPERATURE OF HOT-HOUSES.

The night temperature in all parts of the world is cooler than the day, hence all our imitations of tropical climates should be carried out to the full, or we are imperfect. Nights, even in our own country, are frequently warm, oppressive, moist, and highly inducive to growth; but these are exceptions to the general rule. Too many of our gardeners, however, make up their fires of an evening, get up the temperature of a greenhouse ten or fifteen degrees, and, lest it should want attending in the night, bank up the fire so as to provide the very extreme heat the pipes or flue will engender. Now this increased temperature induces unnatural growth, because the growth that takes place in heat and dark-

ness is weakly, and worse than standing still. No man ought to work a house without a registering thermometer; he would then see to what extent he had raised the heat, and to what extreme it had fallen; but what we desire to inculcate here is, that the fire ought not to be made up at night only, and that increasing the heat of a house in the darkness is contrary to nature in every respect, and therefore injurious to plants. It may not be of so much consequence to some things as others, but it cannot be defended on the ground of its approximation to nature in any of her phases. If plants are to be shut up, it is better by daylight than dark, and those who care much for their greenhouse, will prefer keeping the fire going by day-light, that the house may be sufficiently warm when closed to stand all the frost from without till early in the morning.

We confess that there is some difficulty in thus managing the greenhouse, because the less it is above freezing point of a night, the better it is for the plants, so that the frost be kept out; yet it is difficult to make sure of that during a whole night without getting it up considerably above it. We recommend, though it may be a little extravagant, fires in the greenhouse by daylight, and air given to keep down the temperature a little, but the fire to be let down at night before closing the house, or so reduced as merely to keep alight; then, supposing it to be a frosty night, the fire set off again before day-break, so that it may be up in temperature as soon as it is light.

Every house has its peculiarities, and a man must act according to circumstances; but we would have everybody who has to manage houses study how he can best meet the natural requirement of plants—a colder atmosphere at night. It is the perversion of temperature that causes many of the failures which a gardener meets with in his travels through life; and the sooner he contrives to get over the evil, the better for himself and the plants. How he may do this best depends on the capabilities of his houses, but it should be his study until he accomplishes it. It is more important in his greenhouse than in any other department, because all Botany Bay plants suffer more than we can describe from artificial heat at night. They look worse than any other when drawn, and suffer more permanently from the drawing.

AMHERSTIA NOBILIS.

"The first notice I had of the existence of this magnificent tree, the prince of flowering trees," says Dr. Wallich, "was at Rangoon, in August, 1826, when Mr. Crawford favoured me with some dried unopened flowers, and a leaf of it, with the information that he had gathered it in a garden belonging to a monastery, around the hill at Kogun, on the Saluen River, in the province of Martaban, where they appeared too beautiful an object to be passed unobserved, even by the uninitiated in botany. Handfulls of flowers were found as offerings in the caves before the images of Buddha."

In March, 1827, Dr. Wallich accompanied the British envoy to Ava, and in his official report of a journey on the River Saluen, in order to examine the site and capabilities of the teak forests in that direction, he thus writes:—"In about an hour I came to a decayed Kioum (a sort of monastery), close to the large hill of Kogun, distant about two miles from the right bank of the river, and twenty-seven from the town of Martaban. I had been prepared to find a tree growing here of which an account had before been communicated to me by Mr. Crawford, and which I had been fortunate enough to meet with for the first time a week ago at Martaban; nor was I disappointed. There were two individuals of this tree here: the largest, about forty feet high, with a girth, at three feet above the base, of six feet, stood close to the cave; the other was smaller, and overhung an old square reservoir of water, lined with bricks and stones. They were profusely ornamented with pendulent racemes of large vermilion-coloured blossoms, forming superb objects, unequalled in the Flora of the East Indies, and, I presume, not surpassed in magnificence and elegance in any part of the world. The Birman name is *Toha*. Neither the people here nor at Martaban could give me any distinct account of its native place of growth; but there is little doubt that it belongs to the forests of this province. The ground was strewed, even at a distance, with its blossoms, which are carried daily as offerings to the images in the adjoining caves. Round the spot were numerous individuals of *Jonesia Asoca* in full blossom, inferior in beauty only to those trees; and it is not a little remarkable, that the priests in these parts should have manifested so good a taste as to select two sorts of trees as ornaments to their objects of worship belonging to a small but well-marked and extremely beautiful group in the extensive family of leguminous plants."

This tree, which "when in full blossom is the most striking superb object that can possibly be imagined," Dr. Wallich had the gratification of naming in compliment to the Right Honourable the Countess Amherst and her daughter Lady Sarah Amherst, the zealous friends and constant promoters of natural history, especially botany, in India.

The Amherstia has been cultivated in England for the last ten years; but Mrs. Lawrence, F.H.S. of Ealing Park, Middlesex, who obtained an imported plant not more than two years since, has had the honour of first blooming it in England. Under a special course of management, her plant produced blossoms in the spring of the present year. The first raceme produced was sent as a fitting present to Her Most Gracious Majesty the Queen; this was borne by a plant not more than eleven feet high. A beautiful figure, prepared from Mrs. Lawrence's specimen, has been published in the *Botanical Magazine.*

GLADIOLUS FLORIBUNDUS.

Florists have within the last few years produced some very splendid hybrids and garden varieties in the family of Gladiolus; and this has not been confined to England, but has been more or less the case in all the European countries where Horticulture is in the ascendant. We have now before us the portraits of some very fine Belgian varieties, which have been figured in the *Ghent Annales*, from whence we shall quote the description of their origin and characteristics.

"Dr. D'Avoine, of Malines, has been successful in raising a great number of interesting varieties of Gladiolus. We saw a charming bouquet of them in the month of August, 1848. The Committee of the Royal Society of Agriculture and Botany of Ghent, who are appointed to superintend the plates given in their *Annales*, selected four of these varieties, to which M. D'Avoine, in his love and respect for the honour of science in Belgium, named after men celebrated for their learning. This example deserves to be cited, and we highly approve of it. To have the names of our national Pantheon figured in horticulture is certainly as good as the singular and unhappy mania of giving to varieties of flowers names which are often far from awakening any honourable remembrance. When history, with its respectable and venerated names, shall serve to regulate the nomenclature of flowers, a double object shall have been attained,—these names shall be associated with worthy objects, and our illustrious predecessors will be honoured by their example being imitated."

The description of these four varieties of the Gladiolus floribundus runs thus:—

"*Rembertus Dodonæus.*—The perianth is regularly formed with six divisions, of which three are yellow and three red; but most frequently the two first red divisions have their margins yellow, or a portion of that colour on the purple base. The inferior divisions are striated with purple, their point being entirely of that tint. This variety has a severe aspect, like the traits of the illustrious professor of Leyden; and it will be perceived how much M. D'Avoine must have thought of the celebrated botanist of Malines, in surveying the grave corolla of this gladiolus.

"*Christophe Longueil.* — This variety is much more lively. The perianth has eight divisions: four are red, tinted with white, with the nerves also white; two are uniform purple, and two golden yellow, with the points purple. Longueil was a *savant* of Malines, who wrote commentaries on Pliny, a history of plants, &c. and was a great lover of gardening. He died in 1522, at Padua.

"*Regnerus Bruitsma.*—Flowers delicate and graceful. The perianth is almost regular, with six rosy divisions, ornamented with a white line or stripe in the middle; the under division smaller, with only a single tint of dull yellow. Regnier Bruitsma was a learned physician in the town of Malines; he published a new edition of *L'Ecole de Salerne*, and died in 1617.

"*Georges Van Rye.*—In this variety the perianth has six unequal divisions: the three upper broad, rose and purple, these tints merging into a brick red; the three inferior divisions smaller and straighter, the two lateral ones yellow dotted with red, that of the middle red. M. D'Avoine published an elegant necrology of Thomas Van Rye, a famous physician of Malines. Clusis, by the by, in treating of the Phillyrea and tulips, speaks of Georges Van Rye, one of the greatest horticulturists of his time in respect to importations. We have already observed that the ancients honoured the gladiolus, and beheld in its beautiful forms the gods metamorphosed. The poetic eye of M. D'Avoine has seen in them, in our day, a token of remembrance of humanity's benefactors—*more majorum.*"

THE FLOWERS AND FRUITS OF SCRIPTURE.

THE PAPYRUS, OR PAPER REED.

In the authorized version of the Holy Bible the "paper reed" is mentioned but once (Isa. xix. 7). In that passage, however, it is by no means clear that this is the plant intended, for the Hebrew term *aroth* there employed is explained by the learned in these matters to mean "any grassy reed," and the true paper reed has another and

quite different name—*gome*—in the Hebrew language. Other reedy plants are referred to in the Scriptures, under the name *agmon*. In some cases it is possible that this latter term may have reference to the Papyrus, and this seems especially probable in the passage, (Isa. lviii. 5,) where the prophet inquires in bitter irony, if the fast acceptable to the Lord is for a man "to bow down his head as a *bulrush*." The force of the allusion will be seen by a reference to the accompanying engraving. It is a coincidence somewhat favouring the view just expressed, that the term "bulrush," which has been adopted by our translators, in this passage of Isaiah, has also been used in those in which it is certain that the paper reed is

Papyrus antiquorum.

intended, the original reading being *gome*, the Hebrew name of the Papyrus. It may, moreover, be mentioned, that few plants more ill accord with the idea of "bowing the head," than does the bulrush or Typha, one of the most erect, rigid, and unbending of herbs. It appears that the word *gome* occurs in but four instances in the Scriptures, and in two of these is in our version rendered "bulrushes." These passages occur in Exodus ii. 3, and Isaiah xviii. 2. In Job viii. 11, and Isaiah xxxv. 7, it is translated "rushes."

No mention of the Papyrus appears to be made in the Scriptures in connexion with the use which has given it its name. In both the passages referred to, the allusion is to the ancient application of the reed in the construction of floating vessels. Thus we are told that Jochebed, the mother of Moses, when she could no longer hide her infant son, "took for him an ark of 'bulrushes,' and daubed it with slime and with pitch, and put the child therein, and she laid it in the flags by the river's brink." And thus we also learn, that the Ethiopians, as early as the eighth century before the Christian era, sent their ambassadors by the sea, "even in vessels of 'bulrushes' upon the waters." It has been argued, apparently from this fact, that Ethiopia is the native country of the Papyrus, and that at a very remote date it naturally descended the Nile into Egypt.

The Papyrus, or paper reed, is the *Papyrus antiquorum* of botanists. It is a perennial aquatic herb, with a creeping horizontal rootstock as thick as one's wrist, from which the erect triangular vivid green stems grow erect; these stems grow from ten to fourteen feet high, sometimes even more, according to Pliny; the base of the stem is invested with rudimentary leaves in the form of long sheathing brownish scales. At the top of the stem grows an elegant drooping tuft of slender branches, extremely graceful, having the appearance of an elegant plume. These slender branches, or grassy filaments, are about a foot in length; about the middle each parts into four, and at this point or partition grow the small brown chaffy clusters of flowers which are represented by the dark-coloured dots in our engraving. The appearance of the Papyrus, when growing in a healthy and vigorous manner, is very graceful, chiefly owing to these plumes of drooping filamentous branches. It is therefore a very desirable subject for cultivation among exotic plants; and our illustration was taken from a very beautiful specimen so cultivated in the garden of the Royal Botanic Society, in the Regent's Park. The Papyrus, formerly known as *Cyperus Papyrus*, is not a rush, but belongs to the family of sedges—Cyperaceæ. The rootstock, which, as already described, grows to the thickness of a man's wrist, acquires such hardness as to be used in the construction of various kinds of cups and other utensils. The tender shoots are said to have been eaten, either raw, roasted, or boiled, by the Egyptians.

We must now briefly glance at the uses to which the Papyrus was anciently applied; and first of paper:—This article appears to have been used in Upper Egypt immediately after the disuse of hieroglyphics. We are

also told that it was of old in use among the Ionians, who probably brought it in very early days direct from Egypt; and Numa, who lived three hundred years before the time of Alexander, is said to have left a number of books written on Papyrus. It was certainly extensively used in Egypt, and formed a considerable article of export in the time of Herodotus. "Indeed Papyri of the remote Pharaonic periods are still met with; and since the mode of writing on them is shown by the sculptures to have been common in times long prior to the exode, there is some reason to suppose that the use of the Papyrus was known even so early as the time of Moses."—(*Pict. Bible.*) The manufacture probably originated in, and was in a great degree peculiar to, Egypt. The parts used were the thin concentric coats, or pellicles, that surround the triangular stalk, divided into thin ribbon-like flakes, those nearest the centre being the best and finest. A layer of these slips being spread out lengthwise, and lapped over by a very thin border, another layer was placed crosswise, and being pressed whilst moist and dried in the sun, the sheet was completed by polishing the surface with a shell, or some other hard and smooth substance. It is said that the juice of the plant causes the adhesion of the slips. To form large rolls, a number of these sheets were glued together, the breadth of the rolls being determined by the length of the slips taken from the plant. Some of the sheets have been known to measure one hundred feet in length.

We have already alluded to the construction of boats, or floating vessels, from the Papyrus, by the Ethiopians, at least as early as the eighth century before the Christian era; and in connexion with this, it is interesting to remark that in Abyssinia, according to Bruce, the practice still exists, Papyrus boats being the only kind the Abyssinians employ! It was the upright stem which was used in the construction of these vessels; these were interwoven together, and then coated with some bituminous matter, as is shown by the daubing "with slime [probably the mud of the Nile,] and with pitch," in the case of that in which the infant Moses was placed.

Besides these uses, the fibres of the Papyrus served for cordage; they were liberated by macerating the stems in water or wet sand; and from these fibres it is stated that sailcloth was occasionally woven. Its chief and most important use was, however, in the manufacture of a material for writing on; and its common ancient name (Latin, Papyrus) is represented in our day by the word paper. Biblos again, an ancient name for the stalk of the plant, is preserved to us in the name of the "Bible."

ON THE PROPERTIES OF FLOWERS.

BY G. GLENNY.

I OBSERVE that in many publications there are certain writers going into minute details as to the properties of flowers, and occasionally, one more hardy than the rest ventures to assert that I have not gone far enough. I beg these persons to understand, once for all, that I have laid down general principles which I know to be sound, and must prevail, and have left to more conceited writers the task of interfering with people's fancy. He who ventures to build a house on sound architectural principles, according to the order that he selects, and insists that it is right, must be tolerated, because he has founded his building and carried it up on acknowledged proportions, and in proper taste; but the man who insists that the parlour of a house shall be blue and silver, and the drawing-room green and gold; that this chamber must be yellow, and that one red; is a conceited fool, and dictates upon matters, in which no man will be bound to obey. We know that we have settled the forms of flowers, so that when perfection is attained, nothing can improve; that no other form can equal; and as our models are imaginary, and may never be perfectly equalled, why, those who get nearest will be the best; but we should be stepping out of our way to say that this, that, and the other detail (upon which, by the way, six people would have six different opinions), must be this or that, and interfering with people's fancies and tastes. We may go so far as to say, whatever colour a thing is, it must be clear and decided, and whenever two colours are contrasted, the greater the contrast the better; but after form, the colours, markings, and proportions of colour create the varieties in a collection: and he who affects to say what these shall be, would sadly limit the number of our varieties. We will insist that white or yellow shall be pure, and that one feature of a flower shall not run into confusion with another, but it is the height of folly to dictate the width of an edging to a picotee, the breadth of the feathering in a tulip. The grand principle of floriculture, on which all forms are founded, is that whatever shape would, *if attained*, look the most perfect, shall be the model which must be equalled if we can,—the model of perfection. We think that all colours should be left untouched as a matter of taste which everybody is at liberty to please himself upon, except that they shall be pure, well contrasted, and dense or decided, and that all markings shall be the same; thus we say, the eye of a pansy shall not break through to the margin, though we neither dictate the size of the eye, nor the breadth of the margin. It follows,

as a matter of course, that to avoid this the eye must be small if the field is small; but the infinite variety which may be found, differing only in their colours and properties, would be sadly limited if we dictated the size of the eye, the breadth of the margin, or the quantity of white and yellow. We merely wish people to study and stand by our forms, which are proved to be perfect, even by the fact that the nearer a flower comes to the standard, the better everybody—not only judges, but everybody — likes it. I have had occasion to notice the subject frequently, because the periodicals and papers will admit the detailed nonsense of mere pretenders.

NOTES ON THE FUNGI.

Perhaps nothing in nature gives more colour to the notion of spontaneous generation than this particular race of plants; but when we consider a little, instead of jumping at a conclusion, the fact of their growing every where on decaying matter of every description, naturally has given rise among inconsiderate people, to the idea that such things come of themselves; and this has been carried onward to plants. Many who support the dogma of spontaneous generation, affirm that the myriads of weeds which come up on earth, dug from the lowest depths, like Fungi in decaying bodies, come of themselves. Repudiating, however, the idea of any thing growing other than from its own proper origin, which with plants and Fungi are seeds, the following notice of this most singular branch of natural history will be found interesting.

There has been much discussion as to which of the three grand departments of nature these extraordinary productions actually belong to. They have been referred to the animal, to the vegetal, and even to the mineral kingdom; but Necker affirms that they belong to neither of the three, and contends that they form a distinct yet intermediate kingdom. But almost all naturalists, however, think that the habits and economy of the Fungi indicate their proper place to be an inferior rank in the vegetal kingdom, in which they have accordingly classed them, although analysis proves that they are composed of ammonia, albumen, phosphoric salts, and other substances which are found in animals, and the odour which they emit when in a state of putrefaction, resembles that from animal matter in the same condition.

As the germs, or seeds, of the Fungi, which are exceedingly prolific, are so very minute that separately they escape the eye and even the microscope, it is not improbable that they are almost every where diffused, even in the flesh and fluids of living animals, and in the wood and sap of living plants, in readiness to perform their office immediately that the plant or the animal dies and begins to corrupt. Hence we find them in the greatest abundance and variety in the autumnal and winter months, when the wind, the frost, and the rain have increased the number of dead quadrupeds, birds, insects, and vegetals. The seeds are, probably, so small as to be actually blown by the winds into the almost imperceptible pores of plants, seeds, and animals, in or upon which they grow directly that they come in contact with any corrupt matter, even though the vegetal or animal be alive. Thus, the smaller species have been observed growing on a diseased membrane, which separates the lungs from the rest of the viscera, before death; they have, also, been observed growing in fish just captured; on the eyes and beaks of living birds; and on the bodies of living insects, and other creatures. When paste made of flour has become stale and putrid, it is soon overgrown, although closely corked, by the blue-mould fungus (*Aspergillus glaucus*), the seeds of which must be almost everywhere in more or less abundance, and inconceivably small to escape destruction when the grains of corn, in or about which they must have been previously concealed, are being ground into the finest flour. When the Fungi themselves decay, they are soon grown upon by other species.

The whole tribe are remarkable for the rapidity with which they spring up and develop themselves. Sowerby says, that he has often placed specimens of the *Phallus caninus* by a window, over night, while in the egg-form, and they have been fully grown by the morning, and that he has never known them to grow in the day-time.

Several species attain a very large size. Dr. Withering found a mushroom whose pileus, or cap, measured nine inches across, or twenty-seven in circumference. The *Morning Herald* of October 16th, 1833, mentions one which was thirty inches in the circumference of the pileus, eight inches round the stalk, and weighing two pounds and a half. The *Manchester Herald* of September, 1837, mentions one which was thirty-two inches in circumference of the pileus, ten round the stalk, and weighing one pound eight ounces. And Dr. Mant, Bishop of Down, mentions an Irish specimen larger still, it being eleven inches in diameter, or thirty-three in the circumference of the pileus, and nine inches in height. Mr. Sowerby has a model of a gigantic specimen of *Boletus*, which was found growing in a blacksmith's cellar in the Haymarket.

So apt are the Fungi to imbibe whatever

noxious qualities may be contained in any putrid substances within their reach, that even the few species which may be safely eaten when they grow on a dry and open soil, acquire a poisonous nature when they grow contiguous to stagnant water and to certain kinds of vegetal matter; and so tenaciously do they retain the poison, that Parmentier could not separate it from them, either by boiling or distillation; wherefore its precise nature yet remains to be discovered. In *Brande's Journal*, it is observed, that whenever a fungus is pleasant in flavour and odour, it may be considered harmless; but if it have an offensive smell, a bitter, astringent, or styptic taste, or even if it leave an unpleasant flavour in the mouth, it should not be considered fit for food. Their colour, figure, and texture, do not afford any characters on which we can safely rely; yet it may be remarked, that the pure yellow, golden, blush-white, dark or shining brown, wine-red, or the violet coloured ones, belong to many that are eatable; whilst the pale or sulphur-yellow, bright or blood-red, and the greenish, belong to few but the poisonous. The safe kinds have generally a compact brittle texture and white flesh, and grow more readily in open places, such as dry pastures and waste lands, than in moist or shaded places. Those are generally suspicious which grow in caverns and subterranean passages, or on animal matter undergoing putrefaction, as well as those whose flesh is soft or watery. There are some persons with whom mushrooms *never* agree. Cobbett mentions that whenever he ate them, his body, face, and hands would soon afterwards become covered with numbers of red spots or pimples.

Some species of *Boletus* yield, of their own accord, crystals of oxalic acid; and the champignon (*Agaricus pratensis*) and some others are supposed to contain prussic acid. Braconnot found by analysis, that the Fungi contain two peculiar substances, called *fungin* and *boletic acid*. What little of a nutritive nature they possess,—for they are not very nourishing,—appears to reside in the *fungin*, which is always white, soft, and tasteless. When burnt, it emits a smell like bread, and on distillation it affords a brownish oil, besides ammonia and charcoal; and the latter product from it contains phosphate of lime, carbonate of lime, phosphate of alumina, silica (or flint), and sulphuretted hydrogen gas—constituents which sufficiently declare that it has the characteristics of both vegetal and animal matter, and moreover, when it is left to putrefy in water, it first smells like putrid vegetal matter; and subsequently, like putrid animal matter. *Boletic acid*, in which probably resides both the flavour and the poison of the Fungi, tastes like cream of tartar, exhibits irregular white prismatic crystals, is unaffected by exposure to the atmosphere, but dissolves in forty-five times its own weight of alcohol, or in one hundred and eighty times its own weight of water, when the latter is at sixty-eight degrees of temperature.

SPINACH.

There is hardly a more favourite vegetable than spinach, and none more easily cultivated. There are two kinds that may be considered the most popular, and are in universal demand: the round-leaved and the prickly; the former best in all the spring months, the latter superior for winter; but we have known the round-leaved sort do well sown in autumn, but it is not generally the case. The ground for spinach cannot well be too rich; the quicker it grows, the milder and better it is; and, therefore, well-manured ground is favourable.

SOWING THE SEED.

This may be done in drills, or broadcast; that is, spread all over the space. It is best to sow after rain, when the ground is moderately moist and works well. In drilling, the rows must be six inches apart, and not deeper than two inches. The seed must be sown so thinly that no two plants shall be together, and the earth be drawn down into the drill to cover slightly. When the seed is well up, cut out all the spare plants, so as to leave the remainder six inches apart in the rows. After this has been done a fortnight or so, they must be cleared and thinned again; because you will see here and there a plant that has escaped your first hoeing. In the early spring months and while there is no danger of running to seed, the large leaves may be picked off and eaten; but the common practice is to let them grow till they are large enough, and then take them up and eat all but the root. However, the respective plans will not be alike in all cases; but in general there is no great difference in the result. In sowing broadcast, the ground is levelled after being well dug and dressed, and the seed is scattered all over the surface perfectly even and very thin; and the ground should be raked until the whole is covered up. It is as well to make some preparation for the attacks of birds; for when they one and all do their part towards clearing a piece before the place is dry from the sowing, unless you stop them by some means, they take but a short time to clear a bed.

THINNING OUT THE PLANTS.

When the seed is sown in drills six inches

apart, you have only to cut six-inch vacancies in the drills, and your crop is properly thinned; but when sown broadcast, you do not attempt to make them in rows, but to thin them out to about six inches; not regularly but thereabouts, generally giving or taking a little one side or other, to preserve the best plants. When the plants grow a little, they soon touch; but the round-leaved spinach being fit to cut as soon as there is any quantity worth eating, there are many who do not even take the trouble to thin with the hoe, but sow as thinly as they can, and as soon as the plants have six leaves, pull them out by hand, taking the best plants and leaving the weak ones; this gives the opportunity of eating the plants down to thin the rest. This first drawing is of course smaller than we should choose to eat them as the general crop; because the plants ought to be a good size, otherwise there is a waste; but seeing that they are drawn to thin the beds and give the others more room, it is simply a question, whether the crop, if properly thinned early, would grow so much faster, as to repay one for wasting all that are cut up with the hoe. Our own experience dictates, that for private use, a drill drawn here and there, and sowed thinly with spinach, grows well and rapidly; and that there is no occasion to thin them with the hoe, but as soon as the best plants are large enough to eat, draw them out and give the remainder room to grow. In the heat of summer, spinach is very apt to run to seed before it attains any growth; but this may be counteracted a good deal by copious watering, so as to soak the ground well before the seed is sown and after it is up. Thinning out while very young, and keeping it clear of weeds, the growth is then rapid, but it must be watched and taken up for use before the seed, or rather the flower-buds, appear. In this young state everything but the root is eatable.

THE WINTER SPINACH.

Spinach for winter use is sown in the autumn, and the prickly spinach, which is very hardy, and a continuous grower, is generally sown for it. The plant is not pulled up, as is the case with the round-leaved, but the full-sized leaves are picked off and the others left to grow from time to time, and thus a supply is kept up all the winter through; all ordinary frosts having no bad effect on the plants. This may be sown in drills nine inches apart; or, if sown broadcast, thinner than the round-leaved. When up, they may be thinned to nine inches distance, and be kept clear from weeds; as soon as the lower leaves are full-grown, they may be picked off for eating, and this picking may be continued as often as the leaves come large enough. The spring sowings may begin in March and be continued in April and May. Some repeat in June. The autumn sowing may begin in August, and be continued in September and October. There is nothing to prevent those who are fond of it from following up the sowing of the spring kinds all through the summer; but as it perfects itself quicker, and will run to seed while small, there is less to eat, and it wants more attention lest it be lost altogether. But peas and cauliflowers supersede it, and no one cares for it the two or three hottest months.

SOIL AND SITUATION.

The ground should be open and well manured. In the early months it should not be shaded, but in the hotter weather it may be sown among the trees, where the hottest sun does not reach it. In market gardens it is sown often between the rows of currant and gooseberry bushes, because it is not so parched up with the sun; and if it be drawn a little, it is of no consequence. For the winter sort, the place cannot be too open. It wants all the sun and air it can get uninterrupted; and the ground must be kept very clear all about them. Some of the finest and thickest-leaved plants should be marked, for

SAVING SEED.

The plants left for seeding must be well hoed between and the surface stirred; and a little earth drawn to the roots; they will soon flower and seed. When the seed is approaching ripeness, the entire stem should be cut, and the whole dried in the shade under cover. It is as well not to sow the seed in the same place as it occupied the season before; because all crops are better changed, and especially when you save your own seed.

CROSS BREEDING.

Many writers make a seeming mystery of this simple operation; our object is to make our readers fully masters of the subject, and of the reasons why and the instances where it is desirable. Flowers have, for the most part, a portion connected with the seed vessels which would be perfectly useless, unless there were anthers, which hold the pollen, or powder, to communicate with it, and thus fertilize the seeds, which would otherwise be useless and barren, even if they grew at all. This portion, which is attached to the seed-vessel, becomes at a particular period of its growth sticky, and the powder which escapes from the anthers is retained by the glutinous portion, and every grain of powder forms a complete seed in itself, striking down an imperceptibly fine fibre, or root, into the vessel, and by the communication with the seed within renders it vital. Now the sporting of flowers

forms one of the great charms of the florist's occupation. Many flowers sport of themselves; a pinch of seed from a yellow flower, or a red flower, bringing others of half-a-dozen different shades, and of various properties. Whether this is the result of cross impregnation by the bees and flies that carry the powder on their limbs from flower to flower, is a problem; but it is quite certain that if the seed-vessel of one flower be fertilized by the powder from a different flower, there will be a modification of form and colour, and of a number produced from such crossing some will be like each parent, and some between the two. By this means the good properties which are separate in two flowers will sometimes be combined in one, and the raisers of seedlings should endeavour to anticipate the uncertain and often unsatisfactory work of bees and flies by performing the necessary office themselves. The cases in which such impregnation is desirable are:—

First, when a flower has one or more good properties, but in some respects is faulty.

Second, when a plant that is hardy is greatly inferior in other respects to plants that are tender.

In the first case, we will suppose that we have a finely coloured hollyhock with petals flimsy and bad, and that we have a very thick petalled hollyhock whose colour is nothing new nor very good; cross impregnation here may produce, among a hundred other varieties, some one or more with the good colour and the thick petals,—the very thing we want.

In the second case we will look to Rhododendron ponticum, or maximum, or catawbiense, all of which are perfectly hardy, but none of which have the magnificent crimson of the more tender varieties; by crossing the hardy ones with the pollen of the tender ones, we may obtain the superb crimson on the hardy plant,—the thing of all others to be wished. In this way have we possessed ourselves of the beautiful variety called Alta-Clerense, and many others very rich and very beautiful.

Mr. Smith, of Norbiton, succeeded in a remarkable manner in producing a cross between the splendid Azalea sinensis, bright yellow, and the common Rhododendron, and the result was Yellow Rhododendrons, of which there are now many different shades, from sulphur to deep crocus yellow, and some of various shades of bronze: this may be called the triumph of cross breeding. In this way many very superb varieties of Azalea, Amaryllis and other plants have been produced, and new families almost created. The theory of cross breeding is this: the principal organ attached to the seed-vessel, called the pistil, becomes glutinous when ready to receive the powder, and unless we are pretty quick, the anthers of the flower burst at the same time, and enough of the powder will attach itself to impregnate all the seed; therefore we ought, as soon as the flower opens, to pull or cut away all the anthers; this at once prevents self-impregnation, and we have only to watch for the time when the pistil is ready to receive the powder, and then take some from the flower whose habit we wish to impart to the one we operate on. In various flowers the mode of operation differs according to circumstances; in some it is exceedingly difficult to get at the organs of germination. The pansy can only be fertilized by taking the powder of one flower on a camel's hair pencil and rubbing it into the centre of another flower. The dahlia has the principles of fertilization in every petal, and sports so much without any trouble, that we never attempt it by hand. The rose requires to be opened by gentle violence before it opens of itself; and many flowers require considerable delicacy in the operation, to prevent failure on one side and injury on the other. Many fruits are said to have been produced by actual cross breeding, but we very much doubt if we could do better by hand than nature would do for herself. Some splendid cucumbers have been raised from seed, and not a few melons; certain it is, that we have some magnificent varieties of both now, come whence and how they may. The Cacti and Epiphyllums have been variously crossed to produce novelties, but every one has been inferior to the noble speciosissimus, and although some are varied, they are certainly not improved. It is said, that the splendid varieties of brocoli which equal the cauliflower in whiteness, and beat it altogether in the capacity to stand the winter frosts, were the result of cross impregnating the brocoli with the cauliflower. It is quite impossible to say what lengths we shall stop at in cross-breeding vegetables. The pea, the bean, the hardy winter greens, all invite us to the trial. Some beans are the result of cross breeding; among these Marshall's Prolific is conspicuous; but many persons who have raised seedling flowers, fruit, and vegetables, have no claim to having hybridized them. They have been found among ordinary products from seed; a single plant has exhibited some remarkable feature that has attracted notice, the seed has been treasured as a novelty, and in the course of a season or two a stock has been got together. The French people profess to do a good deal in this way with roses; but, for the most part, the best way to produce novelties is to place together all the varieties that are good for anything, and save all the seed without seeing how they became crossed, for there

is pretty sure to be a great variety, without our giving ourselves the trouble to cross the various plants on purpose. Nature is no bad workwoman, and when left to herself will often do what none of us dream of.

THE PROPERTIES OF THE IRIS.

The lover of flowers could with a little consideration tell us, instead of leaving us to tell him, why he preferred one variety of any kind of plant to another, but scarcely any one will give himself time to inquire or consider, and rests satisfied with the simple fact that he does prefer it. Therefore it is that in many of the most common things we have been obliged to lay down rules and explain principles upon which the merits of a subject may be tested.

The growers of the iris know that the Spanish and Persian varieties are not so rich as the English kind adopted by florists. Why is this? Simply because the principal petals of the latter are broader. If these broad petals are richer than narrow ones, a point is gained by broad petals. Bright or dense colours are preferred to dull watery undefined shades. Thick petals stand longer and hold their form better than thin ones. Smooth edges look better than rough or notched ones; and so we get at certain beauties, which a flower must possess to be perfect.

This explains the principles on which the properties of the iris are founded, which, as there is some difference of opinion, we quote:—

"The three principal petals should be broad enough to touch one another; the three secondary ones should stand distinct and apart from the principal ones, and be also broad enough to touch one another.

"The three principal petals should be thick, smooth at the edges, broad and blunt on the outer extremity, and curve gracefully from the base outwards and downwards in the form of the top half of a hollow globe.

"The colour of all six petals should be dense, be it what it may; pale or dark blue, purple, lilac, or blush, no matter which; and the markings should be distinct and uniform, the three principal petals alike, and the other three alike, but not both threes of the same colour.

"The texture should be velvety over the surface of the three principal petals, and the edges should be crimped or frilled, but not serrated. The surface of the others should be smooth, like wax or enamel.

"The stems should be strong, and the flowers thrown up well out of the sheath, and bloom one at a time; that is, the second should not open until the first is on the decline."

All the floral world, from those who like the least to those who like the most interesting, would on seeing a flower that nearly approached the standard, by the side of one that did not, instantly decide in favour of the former, even if they could not tell us the reason why. The fact is that the more surface of petal there is in a given space, the more brilliant a flower appears; and every vacancy or break looks worse than if the deficiency were filled up.

THE GARDENIA OR CAPE JASMINE.

This first favourite at the markets, as well as gardens, is now cultivated to a great extent for cut flowers, as well as to be purchased as plants. It is one of the most delicate in appearance and most fragrant flowers of the early part of the year, for it is forced forward with alacrity to meet the demands for the first flowers of the spring, and is the most beautiful of all the small flowers produced. The gardenia strikes freely from cuttings placed in sand and under a bell-glass, favoured by a little bottom heat, and as soon as the cuttings are struck, they are planted out in pots, one in each pot, and transferred to a common hot-bed, plunged in the mould to the rim of the pot, and kept growing sharply until they actually flower; but if buds should come while the plants are very small, you may choose which you will sacrifice, the growth of the plant or the flower: sometimes a cut flower will bring more than the plant would if grown up to the market size, and there is no flower in general so popular, come at what time of the year it may. The grand thing to recollect in its cultivation is, that it rejoices in moist peat, and in nothing so much as a common hot-bed; a few pots in a cucumber frame are sure to do well, and those who grow for market find the common hot-bed the most profitable as well as the most efficacious, as for the time the heat is just what the plant requires, and keeps off red spider, mealy bug, and all the other entomological plagues that so readily attack the plant in our ordinary stove. When the plants get large, they should be grown in the orchideous house, which is always moist, otherwise it receives a check which it rarely recovers without a good deal of care, and sometimes not at all. Cuttings taken off at a time when the last year's shoots have made all their growth will strike and bloom before they are three inches high, and in the thumb pots, but it does not follow that they should be allowed to do so if you wish them to be grown up into specimens. There is nothing surpasses the gardenia in fragrance, and very few plants equal it in beauty.

THE ASPARAGUS OF THE COSSACKS.

This plant proves to be the *Typha latifolia*, a species well known, and very widely distributed over the globe. The rootstocks of the Typhas are said to abound in starch, so that their qualities are nutritious. We shall quote an abridgement of an article on this subject in a recent number of the *Ghent Annales*, which has some interest in connexion with the question of the capacities of vegetation to supply us with daily food :—

" The authors of a humorous publication at Brussels introduced, in 1847, the subject of the potato disease into their pages. They have enumerated, in verse, the names of varieties of the famous Solanum tuberosum, and have called the attention of horticulturists to the potato of Bokhara, that reputed happy capital, inhabited by Tartars, Jews, Turcomans, Mussulmen, and Cossacks. Our friends, however, have humbly acknowledged that they are entirely ignorant of the nature of this potato; but, thanks to the kind of freemasonry which exists among botanists throughout the world, we are enabled to put this extolled plant into the hands of these same friends. On obtaining this potato of Bokhara, we soon perceived that it was a plant totally different from the Solanum, and one with which we had long been familiar; and, on referring to Dr. Clarke's Travels, we found we had before us the history of this pretended potato of the Bokharians. The plant which they eat instead of potatoes is an aquatic. For three centuries it has been called by the French, *Marteau* or *Masse;* the Greeks have named it *τύφη*; the Latins, *Typha;* the Germans, *Quarrenkolben* or *Liefsknopsen;* the Flemings, *Lisch-dodden*, or, simply, *Donsen*. It is the *Typha latifolia* of botanists.

" We cultivate the Typha latifolia as an ornamental plant in ponds; but it naturally abounds in our waters where the depth is not too great. M. de Pitteurs-Hiegaerts had many thousand stems from the Lake of Léau; and if we are correctly informed, the leaves were only employed for litter, and the dried stems and rhizomes for fuel. What a glorious feast they would have afforded, when young, for the Cossacks! In the Campine Limbourgeoise the ponds are full of these plants; and they have begun to propagate themselves in the pieces of water on the line of the Vesdre, on both sides of the railroad.

" Dr. Clarke gives full details respecting the utility of the Typha. He found the inhabitants of Tcherkask so enthusiastic with respect to the excellence of the shoots of the typha, that they regarded it as a sacred plant, a special gift of Providence. The lower parts of the stem are brought to the tables at every meal; and in every house bundles are to be found, about three feet in length, tied like asparagus, ready for use. It is sold in the markets, and amongst the provision merchants. It is best used in spring, like our asparagus, when the plants begin to shoot. It is said that in this state it forms a dish which those that have once partaken desire again with increasing relish.

" The Cossacks are still more choice in their use of the Typha. They peel off the cuticle and select the blanched tender part, usually about eighteen inches in length, near the root; and this constitutes a dish, cool, agreeable, and wholesome. The Cossacks, rich or poor, young or old, prefer this vegetable to all others; and Dr. Clarke states, from his own experience, during his sojourn among the inhabitants on the banks of the Don, that the Typha was a very nutritious and excellent dish.

" The Typha is prepared like asparagus, being cut, like the latter, when the young shoots are pushing; the tender blanched part is boiled in water seasoned with salt, and served up in the same way as asparagus. The various culinary preparations to which the asparagus is subjected are equally applicable to the Typha; for it may be cut, stewed, prepared for serving up with yolk of eggs, enhancing the flavour with nutmeg and salt. The Typha, therefore, which ornaments the sides of our lakes and ponds with its elegant foliage and singular tops, may be turned to useful account; for although the plant is eaten, both by Tartar and Cossack, that is no reason why one, being neither, should not avail himself of that which God has created good. Even the French cooks employ various culinary plants for which we are indebted to the Cossacks, among which we may mention tarragon, and a delicious rhubarb."

CONTEMPORARY WRITINGS AND ORIGINAL NOTES.

Raising the Pinus Tribe.—All sorts of pines and firs worth cultivating are propagated by seeds. The ripe cones of these trees are either to be exposed to a gentle heat, or soaked for twelve hours in warm water; after which the several cells will open, and the seeds fall out. These seeds should never be taken out till the time of sowing them, which is March. The ground they are to be sown in must be carefully turned several times to remove the roots of weeds; after this the earth is to be levelled with a spade, in small spots, at every six feet square; in each of which spots ten or twelve seeds are to be

sown, and covered with some of the same mould, broken fine but not sifted ; then they are to be covered with a furze-bush, or other such covering, and this is to remain for some time after the plants are come up, but they must not be covered too close by it. When this covering is taken off, a little loose earth is to be drawn about the stems of the plants, and a little furze stuck about them to keep off the too great heat of the sun. Usually, from twelve seeds, there are eight plants or thereabouts, and these may be left standing together till the third year. In March or April, the third year after sowing the plants, they are to be removed to the place where they are to stand, and planted at eight feet square distance, or greater, if desired. Two plants should, however, be left in the plantation in each cluster, and great care taken not to injure the roots of these. The others also must be taken up with as much earth about their roots as possible; when they are set in the new plantation there must be stakes fixed near them, to tie them to, that the wind may not blow them down, and the roots must be covered with litter, and they must have a gentle watering to settle the earth to their roots. If the weather prove very dry, this may be repeated two or three times, but a little at a time,—over-watering kills all newset trees.

Grape Refuse.—M. Renaudot has sent a paper to the Academy of Sciences in Paris, relating to the means by which the marc of grapes may be employed much more usefully than it is at present. M. Renaudot gives the details of a process by which he expects to obtain a spirituous liquid free from any unpleasant taste or smell, in the place of the ordinary brandy obtained from the distillation of the marc, which is often tainted and never free from an empyreumatic taste, which greatly diminishes its value. Instead, too, of using the remains of the distillation as manure, M. Renaudot proposes to obtain potash from them by calcination.—*Comptes Rendus.*

Arbour making with Trees.—In this country very few arbours are to be seen, at least rustic ones. They are, however, very useful and ornamental in a garden ; for they can be formed before a cascade or an avenue, at cross walks, in a greenhouse or in a conservatory. They are not only striking objects in such places, but offer an agreeable resort for a gentleman and his family in bright summer days. The following plan of forming arbours is explained by a correspondent :—" I generally make them thus :—Four trees of one species are planted in a square, and trained erect until they attain the height required, then the tops are drawn together, and a cut made in each from two to three inches long. A different species, in a pot, with four cuts in it, equal in length to those on the trees planted out, is placed between them, and tied together as in inarching. As soon as the scion is united with the stocks, I cut the four tops off above the union and the scion below, so that the four trees support the one head, which looks very curious, being a different species. I prefer deciduous trees for stocks, and evergreens for scions ; or evergreens for stocks, and deciduous trees for scions ; the appearance being more striking than if they were all of one kind. The scion is allowed to grow at large, but the side branches on the stocks are trained horizontally, or nearly so, until they attain sufficient thickness to be cut with the hedging-shears."

Virgilia lutea.—The Virgilia lutea flowers very profusely in France, but not before it is ten years of age on its own roots. A correspondent writes :—" I have seen it often in flower in the Jardin des Plantes at Paris, and measured its snow-white odoriferous racemes, which were from a foot to a foot and a half in length when grown on its own roots. I mention that the flowers are snow-white, because I have seen them. I suppose it does not often flower in this country, for I have seen it mentioned in catalogues, and other botanical works, as bearing yellow flowers ; I do not know by whom this mistake is made. Perhaps it takes its name, *lutea*, from its wood being yellow, and not the flowers. If it does not flower in Britain, I advise your readers to work it on *Sophora japonica*, as is done by Messrs. Baumann, nurserymen, in France, in whose nursery it flowers very well in three years after grafting on young and old stocks, with racemes from eighteen inches to two feet long."

Slugs and Snails.—There is hardly anything in the whole range of garden plagues much worse than slugs and snails. There is no season but they are present and devouring the crops if they be not kept under by all the means we know of. They may be caught in great numbers by laying cabbage leaves on the soil and taking them up twice a-day, when the pests will be found on the under side ; we have known a quart to be taken up in one round upon twenty rods of ground, under flat pieces of board or tile. Pan-tiles are especially tempting to them, for being arched, the slugs are enabled to get under without exertion, and a score may be picked off a single tile. It may be thought that in time this would thin them ; and if persevered in, a great deal may be done towards extirpating them altogether. Again, they are greatly incommoded by repeated hoeing, raking, and stirring of the earth. In neglected gardens, where weeds are allowed to grow up in abundance, they breed so fast that for some time afterwards it is scarcely

possible to raise a crop of anything. Sowing a plot of ground with quick-lime just before daylight will kill every one that the lime touches; so also will salt, but there is great danger of the plants, because if there is enough to be effectual with the slugs, there would be too much for all tender crops. It has been recommended to put cabbage leaves in an oven, or in some other way to partially roast them before laying them down on the ground, because it draws the vermin from a long distance; but this is often troublesome, and there is one thing quite certain—whatever be the remedy or remedies adopted, they will require to be persevered in a considerable time, for you will hardly find any abatement of the nuisance for many days. We recommend, if they can be had, cabbage leaves strewed upon the ground and taken up once or twice a-day, knocking off all the slugs into a pail of salt and water; tedious as it may seem, it is the best, the safest, and the most permanently effectual plan. It is very probable that one lot of leaves may be enough to extirpate the larger quantity; and when the leaves are done with, watch the opportunity before day break and sow lime on all the stragglers that are out and exposed.—G.

Weeds on Neighbouring Premises.—There is very little thought of the neighbouring ground while we keep our own clean within; but if there be a hedge and ditch at any part, and the weeds are allowed to grow on the bank, or in the hedge, or in the ditch, it will make incessant labour; for it always sows your ground with the seed, and harbours millions of vermin which travel far and near after more palatable food than the ditch or bank affords, and how often has the reader seen on a dull evening, or dark showery day, the enormous black slugs crossing his path and leaving their slimy track for many yards, showing at once what distance they will go in search of food better than they have where they are harboured. Therefore, clean out ditches, rake out weeds at the bottom of hedges, let there not be in the garden nor in the neighbourhood a dirty corner, or an overgrown neglected spot; for wherever vermin can remain undisturbed, they breed in prodigious numbers, and supply an interminable quantity of mischief and vexation.—G.

Stakes for the Support of Flowers.—There is hardly any part of the gardener's work that requires more attention than the supporting of plants to protect them from the effects of wind, or hold them up in their weakness. Some people carelessly drive the stake into the ground so as to hide the stems of the plants, instead of so driving it that the plant shall hide the stake. There is a good deal of taste to be displayed in supporting a patch of sweet-peas, or a dahlia, for if well done they look to be growing free and supporting themselves. Plants like peas should be supported with brushwood; that is, small branching wood that is hardly perceivable. In any open situations, even hollyhocks are obliged to be fastened to a stake, but the stake should be so placed as to be hidden by the plant on the principal side. In like manner, standard roses, if supported by an iron or stake, the plant should be before the supporter, and not the supporter before the plant; that is to say, the stake or iron should be on the side of the plant that is least seen.—G.

Brückea grandifolia.—"For some time I took Brückea for a shrubby plant, since I had always found it in full flower from eight to twelve feet high; subsequently, however, I discovered it from thirty to fifty feet high, loaded with innumerable flowers. The stems of trees this size were from fifteen to twenty feet long and from six to eight inches thick, and surmounted by a head of a roundish pyramidal form. The bark of the stem and the branches is of a bright ash-grey colour: the young branches, also, are studded with warts, and covered with short, yellowish-grey wool. This property is likewise common to the peduncles, pedicels, calyx, and the mid-veins of the leaves. The leaves are opposite, lanceolate, from three to five inches long, and two-thirds of their length is from $1\frac{1}{4}$ to $1\frac{1}{2}$ inches broad, ending in a sharp point, and becoming gradually narrower towards the base, where they have the form of a leaf-stalk from $\frac{1}{2}$ to $\frac{2}{3}$ of an inch long. They are entire, and coriaceous; their surface is of a shining green, which is somewhat fainter or paler on the under side, more or less hairy at the mid-rib and the other larger veins: the somewhat peculiar parenchyma of the network formed of the anastomose veins, shows on the under side small warty pimples. The flowers are developed at the same time with the leaves, at the axils of which they are produced. In January and February may be seen, at the axils of the young leaves, a glomerulus or little round head, supported on a short stalk, and composed of small flower-buds, which are surrounded with small curvilinear bracts, in the manner of a capitulum, or little head. In the axils of the more advanced leaves, this small head assumes the form of a perfect cyme. The peduncles are nearly the length of the leaf-stalks; the pedicels, that of the calyx. All those parts are irregularly studded with small rugosities. The calyx is from three to four lines long, recurved, and keeled. The tube of the flower is white, cylindrical, and somewhat longer than the calyx, by which it is loosely surrounded; its inner surface is slightly hairy; the divisions of the extended five-parted

border are of an oblong form, roundish or obtuse at the points; overlapping each other in the bud. The fruit is somewhat oval, from three to four lines in diameter, and is, for the most part, concealed in the broad, cup-shaped, woody calyx; it is one-celled and indehiscent. I cannot speak exactly as to the flowering time of this plant; seeing that I found it in bloom both in the rainy and the dry seasons. It likes a damp place, in the vicinity of brooks, on open and sunny slopes. I found it growing in such situations, on the mountains of the province of Caraccas, at an elevation of from 5,000 to 6,000 feet. The soil was of an ordinary kind."—*Karsten's Plants of Venezuela.*

Heintzia tigrina.—"The stem of Heintzia attains a height of from four to five feet; it is branchy, of a brownish colour, and, at the younger parts, tetragonous. The leaves are opposite, and nearly a foot in length, supported on a foot-stalk from three to four inches long, and which, with the younger branches, are fleshy, and of a brownish colour: this colour is also found on the larger and prominent veins of their under side. The surface of the leaf is uniformly hairy, dark green on the upper side, while the under side is of a bright bluish green. It is lanceolate, attenuated at the base, and obtusely acuminate at the apex, crenate or serrated at the margins. The flowers, which are produced at the axils of the leaves, are supported on a bractaceous rose-coloured involucel, and are arranged in a kind of umbel or cyme, on a short peduncle; and the pedicels are surrounded by a small bract, which is nearly as long as the leaf-stalk. The calyx is five-parted, and the segments, which in the bud overlap each other, are recurved. The corolla is funnel-shaped, one inch long, slightly curved, and unequally five-parted at the limb, and studded with white hairs or wool, by which it assumes a satin-like gloss that contrasts agreeably with the rose-coloured tips of the calyx. It is of a snow-white colour, with purple spots and freckles. The interior of the tube is downy. The fruit is nearly globular, about the size of a hazel-nut, and surrounded by the persistent calyx; it is between a berry and capsule. The seeds are very small, and of a glossy brown colour. I found this beautiful and distinct plant in the moist narrow dells and shady slopes of the mountains in the province of Caraccas, at an elevation of 5,000 feet. Cedars of a thousand years raise their heads to the heavens, and gentle breezes play in the shade formed by the feather-like leaves of the palms and tree-ferns, which spread a sombre canopy over the more humble kinds of plants. The gold and ebony coloured Cyatheæ, the Alsophilæ, and the tree-like Polypodiæ, expand their magnificent forms over the Heintzia; the brilliant purple of which, on the white base of the corolla, and the rich rosy calyx, together with the delicate dark green leaves, all are in admirable harmony with the solemnity and beauty of the scene. In such warm, moist situations the Heintzia flowers in the summer; and the fruit ripens in the dry season of winter."—*Karsten's Plants of Venezuela.*

The Situation of a Garden.—In the case of small gardens there is seldom an opportunity of selecting the situation, and therefore all that in such cases can be done, is to look to the other particulars which affect the amelioration and proper preparation of the soil for the reception and production of the crops. Suppose the spot to be open to choice. At first, many would prefer a low-lying sheltered situation, under the impression that in such places the crops would be highly favoured as to temperature, and would bring an earlier and more abundant produce. This, however, is not the case, for such situations are subject to damp, and the plants are kept too much in a continued state of excitement and growth; as a consequence of which they are more tender, and more liable to suffer injury from frosts, whether it be the severe ones of winter, or the nipping ones of the spring mornings. In such places, plants always commence growing very early in spring, and though this may seem an advantage, yet so seldom in that case do they escape the blasting influence of the keen morning's frost, that in many cases the crops are injured or lost, and in many more retarded, so as to be actually behind those produced in more elevated situations. But, on the other hand, the extreme of elevation, without shelter, is not desirable; for here, though in most cases the crops are safe from direct injury from cold, yet they in general do not progress in the ratio, nor attain to the ultimate perfection, which is desired in all kitchen-garden produce. A situation moderately elevated, sheltered on the north and east by *distant*—not *contiguous*—trees, should be selected. Nothing is better than the slope of a hill facing the south-west, backed on the north by thick plantations at a moderate distance, and sheltered on the east side by less dense and more distant belts of trees. There is a very general impression among those who are not very familiar with this subject, that the morning rays of the sun are of incalculable value to vegetation, and hence they would be led to suppose that the situation should bear more towards the east than the point already recommended. But this is not the case, and the chief circumstance which leads to a different conclusion may be easily explained. When plants at all tender are frozen, if the sun's rays strike them before they have become thawed, they suffer material injury, whereas if they are allowed to thaw in a more gradual manner, the injury is immaterial.—M.

Thinning of Fruit often makes all the difference between a fine crop and none, chiefly because the crop, when too thick, does not get all the support it ought to have, and all fails together; whereas by dint of attention and timely thinning the crop to half, or a third, or even a fourth of what there was originally, it would meet with a correspondingly improved sample, and all saved and ripened well. This should be carried down to gooseberries and currants.—G.

The Italian Cypress.—It is quite a mistake to suppose the Italian cypress too delicate for our climate. It has been neglected from want of knowledge how to treat it; but there are many fine specimens in our gardens, and the plant seems rapidly coming into fashion again. The cypress, in this damp climate, is apt to grow too fast and too succulent. To correct this, it ought to be planted on dry, hard, gravelly soil, no matter how poor, if not impervious to the roots. Further, it ought to be pruned, kept to a leader, and even headed, if it grow too luxuriantly. It is sure to recover itself. But the best way to give a good figure to the tree, which, like some others of the Conifers, is apt to divide into two leaders near the root, is to trim it up continually to one stem till it reaches the height of three, four, or six feet, after which it will go ahead and run up to a point as well here as in Italy. The mistake made is that of treating it like a bush, branching from the root upwards, as a thuja or juniper, a tendency which ought to be sedulously counteracted. These remarks, however, apply only to Conifers of the cypress and juniper sections, and of upright habit; in no way to araucarias and cedars, which are the most spreading of the tribe. The figure of a good cypress, as seen in Greece and Italy, is that of a tall evergreen poplar, rather more sharply pointed at the top while a young tree, but becoming rounder and more shaggy in character with age. The horizontal or spreading cypresses throw their arms to so short a distance, and acquire by time so near a resemblance to the habit of the upright variety, as scarcely to deserve notice as an exception. The cypress, like the stone pine, and some other Conifers, is apt to throw out, while young, an overstrong branch, which becomes a second or false leader, low down on the stem. It is to prevent the growth or predominance of such branches, that for a few years the trimming system is necessary to secure symmetry in the future tree. A cypress is a tall, graceful tree, and not to be treated like an Arbor-vitæ, or a juniper bush, throwing up a number of stems from the ground; and is as little to be assimilated to the spreading Abietinæ in treatment as the Lombardy poplar or the *Quercus pyramidalis* is to the Abele or the spreading oak of our forests.—*Gardener's Chronicle.*

The Oxalis for Winter Flowering.—Few plants repay the care bestowed on them better than Oxalises. During the cold season of the year, they decorate the rooms, the windows, and the vestibules, with their charming flowers. The small *Oxalis tricolor* is especially attractive and interesting in the evenings and mornings, by its pretty twisted corollas, striped with red and white, and at noon by its elegant open limb. This flower presents the phenomenon of reproducing its buds every night, to expand and fade with the rays of the morning sun. On the other hand, *Oxalis Bowei* has its large rosy-purple flowers; *Oxalis variabilis*, faithful to its name, gives us *grandiflora* and the variety *Simsii*, so distinct by their fine milky-white flowers. *Oxalis speciosa* shines in the midst of its companions by its bright purple corollas; and beside these varied tints, *Oxalis Emersonii*, with its fine saffron-yellow flowers, is equally effective. In the garden of the learned Chevalier M. Michel Tenore, of Naples, there is the finest and most extensive collection to be found on the Continent. They are not grown, certainly, to large and heavy specimens, being not much more than six inches high; but they are very neat, and grown so thickly that they form a sort of leafy carpet, interspersed with brilliant flowers. With regard to the culture:—At the commencement of September, the tufts or roots begin to start. They should then be separated in order to multiply them, putting three or four pieces or little tufts in a middle-sized pot; unless it is preferred to have them in a box, or anything like a large flat vase, so as the better to imitate a flowery turf. The soil should be composed of peat, leaf-mould well decomposed, and sand, giving a third part of each. It should be made light and porous, so as to allow a free admission of air. In this mixture the roots are placed, about half an inch under the surface. They should be moderately watered and removed to a warm and sheltered part of the garden. About the end of the month, the leaves will have begun to spring up. At the beginning of October, they are removed to the sill of the window which it is required to decorate. Here the essential conditions of their growth, and certain and continued flowering, are the sun or light, air, and now and then a little tepid water. From October to March and April these pretty flowers are in all their perfection. In the spring they should be removed to a cool place, where the late frosts will not injure or reach them. Even then they had better be kept rather dry than have a great deal of water. Thus the routine necessary to have these flowers all the winter is very simple.—*Ghent Annales.*

NEMOPHILA MACULATA.

Nemophila maculata, *Bentham* (spotted-flowered Nemophila).—Hydrophyllaceæ.

This is said to be the best of the annual plants collected by Mr. Hartweg, during his recent mission to California in search of new plants for the Horticultural Society. Mr. Hartweg gave it the name of *N. speciosa*, a title which has been rejected on account of its "inappropriateness," and Mr. Bentham has given it that which stands at the head of this article, but which is not, by the way, a very distinctive one, inasmuch as one of the commonly cultivated species *N. atomaria* has its flowers spotted all over with little dark-coloured dots.

Nemophila maculata is an annual plant, of a procumbent habit, like that of the well-known *N. insignis*, and the whole plant is clothed with short spreading hairs. The lower leaves are lyrately-pinnatifid, the lobes being short, obtuse, and somewhat falcate, and the upper ones wedge-shaped and three-lobed. The flowers grow from the axils singly, on stalks longer than the leaves, and are about the size of those of the large variety of *N. insignis*, whitsih in their ground colour, and each lobe of the corolla tipped with a large deep-violet botch, which, when perfect, gives the flower a showy and rather peculiar appearance. This plant attains about the same size as does its congener just mentioned, and produces its blossoms freely, so that it will prove both useful and ornamental under cultivation.

There is one circumstance which has been observed respecting it, that may be regarded as an objection; the colours are liable to sport and vary. Sometimes the flowers are veined, the veins being of a pale blue colour, thus spoiling their purity; at other times the spots are ill-defined, pale, and even sometimes run, by which the flowers lose their distinctness. To retain the species, therefore, in its beauty, the seeds must be saved from the more perfect only of the blossoms, or those in which the colours are pure and distinct; and from among these, those with indistinct, pale, or run colours, should as far as possible be removed as soon as they show themselves. It is the clear and deep-coloured well-defined spotting which gives to the true kind its beauty; the indistinctly marked plants being in every way inferior.

No difficulty occurs in its cultivation, which should be made to accord with that of the other species, which are by this time familiar objects in most gardens. As an annual it will rank in the hardy class, growing well in any

good garden soil, and perfecting seeds by which it may be continued from year to year. These seeds may be sown either in the open border, at different periods for a succession of blooming plants, or the earlier plants may be reared in pots or boxes in a frame, and transplanted into the open ground in April or May. Whether it would survive the winter if sown in the autumn, as *N. insignis* does in dry warm situations, we have had no opportunity of knowing; but coming from the same country, California, the probability is that it would, and if so, a portion should be sown in this way for blooming early in the spring.

Though an interesting, and when perfectly true, a pretty plant, it is by no means so ornamental or effective as *N. insignis*, owing to the absence of distinctive colouring, which in the latter species, apart from its other beauties, renders it a particular and universal favourite.

THE MANAGEMENT OF GREENHOUSES.

One of the principal points to look after in the commencement of a greenhouse management, is to provide near it a room or shed in which all the littering business, such as potting, cutting down, pruning, shifting, and other dirty work may be done. In this there should be a strong table, a bin with several partitions, in which particular composts should be separately kept; these to be filled with—

1. Peat rubbed through a very coarse sieve.
2. Loam from rotted turfs.
3. Potsherds, or broken flower pots of two or three sizes, kept separate.
4. Leaf-mould, being leaves that have rotted into mould.
5. Dung from a melon or cucumber-bed rotted to mould.
6. Silver sand, or very clean river sand.
7. Cow-dung rotted into mould.
8. Turfy peat, merely chopped into small pieces, of say half-an-inch to an inch square or solid.
9. Loam from the top spit of a pasture, without the turf.
10. Horse droppings rotted into mould.

But if there be not convenience for all this, or they cannot be got at, peat (No. 1), loam (No. 2), potsherds (No. 3), and dung (No. 5), are absolutely necessary, and could be made shift with. Then there should be trowels; short blunt-ended sticks of different sizes, to poke down the soil round a plant when shifted from one sized pot to another; scoops like a coal-scoop, to take up the different soils, and by which the pots may be measured as they are taken; sticks of all lengths for supports to plants in pots; flower pots of various sizes, from those called *sixties* to the largest, called *ones*. These sizes comprise wide-mouthed and uprights, between which there is very little difference in the quantity of mould they will contain, but one is formed with nearly straight sides, the other wide at the top and tapering at the bottom, and of course there is a difference in the diameter across the top; there is also a different form, and a slight difference in the measure between one pottery and another. However, as the most general, and therefore the guide for any who propose to follow our directions, the measure of the various sizes may be thus estimated, especially necessary perhaps, because some writers say three-inch, or six-inch pots, instead of sixties or thirty-twos. The measure runs thus:—

	Wide.	Deep.
Thumb pots, sixty to the cast, are	$2\frac{1}{2}$ in.	$2\frac{1}{2}$
Sixties, that is, sixty to the cast	3	$3\frac{1}{2}$
Forty-eights, forty-eight to the cast	$4\frac{1}{2}$	5
Thirty-twos, thirty-two to the cast	6	6
Twenty-fours, twenty-four to the cast	8	8
Sixteens, sixteen to the cast	$9\frac{1}{2}$	9
Twelves, twelve to the cast	11	10
Eights, eight to the cast	12	11
Sixes, six to the cast	13	12
Fours, four to the cast	15	13
Twos, two to the cast	18	14

Besides these, there should be a number of bell-glasses, of the sizes necessary for most of these pots, so that the edge of the glass should come half an inch within the edge; pruning and budding knives, and pruning pincers, a very handy instrument, by which a lady may, without exerting much strength, snip off a branch as thick as her little finger; bass matting in skeins or lengths should hang across nails all ready for use, for although the bass gets harsh and dry, it only requires wetting when used to make it tough. Everything should be ready for use without delay, for nothing is worse than to be obliged to leave a job to procure anything that may be wanting. Labels of wood or zinc of all proper sizes, and wooden ones, should be painted black, because when used they should be covered with white paint where the writing is to be placed, and a sharp-pointed stick will make a distinct mark through the white paint, showing the black underneath it; the white paint cannot be laid on too thin at the time the writing is to be done. Wire trellises for climbing plants of such sizes and shapes as are best adapted for the several species, and boxes or pans about six inches deep for the purpose of sowing seeds in, will be found requisite. A small nest of drawers for the preservation of seeds, as well for the borders as the house, and

shelves for placing things on out of the way; watering pots of various sizes; a portable garden engine or syringe with roses of various sized holes for the distribution of the water in different degrees of quantity and force. All these things are desirable, and anything short of this makes more work, although it is quite possible to do without any of them but the pots and the soils, and these, if the worst come to the worst, might be put in some corner out of doors. It is not our business to show how things *may be done;* we have shown how they *ought to be done*, and the nearer these conditions can be complied with, the better. We next come to the

CHOICE OF PLANTS.

As a greenhouse is, properly speaking, a house for the protection of plants from frost, and no more, and is the only description of house in hundreds of establishments, we look for a tolerably miscellaneous collection of different families, likely to make the best show and continue in the best health. A hundred families of plants would do well in a greenhouse, but nobody with any taste would try to grow a large number of families, but would more judiciously endeavour to grow a number of the best varieties in each family of more choice genera. And some few may be commenced with as the most eligible, while others may be left to be picked up as they may be met with and admired. The following are essential, because they can scarcely be beaten for effect:—

Azalea indica, half a dozen varieties; Camellia japonica, the same number; Geraniums, the like number; Hovea *Celsii* and *ilicifolia;* Chorozema *varium* and *rhombeum;* Acacia *armata;* Epacris *grandiflora, miniata, impressa*, and *campanulata alba*; Boronia *serrulata;* Calceolaria six varieties; Cereus *speciosissimus;* Epiphyllum *Jenkinsonii* and *truncatum;* (the three latter better known as Cactus *speciosissimus, Jenkinsonii*, and *truncatus*); Cineraria, six varieties; Orange, Lemon, and Lime; Crowea *saligna;* Cyclamen *persicum*, and *persicum roseum;* Daphne *indica odorata*; Erica, six varieties; Fuchsia, six varieties; Hydrangea; Ixia, six varieties; Tropæolum *tricolor, Lobbianum, azureum;* Crassula *coccinea* and *falcata;* Cytisus *racemosus;* Lilium *japonicum*, two varieties; Verbena, six varieties; Styphelia *tubiflora.* Although we could mention plenty more, there are already mentioned eighty-four pots, if there be only one of each variety; but these are all subjects that may rank high as rich and beautiful plants, blooming at different periods. If the greenhouse would hold more, and a lady is inclined to grow more species, instead of doubling some of these, let them be selected at nurseries according to fancy. If we had to recommend, we should say double the number of varieties of Camellia, Erica, Cineraria, Fuchsia, Geranium, Calceolaria, Ixia, Verbena, and Azalea indica; or if not the latter, have duplicates of each sort of the best six. Very few plants could be added with so much advantage to the collection, as increasing the varieties, or doubling those mentioned. We are to presume that these plants are purchased in nursery pots, and it must be taken as a general rule, that no plant must be kept in the nursery pot without examination. Our business, however, must be to take family by family, and so direct the fair cultivator, that no vast error can be committed.

STATE OF THE HOUSE.

The temperature of the greenhouse is important; a free ventilation is desirable, nay, absolutely necessary, but a current of air is to be avoided; it is as injurious to plants as to persons. Two doors opposite to each other should not be open, unless the weather is very still, and all the front windows are open also. In cold weather and when the wind is chilly, the door at the windy end should never be opened. It is better to open all the front windows in mild weather, unless the wind blows on them, when they are better closed, and the top lights let down a little. In very damp weather the fire should be lighted to dry the house, and the top lights be lowered to let out the steam. In frosty weather, when there is danger in leaving the house without fire, it should be lighted all day; and even in a frost the top lights may be down a little, but the glass must be watched, and at night, instead of making up extra fire and closing all the house to increase the temperature, have proper persons to attend, and to see that the house is not warmer, nor so warm if possible, as it was in the day. Thirty-five is high enough for the night, but few trust to it, because three degrees lower is frost; forty is, however, quite as much as it ought under any circumstances to reach at night, for there is not one greenhouse plant that does so well with fire heat as without it, if there be no frost.

There are different dispositions and habits among the families we have mentioned, but they will all do well in the same house, by giving some the coolest and others the warmest place; but care should be always taken to have the house cooler by night than by day, whenever it is practicable. Nevertheless, there will be times when the severity of the frost, with a wind to assist it, will so lower the temperature, that all the fire you can give the house may be only sufficient to keep out the cold

and prevent the temperature from going down to freezing point. As regards giving air, even in the height of summer, if there be plants in the house, there should be no thorough draught from end to end; let the top lights be down, and the front lights open, and then there is a circulation all over the tops of the plants, but no draught through them.

PLAN OF A STAGE AND SHELVES.

The front of the greenhouse is the most valuable part; a shelf along the top, just over the front windows, and under the roof, is essential, as it holds all small things that want to be near the glass. The table, or broad shelf in front, at the bottom of the front lights, should be as wide as two feet, for it is of great service for many plants that require constant care and attention; they are easily got at, they are near the light, may be turned round easily every day to prevent their growing one-sided; and this front should be wood trellis-shelving instead of solid, or instead of stone or slate; nevertheless, if it be solid, strips of lath should be laid along, an inch or so apart, so that the bottoms of the pots may not be on a flat place, so as to exclude the air from the drainage-hole. There should also be a good shelf on the back wall near the top for such of the plants as want most air and least warmth, especially for things that rest all the winter, and the main stage should be as near the glass as it is possible to construct it, due regard being had to the growth of the plants. There should not be more shade than cannot be avoided; light is essential, air is essential, and, above all, room for the free play of this air is essential; though it is pretty generally the practice to put the plants in a greenhouse as close together as possible, there ought to be as much room between them as they occupy; and the nearer you can comply with this, the better they will grow. Cleanliness is also one of the great requisites for the health of plants; dead leaves, damp corners, dirty shelves, decaying flowers, and litters of any sort are injurious: whatever the damp can hang about, is likely to produce mildew; the drawing-room itself does not require cleaning more than the greenhouse, if we intend to do the best with the plants.

WATERING THE PLANTS.

The best water for plants is rain; not a quart should ever be wasted. A tub, or a tank, should be inside the house, and the entire rain from the roof should be conducted by a pipe to the inside; nothing is more simple and attainable, nothing more valuable than a contrivance for a supply of rain-water. Next to this it is desirable to have it the same temperature as the atmosphere of the house. One-half the plants that are unhealthy have been chilled by the watering, and, in many places, where they can only get spring water, they are very unsuccessful; some do not know why, but there is no difficulty about establishing the fact. Hard water is injurious, mineral waters are often so; river water is next to rain in value, if it be soft; but even that ought never to be used cooler than the air of the house. Pond water is next to river, if there be nothing noxious flowing into it, but all of these are poor apologies for the rain-water, conducted into the house. Some caution is required in one respect; when the wood-work has been fresh painted, the water will poison anything, so that it must be turned away until it neither tastes nor smells of the paint. In the mean time, some pains must be taken to get good water. With regard to the mode of administering water, only those within reach may be said to belong to ladies' work; but it is quite necessary they should set one who understands it to do the rest, for too much or too little water is fatal. No plant should be watered while the soil is moist; but it is as essential, that when it is watered, all the soil in the pot should be moistened. There is another point that requires attention. If, while other plants are apparently dry, any one seems wet, it should be examined, to see if the drainage be free; because it will be obvious either that the plant cannot absorb so fast as the rest, or that the water has not the means of draining away; if it appear that the drainage is clogged, the ball must be relieved of the crocks or other matter put in at the bottom, and which will appear to have got the soil run among it, and fresh crocks must be put in. A plant suffers as soon from want of the supply of air, and a too great supply of water, as it does from a deficiency. The cistern, tub, or tank, being handy to draw or dip water from, a lady can use just such sized watering pot as is most convenient to handle, and go round the plants to give only such as are dry the requisite moisture, not just a sprinkle at top, but as much as will cause a surplus to run out at bottom. The earth should be examined to see if it be close to the side, if not, the watering has been too long neglected; for the first symptom of suffering, or danger of suffering, is the shrinking of the ball of earth, and if this be not noticed, the water then given proves useless, because it runs down the vacancy between the ball and the pot, and does not soak in at all.

MANAGEMENT OF AZALEAS AND CAMELLIAS.

The Azalea indica, and Camellia japonica, are as hardy as any of the greenhouse plants, and want as little labour as any, although they must have attention. When these plants

are advancing their buds towards blooming, they want abundance of water, and to be placed in the part of the greenhouse least subject to draught, or wind. They will do on the general stage, and may be, for the sake of appearance, set about in different parts, but not too near the door. They should be turned frequently, so that one front should not be better than another, and they will keep in flower a long time in perfection. As the flower goes off they begin to make their new growth; they want turning daily just as much in this period as any, for they are shaping themselves, and if left to themselves without being moved, they would assuredly grow one-sided. In the middle of June they may be taken out and placed in a sheltered spot, with plenty of room, distantly shaded from the extreme heat of the sun; and if there were a canvass house, such as tulips are grown under, nothing could be better, because they can have all or part of the air or sun according to their wants, while they can be entirely protected from those drying winds which injure every tender or half-hardy subject that is exposed to it; but, in the absence of this, we must be content with the most sheltered spot we can find in the garden. The ground should be such as the roots cannot penetrate, and the watering must be attended to diligently; nor ought a rainy period to prevent the same attention, for it will often be found that a bushy plant throws the rain entirely outside the pot, they therefore require examining in rainy weather as well as in fine. When they have made their growth complete, they ought to be placed in the coolest and driest part of the garden, and the quantity of water lessened considerably; they will want only such moisture as will keep them alive, and as they do not absorb much while at rest, this will be very little. In September you may restore them to their places in the house, first examining the balls of earth to see if their roots are matted round the sides of the pot; if so, change these pots for those of a size larger. When the plants have done their bloom and are making their growth, whatever is growing out of form should be cut off. If you want to propagate the Camellia, do it by inarching, and the Azalea by cuttings, in sand, under a bell-glass, and if you have it, in a slight hot-bed, with a little bottom heat. The Azalea and the Camellia grow best in loam (No. 2) two-thirds, peat (No. 1) one-third, and the pot should be one-fourth filled with crocks.

THE CINERARIA, VERBENA AND CALCEOLARIA.

These plants are idle and rest in the winter months, but flower a considerable time when they begin. They require a good supply of water when they begin to grow, and should be placed near the light when their flower-stems rise; when they decline their bloom, they may be parted at their roots, or their side shoots taken off with or without roots; if without, they should be potted and covered with bell-glasses, but if with roots, they may be placed in a shady spot in the garden, on a hard bottom. Strictly speaking, all three of them may be called frame plants, but the distinction is not easily defined, and they do well in a greenhouse; they may be placed on the highest back shelf in September, and will seldom require watering; but, in a good stock of Verbenas and Cinerarias, the plants need not be parted nor propagated, and the pots may be enlarged by change. Many of the plants will flower in winter and early spring. It is only the small newly made plants that need be put up out of sight, for anything that gives a flower in the winter is acceptable. Some of the Verbenas will be dwarf, others require to be supported on a trellis, but the young ones may be turned out into the borders and beds in the spring to flower the whole summer. The Calceolarias will also require supports for their main flower-stems sometimes, though those are the best that support themselves. The soil in which these plants thrive is, half loam (No. 2), a quarter cow-dung (No. 7), and the other quarter peat (No. 1), well mixed. The cuttings strike easily in pots filled all but an inch with the soil, and one inch of sand; the bottom of the cuttings should touch the soil and go through the sand, but not enter the compost, though they will send their roots into it when they strike. To grow any of these large, they must have constant shifts from small to larger pots. All dead leaves must be removed.

ERICA, EPACRIS, CHOROZEMA.

This family is perhaps the most difficult to manage, because so small a neglect is fatal. The soil in which it succeeds best is poor, at least, comparatively so, for it is easily destroyed if much excited; the compost that answers best is four-fifths or parts of (No. 1) peat, and one-fifth or part of loam (No. 2). If it happens that the peat is not sandy, it may be necessary to put sand to it, not exceeding one part. Good turfy peat is, however, generally sandy enough. This should be well mixed together, so that the roots shall find all the soil alike, and not more loamy in one part than another. This compost being comparatively poor, and very pervious to water, the greatest possible attention is required as to the watering; and this may be generally applied to soils of which the greater part or any considerable part is peat, for the water runs through it quickly, and when it is once neglected till dry, the plant suffers, if it does not die. Every time a heath

wants water too long together, some of the lower leaves turn yellow and fall. This makes so many naked stems to heaths of any size, but a worse effect is caused by giving too much, or by the stoppage of the proper drainage of the pots. The more full a pot is of roots, the more constant must be the watching and necessary watering, because the water cannot be held so long by the small quantity of matted soil as if there were but few roots. In some cases a heath may be wanting water twice a-day. The cuttings of heaths should be taken from the last produced shoots, two inches, or one inch, in some cases, long; the lower half should be stripped of the leaves, and the upper half have all left on. Get a pot of heath soil filled, all but half an inch or an inch of sand, according to the cutting; water the sand so that it may be saturated with wet, and stick in these cuttings so that they just touch the soil, but not go into it; cover with a bell-glass, water with a very fine rosed water-pot, so that the sand shall never be thoroughly dry; wipe the glass dry inside every morning; let them be in a cool part of the greenhouse, and be shaded from the sun; when they set off growing well, you may conclude they have struck root, and pot them in sixty-sized pots. They may be kept in a common garden frame all the summer, if you please, or in the most airy part of the greenhouse. Here they may be shifted as they fill the pots with roots, and require but the ordinary attention.

GERANIUMS.

The soil, for the healthy growth of this family, may be of loam (No. 2) three parts, dung (No. 7), or for want of it droppings (No. 10), or if neither can be had, dung (No. 5) one part; peat one part, well incorporated. Cuttings may be struck whenever they can be got, but the usual time for any quantity is July, when everybody cuts down the old plants. These require no care whatever. If they are put in the open border, they will strike; but those who have choice kinds will cover with a hand-glass, and place them all in the shade; when struck, pot them in sixty-sized pots, pinch out the top to induce side shoots, and leave them out of doors until September, simply changing their pots if they get too full of roots; when removed to the greenhouse, examine the roots, and, if necessary, remove them into larger pots, and place them among the other plants to take their chance. The large plants, when they have done flowering, may be cut down to such skeleton shape as shall give a chance of growing handsome; and let them remain out of doors, shifted into a size larger pot, or trimmed up about the roots to go into the same with fresh loam. In September remove them also to the house. If any of the shoots come so as to cross others, rub off those which are least wanted, to give strength to the others and keep the plant in form. If any shoots grow too vigorously for the rest of the plant, pinch off the end, and so regulate the growth in this particular, that it may be handsome. As the blooms come out they will require shading, or they will not remain long in bloom. When in flower, you do as you please with them until the flower declines, and then turn them out of doors, cutting them down again in July, putting them back into the house in September.

CEREUS, EPIPHYLLUM, CRASSULA.

These subjects take any soil better than that which has been popularly recommended. They do not require to be starved. A compost made of loam (No. 2) one half, peat (No. 1) one quarter, and dung (No. 7 or 10) one quarter, will grow them well. They want but little water all the winter, and as their buds begin to swell they may have a supply. After they have done flowering, turn them out of doors, place the pots under a south wall, or in the hottest part of the garden. In September, remove them to the house again. The Crassula may be struck from cuttings as easily as the others, and if left on the ground without inserting at all will throw down its roots sideways into the earth of itself. Small pieces, however, are generally selected, and after drying the juice, inserted in small pots, where they are treated from the first like plants, and shifted from time to time as they fill their pots. The Crassula carries its blooms on branches at the ends of the shoots; consequently, as soon as it begins to grow from a cutting, the ends are taken off to induce side shoots, and thus form a handsome bushy plant with many heads of flowers, in the one case (coccinea) scarlet, in the other (falcata) orange. The shifting is always best after the flowering is done. The Cereus and Epiphyllum require much such treatment at first. E. truncatum should be stopped until there are branches enough to hang down all round the pot, for the habit is weeping, and the flowers come on the ends of all the branches.

GENERAL RULES FOR THE MANAGEMENT OF GREENHOUSE PLANTS.

In mild weather, and during winter in particular, if there is a warm gentle rain, a greenhouse plant of any kind is greatly benefited by exposure to the air; not that it is possible to remove all the plants in a greenhouse out of doors whenever the sun shines in winter, or a warm shower comes, but it is

as well to know this, because we all have our favourite plants, and we can always put out a few of these when the weather is favourable.

Never indiscriminately water the plants in a greenhouse, because where there is a mixed collection of various families, some will be found to absorb much more water than others, and it is quite as bad to give too much as too little water. Half the plants in dwelling houses are spoiled by excessive wet, and especially where the pots stand in saucers to prevent the wet from running over the place when they are watered. In greenhouses we have seen this where ladies are very fastidious about the cleanliness of the shelves; but laudable as cleanliness may be, it is running the greatest possible risk to let plants stand in water. Occasionally examine the pots, and turn out the balls of earth to see if the roots are matting round the side, for it is the best rule for removing a plant to a pot of a larger size. If the plant is growing, it requires it more than a plant at rest; for a plant at rest should never be excited until it begins to advance of itself; besides, when a plant is set for bloom, and about to take its rest, until the buds swell, by a sudden excitement, such as being placed in fresh earth, or having too much heat or water, the bloom-buds get blighted, and the germs of the leaves and branches take up the growth, the former being unable to take the fresh supply, because flowers can only take a certain quantity, and the others being unlimited in their means by naturally extending themselves so long as there is a competent supply. The time, therefore, to examine the roots, is when a plant begins to make its growth, or at the decline of the flowers. There need be no other rule for changing pots, but the filling of the one with roots; generally, however, once in a season is enough for established plants, and that is after they have flowered, and before they make the next season's growth.

Constantly turn plants round to prevent their growing shabby on the side which is in the dark, or comparatively so; and also to prevent its making only one handsome front. All plants should be alike on every side; and although it may give some trouble, it amply repays us by the improved condition. Nothing looks worse than a plant with but one good face, and the others discoloured, or leafless, or warped. Always give plenty of room to plants; the light and air should be able to reach them all round. The best rule is to let there be just the same room between the plants as the plants occupy; but greenhouse room is so valuable, that this is rarely allowed. Nevertheless, it does not alter the fact, that the more room plants have, the better they grow; and nothing does more harm than to place them close enough to darken the backs of the rows.

If you want plants bushy and short, you must keep pinching off the ends of branches that grow upwards; but, as the perfection of a plant is to be full of branches and leaves to the very edge of the pot, this operation of pinching must begin early, even when the cutting has just struck, or the seedling, if the plant be from seed, be only three or four joints high; but those plants which grow pyramidal in form must have the leaders preserved, and should only have such branches stopped as are inclined to come too long,—such as shoot out faster than the rest.

Deciduous plants should not be watered after they drop their leaves; but when they begin to swell their buds, they may be supplied with a little moisture, to be increased in quantity as soon as they shoot out their branches.

Seeds of greenhouse-plants are best sown as soon as they are ripe. Nature points out this for all seeds; but artificial culture, or a change of climate, suggests various changes in the plan of doing many things; for instance, a tender plant may be sown in the open borders, in the spring; and as it will meet with no frost until the autumn, it is quite proper to do so; but if the seeds were sown directly they were ripe, they would come up only to be killed by the frost. Not so with greenhouse-plants: they are in a proper climate. If they come up, they will grow without interruption; and if they are in the habit of lying in the ground till genial, or, we ought to say, till warm weather, where they grow naturally, they will do the same in the greenhouse, unless the temperature be prematurely raised. In all matters of doubt, we ought to make sure on the safe side. Foreign seeds, therefore, ought to be sown the instant we get them; because, next to sowing them at the time nature herself sows them, it is well to do so as soon after as possible.

All seedling plants are the better for pricking out, or transplanting, as soon as they have three or four leaves; and the most effective of all methods is to get small-sized pots—say *sixties*—and plant the seedlings round the edge, close to the side of the pot, about three in a pot, or four, or even five, if they are small slow-growing things. They derive the greatest benefit from their roots reaching the sides of the pot.

As you may be at a loss for the soil in which a new plant grows, use a compost that everything will live and grow in, and leave to time and experience any improvement you

may make. Take loam (No. 9) which is presumed to have no dung or other exciting matter in it, droppings (No. 10), or, for want of it, dung (No. 5), peat (No. 1), and leaf-mould (No. 4), in equal quantities; and if it be too adhesive, take half a part of sand to make it more pervious to water, or at the most a whole part. Mix these well together. It will suit everything a little; and if the plant does not do all you wish, you can at least grow it well enough to get cuttings from, and try them in lighter, poorer, or richer composts; but as we know camellias, geraniums, heaths, and succulents, will grow in it,—and these are very much opposed in their natures,—it is fair to presume that any plant will grow in it enough to answer the temporary purpose of saving it to grow others from. Keep all shelves free from wet and dirt; have grooves cut along the middle of them, for the water to run along, instead of dripping off along the edges, and provide for the drip at the end, so that it does not make any mess, or dirt, or litter, at the part it runs down.

Provide, if possible, the means of shading the greenhouse in any hot or bright weather, as, in the spring, when the azaleas, hoveas, and many other fine plants are in bloom, a few hours' sunshine would shorten their duration some days. A canvass roller-blind outside is very easily contrived; or a thinner blind of calico, or some such material, inside, would have as good an effect, and be somewhat lighter. But shade from the excessive heat of the sun will make several weeks' difference in the lasting of the blooms. It must, however, be recollected, that, as whatever excludes the light in any part of it is an evil,—and, therefore, shading a choice of evils,—the blind must not be down an hour more than necessary.

When the bloom of a plant is over, you have to make up your mind whether you intend it to seed or not. If not, pick off all the remains of flowers, that the pods may not swell; for the seeding of any plant stops, in a great measure, the growth. If it be past the middle of May, you may turn a plant out in a sheltered part of the garden, for want of better accommodation; but if you can give plenty of air in the greenhouse, and shade from the extreme heat of the sun, plants may as well complete their growth in the house as not; for it is not desirable to expose them too much, nor do the lovers of plants like to see the greenhouse empty.

As camellias and azaleas, cactuses, epiphyllums, and many other subjects, are turned out to harden their growth and get the benefit of air in summer, the greenhouse may be supplied with annuals. Balsams, cockscombs, clintonia, salpiglossis, rhodanthe, and other tender annuals, may be sown in a hot-bed in March or April; and, although they require particular treatment for large specimens, may be planted out in pots, and grown still in the hot-bed, until the time they are wanted to supply the shelves of the greenhouse.

In August, everything ought to be cleared out, and the roof of the greenhouse should be well syringed; all the dirt washed from the glass, the walls, posts, shelves, and every part. Cleanliness is everything with plants; and the house should be thoroughly clean before the plants are put in for the winter. Nor is it at all a bad precaution during the period that it is empty, and before the syringing, to fumigate it well with tobacco, and afterwards with sulphur. The one will kill everything upwards, the other anything downwards. The syringing should be done with such force as to drive everything out of the corners.

When the plants are taken into the greenhouse, let the surface of the earth be stirred, the pots cleared from anything that they may have attained in the way of dirt, snails, or vermin, or anything that will cling to the outside or in the holes at the bottom.

Let the paths and floor of a greenhouse be kept dry and clean: it ought to be a paved floor, or a concrete, or some other impervious to wet; and provision should be made for the running off of all the water that may fall to the ground; for if the ground absorbs wet it too often engenders mildew.

Plants should never be trusted to the open air before the middle of May, nor remain out after the middle of September. All before or after this is running a considerable risk.

Grapes may be grown in a greenhouse, if the growth be confined to a branch for each rafter to fruit, and the shoot which is trained alongside of it for the next year's bearing. This does not materially exclude light, but any more would be injurious; and even this must not be attempted if the shelves are to be filled after the present crowded fashion, in which the plants touch each other, and form a complete shade for the backs of the whole. The Sweetwater and Black Hamburgh are the only sorts which should be tried.

Hot-water pipes are the best means of warming a greenhouse in winter-time, but better avoid lighting a fire as long as possible. Mats hung up in front are a great protection to the plants, and that is always the coolest part of the house; but when the glass is down to thirty-five, there may always be expected a frost in the night, or at least it should be provided against. The man who looks after the fires should be on the alert, and the mats in front should be always hung up in doubtful weather, because it is little trouble, and does no harm to the plants.

TREES AND SHRUBS FOR FENCES.

(*Excepting the Hawthorn.*)

BY THE LATE JAMES GRIGOR OF NORWICH.

Having had considerable experience in the formation of hedges under every variety of circumstance, and in all descriptions of soils, I proceed to lay before the public the result of my practice, passing over, agreeably to the conditions, the common Hawthorn, a plant which is universally known in the construction of fences.

I shall enumerate the kinds according to their importance as fence plants. This importance I measure by the variety of soils and situations in which they thrive, their rate of growth in a given time, their rigidity so as to withstand pressure, their branchiness so as to cause shelter, and their durability. Agreeably to this plan, then, I begin with the

Black Sallow (*Salix caprea*). — This tree, which is frequently called the Goat willow, is not generally known or cultivated; but it has of late years attracted notice in some districts as a plant which successfully withstands the effects of the sea air. It is, however, destined to accomplish a great deal in inland situations in the shape of hedges. I have seen it in every description of soil, except peat moss—on dry hard gravel very much exposed, by the side of rivers where there is an excess of moisture, and on all intermediate soils and situations with the single exception referred to. Its chief merit, perhaps, is that it forms a protection *at once*. From the day on which it is planted, it becomes entitled, so far as security of property is concerned, to take its place with a hawthorn fence of seven years' standing. These facts I gather from a hedge of this tree now growing on my own ground; and in order that I may be clearly understood, I shall give the details of how it was formed. My first trial with this tree was with small cuttings of fourteen inches in length, placing them at about nine inches apart from each other. Those grew well, but the fence so formed is not strong enough, and gives way when subjected to pressure. In order to have a rigid framework at the commencement, I procured a waggon load of strong strait rods, six feet in length, and about one and a quarter inch in diameter at the lower end. Those I planted

in the autumn, fourteen inches deep, in the way here indicated—tying them tightly together with willows at each intersection, which prevents their rubbing against each other during high winds, and adds greatly to their power of resistance As soon as planted, they were sufficiently strong to keep in cows, sheep, &c. The first year they made shoots about nine inches in length, those shoots being very regularly disposed over the rods, and not, as might have been expected, on the tops of the rods only. It is of importance to observe here that the more slanting the shoots are placed, the more regularly will the buds break all over, and that if set perpendicularly, or nearly so, they can scarcely be made to assume a hedge-like character, strong leading shoots rising from the tops without sufficient spray underneath. It is also of importance to observe that the shoots, of a necessary thickness and straightness, can be only had from stools grown and treated in the same way that the underwood throughout England is managed; that is, when hurdle-wood is the object. A plant of a few years' standing is cut down in autumn close to the ground: in spring it sends up several straight vigorous shoots eight or ten feet in height: these are allowed to remain three years, when they undergo the same process by being cut down. Without such a nursery, the proper materials for this kind of fencing cannot be had. The great value of this tree consists in its adaptation to almost all soils and situations, and particularly in its being available at once as a protection, which is not the case with any other tree. It would grow freely as a fence-plant throughout the highlands of Scotland, if a trench were opened for the rods, and the soil properly loosened at bottom. This description of fence should be trimmed or clipped every season during the month of June: a second growth will follow the dressing at this date, which will considerably thicken the spray; and in situations near to dwellings, &c. the fence had better be reduced to an even and uniform outline in the latter part of October, which will also tend to its closeness and beauty.

2. The Scotch Pine (*Pinus sylvestris*). This tree triumphs over a great variety of soils and situations, and perhaps it no where more forcibly shows itself adapted to the most barren and exposed districts than in the north of Scotland, on the left hand side of the Grantown road, before reaching the Dava Inn, on the property of the Earl of Seafield. In this particular district, it forms the only species of tree to be seen; and I refer to it in this instance to show what use might be

made of it in similarly situated districts as a fence plant. The best examples of it, in the shape of a hedge, are in Suffolk, where it skirts the highway for miles between Thetford and Newmarket, and where it is made to assume all the uniformity and smoothness of our twiggy hedge-trees. Three or four-year-old plants should be used, but on no account should they be taken unless they had been transplanted during the previous year in the nursery, for otherwise the roots are hard and bare. They should be placed six inches apart from each other, and the pruning may be safely deferred till the second year after planting. It will be five years before this fence reaches the height of five feet, when it will present a complete barrier to cattle, and an excellent shelter to surrounding crops. This sort of hedge should be allowed to spread itself out at bottom to the distance of two feet on each side, otherwise the branches become unmanageable and refuse to throw out small spray. The chief situations which I should recommend for this description of fence are those exposed and poor districts capable of improvement in the highlands, and on all poor lands in the lowlands. Though it will grow tolerably in unprepared ground, it is by no means insensible to kind treatment, and I would strongly recommend a trench to be opened for the plants, and the soil loosened to the depth of two feet. The consequence of this is, that a hedge will be formed two years sooner than by planting without any preparation. A fence of this description in my ground (two-year seedling plants having been used,) was formed two years' since, and it now averages the height of two and a half feet. The soil on which it grows is a loose red gravel.

3. The Larch (*Larix europæa*).—My opinion of this tree is that it nearly equals the Scotch pine in every respect excepting warmth in winter. In planting a hedge of this description, care should be taken to use those plants only which stood thinly in the nursery lines, for if those which had been crowded together be planted, a serious difficulty will present itself in causing the plants to feather close to the ground. It will be readily answered by some, "Cut off the tops and then they will be sure to spring at bottom." I find, however, that this does not answer, the strong leading shoots being indispensably necessary to give rigidity to the hedge. The plan, therefore, is either to use two-year transplanted plants, which are well branched at bottom, or to have those of a younger age, which always break out well when free on both sides. I hold it as indisputable that the leading shoots of a larch fence should not be cut till the fourth year, before which time I have never seen one with the necessary "bones and sinews." Though it will grow in almost all soils, it must not be expected that the larch will in all situations wear that beautiful green which distinguishes it in loam and clay, or on the slopes of hills; and in the shape of a fence it will be found to display considerable diversity in height and vigour, according to the differences of soils; but this may be in a great measure avoided by helping the weak parts with a little *well-rotted* manure dug in about the roots. There is one advantage which the larch possesses over every other hedge plant, and that is, that grass will grow close up to it, and that though the roots impoverish the soil, the leaves or shade of this tree is not hurtful to pastures. Until it is completely formed, the larch should be clipped during the latter part of June, and again in November; but after the fence is complete, a trimming at the latter date will be sufficient.

4. The Lombardy Poplar (*Populus fastigiata*); and The Box-thorn (*Lycium europæum*).—The former is a very fast-growing tree, but is not very lasting. When subjected to the hedge-bill, it throws out thick clusters of spray, which, though not very regularly disposed over the surface, are yet calculated to produce considerable shelter. The more common sorts of honeysuckle are often intermixed with it when planted as a hedge, and together they form a tolerably good fence. Instead of the honeysuckle, however, a much better substitute is to be found in the box-thorn, which grows rapidly, is very hardy, and frequently bears spines like the hawthorn. This box-thorn will grow anywhere, and is most readily propagated by cuttings. Throughout England, it is very currently called the tea-tree, a name which it has acquired through a very trifling circumstance,—the label belonging to a tea-plant having been put on to this tree by mistake, and forwarded, along with other plants, to one of the Dukes of Argyle, who, it appears, had one sent to him before it was generally known. It does not grow sufficiently close to choke and eventually overcome the poplars with which it is mixed; so that a fence of this sort will last for many years, and bear the hedge-bill extremely well. Some recommend the box-thorn as a hedge by itself; but this can only apply to gardens where it is not exposed to stock, &c. In the fields, it will certainly prove a failure if used alone. The cuttings of the box-thorn should be planted in the autumn, after the falling of the leaf.

5. The Beech (*Fagus sylvatica*).—No tree makes a better fence than the beech; but it restricts itself to arable and pasture lands; and on these even, it will not grow freely

unless the soil is prepared. In rich ground, it should be planted in preference to the hawthorn, for it grows very rapidly, is very beautiful in summer, and, in such situations, retains a great proportion of its leaves during winter. In order that it may be safely trusted where cattle are grazing, a double line of plants, eighteen inches apart, should be inserted, and these ultimately form a strong framework on either side, sufficient to resist the attacks of any description of live stock. In poor peaty soils, or on high exposed districts, it will not grow well; but around homesteads, and the fields adjoining, it certainly deserves more general cultivation. The time for trimming the beech is the month of October; but neat workmanship cannot be performed, in this instance, without the hedge-shears. The proper plants to be used are such as have stood in nursery-lines for two or three years. In the fence-lines, they should be placed at about one foot apart; and if well-rotted manure is used, it will materially hasten their growth.

6. The Sloe-thorn (*Prunus spinosa*).—This is one of the few plants that will grow tolerably well in sand, and in heath land where there is a considerable portion of peat-soil. It rises naturally throughout England, but is very rarely cultivated in Scotland, though it is unquestionably hardy enough to grow there. In good soils, it is a rapid grower, forming strong spines, and lasting as long as the hawthorn. It is very important to bear in mind that all blackthorn plants used in hedges should be raised from seeds, and not from suckers, as, in the latter case, the roots spread throughout the adjoining lands, and threaten to overrun whole fields. When seedlings are used, this does not take place, except in rare instances. The berries are ripe in November, when they should be gathered, and laid in a heap of sand, and mixed with it frequently during winter. They should be sown in the month of February, or early in March, during open weather, and covered fully an inch in depth. In the seed-beds they may remain two years, then transplanted in lines fifteen inches apart, and about three inches from plant to plant. In the nurseries, seedling plants may be had at 7*s.* 6*d.* per thousand, and those ready for fencing at 12*s.* 6*d.* per thousand. In all cases where the subsoil is unbroken, the hedge-line should be trenched, and the plants inserted six inches apart from each other.

7. The Crab, or Wild Apple (*Pyrus Malus*).—The proper plants of this tree for hedge-fencing, are such as have been raised from wildlings, or the true crub,—such as are grown from the seeds of grafted apples being frequently spineless. Three objections have been urged against this tree as a fence-plant: its high price, its liability to insects, and its refusing to grow freely except on sandy loam. The first may be safely pronounced a mistake; for, on taking up any respectable nurseryman's Catalogue, it will be found that the price for suitable plants is from 15*s.* to 1*l.* per thousand,—a rate very little higher than that demanded for white thorn. In some seasons, it is certainly liable to be attacked by caterpillars; but beyond the unsightly appearance which ensues, there is but little harm done. Its love for deep loamy soil, and for no other, is certainly correct; but it should be remembered, that when it meets with such, it excels all other hedge-plants as a free grower, and as a stubborn, lasting fence. Those plants which are sold about 1*l.* per thousand may be placed eight inches apart from each other; and such as are stronger, at one foot from each other. When the plants are inserted, they should be all cleanly topped with a sharp knife, at about four inches from the surface of the ground; and if the soil is properly manured, they will send up, during the first year, luxuriant shoots a foot or two in length.

8. The Alder (*Alnus glutinosa*).—I have proved beyond any doubt, that, if the land is sufficiently loosened, this plant will grow very freely in peat, sand, and in the worst description of soils. The usual impression is, that it is suited only to bogs and damp meadow-land; but I have no hesitation in stating that this is by no means the case: in trenched land, by the sea-side, and in the most exposed districts, it thrives luxuriantly. As a hedge-plant, it is rough and uneven, not willing to lose its form as a tree; but after it has been moulded for a few years, it makes a very good fence, and sends out small spray much denser than might be expected. Young plants, such as have been transplanted for one or two years only, are better than old ones; for the latter are generally devoid of branches at bottom,—a defect which is not easily remedied. Suitable plants may be obtained at the nurseries for 15*s.* per thousand. They should be placed six inches apart from each other, and trimmed every year, in September, with the switching-hook.

9. The Spruce (*Abies excelsa*).—In one description of soil—that of a damp loam—no tree excels the spruce as a fence-plant. It will grow well, for a few years, in any kind of land; but in shallow soils, such as sand and gravel, it will soon become stunted, assuming a yellowish hue, and losing its under branches. This last circumstance renders it very unfit for being used generally. However, in all situations which are inclined to be damp, and especially in those with a north-east aspect, it will assume, and retain for many years, a

closeness and luxuriance not excelled by the yew or box. I have always found that it is good policy to allow a fence of this description to occupy at least two feet in width at bottom, the side branches being strong, and a narrower space being insufficient to allow them to develope themselves. Two-year transplanted plants may be placed a foot apart from each other; and if any manure is to be added, it must be very well rotted,—all the individuals of the Coniferæ having an aversion to fresh manure. The universal practice, so far as I know, is to trim this sort of fence with the hedge-shears,—a process which well repays a little extra labour. This may be done in the month of August or September. The price of plants in the nurseries is from 12*s.* to 15*s.* per thousand.

10. The Elder (*Sambucus nigra*).—In all situations which are found too damp for the hawthorn, the elder may be planted with every prospect of success. It is wrong, however, to restrict it, as is generally done, to swampy districts. Wherever the soil is loosened to the depth of twenty inches, it will grow freely. I have seen it flourishing on the tops of hills amidst sand and gravel; and not the least of its services are performed in the shape of hedges by the sea-side, where it forms an excellent protection to plants which, without its shelter, would not grow there. In trenched soil, cuttings planted towards the end of October will answer almost as well as rooted plants; but in untrenched land it is advisable to have the latter. For the first three years an elder fence should be cut only once every season; but afterwards this may be done twice—in June and October, which will have the effect of inducing it to send out thick spray. Plants may be inserted at a foot apart from each other, and cuttings at half that distance. Two years' transplanted plants are sold in the nurseries at 1*l.* 10*s.* per thousand.

11. The Barberry (*Berberis vulgaris*).—I know of no description of soil in which the barberry will not grow. It is true, it dislikes bogs saturated with water; but here it is the excess of moisture that offends it, and not the soil. On chalk, peat, and sand, it is an unflinching grower. On loamy lands, with a calcareous subsoil, it is one of the best of hedge-plants, growing so rapidly, that in the course of three years it makes a good substantial fence. On the very poorest description of soils its branches are occasionally found decayed; but strong living shoots invariably supply their place, so that there is never found an absolute break in the fence. A prejudice exists against this plant, on account of its supposed influence in causing blight and mildew; but it is well known that the fungus which infests this tree is an Æcidium, whilst the blight on corn is an Uredo; so that there is no danger whatever in bringing it in contact with wheat-fields. It is to be hoped, therefore, that a plant so very useful, and triumphing over so many bad soils, will be brought into more general cultivation. Though it will well repay every attention that can be bestowed in the preparation of the soil, manuring, &c. it never refuses to grow though indifferently treated. The plants should be placed about nine inches apart from each other, and trimmed afterwards with the hedge-hook. From the natural denseness and bushiness of its roots, it is by no means necessary to use transplanted plants: well-grown seedlings, two years old, will answer equally well; and those may be had in the nurseries at 10*s.* per thousand.

There are a few other plants which might be enumerated as fit for hedges; but my experience concerning them is not sufficient to warrant my speaking of them in detail. I think it is probable that the buckthorn (*Rhamnus catharticus*), will soon be adopted as a fence-tree; but at present, the demand being limited to the species as fit for shrubberies only, it would be difficult just now to get it in sufficient quantities for the former use.

GARDENING MEMORANDA FOR DECEMBER.*

This month we ought to treat everything as if it were a continued October and November. All the planting and ground operations that are not completed, should be persevered in, and no time be lost. The pruning of vines, wall trees, and standards, should be done as soon as possible, and all that require it be nailed fast to their proper places. The removal of fruit trees may go on. The making of new walks, beds, clumps, shrubberies, and gardens, must be hastened, and it is perhaps the best time of the year to drain where draining is necessary or desirable. Ornamental water may be formed or altered, excavations of lakes ought to be accompanied by the formation of hills, and if there be bold rock work imitated next the water, it aids in the general effect of a good landscape. Litter should be provided for all the crops, flowers, and plants that require it; half-hardy, or tender plants, put out of doors, should be protected with mats, tan over their roots, or a complete case, according to their nature. In bad weather, find work under cover; there are always plants

* A very elaborate and complete Calendar of Gardening Operations for December is published in No. 36 of the Horticultural Magazine.

in some of the houses want putting into larger pots, cuttings or seedlings to pot off, crocks, labels, or flower shrubs to prepare, seeds, bulbs, and tubers to examine, and various other things to do that we might neglect doing in fine weather. This seems inevitable. In frosty weather when the ground cannot be worked, collect manures, such as peat earth, sand, loam, cow and horse droppings, poultry dung, &c. But unless the frost is very hard indeed, many ground operations go on as usual. Then there is the job which we seem never to have done, though always at it, the pruning of trees, shrubs, and vines. The standard trees of an orchard would find work for any number almost to do them justice, and rarely do any gardeners attempt it; they are content with blighted stunted fruit, when they might have it fine, and would rather see them all manner of bad shapes, and the fruit out of reach to require shaking down, and bruising and spoiling, than get up and cut away the useless wood and shorten the height, so that the fruit might come large and be all within reach. We could almost write a chapter on this shamefully-neglected subject. The rest of the duties of this month depend chiefly on the weather, but all the precautions against frost, cold winds, heavy rains, snow, hail, and stormy weather in general, should be taken at night, as if some of these visitations were certain. The taking of plants into the greenhouse, stove, or forcing-house, to bring them forward, is almost a routine business, and a general rule against watering much, applies through all the winter months.

THE TEMPERATURE AT WHICH PLANT-HOUSES SHOULD BE KEPT DURING DECEMBER.

The Greenhouse.—From 40 to 50 degrees by day, and from 36 to 40 degrees at night, or just safe from frost.

The Conservatory.—About 55 degrees by day, and from 45 to 50 degrees at night.

The Plant-stove.—About 60 degrees by day, and about 50 degrees at night.

The Orchid House.—The warm, or Indian house, 65 to 70 degrees by day, and from 55 to 60 degrees at night. The cool, or Mexican house, 60 degrees by day, and 50 degrees at night.

METROSIDEROS ROBUSTA.

METROSIDEROS ROBUSTA, *Allan Cunningham* (robust Metrosideros).—Myrtaceæ § Leptospermeæ.

This is a fine robust evergreen shrub under cultivation, acquiring, in its natural condition, the size of a large tree, "not unusually attaining the height of eighty feet." It, however, blooms under cultivation when not more than a yard high, and may be had from that size up to the largest that can be conveniently accommodated in a greenhouse. It is a New Zealand plant, and is called by the New Zealanders, *Ratu*. The wood is very hard and durable, owing to the closeness of its grain, and hence it is found a valuable article in the construction of agricultural implements, and in ship-timbers, &c.

It forms an evergreen shrub of robust

habit, branching repeatedly in a forked manner, which gives rather a singular appearance to the arrangement of the young branches, most particularly observable on young or moderate-sized plants. The leaves are opposite, of a neat oval or elliptic figure, and quite flat; they have, moreover, a rich aromatic odour. The flowers, which are scentless, grow near the end of the shoots, in smallish dense clusters, and consist of a cup-shaped green wavy disk, surrounded by a ring of long crimson stamens, the thread-like filaments of which form the conspicuous portion of the flowers of this group of plants. These flowers are produced freely in June, at which season the plant is very ornamental; its neat evergreen foliage rendering it at other times cheerful and pleasing.

It was introduced from New Zealand to the garden of the Horticultural Society, by J. C. Bidwill, Esq., in 1845, under the name of *Myrtus robusta*, under which appellation it is now sometimes met with in other gardens.

It is a desirable shrub for a conservatory or for pot-cultivation in a greenhouse where there is space for vigorous growing specimens. The soil in which it should be placed is a mixture of equal parts sandy loam and peat earth, rendered porous, if need be, by the addition of silver sand. The pots should be well drained, and of tolerable size; or, in other words, the plants should not be too much cramped for pot room, at least until they have grown enough to form themselves into handsome bushes, when a more restrictive treatment may keep them for a longer period within bounds, and also induce a more general production of blossoms. It does not at any time require a high temperature, that of a greenhouse being quite sufficient for it. Like other similar subjects, it must be propagated by cuttings of the partially matured young shoots, planted in sand, and placed under bell-glasses in a situation where there is a slight degree of bottom heat afforded them. The early spring season is the most generally suitable for this operation. When the cuttings are rooted, they should be potted singly into small pots of the same kind of soil already recommended, made rather more sandy than usual; the pots must be well drained. They should at first be placed in a close frame where there is a *very slight* degree of heat to start them afresh into growth, after which they should be gradually exposed to bear the atmospheric conditions of an ordinary greenhouse, and may take the ordinary treatment of young hardwooded greenhouse plants. Being in small pots, they should be kept well supplied with water; and should be transferred from time to time into larger pots, as their roots become numerous. From the first, too, the young shoots should be frequently topped to produce a dwarf bushy habit.

ACCLIMATIZING.

So much unmeaning and speculative writing has been published on acclimatizing, that it is almost impossible to command attention to anything that touches on the subject. We have always repudiated the idea of making one degree difference in the capacity of a plant to exist in cold; and, although Sir Joseph Banks has written somewhat plainly on the subject, he has made a distinction between the plant itself and seedlings bred from the plant. It would be ridiculous to question the fact of seedlings being more hardy than the parent plant; every day's experience shows us that seedlings differ in some degree from the parent. Some flower earlier, some later: some are more hardy than others; but the capacity of the plant once settled, which it is as soon as it exists, nothing could make it live through a greater degree of cold than it would bear when it was first matured. Sir Joseph Banks took a right view of some portions of this subject. We agree with him that—

"Respectable and useful as every branch of the horticultural art certainly is, no one is more interesting to the public, or more likely to prove advantageous to those who may be so fortunate as to succeed in it, than that of *inuring plants, natives of warmer climates*, to bear, without covering, ungenial springs, chilly summers, and rigorous winters. He says, too—"Many attempts have been made in this line, and several valuable shrubs that used to be kept in our stoves, are now to be seen in the open garden; *there is, however, some reason to believe, that every one of these was originally the native of a cold climate*, though introduced to us through the medium of a warm one; as the gold tree, Aucuba japonica, the Moutan, Pæonia frutescens, and several others have been in our times."

He says, too,—"In the case of annuals, however, it is probable that much has been done by our ancestors, and something by the present generation; but it must be remembered, that all that is required in the case of an annual, is to enable it to ripen its fruit in a comparatively cold summer, after which, we know that the hardest frost has no power to injure the seed, though exposed in the open air to its severest influence; but a perennial has to encounter with its buds and annual shoots frosts that have sometimes been so

severe with us, as to rend asunder the trunks of our indigenous forest trees."

Annuals are no more susceptible of change than perennials or biennials. The seedlings of anything and everything are more or less changed from the parent in some peculiarity. Therefore, what is attributed to annuals, may, with equal propriety, be attributed to all seedling plants. Nobody will dispute these changes. It might be years before any of these seedlings became more hardy: perhaps in some families they never would. The potato and dahlia seem as susceptible of injury from frost as ever; for though one may seem a little less injured than others on particular occasions, none have approached to what may be called hardy. We have no doubt that, if on the appearance of a plant that stood frost better than the rest, the seeds were perseveringly saved; and the same thing observed from time to time, a step in that path might frequently be gained; but there are hundreds of subjects which, though perpetuated by seeds from year to year, have not been noticed as to that one point, and therefore to this day are no better. Sir Joseph Banks gives one or two instances of plants becoming more robust after a few years' succession of seeds; but the conclusion must not always be drawn from first appearances: cause and effect should be more minutely examined. He says:—

"In the year 1791, some seeds of Zizania aquatica were procured from Canada, and sown in a pond at Spring Grove, near Hounslow; it grew, and produced strong plants, which ripened their seeds; those seeds vegetated in the succeeding spring, but the plants they produced were weak, slender, not half so tall as those of the first generation, and grew in the shallowest water only; the seeds of these plants produced others the next year, sensibly stronger than their parents of the second year.

"In this manner the plants proceeded, springing up every year from the seeds of the preceding one, every year becoming visibly stronger and larger, and rising from deeper parts of the pond, till the last year, 1804, when several of the plants were six feet in height, and the whole pond was in every part covered with them as thick as wheat grows on a well-managed field.

"Here we have an experiment which proves that an annual plant, scarce able to endure the ungenial summer of England, has become, in fourteen generations, as strong and as vigorous as our indigenous plants are, and as perfect in all its parts as in its native climate."

With great deference to Sir Joseph, we do not think there was any proof whatever that the plant was scarcely able to endure the summer, and has become, in fourteen generations, as strong and as vigorous as our indigenous plants are, because, for all we can see, the plant was already so. The very first seeds that were sown, grew and produced strong plants, which ripened their seeds; therefore there was no indication of tenderness, nor is there anything extraordinary in the fact, that the seeds so ripened came up weaker than imported seeds, nor in their gradually improving. It is well to point out seed-saving and sowing as the only means of procuring from a tender plant a race of hardy ones; but it is a fallacy to look upon success as a matter of course. The offspring must be examined, and any single plant which stands frost better than the rest, should be alone saved from, because it is by trifling degrees that we can produce such changes, and, we fear, not to any great extent under any circumstances. The following does not say much either for the accuracy of the author's conclusions or the depth of his inquiries upon the subject; but the conclusion is the same as our own; for we insist that it is impossible to alter the constitution of a plant, though it is not impossible to raise new ones more hardy than the present. Sir Joseph says:—

"Some of our most common flowering shrubs have been long introduced into the gardens; the bay-tree has been cultivated more than two centuries; it is mentioned by Tusser, in the list of garden plants inserted in his book, called 'Five Hundred Points of Good Husbandry,' printed in 1573.

"The laurel was introduced by Master Cole, a merchant, living at Hampstead, some years before 1629, when Parkinson published his 'Paradisus Terrestris,' and at that time we had in our gardens, oranges, myrtles of three sorts, laurustinus, cypress, Phillyrea, Alaternus, Arbutus, a cactus brought from Bermuda, and the passion-flower, which last had flowered here, and showed a remarkable particularity, by rising from the ground near a month sooner if a seedling plant, than if it grew from roots brought from Virginia.

"*All these were at that time rather tender plants;* Master Cole cast a blanket over the top of his laurel, in frosty weather, to protect it; but though nearly two centuries have since elapsed, not one of them will yet bear with certainty our winter frosts.

"Though some of these shrubs ripen their seeds in this climate, it never has been, I believe, the custom of gardeners to sow them; some are propagated by suckers and cuttings, and others by imported seeds; consequently, the very identical laurel introduced by Master Cole, and some others of the plants enumerated by Parkinson, are now actually growing in our gardens; no wonder, then, that these original shrubs have not become hardier,

though probably they would have done so, had they passed through several generations by being raised from British seeds.

"Is it not, then, worthy a trial, *as we find that plants raised from suckers or cuttings do not grow hardier by time*, and as the experiment on Zizania points out the road, to sow the seeds of these and such like tender shrubs as occasionally ripen them in this climate? Fourteen generations, in the case of the Zizania, produced a complete habit of succeeding in this climate, but a considerable improvement in hardiness was evident much earlier."

This is not quite so clear and intelligible as it was meant to be; and while we agree with the author as to his conclusions, we deny that he has at all made out a case with regard to the Zizania; for it grew and ripened seeds the first year, and it did no more at the end of the fourteen. Sir Joseph Banks is an additional authority for our conclusion, that it is impossible to acclimatize plants; and all the writers who assert the contrary, expose their ignorance of the science they profess to advance. There is only one course—the originating new races from the seed.

THE PROGRESS OF FLORICULTURE.

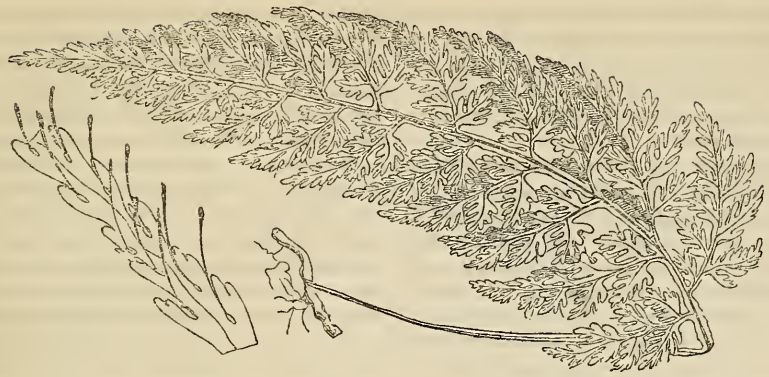
The progress of floriculture during the year 1848 has been greatly retarded by a number of circumstances that tend to lower the standard by which flowers are judged, and we can hardly imagine anything more likely to retrograde, than a continuance of that carelessness of results, which has been manifested by those who take the lead in such matters. The circumstances to which we allude are, first, the abandonment of second-class prizes, the effect of which has been that judges have been obliged to reject good second-class flowers altogether, or give them first-class prizes, and have chosen the latter; second, a carelessness in the appointment of judges at horticultural shows, by which the proper fate of many subjects submitted for exhibition has been reversed; third, an inordinate desire to put out a certain number of new subjects every season, instead of confining the novelties to things really in advance of the present varieties; fourth, a decided and persevering endeavour to counteract the prevalent disposition of the public to select flowers according to the properties which are acknowledged by the best judges to constitute perfection. We will explain these causes in rotation. First, the abandonment of second-class prizes, which ought to have had the best possible effect, and was originally determined upon to raise the quality, has failed, only because the judges have not had nerve enough to carry out the object properly. The intention of those who abandoned second-class prizes was to discourage second-class flowers, and for a time the effect was good. The hopelessness of obtaining a prize deterred people from bringing them, and as the public sought only first-rate novelties, there was no sale for any other. We soon observed, however, that the raisers of flowers who happened to have nothing first-rate, and half-a-dozen or more very fair second-rate ones, were annoyed if they had no prize; and, considering that it made fifty or a hundred pounds difference in the value of a flower, it is not to be wondered at. Yet it was the only way to keep up the high price of novelties. We foresaw that the instant the raisers could make head against the new movement, there would be a change, because the properties that constitute perfection, and the blemishes which excluded a novelty, rendered first-class flowers few in number, and none others would sell. To lower the standard, then, was the only way to get over it, and this has unfortunately been done, though not nominally. Among the means adopted to accomplish this, the most powerful was a reduction of the number of flowers required as a test. In dahlias there is no dependence the first year, consequently they are grown a second season to prove them; and as all raisers, when they grow them a second year, plant out twenty or thirty plants, it was considered by the leaders in the adverse movement that not less than six blooms should be exhibited. This alone was a great protection to the public, because, independently of any merit in the flower as to form, colour, and symmetry, there must be some chance of getting a flower when half-a-dozen are shown. In the struggle to advance on the part of the true florist, and to retrograde on the part of the less scrupulous dealers, the latter have for the moment got the upper hand, and last year the test applied to flowers, of which, as we have already said, few plant out less than thirty, was reduced to half the number. What was the consequence? Why, that fifty varieties that could not have been exhibited at all while the test required six, were shown for prizes, and never will be shown again, by reason of their uncertainty, or, if shown, will give a bloom by accident; for it must be conceded, that if six flowers cannot be produced from thirty well-grown plants at any part of the season, the uncertainty is too great to justify letting the variety out at all. In consequence, therefore, of only showing three blooms, fifty or more that would not yield half-a-dozen specimens, were not only produced to compete with the few that would, but actually obtained prizes. It was worthy of remark, too, that the prevailing fault was imperfection in the eye and

general centre of the flower, than which nothing can be worse, and we need hardly say that if three blooms could not be obtained with perfect centres, a variety should not by any means be noticed at all. But the judges, seeing more seedlings shown than ever had been seen at once before, felt that they must award a few prizes, and so they did, but in vain might they have looked for any that deserved such notice. There were very few that came up to mediocrity, none that passed it. The show at which these novelties were exhibited, was entirely influenced by the growers, and there were many first-class prizes awarded to flowers that will rarely be seen in a stand, and if they are, they will disparage it. What we are now saying of the Dahlia applies to every other flower, and we select this particular subject, chiefly on account of its popularity and dearness, for although it is grown less generally than it was at one time, there are still some thousands of pounds change hands every year. The public will this year, or rather next year, have a hundred-and-fifty varieties called new, and charged for as new, with such tempting descriptions that enthusiasts will be puzzled to select the best, and if they were to buy and grow all, the chances are that they would not retain half-a-dozen, certainly not a dozen, the second year. Of those which have had prizes at the different shows, very little that is at all favourable can be said of them ; there are, in fact, better flowers that have had no such distinction. Perhaps no year has been distinguished less by distinct novelty, but we would rather see an old favourite beat in form than a distinct novelty less perfect ; yet a decided novel colour is an excuse for a second-rate form, until we can get a better. The style of flower approaching Keyne's Standard of Perfection is certainly on the increase, but the worst of it is, so many of them are deficient in the eye, and that is a fault from which the Standard itself is not exempt, and it goes a long way towards making it uncertain. The time has come when nothing worse than that among cupped flowers, and nothing worse than Princess Radziwill as a reflexed flower, should be deemed first-rate, or have a first-class prize. It has the worst possible effect on the general interests, though it may for a time help individuals to pass off indifferent varieties as worthy of notice. It may tell a little in present receipts, but must operate against the future ; besides which, it inundates the gardens with subjects of a lower quality, and the seedlings from them are less likely to advance. The public eye, too, will get familiar with inferior forms of flowers, reconciled to a lower class of productions. Doubtless, if there had been second-class prizes to give to second-class flowers, many that have now had first would have had second ; but there being no such distinction, the judges, calculating on the fact that the more prizes they give the more growers they please, and having no choice but to give first-class certificates or none, err always on the liberal side as to quantity, though too often they also err in selection, by trying to distinguish particular varieties among scores that are all bad alike. Under these circumstances, it is clear that the abandonment of second-class prizes for new flowers is an evil that is rapidly extending itself, simply because the judges, having in general no character to support as judges, act good-naturedly, and if appointed from among dealers, injudiciously award undeserved certificates of merit, for—

"A fellow feeling makes us wondrous kind."

The abandonment of second-class prizes, without the firmness to refuse prizes altogether, is exemplified by the growers themselves, who even this year are advertizing flowers that obtained first-class prizes, at a second-class price. This is honest on their part, but it is a sad rebuke on the judges who could so far forget themselves, or were so unqualified for the task, as to give to a flower an artificial value, that even the owner is ashamed to take advantage of. And this leads us to the second cause of the progress of floriculture being retarded ; carelessness in the appointment of judges at horticultural shows. This is, perhaps, the greatest evil that floriculture labours under. It is not only necessary that men should be qualified for the office, but they should not be dealers, that they may have to care "who wins and who loses," nor be dependent on the caprice or fancy of any body. The most gross partiality is exercised at many shows ; the dealer helps up his best customer, and the best customer helps the dealer as almost a matter of course, whenever judges are appointed by the exhibitors themselves. It is not our business here to mention names, but at a show held in London, or rather in the metropolis, in September, there was the most unblushing, unjustifiable, and palpable injustice done in several classes and sweepstakes, that the oldest adept in floriculture ever saw. Our business, however, is only with general principles, not people. Judges ought to be known as such, paid as such, and be responsible as such ; men who have some reputation as judges, and, above all, not dealers, nor dependent on dealers. Good gardeners are not necessarily good judges. A man may have his particular notions and partialities warped a good deal by the nature of the place he fills, but a judge should be altogether above this. He should be accustomed to exhibitions, and not a mere grower of par-

ticular plants. He should be engaged, and paid, and known to every exhibitor from the first; he then has a reputation to sustain, which is a sort of security against any improper decisions. The reverse of all this has been fatal to the interests of floriculture. In some cases, judges are not thought of until the productions are all ready for their decision. They are then hastily appointed by the exhibitors from persons on the spot, people who are known growers or otherwise as the case may be, but perhaps unacquainted with half the subjects on show. These gentlemen are very frequently there on purpose to be chosen, and some shower ready to propose them; and they have no standing in the Society as judges, no credit to uphold in a decision, that is given, and done with, and forgotten, with all its faults, except by the parties who are wronged. This is the case with a great majority of shows, and those at which there are paid judges are not so well managed as they might be. It is an enormous evil to employ dealers; the temptations are greater than many people can bear. A dealer sees something that he fancies, and buys. His first step is to get the owner to show it where he is judge. Whether it be really good or not, he does not give up its claim to a prize without a hard fight, and it is a very common occurrence for the very man that has given a prize to be the owner of the plant so distinguished. The past year has been prolific of prizes, without having been productive of a corresponding number of good flowers, and all arising out of the carelessness of the arrangements for judges. The third cause of a sort of retrograde movement in the progress of floriculture, we have said arises from the desire of dealers to send out a certain number of flowers every year, and they rather make up the number with bad than not send out their quantity. Let us go to the Dahlia trade as an example, although the dealers in Pansies, Fuchsias, Verbenas, and other flowers, would do just as well. On looking to the advertisements of a number every year, we find from two to ten, according to a man's connexion, always advertized; some years they have one or two good ones among them, sometimes none, but they are always "first-rate." This year more than one hundred are "warranted show flowers," "warranted first-rate," and others strongly recommended, and as elaborately described. For many years past, every season has produced its hundred or two of half-guinea varieties, and yet, with all the advantage of a quarter of a century's established favourites, it would be difficult to find a dozen flowers as good as Princess Radziwill, or the Standard of Perfection. When any one splendid flower came to the share of a grower who was aware of its importance, he was enabled to get four or five hundred pounds for the produce, and any advance or distinguished novelty, well authenticated, would bring the money now; but there is not a grower who has not warranted things over and over again to be first-rate, when they have disappointed the buyer, and the public have ceased to believe one word they read in the catalogues of dealers, or the papers of the day, simply because the papers of the day, being dependent on the advertisements of the dealers, are but the echo of their words. Not that the proprietors of newspapers care one way or the other, but that the persons employed to go among the dealers are influenced by the people they associate with, and have not the firmness or the judgment to act on their own opinion. But, without meaning any disrespect to the gentlemen of the press, we should like to know if there be a single instance of a paper or periodical connected with floriculture, that is to say, florist's flowers, that is not, more or less, actually conducted by or influenced by dealers. The *Midland Florist* by Mr. Wood, florist, of Nottingham; the *Gardeners' Journal* by Mr. Dickson, florist, of Clapham; the *Cabinet* by Mr. Harrison, nurseryman, of Downham; the *Florist* by Mr. Beck, florist, of Isleworth; the *Gardener* by Mr. Neville, florist, of Peckham; and this runs the gauntlet of the floral publications, except the *Gardeners' Chronicle* and ourselves, and we need not say that we are independent of dealers. We have never been indebted to a florist for an opinion on flowers; we have always used our own judgment, or resorted to that of Mr. Glenny. We know our own opinion has never been influenced, and we believe Mr. Glenny's has not been. He has never exhibited much sign of dependence, or even a wish to oblige. We wish he were sometimes a little more considerate than he appears to be, for even an honest opinion may be given without being offensive. While upon this subject, we may as well observe that Mr. Glenny is engaged to supply us next year with a monthly summary of all that goes on in the floral world,—his opinion of all the new flowers worth notice; and this paper must stand upon its own merits; we shall be perfectly uninfluenced even by him. He has been long enough before the gardening world to stand or fall by his own opinions, and as the author of the Properties of Flowers, we presume he is as good a judge as we can engage, to let our readers know from time to time the names and descriptions of the best new subjects.



Trichomanes radicans var. Andrewsii.

CULTURE OF HARDY FERNS.

An intelligent modern writer thus expresses himself:—"If any pleasure can be called bright, beautiful, and lasting, it surely is a love of nature, particularly of the green things that clothe the earth's surface. The contemplation of them gives a tone of health and freshness to the mind, and the culture of them vigour to the body." In accordance with this sentiment, we must claim for the family of ferns a larger share than they have hitherto received of that attention which is so freely accorded, by almost every class, to the culture of ornamental plants. In doing this, we can hardly claim the merit of leading the public taste; for, in fact, a tendency in the direction we desire to point, has already manifested itself. This tendency we would by all means encourage, under the full persuasion that the writer above quoted has touched the very key-string of healthful recreation, and innocent though engrossing enjoyment. It is true that ferns are not attractive and captivating from any gaudiness that they possess: indeed, on the contrary, it is their very simplicity which gains them their admirers. Devoid of painted blossoms, they wear only the cheerful tints of "nature's livery," varied as it is through the many shades which intervene between the bright and transparent, and the deeply-saturated and opaque. It is in their forms, however, that the ferns, as it were, command admiration: here they are unapproachable. No form that art can devise, can for a moment be compared, for grace and elegance, to nature's models, as displayed in the vegetable world; and no other department of the vegetable world can compare, in this respect, with the unblossoming ferns. Even the common bracken which clothes immense tracts of the uncultivated wastes of this country, and in this condition is, perhaps, one of the least beautiful of its race, is superlatively elegant under circumstances more favourable to its full development. We have ourselves seen this common and despised plant growing from the hedge-banks on either side of a damp shady lane, towering far above the heads of the passers-by, and waving its broad feathery fronds in the gently-agitating breeze; and we have been riveted to the spot, entranced in admiration of its wildly-luxuriant elegance and extreme gracefulness. And so it is with many others. There is the lady-fern, which has, indeed, been styled the queen of ferns, and described as being "exquisitely and super-eminently beautiful:"

"Her texture as frail as though shiv'ring with fright."

This, placed under circumstances favourable to its full development, becomes one of the most lovely of its race, its texture transparent, its composition extremely light, feathery, and compound, and its whole form drooping in varied curves, each a "line of beauty." These examples are from the *wild ferns* of our native country, where, indeed, many others, hardly giving place to them in beauty—if, indeed, they do not exceed them in some respects—may be met with. We have purposely alluded to *them* for this very reason, because they are within the means of all, from the peer downwards to the cottager;—ay, and not confined to the mature of either rank, but accessible even to children, in whom it were well to foster a taste for garden exercise, and to whom no group of ornamental plants may be so strongly recommended as those under notice.

"Ferns," says another writer,—and we must quote his happy remark,—"ferns constitute so beautiful a portion of the creation, whether they ornament our ruins with their light and graceful foliage, wave their bright tresses from our weather-beaten rocks, or clothe with evergreen verdure our forests or our hedgerows,—that it seems next to im-

possible to behold them without experiencing emotions of pleasure." Those who have paid any attention to ferns, will at once recognise in this an expression of their own feelings; and those who have not, we hope to start on the pleasing track.

For the present, we confine our remarks to that group of hardy ferns which are indigenous to the United Kingdom. Even among this little group, consisting of upwards of fifty kinds, including within the species some well-marked varieties, there is considerable diversity, amply sufficient to render a collection of the more accessible kinds a feature of deep interest, either in a large or small garden. We must not forget to remind those who live in densely-populated neighbourhoods, and sigh almost in vain for any green thing about their dwellings, that ferns are just the very subjects for them. Even in the heart of London, and in the most confined districts of that metropolis, ferns are cultivated with full success.—"Ay, but at an enormous outlay," some longing admirer of vegetation may exclaim. Not at all so. Nothing very expensive is essential; expense may be incurred for ornament's sake, but this is beside the question. All that is required is comprised in this brief enumeration:—A few logs of rough, broken, otherwise useless stone, a little soil, and a close covering of glass, which latter, though the most costly item, is not at the present day so much so, as to place it beyond the reach of thousands who are by atmospheric circumstances prevented from indulging in any other species of garden culture. Besides, such a structure may be of any size, from that of a common handlight—just space enough for two or three little ferns—to that of a good-sized greenhouse, capable of containing, not only all the indigenous species, but others of exotic origin. Mr. Ward—after whom the contrivances, known sometimes as Wardian cases, and sometimes as window-greenhouses, are named—has for many years cultivated ferns in the centre of London, in the way here alluded to, the essentials of which are a close glass covering to exclude the impure atmosphere, a shady situation, or artificial shade; a rough surface such as is afforded by rock-work, to which to fix the plants, and an occasional supply of water; this latter is not, however, often necessary, the close construction of the case preventing rapid loss by evaporation.

On the subject of the wild ferns of Britain, a little book* has lately fallen into our hands, which we strongly recommend as supplying a most complete and interesting description of all the species and varieties which are known to have been found in the three kingdoms. Some of them are very common and abundantly distributed, and others very rare and local. We shall glance through this "Hand-book," and select a few passages which go to illustrate our subject, first of all remarking, that the book itself is of a convenient size for the pocket, the descriptions of the plants are full, precise, and plain, the illustrations—of which there are upwards of fifty, (some of which, by the courtesy of the author, we are enabled to introduce in illustration of this article)—very faithful; and the analytical tables introduced for the purpose of facilitating the discrimination of the genera and species on the part of learners exceedingly clear and explicit. In the introductory portion we are told, that—

"The cultivation of ferns is a growing fancy, and one which deserves to be fostered and encouraged; for, whoever admires ferns, must be a lover of nature. Their simple and ungaudy elegance—superlative though it be—has nothing in it to attract those whose eyes can feast only on the pageantry of floriculture. A man may admire and esteem a flower for some characteristic which excludes nature altogether from any share of that esteem; but nature and ferns are, as it were, inseparable; and there is, therefore, no group of vegetation, the culture of which is so peculiarly adapted as this, to

'Lead through Nature up to Nature's God.'"

Then follow some chapters on the structure of these plants, in which they are defined as belonging to a group of the flowerless plants, in which stems and leaves are distinguishable, and as consisting of a caudex or stem, from which issue the roots and leaf-like fronds, the latter bearing the reproductive organs or spores, in some cases on their edge, and in others at their back. Thus a fern may be divided externally into four parts, the root, the caudex, the frond, and the fructification. These parts are described at some length; a portion of the description of the frond—which, by the by, the uninitiated would be apt to call the leaf—we select for extract:—

"The *frond* is the most conspicuous portion of ferns, and that for the sake of which the plants are cultivated. Issuing from the caudex, which is a true stem, they are in some measure analogous to the leaves of other plants; and, in consequence, the term frond has, by some, been objected to as unnecessary,

* A Handbook of British Ferns: intended as a guide and companion in Fern Culture; and comprising scientific and popular descriptions, with engravings of all the species indigenous to Britain, with remarks on their history and cultivation. By Thomas Moore, Curator of the Botanic Garden of the Society of Apothecaries, Chelsea. London: R. Groombridge & Sons, Paternoster Row; and W. Pamplin, Frith Street, Soho.

and that of leaf employed in its stead. The peculiar manner, however, in which the fructification is borne on this part of the plant, seems to render it desirable to maintain the distinctive name of frond, which, also, is very generally adopted,—a still further reason for its continuance. An analogy has been traced between these fronds and the deciduous branches of other plants.

" In their undeveloped state, the fronds of the greater number of the species of ferns are coiled up inwards towards the axis of development, forming a series of convoluted curves. The folding up of the frond of ferns, as of the leaves of other plants, is termed their *vernation;* and the peculiar form of vernation which is most general among ferns, and in which the undeveloped parts are rolled inwards, or bent like the head of a crozier, is said to be circinate. The only British species which differ from this in the mode of their vernation, are the Botrychium, and the Ophioglossum; and in these the young parts, instead of being rolled up, are folded straight. As the fronds become developed, these parts gradually unfold, the more compound of the circinate species being in most cases seen to have the divisions of the frond also rolled up in a similar manner; in this case, the larger divisions first open, and afterwards, in order, the pinnæ, pinnules, and lobes. In many of the species the partially developed fronds have a very graceful appearance. As the fronds become developed, two parts become distinguishable. At the base, more or less extending upwards, is a leafless portion, which is called the *stipes* or stalk by some, and the stem by others; the latter term, however, more properly belongs to the caudex, and is therefore objectionable as applied to any part of the frond. Upon the lower part of the stipes generally, and sometimes throughout the entire length of the rachis, is found a more or less dense covering of paleaceous or membranous scales; in some cases, this is confined to a few small scattered scales near the base of the stipes, but in the other cases they are so large and numerous as to produce quite a shaggy character. They are most generally regarded as portions of disrupted epidermis, occasioned by the pressure of the sap beneath. Whatever their origin, they are to be regarded as special organs, being very constant in their appearance and development in the same species. The upper portion of the frond, extending more or less downwards, is leafy, and through this leafy portion the substance of the stipes is continued onwards to the apex of the frond, being, however, distinguished in this upper portion by the term rachis.

The leafy portion of the frond offers many states of division, the parts being much influenced in size and number by external circumstances. Sometimes it is simple or undivided; sometimes pinnatifid, or more or less deeply cleft; sometimes pinnate, or divided into distinct leaf-like divisions, or *pinnæ;* sometimes bipinnate, when the pinnæ are themselves pinnate,—occasionally the pinnæ are only pinnatifid, or deeply cleft,—this second series of pinnæ being called *pinnules;* sometimes the fronds are still more compoundly divided, the pinnules being either pinnatifid, or again pinnate. The character of the division of the frond is much employed in distinguishing the species."

Respecting the geographical distribution of ferns, we are told—

" The proportion which the ferns bear to the phænogamous portion of the Flora of the British Isles, may be taken in round numbers as one to thirty-five. In Scotland they are computed to hold the proportion of one in thirty-one. There is an enormous disproportion between the ferns and the rest of the Flora in certain tropical islands. Thus, in Jamaica, they are one-ninth of the phænogamous plants; in New Guinea, D'Urville found them to bear the proportion of 28 to 122; in New Ireland, they are as 13 to 60; and in the Sandwich Isles, as 40 to 160. Ferns form a very important feature in the vegetation of the Indian Archipelago. Upon the continent they are found to be less numerous; thus, in equinoctial America, Humboldt does not state them higher than 1-36th; and in New Holland, Brown finds them 1-37th. They decrease in proportion towards each pole, so that in France they stand as 1-63d, in Portugal as 1-116th, in the Greek Archipelago as 1-227th; and in Egypt as 1-971st of the flowering plants. Northwards of these countries their proportion again augments, and they are found to form 1-31st of the phænogamous vegetation of Scotland, 1-35th in Sweden, 1-18th in Iceland, 1-10th in Greenland, and 1-7th at North Cape."

We shall now select at random from the body of the work a few of the engravings and descriptions, as specimens of the matter and illustrations :—

" Genus XIV. Trichomanes, *Linnæus.*— Fronds pellucid; veins prominent, branched, either ending at or within the margin, or extended free into a filiform receptacle, around which the spore cases are attached within an elongated cup-shaped involucre of the same texture as the frond; receptacle more or less exserted. Name derived from the Greek *trichos* (a hair), and *mania* (excess), in reference to the exserted hair-like receptacles.

" 1. *Trichomanes radicans,* Swartz (Bristle Fern); fronds 3-4 pinnatifid, pendulous, angular-ovate, glabrous; segments linear entire, or

obtusely bifid ; involucres cylindrical, scarcely two-lipped, solitary in the axils of the upper segments, more or less winged ; receptacles filiform, exserted.—Desc. : *Trichomanes radicans*, Swartz. Hook. Species Filicum, i. 125.

Trichomanes radicans.

Bab. Manual, 2 ed. 415. *Trichomanes speciosum*, Willdenow. Newm. Brit. Ferns, 2 ed. 305. *Trichomanes brevisetum*, R. Br. Sm. Eng. Fl. iv. 311. Hook. Brit. Fl. 5 ed. 445. Franc. Anal. 3 ed. 62. *Trichomanes alatum*, Hook. Fl. Lond. *Trichomanes europæum*, Smith. *Hymenophyllum alatum*, Smith. *Didymoglossum alatum*, Desvaux.—Fig : Newm. 305. Eng. Bot. 1417. Franc. pl. 6, fig. 6.

"*β. Andrewsii;* fronds drooping-lanceolate, lower pinnæ distant, short, involucres immersed, receptacles long curved upwards. Desc : Newm. Ferns, 2 ed. 318. Bab. Manual. 2 ed. 415. *Trichomanes Andrewsii*, Newm. p. 14. Fig : Newm. 315.

"The Bristle Fern—one of the most rare and delicate of all our native species—has an elongated creeping caudex which, as well as the branching roots, are dark-coloured, and clothed with small thick-set narrow articulated scales or bristles, thus acquiring a downy surface, which is less apparent in the variety Andrewsii, than in the more usual state of the plant. The fronds, as has been well remarked, consist of hard wiry-branched ribs or veins, each furnished throughout with a semi-membranous pellucid wing, the wings, in fact, forming the leafy portion of the frond ; their shape is variable, from angular-ovate, approaching triangular, to oblong-acuminate or lanceolate, the latter being the form of those of the variety Andrewsii ; they spring up solitary here and there from the caudex as it becomes extended over the damp surface of the rocks, and are three years arriving at a mature condition ; the young ones being formed about May, attaining their full development in the second autumn, and becoming fruitful in the autumn of the third year, after which they show symptoms of decay ; the barren fronds, however, retain their freshness in moist situations for many years. The stipes are sometimes less than one-fourth the length of the leafy portion of the frond, and in others equally long ; it is winged throughout with a narrow border. The fronds, which are circinate in venation, are usually thrice pinnatifid ; the primary divisions, which are ovato-lanceolate and alternate, almost become pinnæ ; the secondary lobes are broadly or narrowly ovate, according to their position, and the ultimate divisions are narrow linear, in some cases entire, and in others obtusely bifid. The whole of the leafy part of the frond is of a semi-transparent cellular texture, and is seen, when slightly magnified, to be elegantly reticulated. The veins may be compared to wiry ribs branching and extending through all the divisions of the frond ; in the barren parts these terminate at or within the apex of the ultimate lobes ; but where the fructification is produced, they become elongated beyond the margin, the free portion being surrounded at the base, where they are encircled by the spore cases, by a monophyllous, or elongate cup-shaped involucre, and becoming more or less lengthened beyond the involucre ; the latter either projects beyond the margin, as in the ordinary plant, or is, as it were, immersed in the substance of the frond, as in Andrewsii. The veins of the fronds have been already (p. 3,) described as the receptacles ; the veins, which in this plant are elongated beyond the margin bearing the fructification, are hence the receptacles ; and it is around the base of these, which is covered by the involucre, that the spore cases are clustered. The degree of the elongation of the receptacle is very variable ; sometimes it projects but slightly, and at other times is two or three times as long in the involucres ; in the variety Andrewsii they are five, and even six times as long as the involucres, and curve up from the surface of the fronds in a very conspicuous manner. The fructification becomes mature in the autumn.

"Neither the species nor variety are certainly known to exist in a wild state in the United Kingdom, elsewhere than in Ireland, where both are found sparingly, in several localities, attached to dripping rocks and the walls of damp caves, in shaded glens, and the vicinity of waterfalls ; it is also found in some of the warmer parts of Europe, in Asia, and in both Americas."

The Lady Fern, already alluded to in these remarks, is thus described :—

"Genus VII. Athyrium, *Roth.*—Mid-vein distinct, lateral veins branched free ; sori

semilunate indusiate, placed on the side of the lateral veins; indusium oblong-reniform, opening longitudinally towards the mid-vein, the free margin fringed with capillary segments. Name derived from the Greek *athyros* (opened), in allusion to the mode of dehiscence of the indusium, which at length becomes elevated along one of its margins, opening like a door, so as not to enclose the spore cases.

"This genus was constituted by Roth, for the reception of our indigenous Lady Fern, which, from 'the exquisite grace of its habit, the elegance of its cutting, and the brilliant delicacy of its colour,' claims precedence in beauty over every other British species. Roth's genus is not universally adopted, the species being by some still retained under Asplenium.

Athyrium Filix-femina.

"1. *Athyrium Filix-femina*, Roth (Lady Fern); Frond lanceolate bipinnate; pinnæ linear-lanceolate; pinnules linear-oblong, deeply serrate or pinnatifid.—Desc: *Athyrium Filix-femina*, Roth. Newm. Brit. Ferns, 2 ed. 237. Bab. Manual. 2 ed. 413. *Asplenium Filix-femina*, Bernhardi. Hook. Brit. Fl. 5 ed. 443. Franc. Anal. 3 ed. 50. *Aspidium Filix-femina*, Swartz. Sm. Eng. Fl. iv. 282. *Polypodium Filix-femina*, Linnæus.—Fig: Newn. 237. Franc. pl. 5, fig. 4. Eng. Bot. 1459 (bad).—A very variable species, as regards size, outline, division, and density. The following forms, several of which are by some regarded as species, may be distinguished as varieties:—

"*α. incisum;* fronds broadly lanceolate, drooping; pinnules linear, or ovate-lanceolate, distinct, deeply pinnatifid, with flat diverging sharply-toothed lobes; sori distinct.—Desc: Newm. Brit. Ferns, 2 ed. 243. Bab. Manual, 2 ed. 413. *Athyrium Filix-femina*, Roth. *Polypodium incisum*, Hoffman.—Fig: Newm. 243.—Of this form I have examples gathered near Guildford, Surrey, the pinnæ and pinnules of which are large, broad, and close set, the whole frond appearing densely leafy.

"*β. convexum;* fronds linear-lanceolate, semi-erect; pinnules distinct, very narrow, linear, convex with deflexed margins, bluntly toothed; sori confluent.—Desc: Bab. Manual, 1 ed. 388. Newm. Brit. Ferns, 2 ed. 245. *Athyrium rhæticum*, Roth. *Polypodium rhæticum*, Linnæus.—Fig: A seedling, or starved form of this variety (*Aspidium irriguum*, Smith; *Athyrium rhæticum minus*, Roth,) is represented in Newm. Brit. Ferns, 245.

"*γ. trifidum;* fronds ovate-lanceolate, semi-erect; pinnules linear-lanceolate, sub-decurrent, flat, deeply cut, the apices of the lobes generally trifid.—Desc: Newm. Brit. Ferns 2 ed. 242. *Athyrium trifidum*, Roth. *Polypodium trifidum*, Hoffman.

"*δ. molle;* fronds ovate-lanceolate, semi-erect; lower pair of pinnæ distant, short, deflexed; pinnules lanceolate, decurrent, united by wing of mid-rib, flat, toothed; sori distinct.—Desc: Newm. Brit. Ferns, 2 ed. 242. Bab. Manual, 2 ed. 413. *Athyrium molle*, Roth. *Polypodium molle*, Schreber.

"*ε. multifidum;* fronds semi-erect, lanceolate; pinnæ narrow lanceolate, their apex as well as the apex of the frond multifid or tasseled; sori crowded.—Desc: *Athyrium Filix-femina vivipara*, Steele, Handb. Field Bot. 215. Fig: Newm. 248.—A very curious and elegant monstrosity, retaining its peculiar characters under cultivation. Found in Ireland, where two forms, slightly differing, but possessing the same general characters, have been met with by Mr. J. T. Mackay, and Mr. D. Moore.

"*ζ. crispum;* dwarf, (six to eight inches,) slender, delicate, crisped; rachis variously forked, the apex of the divisions densely tufted or tasseled; barren. A very distinct form, discovered by Mr. A. Smith on the hill Orah, in the county Antrim, Ireland; it proves constant under cultivation, and much resembles a tuft of curled parsley.

"Mr. Dickie has favoured me with a singular monstrosity, apparently referable to this species, but very different from either of the preceding forms. In this the pinnules are developed in a very irregular degree, their

margins being irregularly lacerated. It was found in 1846 on Ben Muich Dhui in Aberdeenshire, at 2,700 feet elevation, and has maintained the same appearance under cultivation.

"The Lady Fern grows with a tufted caudex, which in old plants of the stronger growing variety, incisum, becomes considerably elongated and trunk-like; from this the black wiry fibrous roots are produced. The fronds are in all cases of delicate texture, and have more or less of a light feathery appearance; they grow up about May, reaching maturity towards the end of the summer, and dying down in the autumn if not destroyed by early frost; their vernation at first is circinate, but by degrees the apex becomes liberated, and hangs down, assuming the appearance of a shepherd's crook, as in Lastrea Filix-mas. The general outline of the frond is lanceolate, broadest in the variety incisum, and narrowest in convexum: incisum often grows four or five feet high; trifidum, convexum, and multifidum from two to three feet; molle from a foot to eighteen inches; and crispum usually about six inches high. The fronds grow up in a large tuft from the crown, the older plants of the larger varieties sometimes throwing up from twenty to thirty fronds, such examples being noble as well as lovely; incisum has the fronds somewhat drooping; the others, with the exception of crispum, are more erect in habit; crispum is of a spreading

Athyrium Filix-femina crispum.

tufted habit of growth. The stipes is surrounded with numerous elongated scales around the base, where it is much swollen, a few smaller scales occurring on the upper part; on the lower part, from a fourth to a third of the height of the plant, the stipes are bare of pinnæ; in the upper part the pinnæ are closer or more distant, varying much according to the situation where the plant has been growing. The pinnæ are lanceolate, more or less attenuated; they are distinctly pinnate in incisum and convexum, the pinnules becoming somewhat decurrent in trifidum, and more decidedly so in molle. The pinnules have more or less of the lanceolate form; those of incisum are flat, deeply pinnatifid, with diverging sharply-toothed lobes; of convexum linear, convolute, the margins being notched rather than toothed, and folding over the sori; of trifidum flat, deeply cut, the apices of the lobes generally distinctly trifid, and the first anterior lobe larger than the rest; of molle flat with toothed margins. The venation is mostly very distinct, from the delicate texture of the frond; its general character is —mid-vein waved, lateral veins forked shortly after leaving the mid-vein, the anterior branch bearing on its side the oblong sorus, about equi-distant from the mid-vein and margin; the other branch becoming forked or not, according to the composition of the frond, one branch extending to each serrature: in the larger and more divided pinnules the lateral veins branch alternately, and bear more than one sorus. The sori are elongate-reniform, or somewhat sausage-shaped, covered with an indusium of the same form, opening towards the mid-vein, its free margin split into narrow segments. Smith remarks that the sori finally become nearly round, and the indusium orbicular, with a notch at the base, thus assuming in this stage the character of an Aspidium, to which genus he referred the plant. In incisum, trifidum, and molle, the sori are usually distinct; in convexum and multifidum confluent. The fructification is mature about September.

"The species is abundant in most parts of Britain, and particularly so in Ireland; and no doubt the varieties incisum, convexum, trifidum, and molle, are pretty generally distributed, though there appear to be no statistics on this point. The other varieties or monstrosities are, I believe, only found in Ireland. Warm and moist woods and hedgerow banks are the favourite localities of this species, but it is not confined to such situations, although in them it attains its greatest vigour and luxuriance. It also occurs throughout Europe, in Asia, Africa, and North America.

"This species does not appear to be applied to any special use, except that in Ireland, where it abounds on all the bogs, it is employed as a packing material for fish and fruit, as the common bracken is in this country.

"There is no difficulty in the cultivation of this very beautiful plant. If planted about rockwork it should occupy a low boggy situation at the foot of the rock, being planted amongst turfy soil, kept well moistened either naturally or artificially. It is far less beautiful if planted in dry exposed situations. No object about a piece of rockwork is so beautiful as a vigorous plant of the Lady Fern, placed just within the mouth of a dark cavernous recess, large enough to admit of its development, and just open enough that the light of day may gleam across the dark background of the cavern, revealing the drooping feathery fronds. In such a situation it will grow freely, provided there is a sufficient supply of moisture to its roots. For planting in shady woods, or on the margin of ornamental water, no fern can be more appropriate or beautiful. If grown in a pot, it must have a large sized one, and should be placed in rough turfy soil, which should be intermixed with lumps of charcoal and freestone, or potsherds. To attain anything like a fair degree of development, the plants must be kept well supplied with water.

"'The Lady Fern,' writes Mr. Lees in the *Botanical Looker-Out*, 'is the queen of ferns, exquisitely and super-eminently delicate and beautiful;' and he adds some stanzas, one or two of which I must here quote:—

"'By the fountain I saw her, just sprung into sight,
Her texture as frail as tho' shivering with fright;
To the water she shrinks—I can scarcely discern
In the deep humid shadows the soft Lady Fern.

"'Where the water is pouring for ever she sits,
And beside her the Ouzel and Kingfisher flits;
There supreme in her beauty, beside the full urn,
In the shade of the rocks stands the tall Lady Fern,'"

Botrychium Lunaria.

Some of the ferns are of considerable economic value. Thus the *Pteris aquilina*, or common bracken, already alluded to as assuming under certain conditions an exceedingly graceful appearance, is applied to various uses. "The underground succulent stems abound in starch, and, as stated by Lightfoot, have been used in different countries as an ingredient in making a miserable kind of bread; they have also been employed in brewing ale in the proportion of one-third to two-thirds malt. Mr. A. Forsyth obtained a substance like coarse brown flour, by grating the clean-washed stems, washing the pulp, and straining it through a fine wire sieve. By first scraping off the brown outer coating, white fecula was obtained, which, when boiled, had no disagreeable taste. The fecula, he says, may be easily converted into malt, and, mixed with a very small quantity of real malt, will produce good beer. Both the underground stems in winter, and the tender shoots in May, make, when boiled, a very nutritious article of food for pigs, but it is not proper for young ones. The young succulent fronds, also, make an excellent green manure, if cut and dried, or ploughed in immediately. The dried fronds form a very durable thatch, for which purpose they should be pulled up in October, when perfectly pliant; they are besides valuable as litter, and even sometimes mixed with hay, as food for cattle; and are one of the best of all protecting materials in gardens, and are much used as a packing material. The plant abounds in alkali, which is turned to considerable account in the manufacture of soap and glass. The ashes of the full grown plant are very useful in the wash-house for the purpose of economizing soap; they are mixed with enough water to allow of their being made up into balls, which are dried, and when required for use are put into fire until they acquire a red heat, when they are taken out and thrown into water, which in an hour or so becomes a strong ley. Moreover, the plant is so astringent, that it has been employed for the purpose of tanning kid and chamois leather. Medicinally this plant is said to have had among the ancients a reputation in chronic disorders, especially those arising from obstructions of the viscera and spleen; but it is not now much esteemed, though sometimes used in the form of powder to destroy worms, especially the tape worm; the caudex is the part used, in doses of from one to three drachms, repeated for several mornings, and followed by a brisk purgative.

"No plant can require a less amount of cultivation when it is established, but there is a real or imaginary difficulty about transplanting it. Sir J. E. Smith says, 'the roots [underground stems] are generally killed by transplantation.' Mr. Taylor, a successful

fern cultivator, informs me, however, that he removes it from the waste land both for rockwork and potting, and finds it move well at any season of the year; being moreover a great pest in his cucumber beds, when the underground stems are among the soil used, as it comes up over the bed, grows vigorously, and is with difficulty destroyed. I have potted portions of these stems which have lain exposed for some time, and have found them to grow freely. It will grow freely in any temperature. Though it grows in exposed situations, it is very much finer in damp shady places. To form groups of this plant in parks, the following plan, recommended by Mr. Drewett, should be adopted :—'Make choice of some spots of ground which have a partial shade from large trees in summer, say in half acres, and have them trenched, adding, if the land is strong, a good layer of peat, or bog earth; have the ground in readiness for planting in March or April, take up the dormant stems in large square masses from the spots where they have been observed to grow, and plant them immediately at about a yard apart; enclose the patches with park hurdles to prevent cattle from spoiling them before they get established.' Polystichum aculeatum, which is perfectly evergreen, is a very suitable companion."

Adiantum Capillus-veneris.

This *Handbook of British Ferns*, from its convenient size and abundant information, will be a suitable and pleasant companion for the field botanist, as well as the home culturist and the student.

To resume. The species of ferns indigenous to the United Kingdom are distributed throughout the following eighteen genera :—

I.—*Polypodium :* 1. P. vulgare, and three varieties; evergreen in sheltered places; suitable for rockwork. 2. P. Phegopteris; rockwork. 3. P. Dryopteris; rockwork. 4. P. calcareum; rockwork.

II.—*Allosorus :* 1. A. crispus, and two varieties; ornamental; rockwork.

III.—*Woodsia :* 1. W. ilvensis. 2. W. alpina. Both rare, curious; suitable for pot culture.

IV.—*Lastrea :* 1. L. Thelypteris; damp peaty border. 2. L. Oreopteris; shady border. 3. L. cristata; damp peaty border. 4. L. Filix-mas, and two varieties; shady border. 5. L. rigida; shady border. 6. L. spinulosa; peaty border. 7. L. dilatata; peaty border. 8. L. Fœnisecii; peaty border.

V.—*Polystichum :* 1. P. Lonchitis; evergreen; pots. 2. P. aculeatum and variety; evergreen; shady border. 3. P. angulare and two varieties; evergreen; shady border.

VI.—*Cystopteris :* 1. C. fragilis and three varieties; rockwork or pots. 2. C. alpina; rockwork or pots. 3. C. montana; rockwork or pots.

VII.—*Athyrium :* 1. A. Filix-femina, and several varieties; damp shady border.

VIII.—*Asplenium :* 1. A. fontanum; evergreen; pots or rockwork. 2. A. lanceolatum; evergreen; pots or sheltered rockwork. 3. A. Adiantum-nigrum; evergreen; rockwork; 4. A. marinum; evergreen; pots, in-doors. 5. A. Trichomanes; evergreen; rockwork or pots. 6. A. viride; evergreen; rockwork or pots. 7. A Ruta-muraria; evergreen; pots or rockwork. 8. A. germanicum; evergreen; pots or rockwork. 9. A. septentrionale; evergreen; pots or rockwork.

IX.—*Ceterach :* 1. C. officinarum; evergreen; pots or rockwork.

X.—*Scolopendrium :* 1. S. vulgare; evergreen; shady borders, rockwork, or pots.

XI.—*Adiantum :* 1. A. Capillus-veneris; evergreen; pots, in-doors, or under handglasses.

XII.—*Blechnum :* 1. B. Spicant; rockwork, or damp peat borders.

XIII.—*Pteris :* 1. P. aquilina, shady border.

XIV.—*Trichomanes :* 1. T. radicans, and one variety; evergreen; pots in a warm close atmosphere.

XV.—*Hymenophyllum :* 1. H. tunbridgense; and 2. H. unilaterale; fronds persistent; pots, in a close damp sheltered atmosphere.

XVI.—*Osmunda :* 1. O. regalis; damp peat border.

XVII. — *Botrychium :* 1. B. Lunaria; shady peat border.

XVIII.—*Ophioglossum :* 1. O vulgatum; shady border.

Asplenium Adiantum-nigrum.

The most ornamental species for rockwork are the following :—Polypodium vulgare and Dryopteris ; Allosorus crispus ; Polystichum Lonchitis, aculeatum, and angulare ; Lastrea rigida ; Cystopteris, all the species ; Athyrium Filix-femina, var. crispum ; Asplenium, all the species ; Ceterach officinarum ; Scolopendrium vulgare ; Blechnum Spicant.

The best species for planting in damp shady situations, such as woods, and dells, and thickets, are the following :—Lastrea Oreopteris, Filix-mas, and its var. incisa, rigida, spinulosa, dilatata, and Fœnisecii ; Polystichum aculeatum and angulare ; Athyrium Filix-femina ; Blechnum Spicant, and Osmunda regalis.

For pot-culture, as objects of ornament, the following are highly suitable :—Polypodium vulgare, var. cambricum, Dryopteris, and Phegopteris ; Allosorus crispus ; Athyrium Filix-femina, vars. crispum and multifidum ; Asplenium lanceolatum, fontanum, Adiantum-nigrum, Trichomanes, and marinum ; Ceterach officinarum ; Adiantum Capillus-veneris ; Trichomanes radicans ; Hymenophyllum tunbridgense and unilaterale.

All the smaller species of ferns may be grown in a compost of equal parts turfy peat and well decayed leaf-mould, intermixed with pure white sand, and small lumps of charcoal, or broken pots, bricks, or porous stone. Whether in pots, or planted out in any situation, they must (with one or two exceptions,) be well drained ; for they mostly require to be kept very moist, and if the soil is not well drained, it soon becomes soddened, and in that state is injurious to the roots. When they are grown in pots these should be half filled with drainage materials, especially in the case of the more delicate, and the smaller-growing species. The more robust and the freer-growing of the species should have larger pots, less drainage, and a proportion of loamy soil added to their compost. Some few species like the addition of old mortar as an ingredient in the compost in which they are planted ; such are Polypodium calcareum ; Ceterach officinarum ; and Asplenium Trichomanes, and Ruta-muraria.

Of all known plants ferns are the most suitable for planting in the pent-up shaded "court-yards," "areas," and "flats," of town residences, the monotonous mural enclosures of which, relieved by tasteful rockwork, and fringed with elegant fern-fronds, may be invested thus with some degree of cheerfulness.

NEW FLOWERS AND PLANTS.

Burtonia villosa, *Meisner* (villous Burtonia).—Fabaceæ § Papilionaceæ-Pulteneæ.—A beautiful hard-wooded shrub, heath-like in general aspect, bearing conspicuous butterfly-shaped flowers. The habit is close and branching ; the branches, as well as the leaves, being clothed, in a more or less degree, with short hairs. The leaves are dense, sessile, and alternate, consisting each of three linear obtuse leaflets, the margins of which are remarkably revolute. The flowers grow towards the extremities of the branches, from the axils of the upper leaves, so as to form an oblong, almost terminal, leafy spike, the flowers being so numerous as to conceal the leaves among which they are attached ; the colour is a rich palish purple red, the wings being whitish at the base, and the standard having a round primrose-coloured blotch at its base. The heath-like appearance of this shrub is due to the numerous narrow sessile leaflets which invest the stems. Native of New South Wales, in the Swan River colony. Introduced in 1846. Flowers in May. *Culture.*—Requires a greenhouse ; turfy peat, loam, and sand, with plenty of drainage ; propagated by cuttings in sand under bell-glasses.

Chirita Moonii, *Gardner* (Mr. Moon's

Chirita).— Gesneraceæ § Cyrtandraceæ-Didymocarpidæ.—A very beautiful sub-shrubby plant, growing from two to three feet in height; with obscurely tetragonal stems, opposite or whorled pale-green leaves, of a rather acute ovate-lanceolate figure, and axillary blossoms, of large size, usually produced singly from the axils, but sometimes two together. The leaves are clothed with compact silky down, which is most conspicuous beneath. The corolla is large and conspicuous, from the base to the extremity of the lower lip being nearly four inches in length; the tube is ventricose and sub-campanulate, curving a little upwards, pale purple and silky, with an expanded mouth, and broad yellow dash down the centre of the throat; the limb is spreading, two-lipped, of five roundish lobes, and of a deep purple colour, well contrasted with the paler tint and yellow bar of the throat. Native of Ceylon, at "Four Korles," and on "rocks near the summit of the Hantani range." Introduced in 1847. Flowers throughout the summer months. Mr. Moon, the original discoverer, in a "Catalogue of Ceylon plants," calls it *Martynia lanceolata*. *Culture.*—Requires a stove; light rich soil of turfy texture; propagated by cuttings of the young shoots, planted in sandy soil, and placed in heat.

Arnebia echioides, *Alph. De Candolle* (echium-like Arnebia).—Boraginaceæ § Anchusidæ.—A very pretty herbaceous perennial furnishing yellow blossoms in a natural order in which they are by no means common. It has a fusiform woody root, from which spring up the leafy stems, attaining about six inches in height, and clothed with short hair. The leaves are spreading, pubescent, sessile; the lower ones largest, obovate-oblong, those of the stem smaller, obovate-lanceolate. The flowers grow at the top of the stems in a branched scorpored leafy raceme; they are between funnel-shaped and salver-shaped, with a slender tube, yellow, with five roundish purple spots, one being situated at the juncture between each pair of the lobes into which the limb is divided. Sometimes the spots are obsolete in the cultivated plant, as we learn from Sir W. Hooker's account of the plant. Native of the Caucasian alps, and of Armenia. Introduced in 1847. Flowers in June and July. It is the *Anchusa echioides* (Bicherstein); *Lycopsis echioides* (Linnæus); and *Lithospermum erectum* (Fischer and Meyer.) *Culture.*—Hardy: common loamy soil; propagated by division of the plant. Suitable for pot-culture among Alpine plants.

Passiflora amabilis, *Hooker* (white-crowned Passion-flower).—Passifloraceæ.—A most lovely passion-flower, the history of which is, however, obscure. It is a climbing plant of moderate growth, with slender rounded stems, bearing alternate entire leaves, which are ovate and very acute in figure, and have glandular petioles; the stipules are short, entire, ovate-acuminate. The flowers spring from the axils of the leaves along with the tendrils, and are supported by an involucre of three roundish-ovate reticulated leaves. The sepals and petals, forming a ray of ten oblong obtuse divisions, are alike in form and colour, the latter being a bright red on the inner side; the filamentous crown, often in passion-flowers variegated in colours, is in this kind almost entirely white, and is disposed in four series; the contrast between the white of this part and the bright red of the sepals and petals produces a very charming effect, which must render this plant a favourite with all who have convenience to cultivate it. It is thought to be possibly a hybrid, and is known in gardens under the name above quoted, which Sir W. Hooker has adopted. Native country unknown. Introduced in 1847, to the Royal Garden, Kew, by Mr. Mackay, of Liege. Flowers in May. *Culture.*—Requires a stove; turfy-peat and loam intermixed with sand; propagated by cuttings from any part of the stems, planted in very sandy soil, and set where they are supplied with a moderate degree of bottom heat.

Thunbergia alata, *var. aurantiaca, subvar. Doddsii* (Dodd's Thunbergia).—Acanthaceæ § Thunbergeæ.—This garden variety of the well-known and very beautiful orange-flowered Thunbergia differs from its parent only in having the leaves irregularly margined with white, so that the foliage is variegated. Our own opinion of it is, that it is less handsome than *T. aurantiaca*, wanting altogether the rich green of a well grown example of that plant, as a background for displaying its fine orange-and-black blossoms; others, however, admire its variegation. It is a slender free growing climber, with somewhat hastate leaves, white at the edge, and large rich orange coloured blossoms, borne singly in the axils of the leaves. A garden variety obtained by Mr. Dodds, gardener to Colonel Baker of Salisbury. Raised in 1847. Flowers through the summer and autumn. *Culture.*—Requires a warm greenhouse or a cool part of a stove; strong turfy peat with a small portion of loam; propagated by cuttings planted under glasses in sand.

Achimenes longiflora, var. *macrantha* (large-flowered blue Achimenes).—Gesneraceæ § Gesnereæ.—A very showy plant, differing from the ordinary state of *Achimenes longiflora* chiefly in the size of the blossoms, which are very large, constituting a decided improvement on the original kind. In other

respects, the variety pretty closely agrees with its parent, and like it, is deserving of cultivation. A garden variety. Raised in 1847. Flowers in the summer months. *Culture.*—Requires a stove, or to be raised in heat in spring, and flowered in a warm greenhouse; light vegetable soil; propagated by means of the scaly tubers.

PHALÆNOPSIS ROSEA, *Lindley* (pink Butterfly-plant).—Orchidaceæ § Vandeæ-Sarcanthidæ.—A very pretty epiphytal species, and a most interesting addition both to our gardens, and, botanically speaking, to the genus of which it forms a part. The plant is stemless, with exactly the habit of the *Ph. amabilis*. It is furnished with narrow-oblong leathery leaves, eight to twelve inches long, and sharp and recurved at the point. The flowers grow in a loose spike at the end of a stiff ascending lateral stalk; this spike is sometimes said to be as much as from twelve to eighteen inches long. The flowers are individually small, but numerous, about an inch in diameter; the sepals are spreading, oblong-lanceolate, and somewhat acute, the colour being white, slightly tinged with pink; the lip is deep violet or rose-colour red, ascending, the central division ovate-acuminate, slightly lozenge-shaped, the lateral linear-spathulate, oblique and incurved. Native of Manilla. Introduced in 1848, by Messrs Veitch of Exeter. Flowers in September. *Culture.*—Requires a hot moist stove; to be fastened on a block of wood and suspended; propagated by dividing the plant.

NEPENTHES LÆVIS, *Lindley* (smooth Pitcher-plant).—Nepenthaceæ.—An interesting addition to the family of pitcher-plants. It seems to be allied to the *N. phyllamphora*, but is perfectly distinct. The leaves are narrow, leathery, and shining, wholly destitute of fringed teeth, or pubescence. The pitchers are from two to four inches long, inflated towards the base, and contracted about the mouth, and having a pair of narrow elevated crests, which are either fringed or naked; the brim of the pitcher is very narrow and without ribs, the lid nearly circular, except at the base, which is cordate and spurred. Native of Java and Sincapore. Introduced in 1848, by Messrs. Veitch of Exeter. Flowers ——? *Culture.*—Requires a hot moist stove; very light turfy peat soil, almost entirely fibrous, intermixed with broken charcoal or potsherd; propagated by cuttings.

ACROPERA BATEMANNI, *Lindley* (Mr. Bateman's Acropera).—Orchidaceæ § Vandeæ-Maxillaridæ.—A distinct, but not very handsome, epiphytal species, with much the appearance of Acropera Loddigesii, but more robust. The flowers are pale yellow and spotted as in that species; the lateral sepals are doubled backwards, so that the opposite sides of each nearly touch; the petals are oblong with an awl-shaped point, and the apex of the lip is two-lobed, the divisions linear-obtuse, that is, the lip is "extended at the end into a double tongue." Native of Nicaraguay. Introduced in 1847. Flowers about August. *Culture.*—Requires a stove; turfy peat soil; propagated by division of the plant.

MILTONIA FLAVA, *Lindley* (yellow-flowered Miltonia).—Orchidaceæ § Vandeæ-Brassidæ. A pretty epiphytal species. The leaves are not described. The flowers grow solitary on the stalks, which have two ranked boat-shaped sheaths; they are yellow, and not unlike those of *M. stellata*, differing in some technical matters. The sepals are linear-lanceolate, and acuminate; the petals of the same form, but twice as broad; the lip panduriforum or fiddle-shaped, slightly hairy, with a cordate-ovate end, and near the base an elevated ridge, which reaches half-way down the lip, and divides at the point into two short plates. Native of Brazil. Introduced probably about 1843. Flowers in July. *Culture.*—Requires a stove; turfy peat soil; propagated by division of the plant.

CLIMATE OF NEW HOLLAND.

IN the recently published number of the Horticultural Society's Journal,* Dr. Lindley has given some memoranda concerning the climate of New Holland, which it is probable will be found highly useful to cultivators. These memoranda are gleaned from the journal of Sir T. L. Mitchell, aided by an examination of that naturalist's collections and private notes. The general results are stated in a passage which we cannot refrain from quoting:—

"The reader will doubtless be surprised to find how low a temperature was occasionally observed on this journey. In the end of April (our October) in latitude 28° S., within $4\frac{1}{2}$° of the Tropic, at an insignificant elevation, the thermometer stood at 26° at sun-rise, and was as low as 43° at nine P. M.; nevertheless, the country produced wild Indigo, Mimosas, Casuarinas, arborescent Myrtleblooms, and Loranths. A degree nearer the Tropic in May (our November) the thermometer at sun-rise marked 20°, 19°, 18°, 17°, 16°, 12°, and on two separate days even 11°! On the 22d of May the *river was frozen*, and yet herbage was luxuriant, and the country produced Mimosas, Eucalypti, Acacias, the tropical Bottle-tree (Delabechea), a Calandrinia, and even a Loranth. On the 23d of May, the thermometer at sun-rise marking 12°, Acacia

* Journal of the Horticultural Society, vol. iii. p. 282.

conferta was coming into flower, and Eucalypti, with the usual Australian vegetation, were abundant. On the 30th of May, at the elevation of 1,118 feet, the almost tropical Delabechea was found growing, with the temperature at sun-rise 22° and at nine P.M. 31°, so that it must have been exposed to a night's frost gradually increasing through 12°. And this was evidently the rule during the months of May, June, and July (our November, December, and January); in latitude 26° S. among Tristanias, Phebaliums, Zamias, Hoveas, Myoporums, and Acacias, the evening temperature was observed to be 29°, 22°, 37°, 29°, 25°, falling during the night to 26°, 21°, 12°, 14°, 20°; in latitude 25° S. the tents were frozen into boards at the elevation of 1,421 feet, the thermometer, July 5, sunk during the night from 38° to 16°, and there grew Cryptandras, Acacias, Bursarias, Boronias, Stenochiles, and the like. Cymbidium canaliculatum, the only orchidaceous epiphyte observed, was in flower under a night temperature of 33° and 34°; that by day not exceeding 86°. These facts throw quite a new light upon the nature of Australian vegetation. It may be supposed that so low a temperature must have been accompanied by extreme dryness, and such appears to have been usually the case. Nevertheless, it cannot have been always so, for although we have no hygrometrical observations for June and July, and only four for May, yet there is other evidence to show that the dryness cannot always have been remarkable. In May the hygrometer indicated ·764, ·703, ·934, or nearly saturation, and ·596; yet the sun-rise temperature was on those occasions 25°, 28°, 30°, and 34°. On the 22d of May, the grass was white with hoar frost, and then the thermometer was at sun-rise 20° under canvass and 12° in the open air; and on the 5th of July, when it rained all day and the tents were 'frozen into boards,' the thermometer sank during the night from 38° to 16°.

"It is probable that this power of resisting cold is connected with the very high temperature to which Australian vegetation is exposed at certain seasons, and this is horticulturally a most important consideration. We find that in latitude 32° S. in January (our July) the thermometer stood eight days successively above 100°, and even reached 115° at noon; that it was even as high as 112° at four P. M.; that in the latter part of February one degree nearer the line it was twice 105° and once 110°; that in March one degree further northward it frequently exceeded 100°, and there was not much fall in this excessive temperature up to the end of April. This will be more evident from the following —

Table of Noon-day Temperatures.

Lat.	Month.	Average.	Max.	Min.
29°S.	Nov., Dec.	3 Observ. . 102°	103°	62°
32 S.	Jan., Feb.	18 „ . 97½	115	73
31 S.	Feb., March	17 „ . 90	110	80
30 S.	March	20 „ . 95	105	84

"At this time the dryness must also be excessive, as will have been seen by Sir Thomas Mitchell's observations. Even such heats as these do not, however, destroy the power of vegetation, for we find in the midst of them all sorts of trees in blossom, a few bulbs, and even here and there (in damp places, no doubt) such soft herbs as Goodenias, Trichiniums, Helichrysum, Didiscus, Teucrium, Justicia, herbaceous Jasmines, Tobacco, and Amaranths. During these heats the night-temperature seldom remains high. Sometimes, indeed, the thermometer was observed as much as 88° and once even 97° at sun-rise, the average noon heat of the month being 97½°, but generally the temperature is lower. Thus:—

	Average at Noon.	Temperature Occasionally at Sun-rise.
Nov. and Dec.	102°	62° 58° 61°
Jan. and Feb.	97½	61 60 59 47° &c.
Feb. and March	90	61 59 54 48 &c.
March	95	68 55 51 47 &c.

"To this point the attention of cultivators must be carefully directed. I think it is impossible to doubt, from the observations thus referred to, that high winter temperature in hot-houses is a great mistake, and that the practice of gardeners requires, in this respect, to be very carefully reconsidered."

THE FLOWER GARDEN OF THE POETS.

We have introduced our readers to a number of the minor poets as they appear contemplating those bright pages in the *Book of Nature* which display the various and brilliant beauties of the Flower Garden. They all loved to linger among the rich gifts of Flora, and their language often acquires a double sweetness from the associations which it raises. Turning from them to those lofty and gigantic minds whose dimensions were equal to the grasp of the mightiest subjects, —the pinnacles, as we may call them, of the great city of poetry,—we find them directing their gaze towards the humblest and lowliest of those numerous ornaments which spangle the surface of the earth, which bloom

on the slope of the mountain, in the hollow of the valley, in the rays of the sun, and in the secluded shade of the forest. The men whose imaginations were so vast that no subject, however insignificant or majestic, was beyond the circle of their capacity, whose thoughts could range over the whole face of creation, and settle upon the highest pinnacles of wisdom, as well as upon the lowliest flower of the valley; these men loved to sit amid the sweetness of a garden, and to weave from the glittering beauties there displayed, an endless succession of the choicest garlands of thought. Milton was an eminent example. He loved to picture the convulsions of the universe, the wars of heaven, and the most terrible aspects of hell; but he also delighted in the description of flowers, and places made sweet by their presence. From them Paradise derived one of its chief attractions. Whether he would create the idea of happiness, innocence, love, pleasure, or beauty, some simple flower is ready to be invested with the thought, and in the thornless rose of Eden we discover the emblem of that peace and harmony which has, in the mind of the poet, constituted the most perfect bliss.

We will suppose Milton sitting in that magnificent garden, where the first parents of the human race enjoyed their short-lived happiness, where "flowers worthy of Paradise" were sprinkled over the ground, not in artistic order, but scattered in rich plenty over hill and dale, and plain, presenting to the eye the variously-coloured expanse, where

> "The flowery lap
> Of some irriguous valley spread her store;
> Flowers of all hue, and without thorn the rose."

In one direction, as we learn from Eve, when she urges her husband to divide the pleasant labours of Paradise, the poet beheld

> "A spring of roses intermixed with myrtle."

And again, in another spot, the roses budded so thick about, that Adam could scarcely discern the outline of the woman's form as she stood tending the flowers that bloomed so luxuriantly around the palmy hillocks—

> "Oft stooping to support
> Each flowery tender stalk, whose head though gay
> Carnation, purple, azure, or specked with gold,
> Hung drooping unsustained; them she upstays
> Gently with myrtle-band."

There never was, we believe, a poem of any length in which the rose did not supply a simile on the subject of a glowing and enthusiastic description. From Homer's time to the present this has been the case.

> "The blind old man of Chio's rocky isle"

describes

> "The rosy finger'd morn"

as parting the roseate curtains of the day.

> "The rosy bosomed hours,"

described in Comus, forms a favourite quotation. Milton places it almost first among flowers, and in his song commencing

> "Sabrina fair,
> Listen where thou art sitting
> Under the glassy, cool translucent wave,
> In twisting braids of lilies, knitting
> The loose train of thy amber-dropping hair,"

he entreats the goddess of the silver lake to rise and

> "Heave her rosy head"

from out the depths of the stream. The sleeping-couch of young Adonis is formed of hyacinths and roses, and to the silver-buskined nymphs, whose presence haunts the forests of Arcady, he addresses the line,

> "And ye, the breathing roses of the wood."

So that in the rose Milton saw the highest perfection of loveliness. From it he created the most delicate ideas, and where nature spread it profusely over the landscape, there he imagined the very spirit of beauty to linger. But his fondness for this flower did not prevent him from indulging in the most luxurious thoughts, where other of those sweet ornaments displayed themselves before his mind's eye. The repose of Adam and Eve is rendered more delicious by the fact that

> "Flowers were the couch,
> Pansies and violets, and asphodel,
> And hyacinth, earth's freshest, softest lap."

It is not only in his longer poems that Milton pays tribute to the beauty of the flower-garden. Scattered throughout all his other works we find the evidence of that taste which was in him almost a passion, if dilating on the richness of those treasures to be found in the stores of nature. We find him, as it were, sitting

> "By slow Meander's margent stream,
> And in the violet-embroidered dale,"

listening to the voice of Echo, "the queen of parley."

Again, we encounter him

> "Upon a bank
> With ivy canopied, and interwove
> With flaunting honeysuckle."

Milton must have studied with much attention the science of flowers, for he speaks of them not only with the enthusiastic raptures of the admiring poet, but also with the ease and knowledge of the amateur. He knew their seasons, and could tell the time of their

coming. He was well aware of their several natures and virtues, and was not ignorant of the order in which they appear through the several months. We could mention those poets who, carried away by enthusiasm, or lost in ignorance, fling together a profusion of figures and thoughts, heaping up strange flowers in company, and creating impossible combinations in order to produce a glittering picture. But Milton does not thus err. He places each flower in its proper season and situation. From

> " The cowslip's velvet head,
> That bends not as I tread,"

to where, in the regions of eternal summer,

> " The west winds with musky wing
> About the cedarn alleys fling
> Nard and Cassia's balmy smells;
> Iris there, with humid bow,
> Waters the odorous banks that blow;
> Flowers of more mingled hue
> Than her purpled scarf can show;"

all are correctly spoken of, and distinguished by appropriate epithets. On the river bank, in the wood, on the turfy lawn, in the open mead, and in the

> " Hazel copses green,"

we find flowers flourishing in all their various beauty. Of whatever he may be speaking, from that

> " When first the white-thorn blows,"

to the month when all the fields and gardens are gay with blossoms, he continually revels in those glowing descriptions which constitute so great a part of the beauty of his poems. But perhaps the passage in which Milton's love of the flower garden appears to the greatest advantage, is that which occurs in *Lycidas*. We here perceive his great acquaintance with the volume of nature, his minute observance of trifles, with which he forms a succession of the richest ideas.

> " Return, Sicilian muse,
> And call the vales, and bid them hither cast
> Their bells and flow'rets of a thousand hues;
> Ye valleys low, where the mild whispers rise
> Of shades and wanton winds, and gushing brooks,
> On whose fresh laps the swart star sparely looks,
> Throw hither all your quaint enamell'd eyes,
> That on the green turf suck the honey'd showers,
> And purple all the ground with vernal flowers;
> Bring the rash primrose that forsaken dies,
> The tufted crow too, and pale jessamine,
> The white pink and the pansy peaked with jet,
> The glowing violet,
> The musk rose and the well attired woodbine,
> With cowslips wan that hang the pensive head,
> And every flower that good embroidery wears;
> Bid Amarantus all his beauty shed,
> And daffodilies fill their cup with tears,
> To strow the laureate verse where Lycid lies."

Nothing can be more exquisite than this fragment. As we read, we call up the flowers before us, and by the time we arrive at the close, there lies stretched out before our mind's eye a scene so lively, so brilliant, that the imagination fails to receive all the bright impressions created. From these verses, hundreds of others have been coined by writers whose thoughts were so imbued with the rich magnificence of Milton's poesy, that they have often, perhaps unconsciously, fancied they were forming ideas of their own, while they in reality wrote nothing but a mass of verse, whose brilliancy was borrowed, and almost lost in the cloud of weak and dull imagery.

We shall not pause to wander with Milton over the

> " Meadows trim with daisies pied;"

nor shall we stay to hear the story of Hyacinth transformed by Apollo into a purple flower. One more extract we must, however, make. It is of unequalled beauty, and forms the first of four lines of a sonnet on May morning:—

> " Now the bright morning star, day's harbinger,
> Comes dancing from the east, and leads with her
> The flowery May, who from her green lap throws
> The yellow cowslip and the pale primrose."

Shakspeare next claims our attention. Our choice has been accidental; we draw no comparison between the two poets, for there is no analogy between them. We immediately perceive the different cast of thought which pervades their poetry:—

> " And I serve the Fairy Queen,
> To dew her orb upon the green.
> The cowslips tall her pensioners be,
> In their gold-coats spots you see;
> These be rubies, fairy favours,
> In those freckles live their savours;
> I must go seek some dew-drops here and there,
> And hang a pearl in every cowslip's ear."

Whether the savours of the cowslip proceed from the spots in their gold coats, we do not think has been determined by botanists. The mention of the fact, however, by Shakspeare, proves his minute observation, and we conjecture that he must have been told, or have read of the fact, somewhere. This, however, though curious, is perhaps not important, and we leave the discussion of it to others, and hurry on to the delicious description of Titania's forest couch:—

> " I know a bank whereon the wild thyme blows,
> Where ox-lip and the nodding violet grows,
> Quite over canopied with luscious woodbine,
> With sweet musk-roses and with eglantine."

The Queen of Fairies retiring to rest, gives her orders to the attendant train before lying down to sleep:—

> " Hence!
> Some to kill cankers in the musk-rose buds."

For she wished to preserve the beauty of those

sweet graces from being injured by those mischievous agencies very often touched on by the poet,

"As killing as the canker to the rose."—Milton.

The canker in the rose is a favourite simile. Shakspeare has it more than once :—

"As in the bud bit with an envious worm,
Ere he can spread his sweet leaves to the air,
And dedicate his beauty to the sun."

And again, in his fifty-fourth sonnet, he gives expression to an idea of the same kind :

"The rose looks fair, but fairer we it deem
For that sweet odour which doth in it live;
The canker'd blooms have full as deep a dye
As the perfumed tincture of the roses
Hang on such thorns, and play as wantonly,
When summer's breath their masked bud discloses."

The property which renders the rose so much admired, that of retaining its scent when the beauty of its appearance has gone, when its leaves are withered, when it has shrunk into nothing, gives occasion for a fine figure. Shakspeare expresses this well. He has been speaking of the things which are valuable only so long as their beauty lasts,—whose virtue dies with their show.

"Sweet roses do not so;
Of their sweet deaths are sweeter odours made."

Spenser, the quaint poet of Fairyland, does not appear to have been possessed by the love of flowers in a degree half so extreme as that by which the other poets have been influenced. He seldom makes allusion to them except generally. This we cannot fail to regret, evident as it is that, had he chosen them for his theme in any portion of his poem, his easy and rapid pen could have delineated a picture than which nothing could be more pleasing. In the march of the months, however, occasional references occur to the flowery gifts of nature. April is described as riding upon a bull, whose horns are

"Gilden all with golden studs,
And garnished with garlands goodly bright,
Of all the fairest flowers and freshest buds."

And May comes leaping forward—

"Deckt with all the dainties of her season's pride,
And throwing flowers out of her lap around."

The altar prepared for the sacrifice of Serena is decked "with ariest flowers," and for the victim a garland is prepared. The lovely Medora is represented with "a chaplet of sundry flowers" on her head, and her hair "with flowers bescattered." The "dædale earth" is spoken of as throwing forth—

"Out of her fruitful lap aboundant flowers.'

On several other occasions Spenser brings in an allusion to flowers; but, on the whole, he seems not to have taken much delight in them, preferring rather to dilate, either on grim spectacles, or on the more gorgeous and brilliant magnificence of palaces and castles. From him let us turn to Byron, the poet of gloom. He, too, shows little liking for flowers. He takes but little pleasure in the soft and gentle beauties of the garden, but rather loves to turn his ambitious thought towards the passions, and to that grandeur and magnificence of description in which these humble ornaments would be lost. He is almost the only poet who associates with them any idea contrary to that of happiness or innocence :—

"Flowers whose wild odours breathe but agonies."

However, there is rich beauty in the lines :—

"Gently flows
The deep-dyed Brenta, where their hues instil
The odorous purple of a new-born rose
Which streams upon her stream, and glass'd within it glows."

But Byron, as we have said, was no lover of flowers, and we must leave him. His poems contain occasional allusions to them, among which perhaps one of the most delicate is the following :—

"I saw her weep; the big round tears
Fell from that eye of blue,
And to my eye it did appear
A violet dropping dew."

Such allusions, however, are, in his poems, few and far between. Far otherwise was it with numerous other poets, whose ideas constantly fall into the strain, and borrow beauty and imagery from the flower garden. In the "flowery fields of joy" of Joseph Warton we find Youth and Mirth

"Nodding their lily-crownèd heads
Where Laughter rose-lipp'd Hebe leads."

And, further on, what can be more beautiful than the couplet ?—

"When young-eyed Spring profusely throws
From her green lap the pink and rose."

There is less, however, in this poem which refers to flowers than might have been expected. Flowers form the very crown of Fancy; and, in an ode to the nymph, we look for more allusion to them. Dryden very often touched on flowers. His versification, though wanting in the grandeur which renders the poetry of Milton, Shakspeare, and Byron so pleasant to the ear, yet flows smoothly, and, as it were, glides along without effort.

"The sycamores with eglantine were spread,
A hedge about the sides, a covering overhead,
And so the fragrant briar wove between
The sycamores, and flowers were mixed with green,
And the fresh eglantine exhaled a breath
Whose odours were of power to raise from death."

We shall now introduce our readers to the quaint but yet graceful poetry of Andrew

Marvel, whose imagination often delights itself with the luxuries of the flower garden. His idea of it is, however, not of the usual kind; he does not delight in well ordered parterres, in straightly laid walks, and artistically-planned arrangements; he would rather revel in a wild profusion of flowers, and see beauty in disorder. The verses are supposed to be sung by the nymph complaining of the death of her fawn :—

"I have a garden of my own,
But so with roses overgrown,
And lilies, that you would it guess
To be a little wilderness;
And all the spring-time of the year
It only loved to be there.
Among the beds of lilies I
Have sought it oft where it should lie;
For in the flaxen lilies' shade
It like a bank of lilies laid.
Upon the roses it would feed
Until its lips e'en seemed to bleed;
And then to me 'twould boldly trip,
And print these roses on my lip;
But all its chief delight was still
On roses thus itself to fill."

Michael Drayton, a poet of the same class, though not perhaps possessed of so much power, will not miss the opportunity to glance at the gifts of Flora.

"A maiden, on a morn betime,
Went forth, when May was in the prime,
To get sweet sethgall,
The honeysuckle, the harlock,
The lily and the lady-smock;
Thus she wander'd here and there,
And pickèd off the bloomy brier."

Perhaps, as we started with saying that we should confine ourselves in the present article to the loftier pinnacles of poetry, it may appear somewhat strange that, stooping from the level on which we have hitherto ranged, we pick up Elijah Fenton and cull a flower from his modest garden plot. He pretends to little, and does not accomplish very much; but his poetry, though neither grand nor brilliant, is not without its sweetness; and we may be pardoned for bringing him into company with the brighter luminaries which, in the poetical firmament, revolve around Shakspeare and Milton; but these luminaries have their satellites, and we select a verse from one of them :—

"At length the lusty spring prevails,
And swift, to meet the smiling May,
Is wafted by the western gales.
Around him dance the rosy hours,
And damasking the ground with flowers,
With ambient sweets perfume the morn."

The lines are sprightly, and not without merit. Of a different class, but yet quite as happy in expression, is the following passage in Lobbin Clart's panegyric on Blowzelinda. Every one will recognise John Gay in these verses :—

"My Blowzelinda is the blithest lass;
Than primrose sweeter, or the clover-grass.
Fair is the king-cup that in meadow blows,
Fair is the daisy that beside he grows
Fair is the gilliflower of gardens sweet;
Fair is the marigold of pottage meet:
But Blowzelind than gilliflower's more fair,
Than daisy, marigold, or king-cup rare."

The poet is here humble, and his ideas are humble. He confines himself to lowly flowers, for he is treating of a lowly subject; and the gastronomic allusion contained in the lines does not take away from their sweetness.

Our readers will, we are sure, thank us for introducing to them William Hamilton, the Ayrshire poet, whose productions are marked by much genius and originality. There is genuine beauty in the lines we extract :—

"Mark how Nature's hand bestows
Abundant grace on all that grows;
Tinges with pencil hue, unseen,
The grass that clothes the valley green;
Or spreads the *tulip's parted streaks*,
Or sanguine dyes the rose's cheeks."

This is the only specimen we shall give from William Hamilton; but it is a gem of thought. Were our inclination to tend that way, we could multiply, to an indefinite extent, instances of the delight which the poet has almost always felt in dwelling on the beauty and luxury of a flower-garden. The "perfume-breathing rose," the "innocent lily," the "sweet flower of the valley," the "various tulip," the "golden cowslip,"—all share in the poet's praise, some for the brilliancy of their colours, others for the sweetness of their perfume :—

"Full many a flower of sweetness grows;
The lily and the damask rose,
The jasmine and the eglantine,
The pendants of the sweet woodbine,
The snowdrop and the pimpernel,
The pansy and the bright blue-bell :—
All these are sweet—I love them well—
All these are sweet and fair, but yet,
Most I love the violet."

And the poet is not alone in his admiration of the "glowing violet." It is, indeed, a magnificent flower! Who can look upon the rich purple-blue, soft as velvet, which forms its chief beauty, without being struck with admiration!

"The violet blue
Sweeter than the lids of Juno's eyes,
Or Cytherea's breath."

So that, for beauty and fragrance, this flower has received the highest praise. It has yet another quality—modesty—for which it has frequently been extolled :—

"Look, where the violet lifts its lowly head—
That rich, sweet flower, whose deep imperial hue
Surpasses all the gorgeous flowers that grow,
And yet it is not proud. It loves to bloom
Far in the valley's depth, or 'neath the shade

Of some steep mossy bank, while other flowers
Delight to flaunt before the admiring eye,
Out in the sunny fields. And yet of them,
Sweet as they are, and beautiful to see,
Not one can claim to rear its fragrant head
Above the modest purple violet."

The old and unknown poet from whose quaint and crabbed language these lines have been extracted and smoothed, was, in our opinion, almost if not quite right. There is scarcely any flower to which we would accord a preference before the violet. But,

"All that's bright must fade,
The brightest still the fleetest;"

and the violet, accordingly, flourishes for but a brief period, and withers.

Perhaps our readers may not have been uninterested in the perusal of the expression of the poet's sympathy with the beauties of the flower-garden. We have sauntered through the "flowery paths of poesy," and marked a few of the most glittering specimens. But it must not be imagined we have culled all the rich blossoms there to be gathered. An infinite number remain. From Shakspeare we have selected but one or two choice gems; Milton we have not exhausted; and Byron has only afforded us one or two lines. We have not taxed the pages of Chaucer at all, and have left the Hellenic poets and the poets of ancient Italy for another occasion. Meanwhile, we trust our readers may not have felt uninterested in the selections which we have extracted. It is always pleasant to know what influence is exerted on lofty minds by the varied beauties of nature—and the poet's imagination has seldom failed to be such,—and kindled into enthusiasm by the glowing beauties of the Flower Garden.

GARDENING FOR CHILDREN.*

A PRETTY title for a pretty book, written down to the understanding of a child, but divested of that frivolity which distinguishes this branch of literature; for certain it is, that the authors of works for the younger branches seem to fancy it necessary to adapt their little books to very childish notions, as if it were desirable to perpetuate them, instead of leading them to better things. This work, built

* Gardening for Children. Edited by the Rev. C. A. Johns, B.A. F.L.S., Author of "Botanical Rambles," &c. London: Charles Cox.

upon the affection which all children have for flowers, even from the cradle—for the youngest infant will stretch forth its little hand for a daisy—teaches the facts connected with gardening in language quite as simple, but by no means so silly, as older volumes teach the little reader that "old Mother Hubbard went to the cupboard," and forms a contrast worthy of the advanced age. Those children who have been accustomed to the St. Paul's Churchyard books of instruction, which taught them that "a cow jumped over the moon," and "a dish ran after a spoon," will find a great change, and, in all probability, much more delight, in the gardening propensities of "little Willy," the leading character in "Gardening for Children;" and the idea of his awakening his tutor to the necessity of teaching him gardening, by sowing the caraway seeds out of a cake, is a good one. A child's notions are formed from objects around him in the same way that a man's are formed. They are always in advance, because they see certain results arise from certain causes, though they may be often wrong, from the very reason that they are not taught to draw right conclusions; and it is here that we are all wrong. We ought never to allow a child to remain in ignorance for want of satisfying his inquiring mind on all subjects that it is safe to teach: and we should watch the eye as well as listen to the tongue; for nobody can avoid noticing the eagerness with which a child gazes upon anything he does not quite understand; yet, for the most part, children's books teem with all the absurdities of the worst nursery rhymes, many of which are as questionable, and some of which as unquestionable, as to their propriety or impropriety, as they well can be. We have now before us an illustrated book detailing the adventures of "a little old woman," whom, to quote the author's words,

> "I have heard tell,
> And she went to market her eggs *for* to sell."

And in doggrel rhyme we are given the particulars of her journey and adventures.

Now, setting aside the vulgarity, and making every allowance for the fun, will anybody defend the getting-up of a shilling book, with bedaubed wood-cuts to illustrate such a subject, for a child's book? We think not. But let it not be supposed that this is an isolated case; hundreds equally silly, and many quite as vulgar, have been sent forth among the children of this country for the last half century. But, we may be told, we are writing of other books instead of the one we are properly noticing; we admit this, but we do not know how to do justice to a new style of literature for children without exhibiting the faults of the old; and we doubt much if our readers can so well appreciate the one if they are not reminded of the other.

The little volume before us is edited by the Rev. C. A. Johns, author of "Botanical Rambles," "Forest Trees of Britain," and other popular works, who, as Little Willy's tutor, leads him from time to time through the garden, shows him all the operations, gives him a piece of ground, describes flowers, teaches him how to dig, hoe, rake, weed, and do everything necessary to produce his favourite flowers in perfection, and reads a great moral lesson to "children of a larger growth." It is not only a little manual of gardening, written with great care, in language that a child can understand, but it shows how much can be done towards rendering a child useful at an early period. Her Majesty has long since provided the young Royal family with plots of garden, and garden implements; and no higher authority is needed for the propriety of making the tillage of the ground part of the education of a child. It is as necessary as any other branch of learning, and to the million it is of more importance than any; for it is a species of information which enables any one in an unknown region to make the earth find him in food. We cannot be supposed to underrate the reading, because that must be acquired before even this valuable little book can be made useful. Upon the whole, we hail the work as the precursor of a new style of literature for children. It is embellished with nearly sixty very superior wood engravings, representing implements used in gardening, and favourite flowers; and it forms one of the best presents that can be made as a Christmas-box or a new-year's gift. The Rev. Mr. Johns has not forgotten first directions. It is a well-meant and well-done lesson of usefulness, which we should like to see in the hands of every child as soon as he could read; and we are quite sure it is calculated for a school-book, inasmuch as the instructions are fit for all ages. To give an idea of the easy style in which the work is written, we make a few extracts, and at a future time we may return to it; for Mr. Johns has closed the volume with a series of maxims, every one of which is a practical lesson in gardening. We will commence with a few lines from the preface:—

"As the title, 'Gardening for Children,' might create an impression that this little book was written to amuse, rather than to instruct, the Editor feels himself called upon to state that all the directions contained in it were furnished by an eminent practical gardener, and are the result of many years' experience. They are, therefore, not merely adapted for the use of children, but will be

found equally suited for cottagers and amateur gardeners, who have at their command only a small plot of ground."

The correctness of these observations is most fully borne out by the following, or indeed by any extracts we could make from the book :—

"*Nemophila insignis.*—This is a showy annual of a dwarf growth, which soon displays abundance of small blue flowers a little cupped, having a pure white eye, and deeply cut leaves. Its seeds may be sown at different seasons, a few in April, and a few at the end of September ; for if the winter be not very sharp, they will bloom very early in spring, and those sown in spring will come into flower by the time the autumn-sown ones decline. The young plants will bear removal, but I prefer sowing them where they are to bloom ; there is, however, no harm in planting out the few that you take up from a patch when they have been sown too thickly ; and some gardeners make them regularly potted plants, and therefore sow all

in one place, and pot off or plant out at pleasure. They are very beautiful till they begin to straggle along the ground, when, although they still keep flowering a little, I should advise you to pull them up to make room for something better.—P. 10.

"*Sweet Peas.*—These are grown for their scent and abundance of variegated flowers. There are several varieties of colour, and each of the varieties has two or three colours in itself : they are flowers which require to be supported by sticks or something of the kind; leafless branches of trees are perhaps the best

support, because the peas will grow over them, and quite hide their unsightly appearance with their mass of flowers. These may be sown ten or twelve in a patch, and they will grow three feet high, so that neat branches of the same height should be placed for the peas to climb over. Some gardeners, however, use only a single stake, and tie up the peas as they grow, till they are two feet six inches high, when they allow them to fall over and form a head of bloom ; but nothing is so good as two or three branched sticks, which support the peas well, and give much less trouble than single stakes. The Sweet Pea is also an old established favourite as a nosegay flower, and may be cut with long stems."—P. 14.

"*The Columbine* you should sow in May, and it will bloom the next year. The plant is as elegant as the lupine [just mentioned]; the bloom of the very double ones is as rich as it is beautiful, consisting of many horn-shaped florets, which have so quaint an appearance, that they almost remind us of an old-fashioned quilled bonnet. If I knew where to obtain half-a-dozen healthy plants from a good collection, I should prefer saving the seeds collected from those to trusting to any chance purchase. But if our varieties should turn out indifferently, we will make another

trial, for this is far too pretty a plant to be lost. Its colours are dark and light blue,

dark and light pink, blue and white mixed, and pink and white mixed."—P. 31.

"*The Parts of a Plant.*—I shall now enter upon another division of my subject, not relating entirely to the practice of Gardening, but nevertheless very important. I told you the other day that I should wish you to be able to give a reason for every gardening operation that you perform. There are many gardeners, I fear, who, although they work very industriously, and keep their gardens in excellent order, often fall into great errors from not having formed the habit of thinking why it is desirable that certain things should be done in a particular way, or even why it is necessary that they should be done at all. The consequence is, that they now and then find their crops turn out in a very different way from what they expected, and do not know how to set matters to rights on another occasion. Now I wish you never to rest contented with knowing that it is right for you to do so and so, but to find out the reason for the very simplest operation. This you will not be able to do without being first acquainted, to a certain extent, with the science of botany. I do not mean by botany merely the being able to call plants by very long and very hard names, of which you cannot yet know the meaning; but I think it highly desirable that you should be able to carry in your minds a correct general idea of the principal parts of a plant, and of the use of each part. Willy's table of maxims will give you a good deal of information on this point, for you will find that every one of them contains some practical direction founded on what he has learnt, either from reading or personal observation, to be a fact. All the botany that I wish you to study at present is a collection of such facts, and I think you will be the better able to recollect them if I present them to you in a collected form, even although you should discover some of them again among the maxims.

"I will, then, describe the principal parts of a plant, and the most remarkable functions of each.

"*The Seed.*—If you remove the shell and inner skin from a hazel-nut or filbert (fig. 1), you will find that the kernel easily separates into two pieces throughout nearly its whole extent, being held together at the smaller end by a small body, which tapers towards each of its extremities. This little body is called the *germ*, and may be compared to a bud containing the rudiments of a tree like that from which the nut was taken. The two larger portions are termed the *seed-lobes*, and contain enough nourishment to support the young plant until it has formed roots and leaves, and is able to provide for itself. The kernel, or seed, has no tendency in itself to alter its form, if kept dry and exposed to light; but if buried a few inches beneath the surface of damp earth, it swells and bursts its coverings; the seed-lobes are changed into green fleshy leaves, and between them the germ lengthens upwards and downwards, expanding first one *leaf* and then

Fig. 1.

Fig. 2.

another, and sending out from its lower end downy fibres or *roots*. All the nourishment which it receives at present, is derived from the enlarged seed-lobes, called *seed-leaves* in this stage of their growth; consequently, if they are destroyed, the young plant perishes likewise.

"The true leaves, which shoot up between the seed-leaves, are generally different in form from the seed-leaves, as may be observed in the young cabbage-plant (fig. 2). They usually consist of two parts (fig. 3). The *leaf-*

Fig. 3.

stalk, is a collection of tubes enclosed in a thin rind, and destined to convey juices and air upwards and downwards between the leaf and the stem. The flat part of the leaf is composed of a network of tubes like those of the leaf-stalk, the interstices being filled up with a number of minute cells, which contain a green juice, and the whole is covered, above and below, with a thin, transparent skin. This thin skin, or *cuticle*, is perforated over its whole surface, both upper and under, with numerous pores, so small as to be invisible to the naked eye; but, nevertheless, perfectly adapted to the purpose of giving out all the superfluous moisture and air received from the roots, as well as of absorbing from the atmosphere all that it contains necessary for the growth of the plant. The leaves also perform the function of preparing the various juices which are destined for the use of all parts of the plant; they are, consequently, as important as the roots.

Fig. 4.

"At the base of every leaf is a bud, which contains either leaves precisely similar to those described, or rudiments of flowers (fig. 4). Generally, only a portion of these come to perfection, most plants having, as it were, a reserve of these useful organs, to be called into life if required, and in trees they are carefully protected from cold in winter by scales, wool, or gum.

"When the plant has gained size and strength, it is enabled to produce a new organ yet more delicate and complex than the leaf; this is the *flower* or *blossom*. A perfect flower in its natural state consists of a green cup or *calyx*, the leaves of which, if there be more than one, are called *sepals*; the *corolla*, the coloured leaves of which are called *chives* or *petals*; *stamens*, and *pistils*. The beauty of the flower mainly depends on the perfection of the corolla; the production of seed depends exclusively on the presence of stamens and pistils. The art of the florist consists in increasing the number, size, regularity, and bright tints of the petals.

"In the rose (fig. 5) the *calyx* consists of five *sepals*, which remain attached to the plant after the petals have fallen off; the primrose has a calyx of one leaf, divided into five *segments* (fig. 6); the tulip has no calyx.

Fig. 5. Fig. 6.

"The *corolla* of the poppy consists of five *petals* (fig. 7); that of the primrose has but one, which is divided into five *segments* (fig. 8);

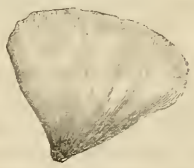


Fig. 7.

Fig. 8.

and some plants have no corolla, but these are rarely cultivated by gardeners.

"A *stamen* consists of three parts; the *filament*, which is a thread of tubes for conveying nourishment to the other parts; the *anther*, a case usually of two cells, which, when ripe, burst and shed a quantity of fine powder, called *pollen* or *farina* (fig. 9). The honeysuckle contains five such stamens; the poppy a countless number.

Fig. 9.

"The place of the *pistil*, or, if there be more than one, of the *pistils*, is in the very centre of the flower. Its summit is called the *stigma*, and its lower part the *germen*, and these are generally separated from one another by a third part, called the *style*. In the primrose the stigma is globular (fig. 10) and the style long; in the poppy the stigma is radiated, and there is no style (fig. 11). The germen contains the rudiments of the *seed*, and when enlarged is usually

Fig. 10

Fig. 11.

called the *seed-vessel* or *fruit*. No flower can produce perfect fruit unless some portion of pollen fall on the stigma; few double flowers, therefore, that is to say, flowers in which the stamens and pistils have been changed by excessive cultivation into petals, produce seeds. In the case of dahlias, China-asters, &c., there would seem to be an exception to this law; but it is only an apparent one; for what is called a single dahlia, or a single China-aster, is not in reality one flower, but an assemblage of small flowers or *florets*, of which the yellow central ones are furnished with stamens and pistils, and the spreading, petal-like ones are furnished with pistils only. Consequently, when the central florets are changed into spreading florets, they still continue to have pistils, and are capable of producing seeds, provided that pollen, either from the same flower, or from another flower of the same kind, falls on them. But in the case of a double stock or wallflower, both stamens and pistils are wanting; these flowers, therefore, are always barren."—Pp. 144—154.

VEGETATION OF BRAZIL.*

Mr. Gardner, in his entertaining book of *Travels in Brazil*, thus describes the nature of the vegetation in the neighbourhood of Pernambuco.

"About twenty miles to the westward of Pernambuco, there is a small German Colony called Catucá .... Being desirous of spending a day or two at this place, I started early one morning in the beginning of November, accompanied by Mr. White, a young gentleman whom I had previously met on the Organ Mountains. Our route for about two hours was through a flat country, principally planted with Mandiocca, although a great part of it was still uncleared, only the large trees having been cut down: a few of those remaining rose high above their fellows of the wood, and agreeably diversified the landscape. After passing through this cultivated country, and ascending a slight eminence, we entered the virgin forest. Previously the road had been of a sandy nature, but now we found it to consist of hard red clay. Many of the trees were very lofty, although they do not commonly attain the stature of those in the Province of Rio, nor have their trunks the same circumference. Among the shrubs that grew below them, I observed a few *Melastomaceæ*, *Myrtaceæ*, and *Rubiaceæ*. Here everything betokened a drier atmosphere, and a more arid soil than at Rio. There were no *Ferns*, *Begonias*, *Pipers*, or *Orchidaceous* plants. On the stems and branches of the larger trees a few *Bromeliaceæ* and *Aroideæ* were alone to be seen. After riding for about an hour through this forest, we reached the cleared valley containing the cottages of the colonists, several of which we passed before reaching the one in which we remained. These cottages are generally of small size, although much superior in cleanliness and neatness of arrangement to those belonging to the same class of Brazilians. My friend being desirous of having a few days shooting in the woods with one of the Germans, I determined to accompany them, in the hope of making some additions to my Botanical stores. We set off early, entering the wood about a mile from the cottage. Here, as in similar situations near the town, I observed a great deficiency of herbaceous vegetation, and in a walk of about two hours only collected a few Ferns. In passing through this wood, we saw an enormously large tree, a species of *Lecythis;* the ground beneath it was covered with its curious pot-like capsules nearly as large as a man's head, their resemblance to a pot being much increased by the large lid which falls off from the top of each when the seeds within are ripe. Most of those we saw were empty, the nuts having been taken out by the monkeys, who are very fond of them. Leaving this wood, we suddenly came upon another cleared valley, containing the ruins of several cottages; this, we were told, had been the first site of the settlement; but as the colonists were forbidden to cut any more wood in that direction, they moved their quarters to the place before mentioned. Near these dismantled dwellings we found abundance of pine-apples, and refreshed ourselves with some which were ripe, sheltering ourselves from the sun under the shade of an out-house which had formerly served as a place for the preparation of Farinha from the Mandiocca root. Near this place I found two beautiful trees, one of them a species of *Vochysia*, covered with long spikes of bright yellow flowers, and the other the splendid *Moronobea coccinea*, literally covered with its globular crimson blossoms. In returning I collected specimens of a yellow-flowered *Palicourea*, called Mata Rato, not, however, the same plant which is known at Rio by the name of Erva do Rato. It proves, notwithstanding, that poisonous qualities are attributed to different plants of the same genus in different parts of the country."—P. 91.

* Travels in the Interior of Brazil, principally through the Northern Provinces, and the Gold and Diamond Districts, during the years 1836—1841, by George Gardner, F.L.S., Superintendent of the Royal Botanic Garden of Ceylon. London: Reeves. [Second Notice.]

Near the village of Propiá on the south of the Rio de Francisco, and seven leagues from Penêdo,

"The most striking objects of vegetation which I observed on the banks of the river, were many trees of considerable size, belonging to the natural order *Leguminosæ*, bearing large spikes of light purple flowers; abundance of a curious kind of *Cactus*, reaching to the height of from twenty to thirty feet, the great fleshy and naked arms of which stand out like the branches of an enormous chandelier. A most striking difference was to be observed between the verdure of that part of the country which, for upwards of four months, had been under water, and the more elevated parts, on which no rain had fallen for nearly six months. The latter had more the appearance of the deciduous woods of Europe in winter, than such as grow within the tropics are generally supposed to present. It was only here and there, that a tree was to be seen covered with leaves, all the others having lost their foliage, owing to the excessive and long continued drought."—Pp. 119, 120.

At Traipú, seven leagues further, on the north bank of the river,

"The effect of the drought on the vegetation was still greater than further down; as far as the eye could reach, nothing like a forest was to be seen, both the hills and valleys being thinly covered with small trees and shrubs, and all, with a few solitary exceptions, denuded of their foliage. On the surface of the ground itself there was no herbaceous vegetation, the red coloured soil alone being seen through the withered bushes. Here and there along the banks a few houses exist, but none were to be observed inland. The only objects that relieved the eye in this desert-like region, were the green bushes which grew along the inundated banks, and the grotesque *Cacti* abounding in dry rocky places. These latter are the most conspicuous objects that meet the eye of a voyager; some of their trunks are of immense thickness, and their branching tops reach to a great height above the surrounding vegetation. These are certainly the most remarkable looking plants of the many which clothe the surface of our globe, their huge fleshy branches seeming more the work of art than of nature. It is only plants such as these, that are able to retain their verdure during the long droughts to which the country here is subjected. On the rocky places where these grow, there are also many *Bromeliaceous* plants, which, in spite of the want of rain, not only grow luxuriantly, but produce their large red clusters of flowers in the greatest perfection. The rocks on which these plants vegetate are of gneiss, in thin layers of a dark colour, full of small garnets, and cropping out at a very obtuse angle towards the south. We remained for the night at Traipú, and at nine o'clock next morning resumed our voyage, but as the wind was very high, we could make no way against the current; at about half a league from the place of our departure we were obliged to halt for some hours on the north bank of the river. This afforded me an opportunity of landing, when I made a few additions to my collections. Among these was a species of *Azolla*, which existed in the greatest abundance, in a flat muddy place that was slightly flooded. Here also I met with some of the largest *Cacti* I have ever seen; one in particular was of enormous size, the stem measuring upwards of three feet in circumference, and unbranched to the height of about ten feet; its entire height could not be less than between thirty and forty feet. This and other large kinds of *Cactus* are called by the inhabitants of this part of the country Sheeke-sheeke, and their fleshy stems and branches, after being stript of their bark and spines, are roasted and eaten in times of scarcity; under similar circumstances they are given raw to cattle. On the following morning, before breakfast, I took a walk to a high ridge of gneiss rocks, which is at a little distance from the river, and found a variety of different kinds of *Cacti*. One of these was a great *Melocactus* much larger than the one which is so common near Pernambuco; it grows in fissures of the rock where scarcely any soil exists, and its tough roots penetrate to such a depth, that they can with difficulty be withdrawn; living specimens of this (*Melocactus Hookerianus*, Gardn.) which I sent home, now exist in the collections at Kew and Glasgow."—Pp. 123—125.

Alagoas was afterwards visited.

"During my rambles in this neighbourhood, I found several species of plants which I had not previously met with. In a small stream of beautifully clear water the curious *Cabomba aquatica*, Aubl. grows abundantly, which to the Botanist is a most interesting plant, as, both in habit and structure, it forms a transition link between the *Ranunculus* family and that of the water lilies. In the same stream I likewise collected specimens of a *Marsilæa*, a pale blue flowered *Pontederia*, and a large white flowered *Nymphæa* different from that which grows in the lake at Olinda. In brackish water a little above Maceio, a *Potamogeton* grows in vast quantities, which, on comparison, does not seem to differ from the British *P. pectinatus*. We returned to Maceio by daylight, and I observed that the

shores abound with Mangroves, principally *Rhizophora Mangle*, which reaches here to a much greater size than I have elsewhere seen it, some of the trees being at least thirty feet high, with stems proportionately thick; it presents a curious appearance, the large roots supporting the stems at the height of several feet above the water, and curving outwards and downwards; if the real top were not seen, we could almost fancy that the tree had been reversed; the long pendent radicles of the seeds are also remarkable, as they are thrown down to the ground while the fruit is yet attached to the parent plant. The wood of this tree is very much used as fuel, it burns extremely well in the green state; at Maranham little else is used for this purpose."—Pp. 145, 146.

"A little beyond Icó the road becomes very rough, frequently ascending and again descending over rocky paths, on which account it is no longer serviceable for the transit of waggons, all farther traffic into the interior being now effected either on horseback, or, strange as it may appear, upon oxen. The diversity of hill and dale renders this part of the journey less mountainous, and although the herbaceous vegetation was much destroyed by the heat, the greater part of the trees, which are both large and more numerous, still retained their leaves; the most abundant tree that I observed was called by the inhabitants Aroeira; it is a species of *Schinus*, perhaps *S. Aroeira*, St. Hil. and reaches to the height of thirty or forty feet; as the stem grows very straight it is much used in house-building; at this time it was destitute of leaves, but from the ends of its branches were suspended clusters of small fruit of a dark colour, giving it very much the appearance of the European alder when covered with its dark-brown catkins. The other trees consist chiefly of large *Acucias* and *Mimosas*, *Bignonias* of considerable size covered with yellow and rose coloured flowers, a *Triplaris*, and, the most beautiful of all, a large *Jacaranda*, the wide-spreading branches of which were densely covered with great panicles of beautiful large blue flowers, not unlike those of the no less splendid *Gloxinia speciosa;* among these sometimes appear a few solitary Carnahuba palms, but in hollow sheltered places they often occur in groups; large *Cacti* are not uncommon, and we passed over some elevated open shrubby tracts abounding in a species of *Krameria*. The Villa de Lavra de Mangabeira is situated on the banks of the Rio Salgado, and contains about eighty or a hundred houses, all small, and many of them falling to decay .... Here I found, growing in vast quantities on the sandy margins of the river, a species of *Grangea*, which is a powerful bitter, used by the natives as an infusion in dyspeptic cases in the same manner as camomile, which, indeed, it much resembles, and to which they give the same name (*macella*). We left Lavra on the afternoon of the same day on which we arrived, and halted for the night at a small house near the river. In the evening I took a walk in the neighbourhood, but met with nothing new except a species of *Mikania* clinging among the branches of a *Mimosa;* and a few shells in the bed of the river. Between this place and Lavra, the course of the river is very tortuous, and being now very nearly dried up, I observed that the inhabitants had planted melons, water-melons, gourds, &c. in it; bananas were now beginning to be cultivated, and almost every house had its own little cotton and tobacco plantation. Every where *Argemone Mexicana*, the Cardo Santo of the Brazilians, grows in great plenty, the large yellow poppy-like flowers being very beautiful; a handful of the leaves of this plant, together with about a quarter of an ounce of the ripe seeds infused, is used as a draught in jaundice."—Pp. 173—176.

"The greater portion of the wooded districts around Crato consists of deciduous trees and shrubs, forming what are called Catingas, but in low moist localities, and along the base of the Serra, a great many of the trees are evergreen; one of the most common denizens of the Catingas is the *Magonia glabrata*, St. Hil., which is here truly gregarious, covering large tracts for miles to the exclusion of almost everything else; in general it is a tree from thirty to forty feet high, but at full growth it often attains a much greater stature. Like many of the other inhabitants of the Catingas, its flowers appear before the leaves, they are in large panicles, of a greenish yellow colour, and of very sweet scent; it is called Tingi by the natives, who apply it to many useful purposes; an infusion of the bark of the root is employed to poison fish, and that of the stem to cure old ulcers. The fruit is a large dry triangular capsule filled with broad flat seeds, from the kernels of which a kind of soap is manufactured; the manner in which they make it is this: After having taken off the brown membrane which covers the seeds, they are put into a tub of water to steep for some time, when the cotyledons begin to swell and soften, the thin skin which still covers them is easily taken off, and they are then put into a pot along with a small portion of tallow; by boiling and stirring them they soon form a homogeneous mass, which, when cool, is said to answer very well for washing clothes. Another tree which grows in similar situations, is a species of *Caryocar*, that presents a fine appearance when covered with its large corymbs of yellow

flowers; the fruit, which was not ripe during my stay, is said to be excellent when cooked, and its hard wood is of great use as timber in the construction of mills. The Visgeira, already mentioned, and the Timbahuba, are also two large trees of the neighbourhood; the latter belongs to the *Mimosa* tribe, producing large round heads of yellowish flowers, and a broad legume curved round so as to resemble a horse shoe. A kind of small deer that much frequents the woods is very fond of this fruit, and is often watched for at night at the season when the fruit falls, being discovered by the rattling noise which the seeds make within the pod when trodden upon. The Jatobá, a species of *Hymenæa*, is another large tree of common occurrence, as also the Angelim, a large and beautiful species of the genus *Andira;* two *Bignonias* of considerable size are also common in the distant woods, one with purple, the other with yellowish flowers, but owing to the durability and hardness of their timber, which is much sought after by the natives for the construction of mills and carts, they are not allowed to attain any great size near the town of Crato. Besides these there are many other trees of smaller size, among which may be mentioned the Pao de Jangada (*Apeiba Tibourbou*), and one of frequent occurrence, and conspicuous from its large prickly capsules; on the coast its wood affords the material for the raft-boats before described, so commonly in use there. A species of *Byrsonema*, a *Callisthene*, a *Gomphia*, and a *Vitex*, are all remarkably beautiful when in blossom. When planks are required in most, indeed I may say in all parts of the Sertão, there is a sad waste of timber, for to obtain one an entire tree is chopped on both sides until it is reduced to the exact size required. A number of wild fruits are found in the Catingas; among these are the mangaba already spoken of as very common about Pernambuco, the Guava, the Araça, and also, but only on the top of the Serra, a nearly allied species called Marangaba; it is the *Psidium pigmeum* of Arrudo, a shrub from one to two feet high, the fruit of which is about the size of a gooseberry, and is greatly sought after on account of its delicious flavour, which resembles that of the strawberry. The woods in the immediate neighbourhood of the town produce a fruit called Pusá, which belongs to a new species of *Mouriria* (*M. Pusá*, Gardn.), it is about the size of a small plum, of a black colour, and resembles very much in taste the fruit of the Jaboticaba (*Eugenia cauliflora*, DC.) of the south of Brazil; when in season it is brought to the town and carried through the streets for sale, by the Indians. The Cashew is also very common, but the eatable portion of the fruit is smaller and not so well tasted as that which grows along the coast."—Pp. 191—193.

"The country between Parnaguá and Saco do Tanque is comparatively level; and although the general vegetation has very much the same character as that of other Catinga districts, many of the shrubs and trees were quite new to me. At this season very few were in flower; of these the most remarkable was a very large tree to which the name of Sicupira is given by the inhabitants, and which I afterwards found extending far into the province of Goyaz; it belongs to the natural order *Leguminosæ*, and has only very recently been described by Mr. Bentham, under the name of *Commilobium polygalæflorum:* it is easily recognised at a great distance by its numerous large panicles of lilac flowers. An essential oil which is contained in the fruit, is much used by the inhabitants to alleviate the pain of the toothache. A very large silk cotton-tree (*Bombax*), entirely destitute of leaves, was also common, but on one of them I found a few blossoms, which were of enormous size, measuring when fully expanded about a foot and a half across; the petals were of a dark brown colour without, but white within. Near a Fazenda called Riacho d'Area, where we stopped a day, grow a number of large palm trees, on the stems of which I found a large fleshy-stemmed orchideous plant, a species of *Cyrtopodium*, which produced flowering stems about four feet high, terminating in a large panicle of flowers, with brown blotches on an orange ground, and smelling sweetly like wallflower. In marshy bushy places on this journey I saw many plants of the *Vanilla planifolia*, seldom bearing flowers, and more rarely producing fruit. It has now been satisfactorily determined, that this is the species from which the true Vanilla of commerce is procured. In Mexico it is extensively cultivated for the sake of its fruit, which it yields abundantly; while the plants which have been introduced into the East Indies, and the hothouses of Europe, though they have frequently produced flowers, have very seldom perfected their fruit. Dr. Morren of Liége was the first to study attentively the natural history of this plant, and to prove experimentally that the fruit of the Vanilla may be as freely produced in our hothouses as it is in Mexico. He has discovered that from some peculiarities in the reproductive organs of this plant, artificial fecundation is required. In the year 1836, a plant in one of the hothouses in the botanic garden at Liége produced fifty-four flowers, which having been artificially fecundated, exhibited the same number of pods, quite equal to those imported from Mexico; and in 1837, a fresh crop of about a hundred

pods was obtained upon another plant by the same method. He attributes the fecundation of the plant in Mexico, to the action of some insect which frequents the flower ; and hence accounts for the non-production of fruit in those plants which have been removed to other countries. There can be no doubt that this plant is as perfectly indigenous to Brazil, as it is to Mexico; but it is no less certain that its fruit is there seldom matured. Is this also to be attributed to the absence of the means by which nature is supposed to effect fecundation in Mexico? This is a subject, which, as Professor Morren justly observes, well deserves attention in a commercial point of view, since his experiments go to prove, that in all intertropical countries, vanilla might be cultivated, and a great abundance of fruit obtained."—Pp. 295—297.

The Fazenda de Saco do Tanque is situated on the boundary between the province of Piauhy, and the south-western portion of that of Pernambuco; in this district is an elevated table land, called Serra da Batalha, covered with an ever-verdant vegetation. At the foot of this Serra, and on the ascent itself, Mr. Gardner made one of the finest collections of plants since leaving Oeiras.

" In moist sandy places at its foot grow some of these beautiful large-flowered small-leaved *Melastomaceæ*, which are so abundant in the gold and diamond districts ; while on the more elevated sandy tracts I found immense quantities of a kind of nutmeg (*Myristica*), which does not grow more than three feet high The trees on the Chapada itself, consisted chiefly of the Cashew, Piki, Jatoba, Mangaba, Sicupira, *Gomphia hexasperma*, and an arboreous *Bignonia ;* but intermingled with these, there were many beautiful trees and shrubs, which I had not before met with. After crossing the Chapada, which is three leagues in breadth, the descent is very gradual, and ultimately merges into a marshy plain abounding in Buriti palms. The whole country here bore a very different aspect from that we had left behind us, the vegetation being fresh and verdant, which was a great relief to the eye, after having been so long accustomed to leafless trees, and a bare soil of red clay. The woods were all evergreen, and between the clusters of the noble Buriti palms and the wooded parts of the country, there were large open marshy Campos covered with grass, and other herbaceous vegetation common to marshy tracts . . . I was not disappointed in the few short rambles which I took in the neighbourhood, as I met with several remarkable plants, quite different from any I had before seen ; among these were an *Eryngium*, a *Jussiæa*, which formed a small tree about twenty feet high, a tree-fern, the only one I had seen since I left Crato, and a few curious *Eriocaulons* from the marshes."—Pp. 299, 300.

Near where the Rio Preto divides the province of Pernambuco from that of Goyaz, " the moister sandy places afforded me several of those curious *Eriocaulons*, of which so many exist in my collections ; one of these, which I found shortly before we reached the river, was a large branched species about five feet in height; these remarkable forms I afterwards met with in great abundance in the Diamond District, which is the great centre of the *Eriocaulons*, as it is of the *Vellozias* or tree-lily tribe . . . . In a marsh by the side of the river, I collected specimens of an *Isoetes*, which does not appear to differ from the one which grows in Great Britain, (*Isoetes lacustris*, Linn.) The sight of this plant recalled pleasing recollections of long past times, and I could not refrain from indulging in a lengthened train of reflections, which ended by comparing it with myself—a stranger in a strange land, and associated with still stranger companions."—Pp. 310, 311.

" I made many excursions in the neighbourhood of the Aldea do Duro, and notwithstanding it was then the end of the dry season, I found it an excellent field for my researches. The sandy marshes yielded me many curious *Eriocaulons*, and beautiful *Melastomaceæ;* while the upland Campos produced several species of *Diplusodon*, many *Compositæ*, *Labiatæ*, &c. ; but the most common, as well as the most beautiful of the productions of the Campos, were a small *Bignonia* growing in tufts, and scarcely a foot high, bearing numerous large lemon-coloured trumpet-shaped flowers, an *Ipomœa* similar in habit, and about the same size, producing large violet-coloured blossoms, (*Ipomœa hirsutissima*, Gardn.) and two erect kinds of *Echites;* in dry rocky places *Amaryllis Solandræflora*, Lindl. was very common, producing abundantly its large yellow flowers." P. 321.

Near the Villa de Natividade is a lofty Serra, or mountain range.

" I found the western side of the Serra to be bounded by a thick bed of very compact greyish coloured limestone, which beyond the northern point of the Serra, for some leagues, forms large isolated hills, covered with wood. The central part of the chain is granite, between which, and the limestone formation, the rocks are schistose. My botanical harvest was a very rich one, so much so, that I was induced on two subsequent occasions, to ascend the mountain again. I collected, in

particular, many curious and beautiful little ferns, all new species, and several beautiful *Vellozias*; these plants are peculiar to Brazil, and as I have so often spoken of them, I shall here describe their appearance: they belong to the *Endogenous* or *Monocotyledonous* division of the Vegetable Kingdom, and were named in honour of Dr. Joaquim Vellozo de Miranda, a Jesuit, who was a native of the province of Minas Geräes, and who devoted much of his leisure time to the study of the botany of his country. They are most commonly found on the mountains of the interior, but principally in the gold and diamond districts, growing in open grassy places, and often covering large tracts; they vary in height from a few inches to twelve feet, their stems are very dry and fibrous, and seem to be made up of a great mass of long slender roots loosely hung together; and not unfrequently they contain a resinous matter, which causes them to be sought after in the woodless regions of the diamond district for fuel. Sometimes these stems are not less than a foot in diameter, they are very much branched, and are entirely leafless, except the last divisions of the branches, which are clothed with long, narrow, aloe-like leaves, not however, fleshy; from the centre of these spring the flowers, which are generally solitary, although some of the smaller species have as many as six arising from the end of each branch. In the large kinds, the flowers are about six inches long, either of a pure white, or more frequently of a beautiful purple colour; in shape, they are not unlike the large white lily of our gardens, and hence their name of tree-lilies. These plants are called by the Brazilians, Canela d'Emú (literally Emu shanks) from their bare stems resembling the legs of that bird. These beautiful plants were first introduced into the hothouses of England, from seeds sent home by me, and as they are of a very slow growth, and apparently difficult of cultivation, it may reasonably be expected they will be a long time before they can exhibit the beauty of their wild progenitors."—Pp. 343, 344.

"One dark night, about the beginning of December, while passing along the streets of the Villa de Natividade, I observed some boys amusing themselves with some luminous object, which I at first supposed to be a kind of large fire-fly; but on making inquiry I found it to be a beautiful phosphorescent fungus, belonging to the genus *Agaricus*, and was told that it grew abundantly in the neighbourhood, on the decaying leaves of a dwarf palm. Next day I obtained a great many specimens, and found them to vary from one to two and a half inches across. The whole plant gives out at night a bright phosphorescent light, of a pale greenish hue, similar to that emitted by the larger fire-flies, or by those curious soft-bodied marine animals, the *Pyrosomæ;* from this circumstance, and from growing on a palm, it is called by the inhabitants 'Flor do Coco;' the light given out by a few of these fungi, in a dark room, was sufficient to read by. It proved to be quite a new species, and since my return from Brazil, has been described by the Rev. Mr. Berkeley under the name of *Agaricus Gardneri*, from preserved specimens which I brought home. I had already named it *A. phosphorescens*, not being aware at the time I discovered it, that any other species of the same genus exhibited a similar phenomenon; such, however, is the case in the *Agaricus olearius* of De Candolle; and Mr. Drummond of the Swan River colony, in Australia, has given an account of a very large phosphorescent species, occasionally found there."—Pp. 346, 347.

The fields about the banks of the Rio de Palma were gay with a fine terrestrial orchideous plant, an Epistephium, about two feet high, bearing a spike of large rose-coloured flowers.

"The country around Arrayas affords many prospects as highly picturesque and pleasing to the eye of a common observer as to that of the naturalist; to the latter, however, it offers a double charm, owing to the great variety in the objects which such diversity of soil and situation present for his investigations. My excursions in various directions yielded me upwards of three hundred species of plants, all different from any I had elsewhere collected. The dry upland Campos afforded numerous grasses, which are nearly all coarse and rank, and not well suited for pasturage; these grasses do not form a close turf, as in Europe, but grow in scattered tufts, leaving greater intervals of bare soil than the amount of surface actually covered by them; this, however, is not apparent at first sight, for the culm is generally long, and when ripe, and seen from a distance, the Campos appear as if covered with wheat or oats. Many flowering shrubs and beautiful herbaceous plants are found growing among the grasses; of the former *Diplusodon* and *Kielmeyera*, are the most ornamental; one of the latter, (*Kielmeyera rosea*, Mart.) grows in bushes about a foot and a half high, and produces numerous large rose-coloured flowers, from which it has obtained the name of Rosa do Campo. Of the herbaceous plants of these tracts, the most beautiful are those belonging to the Gentian tribe. A species of *Lisianthus* produces large blue bell-shaped blossoms, not unlike those of the *Digitalis* in shape; and towards the end of the rainy season, the fields

are gaily adorned with two elegant species of *Callopisma;* one of these is more abundant than the other, and being intensely bitter, is used medicinally as gentian by the inhabitants of Goyaz, who collect it when in full flower, dried bundles of it being seen hanging up in almost every house ; it is used, in infusion, in dyspepsia, and also to strengthen those who are recovering from fever. The trees of the upland Campos are mostly small, consisting chiefly of the beautiful Sicupíra (*Commilobium polygalæflorum*), *Qualea grandiflora*, and *Q. parviflora*, a *Vochysia*, *Salvertia convallariodora*, a *Panax*, an *Albertinia*, a *Lafoensia*, two species of *Cecropia*, the Mangába do Mono, the Cashew, and several species of *Mimosa*."—Pp. 369, 370.

" Lavrinha is situated on the southern extremity of the Serra, in a hollow, surrounded by rocky hills, somewhat lower than those which form the more northern parts of the Serra. Here I again made numerous collections, among which were two fine orchideous plants, both species of the beautiful genus *Lælia*, one of them bearing violet-coloured, and the other bright yellow flowers. In dry arid clefts in the rocks grew several curious little *Vellozias*, and *Eriocaulons;* one of the latter was a branched species about six feet high. Having so frequently mentioned this curious tribe of plants, I will here make a few observations upon them. When Linnæus published the last edition of his *Species Plantarum*, in 1764, he described only five species, from all parts of the world, while from Brazil alone, my herbarium contains upwards of one hundred. Only one species is found in Great Britain, a little grass-like plant, with a single flowering stem about six inches long, bearing a small globular head of minute white flowers. It is found only in lakes in the Isle of Skye, and in the west of Ireland. Very few of the Brazilian plants bear much resemblance to this northern species, for a great number of them are large suffruticose plants, often obtaining a height of from four to six feet, with leafy, very much branched stems, each branchlet terminated by a large white ball, composed of a vast number of smaller heads, placed on peduncles of unequal length. Another remarkable circumstance connected with these strange plants, is the fact, that the greater number of the Brazilian species do not inhabit water, in the manner of our native British one, but grow in the most dry and arid portions of mountainous declivities; many others also grow in parched, flat, sandy places, which are flooded in the wet season ; the truly aquatic Brazilian kinds, more or less resemble our own in habit."—Pp. 443, 444.

" The hills around the Cidade do Serro, are covered with a grass which the Brazilians call Capim gordura (*Melinis minutiflora*, Nees ab. E.) It is covered with an oily viscous matter, and universally makes its appearance in those tracts which have been cleared of virgin forest for the purposes of cultivation ; both cattle and horses are very fond of it, but although they soon fatten on it, the latter get short-winded, if they feed on it for any length of time. Martius considers this plant to be truly a native of Minas Geräes, while Saint Hilaire is of a different opinion ; as it is now everywhere so common in this province, it is a difficult matter to say which of those excellent botanists is in the right ; all the agriculturists that I have spoken with on the subject, agree with Saint Hilaire, although they differ in opinion in regard to the place of its original growth. It is only on the mountains, that it is found covering large tracts, and at present it is rapidly extending northwards. Saint Hilaire during his travels did not observe it beyond 17° 40′ of south latitude ; but while crossing the Serra Geral from Goyaz to Minas, I met with it many degrees to the north of that parallel ; I noticed it only near houses, and there is little doubt but that in the course of a few more years, it will overrun that chain, in the same manner that it has done those of Minas. The seeds had evidently been brought from the latter country by troops, which pass that way into Goyaz ; it is not to be met with at all in the Sertão. Another plant which makes its appearance with this grass, and one of the worst pests which the Brazilian farmer has to contend with, is the *Pteris caudata*, a large brake similar to that so common in many places in Great Britain : it is called by the common name of Samambaia."—Pp. 477, 478.

Between the Fazenda Filippe Alvez and the village Arraial de San Caetano, Mr. Gardner " found a fine large species of *Equisetum*, the largest indeed that has yet been seen in the recent state ; it grew abundantly in a wooded marsh near the road, and I measured one that was upwards of fifteen feet in height, the lower part of the stem being full three inches in circumference. Although of gigantic size, when compared with the other species existing at present on the earth's surface, it is far from equalling those enormous remains, which are found in the fossil state in the coal strata, and known to geologists under the name of *Calamites* ; many of these have stems as thick as a man's body ; indeed the difference in size between the recent species of *Equisetum*, and those which have existed at a former period of the earth's history, is about as great as between a stem of wheat, and the gigantic bamboos of the East Indies and of South America."—Pp. 515, 516.

On his return to Rio de Janeiro, Mr. Gardner again visited the Organ Mountains, as already quoted [p. 117], after which, being desirous of returning to England, he embarked at Rio, and once more set foot on the shores of England, on the 10th of July, 1841.

"Besides Botanical specimens for the Herbarium, I collected during my residence on the mountains a large number of the most beautiful plants in a living state to take home with me. . . . Among those which were introduced to England for the first time on this occasion, may be enumerated the following:—*Siphocampylus betulæfolius*; G. Don. *Pleroma Benthamiana*, Gardn. and *P. multiflora*, Gard.; *Franciscea hydrangeæformis*, Pohl; *Nematanthus longipes*, Pohl; *Gesneria salviæfolia*, Gardn., and *G. leptopes*, Gardn.; *Clusia fragrans*, Gardn. *Luxemburgia ciliata*, Gardn.; *Dorstenia elata*, Hook.; *Prepusa connata*, Gardn., and *P. Hookeriania*, Gardn.; *Campomanesia hirsuta*, Gardn.; *Bidens speciosa*, Gardn.; *Bowmania speciosa*, Gardn.; *Anemia stricta*, Gard. M.S.; *Pteris sagittæfolia*, Raddi; *Alströmeria nemorosa*, Gardn.; *Euterpe edulis*, Mart., and *Corypha cerifera*, Mart. from Maranham."—Pp. 548, 549.

Travellers cannot do a greater service to cultivators than supply them with particular information as to climate. Many interesting remarks on this subject are dispersed through Mr. Gardner's volume, which will be found both entertaining and instructive.

GUANO.

"If experience of the last few years have taught us one thing more certainly than another, it is the unfailing excellence of Guano for every kind of crop *which requires manure*. We do not, however, include in this opinion Saldanha Bay Guano, or any other imported kind except the Peruvian and Bolivian. The former is never good, and is often bad, or worthless; the latter, if undamaged, is of such uniform quality that, practically speaking, one cargo may be taken to be the same as any other cargo; and the high character of the importers secures the public completely against fraud, if it is obtained directly from their recognised agents. That the public thinks as we do is sufficiently proved by the sales, which amounted to 63,600 tons from July 1846 to July 1847, and to 75,000 tons in the next twelve months. This advance of 11,400 tons may be taken to represent 114,000 more acres manured with Peruvian Guano in 1848 than in 1847. Such an increase of consumption is the more surprising considering the notorious frauds which what we must be permitted to call the supineness of purchasers still permits unprincipled persons to practice. Loam, coloured gypsum, coloured chalk, and other rubbish, continue in demand among a certain class of dealers, in spite of all that has been done by ourselves and others to expose them. The high price of the article, and the duliness of buyers, together, constitute a temptation which dishonesty *cannot* resist. Hence it is that amidst the most unquestionable success which attends the use of pure Guano we are continually hearing people assert that 'there is no goodness in it.' Of course there is no 'goodness' in loam or chalk; and those who use Guano should not mistake them for it. One thing is certain, that *all samples sold below the market price must be adulterated;* and this is of itself a convincing reason why those who employ it should turn their backs on the peripatetic agents who haunt country towns; for if such persons offer it for less than the market price they offer a spurious article; and if they demand the full market price there is no advantage in dealing with them. Cheap Peruvian Guano must either be stolen or adulterated: it is too bulky to steal, and therefore the inference is obvious. While, however, we thus point out a means of escaping fraud, we are not insensible of the difficulty which some may experience in telling where to avoid making purchases. We, therefore, wish it to be known that although we have long, perhaps too long, been silent, we still have an eye to spare for detecting Guano cheats, and we invite the readers of our columns to assist us in their discovery and exposure. Gardeners more especially are interested in this matter, because they are rarely able to make purchases considerable enough to be worth the notice of the principal agents; and to them we look with confidence for information. This is certain, that if the proper application of Peruvian Guano fails to produce the desired effect, there is a grave cause for suspicion, which all concerned should endeavour to investigate."—*Gardeners' Chronicle.*

GLENNY'S GARDEN ALMANAC.

The Garden Almanac for 1849 is a decided improvement upon all the previous volumes. The Editor has, with much better taste than he usually displays, left out all that waspish and personal matter which too often distinguishes his almanac. Mr. Glenny has written well enough and long enough to give the gardening world more real, practical, and original information than almost any other man; he started the first newspaper, and, we believe, the first almanac that was ever devoted to the science of horticulture. It cannot, however, be denied, even by his best friends, that he was unmeasured in his abuse, and that

few, if any of his works, have been hitherto free from the leaven of bitterness. We may be told that his bitterness made him to be feared, and that, but for that very bitterness, horticulture would not have been freed from the enormous frauds with which, in 1832, it was beset; that the vagaries of theorists would have consigned tens of thousands, instead of thousands of good plants to destruction; that Kew Gardens would still have been worse than a hogsty; that various societies, now tolerably free, would have still been full of abuses; and that the mischief of empyrics and cheats, which disgusted gentlemen with horticulture and all belonging to it, would have still rendered the science degraded and disgraced. We, however, think differently; we maintain that if he had urged all these things, without the bitterness and abuse, he would have been infinitely more powerful; and his conversions of other people to his own opinion would have been more rapid. We affirm that had Mr. Glenny, with all his perseverance and all his talent, urged his doctrines or dogmas without abuse; had he been content to show his own knowledge, without exposing other people's ignorance, he would at this moment have been considered as the best champion of horticulture and floriculture, and the most practical and useful writer that ever touched the subject. We make all due allowance for the aggravating truth that a number of persons were from the first imitating, or immediatcly copying his original ideas and even words; this, we are aware, was sufficiently aggravating to draw forth whatever ill-temper a man possessed; but denouncing them as thieves and vagabonds was not the way to meet such annoyances; he should have stated the facts, and left the world to draw their own conclusions as to the characters of the men who were guilty of such unprincipled conduct. Instead of which, Mr. Glenny, by his violent tirades, offended so many, that however great the injury, but very few commiserated him; but, on the contrary, they almost rejoiced at any and everything that damaged our waspish friend. In short, his bitterness has hitherto been his enemy; it lost him many friends, and, we think, materially damaged his writings. We are truly glad, therefore, to see the present year's almanac full of important facts and valuable lessons, and without the usual snarling preface. His lists of the best fruits, flowers, vegetables, &c. are excellent; and the short articles on the culture of all the florist's flowers are written in his usual pithy style. In fact, Glenny's Almanac for this year is a most valuable compendium of practical floriculture.

The Frontispiece.—The plants represented in the frontispiece to the present volume are the following:—Plumbago Larpentæ, a rich-coloured blue half-hardy Chinese plant, which combines bad and good qualities; Zauschneria californica, scarlet, having some resemblance to a fuchsia, a free growing and free flowering perennial, suitable for the border; Acacia leptoneura, a yellow-flowered greenhouse shrub from Australia; and Burtonia pulchella, also an Australian plant, and a neat greenhouse shrub, with handsome purple blossoms. More detailed descriptions of these plants have already been published in the *Annals of Horticulture*.