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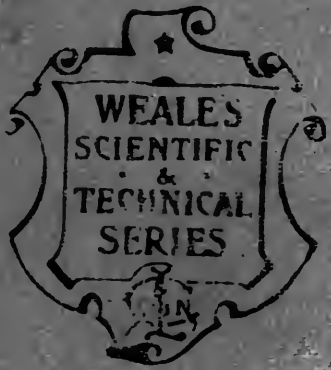

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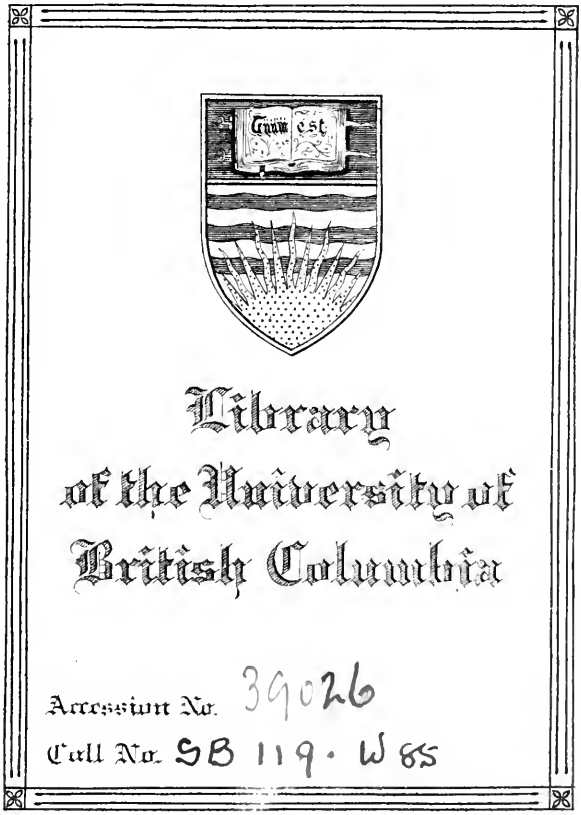

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SIXTH IMPRESSION

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INTRODUCTION.

THE propagation of plants is a most useful and interesting art; and although in most cases it certainly requires care, patience, and perseverance, yet there is a pleasure connected therewith that is quite original in its nature, and those who are masters of the art of propagation are as far in advance of the ordinary course of gardening as an inventor of a piece of machinery is before the man who merely makes the machine according to a given plan.

The practical theory for the propagation of plants is scattered over the whole of the literature of gardening; so that if you want to find how to multiply a certain plant you may possess, probably you may have to buy or borrow some book, hard to come at, possessing the required information, before you dare venture to cut your plant for propagation, lest you should lose both the cuttings and the original, which is frequently the case. This has at times cost the loss of a man's professional reputation, and frequently his place too. It is true some books profess to embody the art of propagation of most plants, the information in which may be sufficient in detail for the experienced professional, while conveying mere hints not sufficiently definite for the novice. Here, then, I find good ground for the present attempt to produce a book which in itself shall meet the demand without further reference, trouble, or expense.

I well remember when I first took a lively interest in the art of propagation, as I was determined to

be a plant propagator and plant grower, what anxiety, research, expense, and loss of time I encountered to find how to proceed with some particular class of plant I had in hand. In the present pages I hope I have obviated the necessity for all this trouble, and I trust that under each head enough is detailed for all classes of plants and all classes of plant growers.

I think I may assert for a truth, that to become a proficient tree and plant propagator is impossible within a very short space of time without consulting works of reference, because it frequently happens that the propagation of some kinds may not practically come under the observation of a person once in his life. Yet by reading an article, and by working in the abstract on the subject, a young man may become more than half acquainted with the method of the propagation of the tree or plant. To be a successful forest-tree planter, a man should really know the true physical and functionary powers of the plant, and this can scarcely be practically known unless a man is a propagator: for instance, no one will grow Oak timber well unless he understands the nature of its physical powers and is aware of its peculiar construction, and so on with other trees and shrubs. Those who propagate them are well aware of the formation of the roots, and how the plants perform their functions below the surface, which, no doubt, is knowledge most vital for success.

The reader will observe that I have placed the most common classes of trees first. I have done so because they are of more real importance to man in general than the more ornamental classes; and again, these are generally passed over by most writers. I have placed the Oak first, as this grand forest tree should be cultivated to a much greater extent than it is. There are localities which will not grow the Oak well, and there are others which will not grow the Elm; and if a man plants these indiscriminately, without making the necessary observations beforehand, the probable result will be timber at some future time not worth much. I once

knew a timber merchant who purchased an entire estate of Oak timber, consisting of a little less than 20,000 trees of a good size, clean, and to all appearance of first-class quality; but it was found to be otherwise, I was informed, when the timber was cut down. Many of the trees were worthless for shipbuilding in the centres, the hearts being partially decayed. This was on account of the locality not suiting the Oak. So it is with reference to other kinds of trees—as, for instance, the Apple, which will luxuriate in some places, and in others will remain almost stationary and not get much larger; it will neither grow nor die.

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THE TREE PROPAGATOR AND PLANTER.

BOOK I.

TIMBER, PARK, AND ORNAMENTAL-FOLIAGED TREES.

The Oak.

The Oak is multiplied by seed for ordinary timber, and for some rare kinds it is grafted on the common sorts. The acorns should be gathered as soon as ripe, and sown at once either in beds or drills; but if a large quantity should be required, it is best to sow the acorns in four-feet beds. Choose a nice, kind bit of ground, of a breify nature, with a small proportion of sand in it. This ground should be of a moderately moist nature, and pretty deep. It should be dug fifteen or eighteen inches deep, and well broken; when the whole bed is so prepared, turn four or five inches of the surface clean out on each side of the bed, leaving a level surface, on which sow the acorns as thick as they will lie in one layer, all over the bed, and then turn the soil that was dug out on to the seed, first breaking it moderately fine.

When the acorns are sown in drills, the ground must first be dug and made fine; the drills must be drawn not less than five inches deep with a heavy hoe. The acorns may be sown as thick as marrowfat peas are, and covered up in the same manner.

If it should be inconvenient to sow the acorns at once, they must be preserved from drought by keeping

them in a damp cellar or outhouse, covered over with ferns, old hay, or straw. They must be sown not later than February under any circumstances. The seedlings should remain three years in the seed-bed, and then transplanted to where they are to remain. It is not often convenient, but when it is, in order to get good old hearty Oak timber, the acorns should be sown where they are to remain for timber; for the Oak always makes a taproot much in advance of the top growth. This taproot is the secret of getting large and sound old timber; when an Oak-tree cannot maintain this chief organ, it seldom produces such timber. This was the reason why the old timber referred to in the Introduction was unsound at heart. This large quantity of Oak timber grew chiefly on a rocky subsoil, which prevented the majority of the trees forming that principal organ—the taproot. We find that self-sown Oak-trees produce the largest as well as the soundest timber.

In transplanting young Oaks for timber, care should be taken to maintain as much of the taproot as possible. This is contrary to the usual practice, which consists of cutting as much of it off as possible; but I have made my observations in this matter, and can confirm what I have said to be a fact.

The common Oak (*Quercus pedunculata*) requires a moist, stiff, strong clay to flourish in, and to attain to a healthy old age. The chief reason why some Oaks throw up suckers is because they cannot form a taproot—the subsoil does not suit them. Some kinds must be grafted to multiply them and to keep the sort true.

The *Quercus cerris* is used for stocks for most of the kinds requiring grafting. The grafting should be done during March and April. The graft should be put on the stock close to the ground, and the stock may be smaller or larger than the graft. Common whip-grafting, as adopted for pears and apples, may be the method, or, if the stock is much larger than the graft, rind-grafting may be employed; but it must be borne in mind that the bark of the stock must readily leave the wood (see page 149). Tie the graft in, and use

"grafting-wax" or clay. The Cork-tree (*Quercus suber*) and its varieties are grafted on the Turkey Oak. This Oak grows very rapidly, and soon forms a large spreading tree with a beautiful foliage.

All the varieties of the evergreen Oak are most useful and beautiful shrub trees, well adapted for the second tier of plantation forming, and also as single and conspicuous objects on a well-devised estate. They will bear cutting-in to any extent to keep them within the desired limits. I know of no subjects among the large-growing evergreens so well adapted for ornamental break shelter as the *Ilex* and the other varieties of evergreen Oaks, possessing as they do a thick and dark foliage. Many of them may be multiplied by seed, for they bear seed as well as the deciduous kinds.

Some theorists advise that the seed (acorns) should be dried before sowing, and that the sowing should take place in March. Now I beg to warn my reader against any such practice, or a total failure will ensue; for if acorns are allowed to dry much, they will never vegetate. What I have already said in reference to sowing I can vouch for.

There are about 112 or 114 varieties of the Oak, and although soil and situation have a great deal to do with the quality of the timber, yet there are some kinds of a much tougher nature than others. The following diagrams will give some idea of the quality of Oak timber grown on two different soils, and will serve as a guide for the merchant in the purchase of standing Oak timber. No doubt situation and the subsoil have everything to do with the quality of the timber. Now it must be admitted that well-grown English Oak is far superior to any other in elasticity and durability. Oak that is grown too quickly or too slowly is wanting in quality. In the former case it will be porous and brittle, with a larger proportion of what is commonly called "sap," and is of little or no value. In the latter case the timber will possess a considerably larger proportion of "heart" than in the former, but at the age of maturity, which is about one hundred years from

sowing the seed, the timber will be in a similar unsound state to that shown in the diagram, Fig. 2. Moreover, the timber will be less elastic, and not so good for ship-building as in the other kind.

The illustration Fig. 1 gives a fair idea of an Oak at the same age as Fig. 2, but which has grown on a suitable soil and in a good locality—a deep, tender clay, containing an average amount of natural moisture, not too elevated, nor in a supersaturated, swampy district. When the Oak is grown under such circumstances, and

Longitudinal sections.

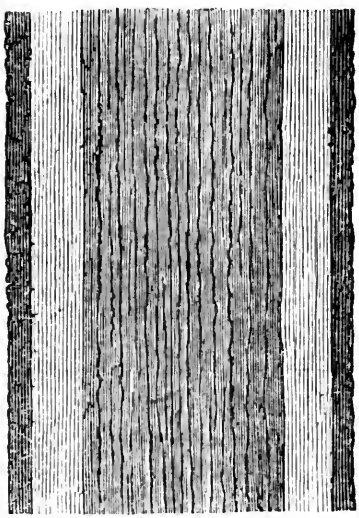

Fig. 1.

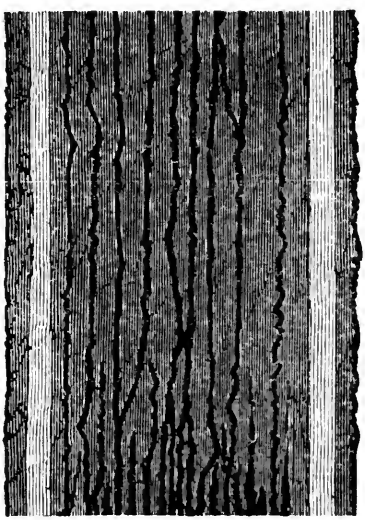

Fig. 2.

Two Oaks, age 100 years.

maintains a good taproot, the timber will be considerably better in quality, larger in size, and more elastic than that shown in Fig. 2 at the same age.

Figure 3 shows the frequent state of the Oak when come to maturity, through cutting off some of its large limbs at fifty years old, hastening it more or less by ten years. 1 shows the effects of so doing. This is a deceptive kind of thing, for if the tree has grown freely, then the cut will be healed over at the age of maturity, as seen at 2, Fig. 3. And should

this tree remain much beyond the age of maturity, most probably the heart, 3, will be entirely worthless for any special work. In purchasing Oak timber, it is good policy to find out what the subsoil is, and then the age of the timber, for it is proved beyond a doubt that in most cases the heart is unsound after the tree has reached the age of 100 years, especially if the subsoil does not suit, as shown heretofore.

Longitudinal section.

Fig. 3.—A section of a well-grown Oak at maturity, showing the effect of cutting a large branch off when fifty years old, but which had healed.

Figure 4 is a fair illustration of an Oak growing on a dry, gravelly, or rocky subsoil, and in a very elevated locality. There are some specimens of this kind growing, or rather existing, on Dartmoor, in Devonshire, well worth the while of any person who may wish to see them. These Oaks are perhaps much smaller for their age—which may probably be 200 or 300 years—than any to be found. There they exist, but get no larger; nor can they, owing to the very elevated place in which they are situated, and the rocky soil on which they stand.

THE WAY TO PLANT OAKS.—When a plantation of Oak is to be made, it is a good plan to place the young trees three or four times thicker than what is required for the maturity of the timber. Plant at a distance of 4 feet apart every way, and when the trees get 10 or 15 years old, cut two down to within a foot of the ground in the spring, and bark them for the tanner, leaving every third tree for timber; these will be 12 feet apart, which will not be too close for good straight timber. Those cut out will give underwood. If the trees are planted 4 feet apart, an acre will take 2,770

plants to fill it. If the timber trees are left 12 feet apart, there will be about three hundred of them on the acre. If the young Oaks require trimming, it should be done while they are very young, in the spring, and with

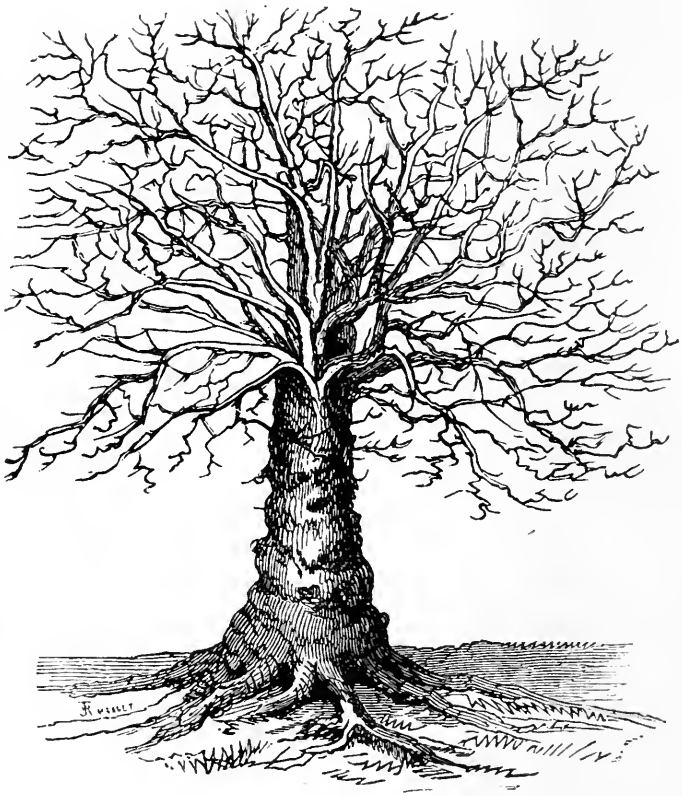

Fig. 4.—A Dartmoor Oak.

a keen-edged tool, cutting close to the stem, and smooth, so that the cut may heal over in a few weeks, the same spring.

The Ash-tree.

There are about 70 species and varieties of the Ash. It will be observed that some kinds never bear seed, while here and there it is found in abundance on some. This occurs on account of the tribe consisting of two

distinct varieties, namely, male and female plants—*i.e.* one plant bears the organs to produce the seed, and the other bears fruitless flowers. The common species (*Excelsior*) contains 16 or 17 varieties. These attain to a great altitude—as much as from 80 to 120 feet—if the soil and locality are suitable. The most favourable soil for growing large and sound Ash timber is one containing a deep, tender loam, free from rock and excess of stone, and, while retentive of moisture, not water-bound. I have known the Ash attain to a most surprising magnitude in such a soil, even when it has not been so high as the general level. I knew a whole wood of this kind of Ash, which acquired the name of "Ash Wood" on that account, and I have never seen such fine Ash timber, either before or since; and, moreover, it was sound when it was felled. The Ash will grow very rapidly in such soils.

The propagation of the Ash consists in raising it from seed as well as by grafting. The former plan is effected by gathering the seed as soon as it is ripe, and then burying it a foot deep in the ground, and nearly filling the trench, which may be 1 or 2 feet wide, with the seed masts. Then cover the seed up with earth, and let it remain till February, when it may be taken out and run through a coarse sieve to separate it. It may then be sown in drills 1 foot apart, in good tender, sandy soil, and transplanted from these drills at one or two years old. One year is time enough to plant the seedlings, when they are to be placed in a plantation for subsequent removal as stocks for grafting the pendulous or weeping varieties on. In this case plant the young seedlings on a deeply dug, good soil, in rows 1 foot by 6 inches asunder, with the hand-dibber; let the seedlings remain here for three or four years, when most of them will have attained a height sufficient for grafting on the weeping varieties. This is done at the top of the stock, at any height which may be thought most desirable, which should be 10 or 12 feet from the ground, as a rule. These stocks should be grafted before they are removed—two years previously at the least.

The grafting may be done by the common whip method; or if the stem is large enough, rind-grafting may be adopted. In all cases of grafting I think the grafting-wax is the best preservative against droughts. This is put on with a small painter's brush when half cold, or just thin enough to paint upon the tied-in graft. If ordinary grafting-clay is used it will dry and crack, and let in the air, when probably the operation will prove a failure. As soon as the graft has grown and made a shoot it should be cut back close, so as to induce as many shoots as possible to form close to the crown, and when these are considerable in number, and have made a foot or two of growth, tie a string to each leader and gently bend them down, and tie each string to the stem (Fig. 5). The Weeping Ash should be planted in deep and good ground if a luxuriant specimen is desired. It is useless to expect a fine and free-growing tree unless this is done; and the plant should be placed where it is to remain for life not later than three years from the time of grafting on the stock.

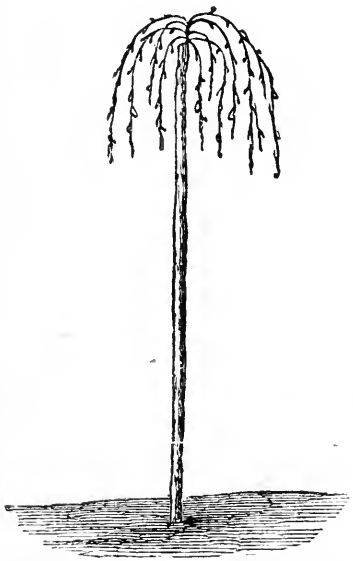

Fig. 5.—The Weeping Ash, two years grafted.

Soon after maturity the Ash begins to decay. This commences at the surface of the ground, or just below it, and the tree decays upwards. Whenever the woodpecker is found to have made a hole in the stem of an Ash-tree (which it frequently does), be sure that tree is worthless in the interior, notwithstanding it is, to all outward appearances, healthy and sound.

The timber is most useful for dry work, but useless for outdoor work, and soon decays if exposed to the

wet. It is also liable to the attacks of those wonderfully minute insects *Sirex Gigas* and *Sirex Juvancus*—the wood-borers. Of all insects these are no doubt the most wonderful. You observe your chairs or table full of pin-holes, and these holes increase in number; yet you can never discover what causes them. Well, these tiny little insects, not large enough to be seen, have done it all, and will ultimately destroy the article, so that one day it will drop to pieces in your hand. These insects do not wait until the wood is decayed, but attack articles as hard and as sound as bone, seeming almost to delight in their hardness. I have tried many times to find the wood-destroyer, but never could, although I have had some articles destroyed by it.

The Ash-tree seldom sends down a direct taproot, but is provided with some few indirect downward spurs, which descend with equal strength and support as a taproot. In fact, those who grub the bottoms up say these spurs are worse to get out than a breach with a taproot, because they are not so easily found. Besides some five or six of these deep spurs, the Ash is provided with numerous surface-roots of a large size, according to the age of the tree, which frequently run on the surface of the ground scarcely half buried. These roots may be frequently traced for several yards. They seem to go a long distance in search of nutriment, and will so impoverish land that no vegetation can survive except of the tree kind. For this reason the Ash must never be allowed to grow near tillage-land. I mention this particularly as a caution.

The Elm.

The Elm, like the Ash family, contains numerous species and varieties. The *Campestris* are the common varieties we usually see; the *Montana* and its varieties are seed-bearers, and are used for stocks for grafting the others on. Most Elms will grow from suckers, when they can be had; and this is often the case, as the Elm is free to produce suckers from the roots that

travel a long distance from the stem of the tree, a few inches under the surface of the ground. I have traced them for rods. These suckers may be taken up with a mattock and planted in rows or beds, and finally transplanted to the place where they are to remain for timber.

The seed should be gathered as soon as ripe, buried as recommended for the Ash, and sown in early spring in the same manner. The seedlings will be fit for grafting the second and third springs from the sowing. This should be done near the ground, except in the case of grafting the pendulous varieties, when the grafting must be done at the top of the stem, as for the "Weeping Ash."

The Elm will grow to a large size, and remain sound in a good deep soil, not too wet; but if the locality is low and supersaturated with stagnant water, the timber will begin to decay before it has arrived at half the size it is capable of attaining. It will soon begin to do this in the centre, at the root, if the land is too wet. The Elm never has a taproot, and seldom any very large downward spurs like the Oak or Ash. This is the cause of its early decay and of its easy capture by the winds.

When, however, the soil suits it, and the tree flourishes at a great size, such timber will generally be found to be sound, although extra large. This timber is liable to be attacked by the larva of the goat moth, which will eat its way into the heart and cause the decay of the tree.

The Beech.

The Beech is propagated by seed and by grafting. The common sorts are raised from seed, which is obtained in abundance. These nuts may be gathered as soon as ripe, and should be preserved moderately dry until March or April, when they should be sown in drills as for marrow peas, in a light sandy soil. If the ground is good, the seedlings will make satisfactory

growth, and be fit to transplant the second year. The fancy varieties are grafted on these as for the Elm. The Beech will flourish only in a dry sandy soil, where it will live and become a large tree. It will not decay in the timber when the soil suits it, but it is fearfully subject to the depredations of those destructive wood-borers the *Sirex Gigas* and *Sirex Juvancus*, notwithstanding its hardness when dry.

This wood is of great value for mechanical uses, but valueless for any purpose where exposure to wet is necessary. The Beech is of all deciduous trees the most useful from two or three points of view; first, it is well adapted for inner summer wind-breaks in any garden; secondly, it never distresses the land. Moreover, it is of a lively green, and it may be clipped to any compass; and being deciduous and of light growth, it shades but little during winter. The bronze and copper Beech are very uncommon, and are desirable dwarf trees among other shrubbery plants.

The Birch.

There are a great many varieties of the Birch, some of which are really handsome, especially the pendulous kinds. These are particularly so when they get old. I know of no forest trees comparable with fine old standards (*Alba Betula*) growing at the edge of a plantation so as to show themselves beyond the rest of the trees, or planted in large clumps of a dozen or so, with an Oak or two filling up the middle. If the land is moderately dry and good, the Birch will grow well, attain to a fair size, and live to a good old age; but, if not, it will decay before its time. The timber is comparatively worthless except for some dry mechanical purposes. The wood is of the finest grain, heavy, and durable, and is fit for some fine cabinet-work, being free from iron, oil, &c.

This wood is subject to the attacks of the *Sirex Gigas* and *Sirex Juvancus*, the wood-borers.

The Birch is propagated by seed and by grafting.

The seed must be gathered as soon as ripe, dried well, and preserved in paper bags till the spring, or it may be sown in the autumn. In either case the ground must be fine and light. The seed must be sown in very shallow drills, or over the whole surface of a fine bed, thickly; and some fine leaf-mould and sand strewn thinly over the whole so as to barely cover the seed, which is very fine. Or it may be sown in seed-pans and treated as the *Coniferæ* (see pages 18—20). The grafting

Fig. 6.—The Birch.

is done as for the Elm, &c. Sometimes suckers may be obtained, by which means the common Birch may be multiplied. The Birch will bear cutting in to any extent, but its beautiful character is only preserved by allowing it to grow unpruned.

The Lime-tree.

The Lime-tree is a small genus of very useful trees. It is capable of attaining to a very great size, which it may retain in good health. The Lime grows freely in a deep sandy loam. It will bear pruning to any extent; this qualifies it for almost any situation. It is a densely

foliaged tree, and bears racemes of sweet yellowish flowers, of which the honey-bee is remarkably fond. The timber is of no use except for dry work, but it is of a soft nature. There is no tree better, if so well, adapted for avenues and wide streets, for summer shade, as this. It is of a beautiful light green, very flexible in habit, and will bear the knife, as I have said before, so that it can be kept from encroaching beyond the desired limits.

The Lime is propagated by seed; but as it gives suckers freely at the root, if some earth is thrown around the trunk the suckers will strike root in it, when a number may be taken off every autumn, and planted out into beds or rows. As the young trees get up, care must be taken to keep the stems clear of offshoots, in order to obtain a clean neat stem.

The Chesnut.

There are two species of the Chesnut, each being totally different from the other, botanically. I will speak of *Æsculus* (Horse Chesnut) first. This species is a most noble park tree, especially the scarlet-flowered kind, but the timber is of no value except for firewood. It is soft and brittle, and when the tree gets large, it is very liable to be broken by the high winds. For this reason it is objectionable for parks; nevertheless it is a noble-looking tree. It is propagated by seed only. The nuts should be planted three or four inches deep during the autumn and winter months.

The other species of Chesnut, the *Castanea*, is not so beautiful as the former, but still it is a fine park tree, of great utility for its timber (which is as handsome as mahogany, and will take as fine a polish), as well as for its fruit, which is good eating as a nut. This timber will pay well to grow largely on account of its value. It is raised from seed. The nuts may be sown from the month of January until March, as in the case of the Horse Chesnut. The ground should be of a good light nature in which to sow them.

The Acacia (*Robinia*).

This Acacia belongs to the same natural order as Acacia proper, but differs in the construction of the organs of fructification. The Acacia proper belongs to the Linn. order *Polygamia;* which means plants possessing male and female flowers on the same plant separated; but the false Acacia, as it is called—the Robinia—belongs to the Linn. order *Diadelphia Decandria*, which class of plants possesses them complete, *i.e.* those having male and female organs in the same flowers; yet both of these species bear seed-pods alike, and have the same appearance as regards their foliage, the difference being merely in the flower.

The Acacia Robinia is as beautiful and hardy a tree as any we possess, regarded as a park tree. The foliage is pinnatifid and of a slender construction, being of a light green colour, and beautifully distributed over the whole plant. The character of the tree merits it a place in every well-devised park. The timber is of the choicest description, and surpasses even the rosewood for beauty of polish and markings in the grain. There is no wood which can equal the Acacia as regards excellence for choice cabinet-work, and it is almost as hard as ebony—therefore not soon affected by damp or heat, neither is it liable to the attacks of insects like some others.

They all bear handsome flowers of a white, yellow, or red colour. They may be raised from seed, which they produce freely. Some are propagated by cuttings of the half-ripened young wood, struck in sand and peat under a bell-glass, with a small amount of heat. The better kinds may be grafted, or budded on the common kind—the Pseudo-Acacia, which can be raised freely from seed.

As the seed is very hard, it is necessary to soak it for a few hours in tepid water previous to sowing, especially if the seed is saved in a hot climate.

The seed of the common Acacia may be sown in the open ground in fine sandy soil in a warm place, but it

is best to sow it in deep seed-pans and set the pans in a cold pit or frame, keeping the sashes close and the seed sprinkled daily until it comes up, when the seedlings may be put outside in a sheltered place until they are large enough to put out into the open ground. The young seedlings may then be pricked off into a bed of fine soil or into other seed-pans or pots, from which they may be transplanted to the spot where they are to remain. The Acacia flourishes well in a porous sandy soil, and will then grow to a good girth, but it will decay much earlier if the subsoil is wet. The grafting may be done either on the top of the stock or at the bottom, as for the Plum.

The Acacia proper.

This class of Acacias are all more or less tender, being only adapted for our conservatory ornamentation; and although as a class we seldom see any of them here (except the old favourite *A. Armata*), yet there is not a more beautiful class of foliaged shrubs to be found among all our plants. There are something like 180 species and varieties of this family, all more or less handsome, many being of extraordinary beauty, while some are very useful from a commercial point of view. The Gum Arabic commonly sold in our shops is the produce of *A. Arabica*, a native of the East Indies. The Gum Catechu is from *A. Catechu*, also a native of the East Indies. *A. Lophantha* is a beautiful conservatory tree, and is well adapted for window work, but *Armata* is admirably suited for the latter.

All the varieties may be propagated by seed, as well as by cuttings, which latter may be easily struck in sandy peat under a bell-glass in almost any place; but a small amount of bottom heat facilitates their striking. The cuttings must be of the same season's growth, half-ripened short stuff from the old wood: the base of the cutting must be made clean with a keen-edged penknife, or a budding-knife, and the leaves trimmed off half-way up with a pair of trimming-scissors. The

pots should be half filled with broken potsherds, and then filled up to the top with a fine sandy peat compost quite firm. The cuttings should be inserted an inch apart all over the pot, allowing sufficient space for the striking-glass to go over them and inside the rim of the pot. Settle the soil about the cuttings by watering them with a fine rose water-pot, and let them dry off a little; then put the glass on, and shade them from the hot sun with a sheet of paper. Wipe the bell-glass occasionally, when there seems too much damp condensed on the glass inside, and then put the glass on again immediately; a little water will be necessary at times before the cuttings have struck root, which is rather a slow process. As soon as they have rooted, which may be known by the growth they make, remove the glass, and pot the cuttings off a week or two afterwards, using small pots and the same kind of soil: nip out the top of each young plant; this will induce dwarf, bushy plants to be formed while they are young.

The raising of the Acacia from seeds is attended by many circumstances requiring attention. The seed is extremely hard, and must either be subjected to a strong moist heat, or be soaked in very warm water for twelve hours before sowing it, then covered a full half-inch with the soil, which must be sandy, and set on a brisk heat to vegetate. I put the seed in a mug, basin, or cup, and pour moderately hot water on it at night; let it stand, and sow the seed the following morning.

The Pine-tree and Fir-tree.

Our home-grown Pine is not so good as that imported; still it may be, and is, of great use in dry rough work. The common Scotch Pine is as good as any for general use, and will grow to a fair size in any situation. The Larch is one of the most useful of this class, and it is no doubt a good speculation for large landowners to plant it extensively on their waste lands.

There are thousands of acres of land that can scarcely be put to any tillage purposes, that will pay well for growing the Larch Fir; in fact, as well, all things considered, as an annual tillage of the land; for when we take the expenses into account, we find that these Larch-trees nett as much profit as other things. But leaving this out of the question, the Larch Fir will grow where the land will not pay for an annual tillage at all. This is my reason for recommending the planting of timber trees on all accounts.

All the Fir and Pine tribes may be propagated by seed, of which some of the more hardy and common sorts may be obtained from English-grown trees; but for some of the rarer sorts recourse must be had to foreign seed merchants, or those who import the cones. It is true most of them will bear cones in this country; but I find some perfect very few seeds, or next to none. The Scotch, the *Cembra*, the *Pinus Insignis*, the Spruce, and the Larch will perfect good seed here. This should be gathered as soon as ripe, and the cones kept dry till spring, when about March they may be laid in deep tin pans, or some such utensils, and set in the full focus of the sun under glass. In this situation the cones will open, and let the seed out, which must then be put into paper bags as it comes to hand, and sown in deep seed-pans in April, using a compost consisting of sandy maiden loam. In sowing the seed of the Fir tribes, and, in fact, all the *Coniferæ*, care must be taken not to cover it too deep. I once gave my young man half a pound of *Cupressus* seed to sow on a given spot in the open ground (for it may be sown in the open ground, provided the soil suits it, and the necessary care is taken afterwards in order to insure success), when he forgot my directions, and having sown it he raked it in an inch deep. Of course none of it came up.

The seed-pans should be filled firmly with the compost up to within half an inch, and made solid by shaking it down and knocking the pan on the bench, also by pressing the soil in with the ends of the fingers.

When made smooth on the surface, and the seed sown moderately thick over the whole place, with some of the fine-sifted compost sown over it, barely covering it, then set the seed-pans behind a north wall, or rather behind a south wall or hedge, which would be of course on the north side. It is not advisable that they should be exposed to the open north winds without some break, for in such a case the seed will vegetate reluctantly.

To be really successful in raising the seedlings of any of the *Coniferæ* (which means all the Pine, Fir, and *Cupressus* tribes), it is necessary to possess favourable circumstances with regard to the situation; partial shade, and shelter from harsh and drying winds. These are necessary for raising these tribes from seed, together with careful watching, to see that the surfaces of the pans or beds do not get perfectly dry. As at certain times of the year (April and May, for instance), drought may be expected to be severe, a daily sprinkling will be necessary to prevent the spearing of the seed being delayed; but care must be taken not to supersaturate or sodden the earth, or it will rot. The seed is also liable to the attacks of mice, to prevent which place some fine wire netting over the seed-pans.

The seedlings should remain in the pans two years, or at the least until the April following, when they may be transplanted from the pans to a bed or beds of fine sandy soil well prepared. In doing this choose showery weather, mark the surface of the bed across with a five-foot measure at 6 or 8 inches apart, then shake the seedlings out of the soil, or rather the soil out of the roots, and shorten the roots moderately. Then, as quickly as possible, before they dry too much, prick them out into the lines with a common dibber, at 4 to 6 inches asunder, and well water them afterwards. Here they may remain for one or two seasons, when they must be replanted at a greater distance apart, and soon, about every two or three years, a replanting will be necessary, until the plants are placed where they are to remain permanently

How to plant Pines and Firs.—When any of the choice Pine, Fir, or *Cupressus* tribes are to be permanently planted, it is of the utmost importance to look forward as to what it will be twenty or thirty years hence. I have known some valuable trees obliged to be sacrificed to the woodman's axe entirely through misplanting, or planting the young tree where it had not sufficient room to develop itself. "Oh! what a pity," thought I, "that this fine tree, worth a hundred pounds, should be obliged to be cut down before it has half developed its grandeur, and all through the planter not looking forward and seeing how much room it would require to develop itself fully." I am quite aware of the difficulty there is in giving a good flowery finish to a gentleman's grounds around the mansion, when young stuff of 18 or 24 inches high is planted for a few succeeding years. For this reason (and one other, which is of more consideration to the nurseryman who supplies the stuff than the first reason), the Fir and Pine tribes especially are, in nine cases out of every ten, planted too thick, and without good judgment. In every case of making new plantations composed of *Coniferæ*, especially the Pine and Fir class, certain subjects should be made specialities throughout the whole plantation. These should be noted on the plan; others then may intervene as mere accessories, to be removed in due time, so as to give room for such specialities to develop themselves freely. This seems to be the chief point in plantation-making.

It is not good policy, in planting the *Coniferæ* tribes, to use large specimens on any account; generally, it is three-fourths so much ready money sunk, because two out of every three plants die—yea, three out of every four, or even more, unless they have been shifted every two or three seasons at the least. Then these trees can be warranted by the nurseryman; but if they have not been so removed they may look even more luxuriant, and the price may be an inducement to the purchaser; but they are sure to die if not planted by some most judicious and painstaking person, and even

then some of the *Coniferæ* will die at an advanced age and growth. I must here repeat my remarks relative to the planting of this class particularly, as I am convinced of the error most men fall into when planting trees and shrubs, chiefly about gentlemen's grounds, and more especially about the house and on lawns, &c. It frequently happens that, to make a newly planted tree of an ornamental description appear neat and a finish, the plant is put in the place, and the soil trodden in upon the roots as hard as it was before it was dug out for the reception of the plant. This is one of the greatest errors it is possible for a man to commit in planting, and is a sure means of destroying the tree, in nine cases out of ten, from the very fact that the fertilising influence of the sun and air is excluded from the roots; not only so, but the formation of the new and tender parts of the roots (which must be formed before the tree can succeed) cannot freely penetrate the soil so trodden in immediately upon them as hard as a beaten pathway. This is no doubt the chief cause why large trees of the evergreen class fail.

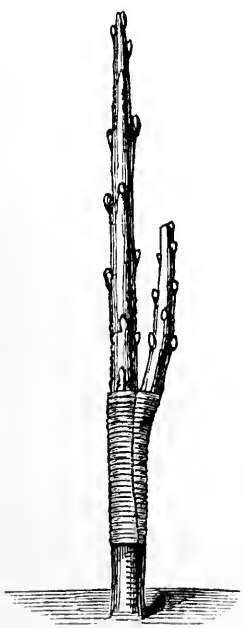

Fig. 7.—The Pine-tree whip-grafted.

Several weeks should elapse from the planting of a tree till the final filling up with all the soil upon the roots; and very little treading in of the soil upon the roots should be done at all, just enough to fix the tree steady, and allow the earth to settle down by the rains gradually for two or three weeks, then fill in finally. A large tree or shrub should be supported by three stakes as a preventive against the wind.

But I advise that young trees of the Pine, Fir, and Cupressus classes be planted in preference to medium-sized ones. Four or five years are quite enough as regards age.

PROPAGATION OF THE PINE AND FIR TRIBE BY GRAFTING.—The choice and rare sorts may be multiplied by grafting, using any of the common kinds for stocks. The grafting must be done close to the ground on small stocks in the early spring. Side-grafting is the method best adapted for these classes.

THE POPLAR.

There are a great many varieties of this genus; but the *P. Tremula*, or Aspen, is, perhaps, the most useful as timber. There is a very singular feature in connection with this Poplar in which I have felt particularly interested, in its differing from any other common tree. When it is in leaf, let there be ever so slight a motion in the air, when the leaves of all the other trees are perfectly motionless, those of this tree are still on the move in a singular way. This arises from the long footstalk of the leaf being attached to the middle of the broad-shouldered leaf, which, being large in proportion to the strength of the footstalk, is suspended in a similar way to a kite; and this peculiar construction gives the slightest breeze power enough to cause a vibration of the leaf from right to left and *vice versâ*. Looking at the tree from a distance, when there is (it may be said) no wind, it looks like a thing affected by some unnatural phenomenon. This Poplar is of very rapid growth, and soon forms timber; but this is of little use, except in the dry, for such purposes as for the rafters of houses, stables, granaries, &c.

There is a striking illustration of the peculiarly durable quality of the Poplar to be seen in a main beam in a church at Thaxted, in Essex. I was informed of it some years since, and it may possibly be there now (1880). Upon this beam, which is large and exposed to view, is written in bold type—

"Let the heart of oak be ever so stout,
Keep me dry and I'll see him out."

This, no doubt, may be true in fact, as even the heart of Oak is liable to be destroyed by the "wood-borers," like the Beech, Ash, &c., whereas the Poplar never is. A singular fact this, but why this is so I cannot properly account for, except that the wood of the Poplar is too soft and woolly for these wood-borers to cut into. Most probably, too, its being of a fine long grain fussels their cutter-up so that they cannot work pleasantly. But the Poplar is of no value for any work where it is exposed to wet.

The Poplars may be propagated by cuttings made of long, stout young wood, well ripened and dug in as for briar-rose cuttings, during the autumn of the year. The Poplars may also be multiplied by seed, and by suckers when they can be had. *P. Grandidentata* is the most noble, perhaps, of all, towering as it does up into the air for 100 feet.

The Holly.

There are a great many varieties of the Holly, and nearly all of them are natives of Great Britain. There is also one commonly called *Knee Holly*, which is not a Holly at all. The Holly belongs to the nat. order *Aquifoliaceæ*, while the Knee Holly, or *Ruscus Aculeatus*, belongs to the nat. order *Liliaceæ*, *i.e.* flowers resembling a diminutive lily, while the flowers of the former belong to a class quite different, Linn. class 4, and order 3, the latter having 6 stamens and 1 style.

Aquifoliaceæ conveys no idea of the class, but simply refers to the plant belonging to those with prickly leaves. This being the case, I am disposed to look upon the term "Aquifoliaceæ" as misleading, because there are some other genera possessing prickly leaves, and some Hollies that have leaves with no prickles; and in the case of the *Ruscus*, which has prickly leaves, it may be and is called a Holly, while it is of another genus.

The Hollies are a most splendid tribe of plants, and may be considered among our best hardy English foliaged evergreens, well adapted for every species of

ornamental planting. They live to a great age, and if the soil suits them (which should be as good as is required for Roses), they will amply repay for it in handsome foliage, with an abundance of it, with a free growth. This, however, is not often the case, for it seems that generally Hollies are planted where few things else will grow, and the consequence is poor, half-starved growth, with thin and poor foliage, which in a Holly is miserable. The common sort is a splendid dark evergreen when grown in good ground, but the silver and gold variegated sorts are superb plants, above the general conception when planted in good soil, and somewhat shaded. The *Crispum* and *Ferox* are very handsome and curious in their foliage, and worthy of a place in every select shrubbery border.

THE PROPAGATION OF THE HOLLY.—The common sorts are multiplied by seed. The berries must be gathered during the late autumn or winter, and either put in a heap to rot the flesh off the stones, or buried in the ground for the same purpose. The seed may be sown during the following spring in deep drills, or beds of light soil, covering it 3 inches. It is very slow in coming up; some may not appear till the second season. The seed should be shaded during the summer with furze or fir branches. When these common seedlings are two years old, they should be transplanted out into rows 9 inches asunder and 4 inches apart in the row. Here they may remain for one or two seasons, when any of the variegated sorts may be grafted on them close to the ground. In grafting them care must be taken to match the scion and stock. Tie the graft carefully on, and cover it well with grafting-clay or grafting-wax, which is better. They are slow in uniting, therefore do not untie them too soon—not before the autumn.

It is of no use sowing the seed of the variegated sorts with a view to get plants like them, for the seed of these will produce green Holly only. Cuttings of the choice sorts may be struck with care and long patience under a handlight, in a shady place. The cuttings

should be of the summer's growth. The soil must be moderately light and very sandy for this work, and free from too much water.

The Holly should by all means be planted where it is to remain for life while quite young. It is one of the most stubborn and fastidious things possible to remove when much advanced in growth, and seldom or never does well if removed when of middle size or above that. The transplanting of the Holly should be done early in the autumn, or not before April; and some additional pains are necessary for success when planting good-sized Hollies. Some fine sandy maiden loam should be used for the roots, and well worked among them. This soil is excellent for inducing a quick root.

The Thorn.

The uses of the White Thorn are well known, and the beauty of some of its varieties is equally deserving of notice as being very ornamental for park and lawn trees. There are numerous species and varieties of this interesting tribe, some having flowers as beautiful and as double as a rose. Nothing can surpass, if comparable to, *Cratægus, Oxyacantha multiplex*, with its beautiful double white flowers, and *C. punicea*, with its handsome scarlet flowers, and *C. rosea flore-pleno*, a splendid double pink-flowered variety. All the double varieties must be grafted on the common Thorn, which is raised from seed. The haws must be gathered as soon as ripe, and the pulp rotted off by laying them in a heap, or by burying them in a hole dug out in a dry spot out of doors, and then covering them up till the spring (about March). Then clean them, and sow the seed in deep drills drawn with a hoe, sowing it thick as for small early white peas, and covering it up with fine light sandy soil. These seedling quicks are used for making hedgerows, and may be planted at one, two, or more years old.

When they are wanted for stocks to graft on, they should be planted out young in good strong ground,

and encouraged to grow as fast as possible, so as to get healthy and straight stems. The grafting may be done near the ground, or at the top of the stock at an advanced age, as for the Apple or Pear. March or April is a good time to do this.

The wood of the Thorn, when come to maturity and thoroughly dry, is nearly as hard as bone, and is excellent for mallets, &c.

The Sycamore (*Acer pseudo-platanus*).

The Sycamore is a species of Maple, all of which are very ornamental-foliaged trees, but the common Sycamore is one of the most splendid ornamental park trees to be found. Now many persons no doubt will wonder at such praise being given to the common Sycamore, who may not have noticed the beauty of it as I have. This consists, not in the habit of the plant, but in the flowers and the seed, which consist of splendid long racemes suspended from the branches in abundance and in a most graceful manner. After these come the singular Samara-like bunches of seed, suspended in a very conspicuous manner from the long footstalk, and which continue for a long time.

The leaves of this tree are large and ample, affording a good screen from the heat. This tree should no doubt be planted freely in public gardens, for shade in streets, and along public walks, &c. It may be multiplied by seed freely. Gather the seed as soon as ripe, and lay it in a heap, or bury it for a short time to rot the husk off; then clean, and sow it in drills 2 inches deep, in some light, good ground. Plant the seedlings out the first or second year 1 foot by 6 inches asunder; replant them again after two seasons, in rows 3 feet by 2; here they may remain for specimen plants, to be planted where they are to be for life.

The Maples are a splendid class of forest trees, and are, moreover, very serviceable for the wood, which is used for fine cabinet-work, and has a beautiful light grain.

The Plane-tree.

The Plane-tree is a small class of very remarkable, fine park trees. Its foliage is of the noblest description; the leaves, which are not so thick in numbers as some, being very large and of a boldly-cut character. This tree is one most deserving of a place in parks and public places for its shade during the summer. It may be multiplied by seed, like the Sycamore, Maple, &c. It will also grow by cuttings of the last season's growth, cut off just where the shoot started, with a heel of the old wood, clean cut at right angles at the bottom of the cutting, and dug in, as in the case of the Laurel, in fine light soil three-fourths of the length of the cutting, treading the soil firmly on the lower part of it. If the weather should be a long and severe frost, or is likely to be, some means must be adopted to protect these cuttings, as the hard frosts will even kill old trees of the Plane kind. Some branches of Fir, or furze, or ferns may be used to cover them on such occasions, to be removed as soon as a thaw commences. The wood of the Plane is of little use except for firewood.

The Cedar.

The Cedar of *Lebanon* and the *Cedrus deodara* are the most conspicuous of all Cedars. These are too well known to require any description here; suffice it to say that both are worthy of a more extensive cultivation than they yet command. The *Deodar* is certainly the most beautiful to be found for park planting, and makes one of the most majestic and at the same time most graceful trees to be seen, while the *C. Lebanon* no doubt outvies every species and variety of evergreen tree to be found in the world. A well-grown specimen, 200 years old, throws every other forest tree into the shade for general magnificence of character, both in regard to its magnitude and colour. It is difficult to convey anything like an accurate idea of the imposing magnitude of such a thing to one who has never seen large trees.

There is a sort of solemn awe experienced on approaching a gigantic, sombre, and aged Cedar of Lebanon, with its table-like, carpeted, horizontal branches extending for yards from the main body. And in a well-grown old tree these broad table-like branches, one above the other, give a sombre appearance to it differing from anything else.

The Cedar of Lebanon is such a sturdy tree that we never hear of one being blown down or broken, although it carries as much foliage as most trees; but the wood is of so strong a nature, and the branches are so peculiarly united to the main stem, that, pull the limb which way you will, it is able equally to resist the strain.

The wood of the Cedar of Lebanon is equal to mahogany; yea, more durable, and equal to it in polish. I am quite surprised to see so few of them about the parks, &c.

The propagation of the Cedar is by seed got from the cones by splitting them with a chisel, extracting the seed, and sowing it in deep seed-pans during March and April, as for the Pines, Firs, &c., the subsequent treatment being precisely the same. Cuttings may be struck with care, and the *Cedrus deodara* may be grafted on the Larch Fir, close to the ground. The Red and White Cedars are splendid minor trees, propagated by seed sown in the same manner as for Pines, &c.

BOOK II.

ORNAMENTAL TREES OF LESS GROWTH.

The Arbutus, or Strawberry-tree.

The Strawberry-tree is an apt appellation for this shrub, for the fruit exactly resembles a strawberry, and it is also of an agreeable acid taste. This shrub is a most suitable subject for single specimens or for mixed shrubberies, but it should be planted where it can display its beauty, which consists in the peculiar feature of possessing flowers and ripe red fruit at one and the same time. The flowers are as much like Lily-of-the-Valley bells as anything, and are very good in bouquets for vases.

This shrub should be cut back frequently, as it is very liable to get barren below. It may be raised from seed, which should be washed out of the pulp, dried thoroughly, and sown in the month of February or March in deep seed-pans filled firmly with fine sandy peat and maiden loam. The pans should be well-drained, the compost pressed in up to within half an inch of the rim, made even, and the seed sown moderately thick over the surface, and then covered one quarter of an inch with finer-sifted soil of the same sort. The pans containing the seed should be set on a gentle bottom heat in a frame or pit until the plants appear. They should then be hardened off for a week and shifted into a cold pit or frame, and shaded from the strong heat of the sun for a month, when the pans

may be removed and set behind or under a north wall, or some shady spot for the summer. The seedlings may be pricked out into other pans or pots, or potted off singly into small pots in the following spring, and finally planted out into beds. The soil best suited for growing the Arbutus in is one of peat or good maiden loam. There are several varieties, but the *Unedo* is the best on account of the abundance of its berries.

The Yew.

The common and Irish Yews are great favourites. There is nothing, in my opinion, which has a better effect than a good many Irish Yew-trees about pleasure-grounds—their peculiar, compact, and upright character adapts them to every place, however small. Some of the Irish Yews, planted in suitable places, over lawns, on terraces, and in cemeteries or churchyards, and for the Italian garden, give them a somewhat marked character, differing in effect from those places which are destitute of them. The close, compact, pillar-like character, the deep green colour, and the lasting nature of the plant, render it quite an acquisition among the more delicate classes of shrubs. The Irish Yew will grow in any kind of good soil, and may be planted at almost any time of the year, except in the middle of summer.

There are several varieties of this tree. They may be propagated by cuttings of the ripened young wood under a handlight put in during the autumn. The common Yew is well known, and I know of no plant so thoroughly well suited for evergreen hedges, for interior fences, and screens about the house, &c., as the common Yew. It will live for ages, bear clipping as neat as a carpet, grows as close as a boarded fence, and is nearly as good, or perhaps quite, as a wall for a wind-break, while it is infinitely more agreeable in appearance. The Yew may be propagated by cuttings and by seed, the latter plan being the most general. The berries should be gathered as soon as ripe, washed clean

from the pulp, in the same way as for the *Arbutus*, and the seed sown in the ground or in seed-pans during the month of February, March, or April. Cover the seed one inch with fine soil, and keep it moderately moist. Many of the seeds may not vegetate till the following season. The after-treatment of the seedlings may be referred to the Holly, or any of the hardy seedling shrubs in planting out, &c.

The common Yew does not transplant well when large, unless it has been frequently shifted. It may be propagated by cuttings also, planted in a shady border. These cuttings must be firm, and nine or ten inches long, planted half-way in the soil.

The Willow.

There are a great number of species and varieties of the Willow, but I may only mention the Weeping Willows. The propagation of the species is nearly one and the same. Some of the more tender sorts will require to be struck in pots under glass, while the hardy ones merely require stout cuttings to be inserted in the open ground. The pendulous or weeping sorts must be grafted at the top, like the Weeping Ash, on stout stems of the common erect-growing variety—*Alba* or *Nigra*.

The American Weeping Willow is a most desirable tree if planted near a pond, canal, or stream. It is a very rapid grower, and quickly forms a handsome pendulous specimen. This and *Babylonica Napoleona* are the most suitable subjects to plant near the tombs of our departed friends, which trees always seem to say, "I mourn," and to participate in the grief of those left behind for the departed. The *Napoleona* is somewhat better suited for this purpose than the American, on account of its finer growth, *i.e.* it does not grow so rank.

When the Weeping Willow is to be planted on ground of a dry nature, as is frequently the case in burying-grounds, it will be necessary to provide in

some way to meet the case. In doing so, let the hole made to receive the plant be above the ordinary size, and 3 feet deep. Take the soil clean out, and put a foot layer of fine close sand at the bottom, treading it in well; this sand will retain moisture. Plant the tree in good earth, and a fine specimen will repay you for the trouble.

The Syringa (*Philadelphaceæ*).

The Mock Orange does not belong to the Lilac, which is mostly called *Syringa*. The *Syringa* proper is quite a different thing from the Lilac. This genus has *Philadelphaceæ* for its natural order, and belongs to the twelfth Linn. class—plants with many stamens—and the first Linn. order, one style; whereas the Lilac *Syringa* has the Olive for its type, *Oleaceæ*, and belongs to the second Linn. class—plants with two stamens and one style. This is very confounding, for if you send for a *Syringa* to a nurseryman, probably he might send you a Lilac, and they are two things quite different, both in character and in quality. The *Syringa*, or *Philadelphaceæ*, is as much like the Orange in the flower as anything can possibly be, both for character, colour, and fragrance. The *Syringa*, then—what I am now speaking about—is a hardy, free-flowering, fragrant shrub, which grows about 7 or 8 feet high, or perhaps less.

This shrub may be planted with others of the like character, but it should be so situated that it may develop its true character, which consists of a bushy style. It will flower down to the ground if kept cut back annually, just as you would prune a black currant, *i.e.* cut the overgrown stuff clean out and leave the young in. It is readily multiplied by suckers, and also by layers. The *Syringa* is a useful shrub for forcing, for imitation orange-blossoms.

The Guelder Rose (*Viburnum*).

Viburnum opulus is the Guelder Rose, which has, however, nothing to do with the Rose. *Viburnum* is

the genus, Guelder Rose is the species. The *Laurestine* is a *Viburnum*. The Guelder Rose is a valuable and a most singular plant when in flower. A few good plants of this kind have a very marked and striking effect among others in the spring, when in flower, with their large and pure white perfect balls of flowers, suspended as they are from the points of the branches in a most fantastic way; and being very large, they show themselves from a distance.

It may be propagated by seed and by cuttings. The seed should be sown as soon as ripe, or in the spring, in fine light soil. The cuttings should be put in in the autumn.

The Portugal Laurel.

The Portugal Laurel is a very useful shrub if planted in conspicuous places, where it can grow free from obstruction and has the benefit of good light all round. It should be cut over with the knife (never use shears) annually. It forms a beautiful, compact, evergreen ornament, if grown quickly for a few years and trimmed up with a leader to 8 or 10 feet, then stopped to form a head, and this head cut over with the knife annually, so as to form an umbrella-shaped head, with a clean, straight stem, and ultimately grown in a large pot or tub. It then answers well for imitation Orange-trees for the terrace, Italian garden, or for setting beside broad walks, entrances, &c. Planted as hedge-breaks for interiors, and kept cut in with the knife annually, it forms one of the most desirable screens in connection with pleasure-grounds that it is possible to have, and far superior to the common Laurel, as it never under such circumstances gets leafless and unsightly below, as is invariably the case with the common Laurel.

It may be easily propagated by cuttings, and raised from seed. The cuttings should be 10 or 11 inches long, of the same season's growth, taken off in the month of September or October, with a heel of the old wood; then cut at right angles through where the

young wood started from, quite smooth, and dig in with the spade in the following manner :—Dig a double row of spits, make fine and firm, then cut a slightly sloping trench with the spade across, say, a four-foot bed, deep enough to admit of the cuttings being half-way in the ground when finished. Now set them in, 3 or 4 inches apart, against the bank, and dig a spit of fine earth on to the cuttings, then tread it firmly on the lower part of them, and proceed so as to have the rows of cuttings 9 inches asunder from row to row. It may be necessary to top the cuttings as they are made. They will be fit to remove from the bed in which they are struck in the second season, spring or autumn, when they should be bedded out further apart.

The Portugal Laurel may be raised from seed sown in drills in a light sandy soil 3 inches deep. It may also be propagated by layers. To do this conveniently, old plants should be cut down close to the ground a year or two beforehand, so as to get a good supply of suitable stuff. The layering consists in bending a branch down, and burying one-third of the middle part of it in the ground, first cutting a tongue on the under side of each segment of the branch; and when these are brought upright at the points, the tongues will spring out, from which roots are emitted—(see Fig. 8.)

The Common Laurel.

Scientifically the Bay is called *Laurus*, or Laurel—which, however, has nothing to do with it. The Bay is called *Laurus nobilis*, and has *Lauraceæ* for its natural order, while the common Laurel has *Drupace* for its natural order, and belongs to the Cherries. So that the common Laurel is really an evergreen cherry—*Cerasus* or *Lauro-cerasus*, or common Laurel Cherry. This is confounding, scientifically speaking.

The common Laurel is too well known to require any description; suffice it to say that it may be propagated by layers, as for the Portugal Laurel, and also by seed and cuttings. To prevent the Laurel from running to

the extremities, as it is sure to do, use the knife annually, and cut it back frequently. When it gets barren below cut it clean down, or layer it; these layers will grow, and fill up below speedily.

The Bay.

The Bay-tree is a most useful and beautiful evergreen shrub, suitable for all classes of screen and shrubbery ornamentation. It is not, like the common Laurel, apt to get out of order, but maintains a feathery state of foliage at all ages down to the ground. It grows thick, and consequently is admirably adapted for screens in all kinds of places that are disagreeable to the eye; and as it gives out a lovely fragrance to the touch, it is a most desirable shrub to plant in order to hide water-closets, ash-pits, &c., or to form an inner hedge as a break in all kinds of places. It will bear a moderately rough usage, and the knife may be used freely.

It may be propagated by seed freely, and by layers of the last season's growth. The seeds should be gathered in the late autumn, when they are black, and sown at once in drills 3 inches deep, in a light sandy soil. The seedlings will all appear in the following spring, and may remain two years in the seed-bed, after which they should be transplanted in beds or rows 1 foot by 1 foot 6 inches asunder, where they may stay until planted where they are to finally remain.

The Laurestine (*Viburnum Tinus*).

Viburnum is the genus, *Tinus* the species. It has many varieties, all of which are well known to be the most beautiful flowering evergreen shrubs we possess of a hardy constitution.

The propagation of this shrub is of the easiest description. It may be multiplied by cuttings, by layers, and by seed; by cuttings of the last year's growth, ripened in the autumn under a handlight in a shady

border; by layers as for the Laurel, trimming off the small spray and leaves from the branches buried in the soil, and scraping with the knife all the shoots, at a joint above on the upper side, which are suitable to

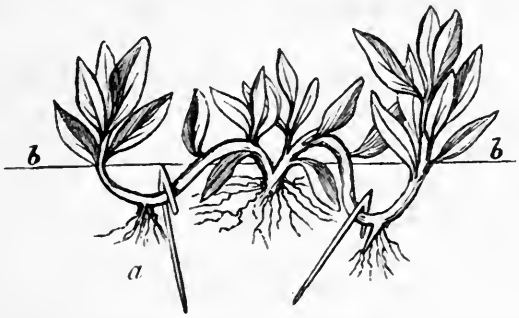

Fig. 8.—Laurel or Bay layered, showing the emission of the roots from the tongue, *a a*; *b b*, ground line.

make plants. This scraping of the bark is equal to cutting a tongue; it checks the run of sap, and induces the layer to emit roots below.

The seed should be sown as soon as ripe, or it may be preserved in sand till February, when it should be sown in drills 2 inches deep, in a moderately light sandy soil, in a little shade. Most of the seed will vegetate the same season. Let the seedlings remain in the seed-bed two seasons, after which they may be bedded out. Young plants of the Laurestine kind should be planted where they are to remain.

The Escallonia.

There are many varieties of this, but I shall merely refer to one, *Macrantha*, this being the most popular and the best. This shrub is no doubt one of the most superb hardy plants we possess; I know of no equal to it in the West, where it flowers the greater part of the year. It does this so profusely that it is a mass of crimson scarlet, and luxuriates to perfection.

This plant is a most accommodating one. It may be grown in a pot, and is superior to any Fuchsia: it may

be trained on a fence as a subdivision fence, where it will far excel the Rose in the richness of its dark-green foliage, which is of great substance, and also in its rich flowers: it may be trained on a wall to any reasonable height, while it makes a superb dwarf bush by cutting in; and it will flower abundantly in each of these situations.

The Escallonia will grow freely in almost any kind of good garden soil, but the drainage must be good. In some soils it might be advisable to introduce a large proportion of peat and leaf-mould, but I see it luxuriate to perfection about Torquay, Devon, in any kind of soil, which is frequently not much else besides loamy rocks, or stone and loam. In all probability this shrub would require a sheltered situation to preserve it during severe frosts. Here at Torquay we have the old Globe Fuchsia, and even some of our original greenhouse varieties, comparatively small trees, and the broad and narrow-leaved Myrtles in large standard shrubs, which are never injured by frost. This proves what the climate is, but I cannot say what the constitution of the *Escallonia* is, having never seen it in the northern counties.

It may be propagated by cuttings of the half-ripened last growth, stuck in pots of fine peat and maiden loam of equal parts, and covered with a handlight. A slight bottom heat will be necessary in cold counties. It may also be multiplied by layers and suckers.

The Magnolia (*Magnoliaceæ*)

The *Magnolia exoniensis* may be taken as a type of this magnificent genus. In the northern counties Magnolias can only be seen on warm walls, or walls facing the south, but in the western counties they may be seen as standards in fine flower, as also in the Western States of America. All the Magnolias are noble subjects when in flower. The *M. exoniensis* is one of the grandest flowering evergreen shrubs we possess. I am much at a loss to know how it is that so few plants of this grand variety are to be found, suited

as it is to any house wall. I would decidedly recommend it to all parties to plant on the south side of the house, and to train it on the wall quite thick, where it will present a most pleasing appearance, both in its large Laurel-like leaves and in its fragrant and noble cup-shaped pure white flowers, which are as large as a cup.

In planting this, it is necessary to make a careful preparation if the soil is not naturally of a sandy peat or good sandy loam. A large hole should be dug out and then filled in with peat—not bog earth, unless it has been exposed to the influence of the dry air for twelve months; or, the hole may be filled with sandy maiden loam and decayed leaf-mould and some pit-sand well mixed. In either of these the Magnolia will flourish.

The propagation is by cuttings of the last year's growth, taken off so as to secure a heel of the old wood. These should be taken off in the early autumn, as soon as the season's growth is ripened—the end of September or October—and inserted in large pots, 7 or 8-inch, filled with fine sandy peat, giving a good drainage. Put six or nine cuttings in each pot; let them be put into the pot half-way, close the soil well, and water them, and set the pots in a mild bottom heat. They are slow in emitting roots. The Magnolia may be raised from seed sown in a brisk heat, and it may also be grafted and had by layers. But as the cuttings may be had freely and will strike surely, that is all that is necessary for the propagation of the Magnolias.

The Tamarisk.

These are all very peculiar shrubs, on account of their finely-cut foliage, which gives them a great contrast to most others. Under careful management the *Tamarisk* will present a very beautiful character, but if left to chance it soon gets quite disagreeable in figure, for it grows very fast, and soon becomes ugly, and even an eyesore among other good shrubs. It forms a very

pretty standard if the long branches are kept constantly cut back, so as to keep the head short and compact. This is really the only way to preserve the Tamarisk in good health, for if it is left to itself it grows and dies and dies and grows in succession; that is, the branches do so. It may be multiplied by cuttings.

The Mountain Ash (*Pyrus Sorbus*, or Service-tree).

This is called "Ash" merely on account of its resembling the Ash in its leaf and the colour of the wood, for it has nothing to do with the Ash tribe as a genus. The Mountain Ash is very common in English woods and forests. It is remarkably pretty in the autumn of the year, with its bunches of vermilion berries. The tribe, especially this variety, may be multiplied by seed freely. Gather the seed as soon as ripe, and rot the flesh off by laying the berries in a heap; clean the seed out by washing, dry it, and sow in the early spring, in drills 2 inches deep, in good light soil. The seedlings may be used for grafting stocks for the more choice sorts, and for grafting Pears on. Many of the *Sorbus* kind are fine fruit-bearing subjects, and the fruit is very pleasant.

The Alder.

The Alder is a useful wood for converting into handles of tools, brooms, brushes, and various other articles of the domestic kind. The wood is of a peculiar light, soft, and fine-grained class, but of no use for any purpose where it has to be exposed to the wet for long. The Alder is a good shrub for its leaf, but only fit for outer plantations and for coppices. It may be multiplied by seed, sown as in the case of the Ash, Elm, &c.

The Judas-tree.

The *Cercis siliquastrum*, or Judas-tree, is a curious and beautiful small tree, producing its flowers before

the leaves. The flowers seem to come out of the solid wood, and are of a pea shape and of a red colour. Tradition says that this is the tree Judas hung himself on (?). It may be so, as the tree comes from that quarter of the world; and probably, being of an ornamental kind, it was planted around Jerusalem. The tree is certainly an ornamental one for outer plantations. It may be propagated by seed, sown in deep seed-pans of fine maiden soil and peat, and set in a mild heat in the spring. It should be hardened off as soon as it is well up, and finally planted out into good and fine earth. The rarer sorts may be grafted.

The Sumach.

The Sumach is an ornamental and large-growing shrub. *S. cotinus* is a very beautiful-foliaged plant. If it is grown rapidly (which it will do fast enough if in good soil), and trained up with a clean straight stem to about 8 or 10 feet, and then stopped, it will form a head which, when well grown for a season or two, and in leaf, will present a very noble appearance on the lawn as an isolated object. It is rarely that we see the Sumach to advantage.

The propagation of this species is by seed sown in deep seed-pans of fine soil, or by suckers and layers. The roots will form plants if made into cuttings, and every bit of root will make a plant if dibbed into the ground in the early spring.

The Laburnum.

There are many varieties of the Laburnum, but none more deserving of notice than the common Scotch. The common Laburnum is one of the most beautiful trees we possess of itself, and is too well known to need any description here. But there is one thing deserving of especial notice in this genus which we seldom or never see, and that is, the common Laburnum serves for stocks on which many varieties of the *Cytisus* may be

grafted, in a most useful and novel manner, as ornaments for our lawns, a thing but little done or seen.

The common yellow and white Spanish Broom may be easily grafted on the Laburnum at a height of 4 or 5 feet from the ground, which has a very splendid effect as single specimens on well-kept lawns; and the *Genistas* may also be grafted on the Laburnum with a good effect as low lawn trees. A variety of these, displaying their various colours in the form of small pendulous trees, judiciously planted over a good lawn, would produce an effect not common nor easy to improve upon by any substitute, and as lasting as can possibly be desired; for if well done and the soil is good, these trees will continue to do well for many years. Occasionally the heads will require a little thinning out and the dead wood cut out.

The tribes of *Cytisus* and *Brooms* (*Genistas*) may all be propagated by seed and cuttings. The double *Genistas* are propagated by cuttings and grafting. The cuttings may be struck under handlights during summer, and some in pots.

Genista canariensis is a beautiful greenhouse variety. Cuttings of it may be struck freely in pots, covered with a bell-glass.

Genista tinctoria flore-pleno is a beautiful hardy trailing shrub of compact growth, and well suited for rockwork. Cuttings of it may be easily struck under a handlight, put in during the early autumn or spring. The last season's growth, taken off at the joint where it started from, are the sort of cuttings best adapted to insure success.

By Seed the Laburnum and Spanish Brooms may be raised readily. Sow the seed in March or April, in drills 8 or 10 inches asunder, in light and good soil; the drills to be 2 inches deep, drawn with a half-moon hoe, and the seed covered as for peas. Plant out the seedlings into rows 1 foot apart and 18 inches from row to row. The seedling Laburnums will require straight stout sticks to tie the stems to for a year or two after the second season, and until the stems are stout

enough to bear the head, or they will grow very crooked and ugly. If the Laburnums have made good progress, they will be fit for grafting the Brooms on the third and fourth year. The grafting is done at the top of the stock, as for the Weeping Ash.

The Pyrus Japonica.

The *Pyrus Japonica* is a very uncommon plant, notwithstanding its remarkable beauty, which, when in flower in the early spring, is very striking, the whole plant being covered with large scarlet flowers, which appear before the leaves. There are several sorts of it, and the Quince is one of the genus. The *P. Japonica* may be grafted on standard stocks of the Quince at 5 or 6 feet from the ground, when it makes a beautiful lawn tree, and being very hardy and early in flower, it is very desirable to enliven the scene after a dull and dreary winter.

The grafting is done in the same way as the Pear or Apple is grafted in the spring. It may also be multiplied by layers of the last year's growth, as the Grapevine is layered. These are slower to emit roots than the Vine, and must not be disturbed for twelve months from the layering, when the rooted layers may be removed and planted out, being cut in a bit to induce dwarf plants for walls, for which they are often used, as well as for low interior fences. The effect of this plant, trained on such a fence, is extraordinary when in flower in the early spring.

The Garrya Elliptica.

This and the remainder of the small genus are *Monœcious* plants, and belong to the Nut class. The *Garrya* is the type of the order, *G. Elliptica.* It is one of the most beautiful hardy evergreen shrubs to be found, possessing leathery, oak-like leaves. The flowers, to be sure, are not gaudy, but of a singular quiet colour and of a most distinct character, being doubtless incom-

parable as regards their exquisite form, being very long catkins of a lovely formation, which, when fully out (which is during the early spring) and seen hanging on a moderate-sized plant, are truly well deserving the title of "graceful," if such a term can be applied to a plant.

It should be planted on a lawn in single specimens, where it can be seen to advantage. It may be propagated by grafting on the Oak close to the ground, also by layers, and by cuttings in fine sandy soil under a handlight. The cuttings should be of the last year's growth, half ripened, and inserted in sandy soil in the open ground and shady; but the quickest and surest way to get plants of it is by grafting.

The Photinia (*Pomaceæ*).

The *Photinia* belongs to the Appleworts, although in natural appearance it looks like a Laurel and is an evergreen. It is a noble-charactered plant in regard to its foliage, but rather a thin-growing subject, having no particularly desirable feature as a shrub, except for its glossy leaves, which are of a dark green, inclining to a red in the autumn. It may be grafted or budded on the White Thorn or Crab stocks close to the ground in the spring, and budded in September.

The Figwort (*Buddlea*).

The old *B. globosa* is the only one well known of this small genus as a hardy shrub. Some of the tribe may be found in our greenhouses. They are very distinct in their flowers. The one here named has perfectly round flowers; hence its name, *Globosa*. They are of a rich yellow or orange colour, and are produced in abundance on plants grown on a dry soil.

The propagation of this species is by cuttings and by seed. Cuttings of the half-ripened wood may be easily struck in pots of sandy fine peat under a bell-glass. The seed should be sown in seed-pans in the spring and set on a gentle heat.

The Leycesteria (*Caprifoliaceæ*).

L. Formosa is nearly an evergreen in a warm climate. It is of a beautiful pendulous form, well clothed with foliage, and bearing an abundance of flowers and fruit. The fruit is similar to the berries the common Honeysuckle bears in regard to size, only the *Leycesteria* berries are black when ripe, and the Honeysuckle berries are red; the flavour of both is the same. Birds are very fond of them, and for this reason the Leycesteria is planted in game covers. It may be propagated by seed freely, sown in the spring in a fine light soil, and by cuttings put into pots or under handlights.

The Sunrose (*Helianthemum*).

The *Cistus* and the Sunrose vary so little in their generic relation, and are so much alike in their characteristics generally, that they may be fairly classed together here. Few or none could distinguish the difference between a Gum Cistus (as the Sunrose is technically called) and a Cistus. They are a most splendid class of plants. The division above, the *Helianthemum*, is a remarkably beautiful and useful tribe for covering rockwork, banks, and beds. Many of them will excel in beauty the bedding Verbena, and will flourish where the Verbena will starve and die away. They possess a variety of colours—white, yellow, pink, copper, red, &c., and many of them are as double as a Rose.

All of them may be propagated by seed sown in seed-pans in the spring, using fine peat and maiden loam, and set in a cold frame; and by cuttings of the half-ripened young wood during the summer months—short and firm young wood, taken off without any flower-buds, and carefully inserted in pots filled with fine peat, and set in a shady spot with a handlight over them. Water the cuttings to settle the soil about them, but be careful not to use too much water afterwards. Keep the cuttings at a moderate state of moisture, and as

soon as they are struck, which they will soon do, lift the handlight up to give them air; stop them, and finally pot them off or prick them out into a shady fine border, and again plant them out in a dry and sunny border or bed.

In the cold northern counties it will be necessary to house the young plants in a dry cold frame in the severe and protracted frosts of winter, and to screen old plants with furze-branches; but in the western counties no such protection will be required.

By Seed they are easily raised.

The Lilac (*Nat. Ord., Oleaceæ*).

I have said enough in reference to the Lilac not being a *Syringa*, although the genus is called one. Under the head "*Syringa*" is my explanation. The Lilacs are a most beautiful class of flowering deciduous shrubs, and are too well known to require any description here. They may be propagated by seed sown in the spring, in drills of light soil, a little shady.

The Lilac may be multiplied by the suckers, which it gives in abundance, and also by layers. It is a genus that is most desirable in back borders, and will bear cutting to any amount. It is useful for forcing, especially the Persian, and more particularly the White Persian. It may be taken up from the ground with a good ball of earth carefully, and potted in October, when, introduced into the heat in December, it will succeed well.

The Gleditschia (*Fabaceæ*).

This is the genus to which the Honey Locust-tree belongs, and which in all probability is the plant which composed the crown of thorns which the Jews placed upon our Saviour's head. It is a spiny variety; in fact they are a horribly thorny tribe, and the greater part of them come from Asia. The fruit was the locust food which John the Baptist eat, as it was plentiful

about Judea. Being a horrid thorny class, no doubt one of these was the tribe from which came the crown of thorns, instead of from *Paliurus*, which tribe is a dwarf class of very handsome shrubs, although spiny. The other, *Gleditschia*, grows to a common coarse tree, similar to the *Acacia Robinia*, and produces pods of bean-shaped seed. *G. Ferox* possesses thorns 5 or 6 inches long.

It bears seed as does the *Robinia*, and the species may be propagated by raising it from seed sown in deep seed-pans or pots, after soaking it for some hours in warm water. Sow in any good soil of a sandy kind, cover the seed an inch deep, and set in a brisk heat; pot off as soon as a few inches high, and plant out finally; or, the plants may be hardened off and pricked out from the seed-pot into a bed of fine good soil. The choice kinds must be grafted on the common sorts.

BOOK III.

SHRUBS OF AN ORNAMENTAL CHARACTER AND DWARF GROWTH.

The Euonymus.

The *Euonymus*, or Spindle-tree, can scarcely be called a tree, as it seldom attains to 6 feet in height. There are many varieties of this beautiful tribe. The gold-striped and the silver-leaved are among the most unique evergreen shrubs we possess. All the *Euonymus* kind are remarkably well suited for inner fence-breaks, or interior subdivision low fences, for nurseries as well as in the parterre, where neatness combined with beauty is a matter of importance. Nothing can excel and few things can compare with these for low, close fences, as subdivisions, if well planted, grown freely, and carefully cut in, or the points of the shoots nipped out as they grow.

As single specimens, the *Euonymus* cannot be equalled when well grown, as isolated subjects on a neat lawn, or in groups of three forming a compact clump. They are also well suited for low edgings round large beds of bulbous plants, especially the gold and silver leaf kind, which are as handsome as any flower, and much more lasting, as they always remain the same.

The propagation of these is easy enough. In the early autumn months, about October, select some cuttings of the last season's growth, 3 or 4 inches in length, trim the leaves off the lower half of the cutting, and,

with a keen-edged knife, cut it at right angles just below a leaflet. When enough are made to fill a handlight, place them under it, in a nicely-prepared compost of maiden loam, peat, and sand, made fine. Insert the cuttings, 2 inches asunder, all over the space covered by the light, let them into the ground full half-way, and close the soil well to the lower part of the cuttings with a small dibber, which should not exceed in size a large school cane. When all are in, water them well with a moderately fine rose water-pot to settle the soil to the cuttings, and cover them with the light. By the spring they will have made sufficient root to allow of their being taken up and potted into smaller pots, or planted out into fine soil in a shady border 6 inches by 4 apart.

Should not the cuttings all have struck root by the spring, they must remain until the following autumn, lifting the handlight off as soon as they begin to grow. The *Euonymus* is a remarkably fine pot shrub, and will safely bear a good deal of drought and exposure.

The Berberis.

There are two classes of this genus, the evergreen and the deciduous. This last division consists of the common coarse-growing thorny Berberry, from which a small acid fruit is gathered for preserving. All the berberries are most desirable plants. The evergreen species are among our choicest ornaments of the garden. *Darwinii* and *Dulcis* are the most splendid-flowering evergreen shrubs we possess for planting on lawns, being covered in the spring with golden bells. They should have a conspicuous place assigned them. Nothing among low-growing shrubs can excel a well-grown specimen of *Darwinii* on a nice lawn.

They will bear cutting in well, but it should be done with the knife and not with the shears. The cutting or trimming should be done immediately after the flowering is over. Some of them, as *Empetrifolia* and *Repens*, are good rock plants, being prostrate-growing

sorts. All the species may be propagated by seed sown in the month of March or April, in drills 3 inches deep, in good light sandy soil, and somewhat shaded. They should be kept moist until up, but not supersaturated with water. Cuttings of the last season's growth taken off with a heel of the old wood will strike freely if inserted under a handlight during the month of September in a shady border, and in a fine compost of peat and maiden soil. Cut them at right angles just below the base of the young wood with a keen trimming-knife, and trim the leaves off half-way up the cutting, and insert them 2 inches apart up to the leaves; water to settle the soil about them. Let them dry off a little, and cover them with a glass. Suckers may be often obtained from most of the sorts, and they may also be multiplied by layers.

The Furze (*Ulex*) (*Fabaceæ*).

The double-blossom Furze is a very beautiful shrub for a lawn, as an isolated object; but when it is planted in conjunction with anything else, it loses its beauty as a shrub, and soon becomes a thing in common with confused border shrubs, and even gets ugly. It should be allowed a clear open space on the lawn, and carefully cut in with the knife, or, what is better, the pruning-shears, so as to keep its symmetrical character, which is a dwarf compact bush. If the Furze, whether single or double, is left to itself, it will soon get beyond what is ornamental or desirable.

The double-flowered kind is only propagated by cuttings, and must be done with the short growth of the last season, and one-half the cutting divested of its leaves, or rather spines; the base of it being cut smooth with a keen-edged knife, and inserted in fine-sifted peat and maiden soil of equal parts, with a portion of silver sand, under a handlight. This should be done in the month of October or in the spring, in a shady spot, and one not liable to too much wet, *i.e.* where there is stagnant water, nor under drips of trees or build-

ings. The single Furze is easily obtained from seed sown in shallow drills in March.

If two rows of Furze are sown 18 inches apart, they make one of the most enduring and close fences that can be had, especially for gardens that require shelter from cold winds; but it must never be forgotten that it requires the pruning-shears every season to keep it well feathered below, and then nothing will go through it.

The Althæa (*Malvaceæ*).

All the species and varieties of this order are more or less beautiful, and even the weeds of this class partake of its beauty. It consists of three divisions, the *Hibiscus*, the *Hollyhock*, and the Mallow, with their several varieties; and although all three of these divisions belong to the one great natural order *Malvaceæ*, yet few would observe this in the case of some of the subjects; for instance, the old *Althæa frutex* would be easily taken for quite a different thing from the Hollyhock, the Mallow, Hibiscus, &c. Here I shall only refer to the Hibiscus class, the *Althæa frutex*. These are deciduous shrubs of great beauty, comparable to carnations on trees. There is nothing to be compared with a well-grown dwarf standard Hibiscus on a lawn, or a small bed of them, consisting of numerous shades, as they are so remarkably varied and rich in colour. To grow them well a good compost of peat, maiden loam, and decayed manure is required, with a good free drainage. In the northern counties a difficulty will arise as to the flowering of many of the choice kinds; but in the southern and western counties no such difficulty will be felt. These are seldom or never seen nowadays, not because they are surpassed in beauty by any of our new things, but because they are not really known.

They may be propagated by seed from the single sorts, and by cuttings of the double ones, also by grafting on stocks of the common *Syriacus*. The cut-

tings must be ripened shoots of the last season's growth, taken off with a heel of the old wood. Cut immediately below the base of the young wood—a clean cut—and insert the cuttings in pots of sandy peat, and set them on a gentle heat in a pit or propagating-house, and place over them a handlight or a bell-glass that will cover say three pots. The seed must be sown in the spring, and set on heat until up, then hardened off, and finally potted for the tender sorts, and planted out if of the hardy kinds, such as *Syriacus*.

The Azalea.

It is almost superfluous to offer any descriptive remarks about the Azalea beyond that the American varieties are available for any of our gardens, and may be easily grown in good rough maiden loam, leaf-mould, and pit sand in equal parts, when peat cannot be obtained. Many people dispense with these beautiful lawn shrubs because they think they must have peat to grow them in; and peat cannot be had at all times. But the above compost will be found a good substitute, and it is generally obtainable on the spot. Gather all the leaves in the autumn, and deposit them in a heap somewhere where they may remain for twelve months or two years, turning the heap once or twice to hasten decay. At the end of the time it will have become thoroughly decomposed and fit for the purpose. The maiden loam may be fresh dug from a common or field, turf and all, chopped up, and used when wanted. The sand may be obtained from sand-pits.

If the natural soil is not good, nor fit for the Azalea, dig the bed out that is to receive the plants, 18 inches deep, carry it away, and fill in with the above compost; plant therein, and success will follow in the way of good bloom and healthy plants.

The propagation of the Azalea is by seed, by layers, and by cuttings. If by cuttings, select the last season's young wood 2 or 3 inches long: abundance of this is found on the plants as laterals. Take these off when

half ripe, with a heel of the old wood, or at least let a good base of last season's growth be attached to the cutting. Take off as many as will fill a handlight or a pot, as the case may be. This should be done at the end of August or the beginning of September. Trim the leaves off full half-way up the cutting, cut the base of it clean at right angles with a keen-edged trimmer or budding-knife. Cut immediately at the base of the growth, and insert the cuttings in pots, firmly filled with fine sandy peat up to the brim, quite level and firm, placing them 1 inch asunder, and up to the leaves, then close the soil well to the base of the cuttings, using a small stick dibber about the size of a cane. Water them well to settle the soil to the whole, and set the pots on a very mild bottom heat in the propagating-house, pit, tank, or tan-bed, covering the pots with a large bell-glass or handlight.

They will then strike root within two months or ten weeks, when air must be given, and finally the light removed altogether, leaving the struck cuttings in the same place for a month, when they may be potted off, and continued in a warm pit or house if of the Indian kinds, and in a cold frame if of the American or Ghent varieties, until the spring, when the hardy sorts may be planted out into beds of peat, and the Indian sorts re-potted into 5-inch pots, and stopped to induce a bushy habit.

By Seed.—Sow the seed, which is very small, on the surface of seed-pans filled with fine sandy peat, and barely covering it; set the pans on a mild heat, and lay a flat square of glass on the pan, placing a sheet of paper on the glass to break off the strong sunlight until the seed comes up. When it requires watering, great care is needed in giving it, or these fine seeds are sure to get washed out, and a total failure ensue. The dew-pot must be used for all fine seeds—(see page 100).

By Layers.—Layering of the Azalea is done in August and September. The stools of the hardy sorts must be planted in peat soil to insure success in layering.

The Rhododendron.

The propagation of the Rhododendron is by seed, by layers, and by grafting. Seedling stock from the common *var. ponticum* are used for grafting the rarer sorts on. Seedlings may be raised freely by sowing seed on the surface of the open ground of a peaty nature, and in the shade, as in the case of similar full-grown plants, or any other plants of the same class. In the spring prick up the ground under them, and then rake it down to a fine surface, and sow the seed thickly all over the surface under and between the plants, or on a shady border of a peat soil, and draw the back of a spade gently over the surface, and leave it. The ground must not be either hoed or raked for a twelvemonth after the seed is sown. It may be sown in seed-pans and set under a north wall, and must be kept damp. The layering is done as for the Azalea, and the grafting as for the Camellia.

The Camellia.

The Camellia as a flower is too well known to require any description here; but, as a plant, it is scarcely so well known. The Camellia is generally considered by amateurs a difficult plant to manage. Many fail to make it answer their expectations, and get disheartened; but, in my opinion, the Camellia is easy to grow, so as to flower as well as a rose. In doing this a certain simple step has to be taken, which consists in merely subjecting the plant to a mild heat for a few weeks after it has flowered, until the flower-bud has formed itself, and no longer. Then either discontinue the heat or harden the plants off for a week, and remove them out into the open air, and set them under a north wall for the summer months until the middle of October, supplying them with water as required, and once a week giving them some liquid manure. If the Camellias are continued in the house, no heat must be allowed them after the flower-bud has formed, and all the air is ad-

mitted that is possible. If the plants require shifting, it should be done as soon as the flowering is over. Peat and good maiden loam, two parts of the former to one of the latter, is a good compost to grow them in.

The Camellia is not at all tender. In the west of England it may be grown out of doors on a west or north wall. The propagation of the Camellia consists in multiplying it by seed for new sorts. The seed is obtainable from some seedsmen who import it. It is large, and should be covered, when sown, with 1 inch or 1½ inches of soil at the least. Sow the seed in pots filled with a compost of fine peat, sand, and maiden loam, in February or March, and set them in a brisk moist heat; plunge the pots up to the rims over a warm tank or in a hotbed. These seedlings are used for stocks to graft the double sorts on.

Fig. 9.—The Camellia, whip-grafted.

The grafting is effected when the stocks are two or three years old, and is done close to the pot. Inarching used to be the method of grafting, but the grafts will do very well detached from the stool, and attached to the stock, as for Roses, Plums, &c., allowing the stock to retain its top instead of cutting it down previous to attaching the graft. The method used is side-grafting. But grafts of the Camellia will unite very well if even the top is cut off the stocks beforehand, if the stocks are excited a week or fortnight before the operation, and a gentle heat is allowed them after it, and they are kept close and shaded. Tie on the grafts with rofea, and use the grafting-wax to exclude air.

The Camellia may also be propagated by cuttings. In the autumn, say September, select cuttings 3 or 4 inches long, of the same season's growth. Cut them at

right angles at the base immediately below a leaflet, detach the two lower leaves, and insert them in 5-inch pots, 48's, up to the leaves. The soil should be fine-sifted sandy peat. Put four or five in each pot. Close the soil well to the cuttings, give a good watering, and plunge the pots up to the rims in a tan-bed or over a tank with a mild bottom heat. Cover the pots with hand-glasses or large bell-glasses, and keep close until struck, shading from the strong light and sun. By the following spring the cuttings will all be well rooted, and should then be potted off and treated as for mature plants. I have soon had good plants this way, and recommend it before grafting, as both room and time are saved.

The Daphne (*Thymelaceæ*).

The Daphnes are among our most superb shrubs, and are great favourites, both on account of their habit and fragrance as a flower. For fragrance I know of nothing comparable to the *Mezereum* when in flower. One or two good plants of this are sufficient to perfume a small garden. The *D. Cneorum* is a profuse flowerer, and forms a splendid dwarf bed on a lawn. The *Indica rubra* and *I. alba* are most desirable greenhouse shrubs for cut blooms.

The propagation of the Daphnes is sometimes by seed, but chiefly by cuttings or grafting. By seed—of all that bear seed, sown in autumn or early spring. The *Mezereum* is mostly by seed sown in the open ground in drills 2 inches deep in a warm border, or in seed-pans 4 inches deep, the seed being covered $1\frac{1}{2}$ inches with soil. This should be half sandy fine peat, and half maiden loam, well mixed, a good drainage being given. This must be well looked to, as the seedlings should remain two years in the seed-pans, for they are too small at one year old to remove. Moreover, some of the seed may not vegetate till the second season after sowing. The second season the seedlings may be potted off, or planted out into beds of fine peat and maiden soil, although the *Mezereum* will do very

well in any good rich common garden soil of a fine nature.

The seed should be sown in the autumn, and screened a bit from heavy rains during the winter months, but not kept too close. The three-year-old seedling *Mezereums* may be used for stocks to graft the better or rarer sorts on.

The grafting of Daphnes is by means of scions, say 2 inches long, of the last season's growth, and should be done in the month of September, as for the Camellia —(see page 53). I find many make quite a mistake in reference to the situation required for the *Mezereum*. They select a shady place to grow it in, but the best lot of plants I ever saw were some I grew from seed, which were bedded out in the most sunny warm spot I could find in my little nursery. They were dwarf, bushy, and handsome healthy plants, and in the spring each one was a bouquet of itself.

Cuttings may be struck if the short young wood is taken off at the base, nicely cut across at right angles, leaving a heel of the old wood, and inserted in pots of fine peat and sand, and set on a mild heat, kept moist, and covered with a handlight. You may put three pots under a large bell-glass—(see page 101). The Daphnes should be planted where they are to remain as long as they live, as they do not remove well after they have been a few years on the spot without shifting. The common Wood Laurel is used for stocks to graft *D. Indica* and any others on, and may be obtained in many localities by suckers.

The Deutzia (*Philadelphaceæ*).

The *Deutzias* are a very beautiful and useful class of plants, possessing delicate white flowers in the spring. *Gracilis* is a well-known favourite, and forces well, flowering freely. The chief thing is to induce it to make new growth—on this depends a good crop of flowers in the following season. This variety makes a good small bed or clump for the lawn.

The propagation of this species is by cuttings of the half-ripened wood inserted in pots of fine peat and maiden loam, and plunged in a mild bottom heat; or ripened wood of the last season's growth, planted under a handlight in the open ground in the autumn. Or some of them may be multiplied by division of the root, suckers, &c. Any good common garden soil suits the *Deutzias*, as they are quite hardy.

The Cotoneaster (*Pomaceæ*).

Cotoneaster microphylla makes a very pretty lawn tree grafted on 5-feet stems of the common Hawthorn. Being evergreen, and of a recumbent habit, it forms a beautiful weeper for the lawn. It may also be used with good effect to cover unsightly low walls. It requires little nailing, and is one of the best rock plants it is possible to have. I had (or there was where I was gardener) a large shillity rock covered with this, where nothing else would grow. It is a capital thing to train on a low wire fence for an interior division break, and looks very neat; and being full of red berries through the winter, it has a good effect. It may be propagated by cuttings, by seed, and by layers; in fact it will take root freely of itself if allowed a little soil to strike in. The cuttings strike freely if taken off 6 or 9 inches long, and bedded in, as for the common Laurel. The grafting is done as for the Apple or the Pear, and should take place in the spring. The seed should be treated as the Hawthorn—(see page 24).

The Box (*Euphorbiaceæ*).

There are many varieties of the Box-tree. They are all useful evergreen dwarf shrubs, chiefly used as ornaments of the garden, and are very accommodating, being compact growers, always green, growing well anywhere and in any soil. The narrow-leaved variegated kind is very beautiful. They make conspicuous

objects about the grounds, and may be used as a sort of dwarf avenue on each side of a shrubbery walk, or for a neat back break-hedge to borders, &c.

The propagation of all kinds of the Box-tree is by seed or cuttings; but as the latter will grow, surely no other method will be employed by which to multiply it. In the month of August or the beginning of September select the last growth, 4 inches long; trim off the leaves from the lower half of the cuttings, and insert them 2 inches asunder in a shady border of good soil; give water to settle the soil close to the cuttings, and nothing more will be required to be done to them but weeding for two years, at the end of which time transplant them out at 6 or 9 inches apart in some more open spot, where the young trees can develop themselves.

The Kalmia (*Ericaceæ*).

The Kalmia is named after a man. It is one of the choicest evergreen flowering shrubs we possess. Those who admire beauty of construction as well as delicacy of colour should no doubt have a bed of them on the lawn, however small, for there are few things to equal a truss of Kalmia blossoms. It is quite a ladies' flower, being of a most exquisite form, and comparable in tint and substance to a wax flower. Peat soil is indispensable for growing them.

The propagation of this species is by seed and by layers, and with care cuttings may also be struck. The seed, which is very fine, should be sown on the surface of seed-pans well drained and filled with pure peat (not bog earth)—(see pp. 170—180)—of a fine sandy nature. First fill the pans up to the rims within half an inch, and press the soil in pretty firm. Make the surface quite even and smooth with a small pot or a little block of round wood sawn off a stake. Then water the soil in the pan with a fine rose water-pot, so as to soak it through, and let it stand over for an hour; then sow the seed moderately thick over the surface, and give it a very thin sprinkling of fine peat and

silver sand, enough to barely cover it. Set the pan or pans in a cold frame, and keep them close and slightly shaded from the full influence of the sun until the seed is up. Great care is required in watering the seed-pans for some time after the seedlings appear, as heavy or careless waterings will wash them out of their place and cause a failure. The seed should be sown in March or April.

Cuttings may be struck, if sound, young stuff is taken, 2 inches long, and should be inserted in fine sandy peat, and covered with a bell-glass placed in a frame facing the north. The layering is done as for the Azalea—(see page 35).

The Weigela (*Caprifoliaceæ*).

There are several varieties of this, but the *Rosea* is the most popular one, and well worthy of a place in every garden, however small, on account of its dwarf habit and abundant flower. The plant will bear pruning in to any extent. This should be done in the spring, so that new growth may be formed for flowers the following season. The propagation of this species is by cuttings of the ripened young wood inserted in pots, pans, or under a handlight, with a soil composed of peat and maiden loam with a portion of sand.

The Ribes, or American Currant.

There are many varieties of this genus, but only one is worth notice as a flowering shrub, and that is *Sanguineum*, which is very generally known. It makes a pretty spring flowering shrub, and is very ornamental. Some train it on fences or walls, where it looks very well. The propagation of it is by cuttings of the last season's young wood, 9 or 10 inches long, and dug in the soil as for the common Currant cuttings, in the autumn or early spring. Let them remain one year in the cutting-bed, and then transplant, 1 foot by 1 foot 6 inches apart, to remain till finally planted out.

The Aucuba Japonica.

The Spotted Laurel, as some call it. This belongs to the *Monœcious* section of plants, and not to the *Diœcious* class, as seems to be the idea of some persons. If it belongs to the former class, then there is a mistake about the *Aucuba* possessing male and female sections —in other words, one plant bearing berries only and another flowers only, or male and female plants separately, as in the cases of the Yew and Willow. These are *Diœcious* plants, but the *Aucuba* is a *Monœcious* plant—which means the same plant bearing both male and female flowers, as in the case of the Nut, Pinus, Cucumber, &c.

The *Aucuba* is one of the most useful and beautiful classes of evergreen dwarf shrubs we possess. The propagation of it is easy to accomplish. In the months of September and October select the last season's growth, *i.e.* the last growth which will be made the same season. Let the cuttings be 9 or 10 inches long, and firm. Cut them off with a heel of the old wood at right angles, immediately below the union of the old wood and the young. Trim off the leaves half-way up the cutting, and lay them in up to the leaves in light sandy soil: dig them in as for the common and Portugal Laurels, treading the earth firmly on the base part of them. As you proceed trench after trench, tread the soil (which must be made fine) on the cuttings, when one spadeful of soil only is turned on them; but do not tread it after, except a little to form a solid trench to be cut down on or against which to lay the cuttings. They may remain here for two years, when they may be taken up and replanted in beds 1 foot 6 inches apart, or 1 foot 6 inches by 1 foot.

The Aucuba may also be propagated by layers and by seed. The layering is done in the same way as for the Azalea or Laurel—(see page 35).

The Savin (*Juniperus*).

All the Junipers are desirable evergreens, but *Sabina*, or the *Savin*, is peculiarly so. The green Carpet Juniper, or *Savin*, is a most desirable plant, and ought to be much cultivated, as ought also the *Sabina variegata*, for covering embankments, rockeries, dwarf beds, and sloping grounds. These grow so close together and so near to the ground that they well deserve the title given to them, viz. the "Carpet Juniper." It is quite astonishing to me that so few of these are to be found, especially in neighbourhoods abounding with sloping grounds, terraces, and embankments, where the Carpet Junipers would flourish exceedingly well, and last as long as a generation.

The variegated Carpet Savin is a beautiful thing, and should be freely planted on slopes, rockeries, &c. The propagation of the Savin is by layers, by cuttings, and by seed. The cuttings must consist of ripe young wood inserted under a handlight on a dry shady border. The small cuttings require carefully preparing previous to insertion; first, select the half-ripened young wood an inch or two long; cut them below the joint where they are connected with the old wood, at right angles through the connection, with a keen-edged budding-knife, trim off the leaves, &c., and then insert them in fine sandy peat and maiden loam, made solid by pressing it together, and make the surface quite smooth and firm. Place them 1 inch asunder, and set a good handlight over them, after having watered them to settle the soil well to them.

By the following spring (the cuttings being put in during the autumn, about September) they will have made root, which will be indicated by a fresh point of young wood, when air must be given them, and by the autumn they may be potted off into 60-size pots, and plunged on a dry border.

In the following spring they may be shifted into 4-inch pots, and plunged into a shady border.

By Seed.—All the Junipers may be raised by seed

when it can be had. It may be sown in deep seed-pans, or in the shady border, but the former are preferable. Use good soil as for the cuttings, have good drainage, and cover the seed 2 inches with soil. Treat them as for Pinus, &c. Set the pans out of doors in a shady place for the summer, and remove them to a more sunny situation for the winter season.

THE CRYPTOMERIA (*Coniferæ*).

This small genus contains very beautiful pendulous evergreen Juniper-like trees. *Japonica* is a handsome shrub, growing similar to the Hemlock Spruce, but will grow higher, and forms a noble pendulous tree, when it can be favoured with room and a damp situation. It may be raised from seed, by sowing it in deep seed-pans in the month of April, and treated as for the *Cupressus*, *Pinus*, &c.

THE TAXODIUM (*Coniferæ*).

The *Taxodium*, or deciduous Cypress, is among our best medium park and lawn trees. It is of a peculiar light green foliage during the summer, and looks conspicuous on a good large lawn among other deeper green objects. Here is a group fit for a small park or a large lawn :—A Cedar of Lebanon, a *Cedrus deodara*, a *Pinus Wellingtonia*, a *Pinus insignis*, a deciduous Cypress, a *Cupressus sempervirens*, a *Cupressus macrocarpa*, a *Pinus imbricata*, a *Thuja occidentalis*, a *Cryptomeria Japonica*, a *Taxus fastigiata*, a *Juniperus pendula*, an *Abies Canadensis*, an *Abies Smithiana*, a *Chamæcyparis sphæroidea* (White Cedar), and a *Garrya elliptica*, a clean standard Scotch Laburnum, ditto Scarlet Thorn, ditto Copper Beech, a clean standard *Pyrus Japonica*, ditto *Pyrus floribunda* (white), and a bed or two of *Juniperus sabina*, and ditto *Variegata*. These well planted on a clean lawn, at a good distance apart, will have a general effect not often met with, and will prove as lasting as a decade of generations.

The propagation of the *Taxodiums* consists in raising them from seed, and by cuttings. The cuttings must be of the firm young wood in the early autumn, inserted in deep seed-pans filled with fine sandy peat and maiden loam of equal parts, and set in a cold frame facing the north, being kept moist. The seed may be sown in April as for the *Pinus* tribes, and treated in the same manner.

The Hydrangea (*Hydrangeaceæ*).

The *Hydrangea* is so well known that it seems almost superfluous to say anything about it here. It is certainly worthy of a more extensive cultivation than it seems to get in some parts. It is propagated by cuttings of the young wood taken off in June and July, 3 or 4 inches long, and inserted in pots or under a handlight, and well watered. Or they may be put into heat, where they quickly strike root. The *Hydrangea* may also be multiplied by division of the root; but to get fine flowering plants in pots, with a large single head of flowers, cuttings must be struck from the young wood, or rather of young wood, as I have said, and as soon as they are rooted, pot them off singly into 4-inch or 5-inch pots, using fine peat and loam. Encourage the plants to grow freely, and continue them in these pots until the following spring, when they should be shifted into 6-inch pots for flowering, or they may be turned into the beds. The peat soil from Dartmoor will produce the blue colour freely.

The Andromeda (*Ericaceæ*).

There are a great many varieties of this beautiful dwarf shrub. *Floribunda* takes the lead in this genus, and is of a very pretty dwarf character, as free flowering and as handsome as a Heath. It makes a splendid bed, being compact and suitable for the centre, around which may be planted with good effect some of the free-flowering hardy Heaths.

The propagation of the *Andromeda* is by seed sown

in seed-pans, as for Heaths, &c. Fill a pan with good sandy fine peat, make the soil firm, and water it; let it stand for an hour, sow the seed, and cover it as thick as a sixpence, and no more. Set the pan in a propagating-house, and cover it with a bell-glass, handlight, or lay a flat square of glass over it.

By Layers.—This is the most successful way to multiply the *Andromeda*. In the month of September or October lay down some of the outer branches in the ground, trimming off the leaves, &c., that are to be buried. Set the branches in the soil, which must be peat, 3 or 4 inches, cover the part, bringing the ends of the branches upright out of the ground, and press the soil moderately firm on the buried part. Let them remain for twelve months, when the layers will all be rooted, then remove them, and plant them out into beds 1 foot 6 inches by 1 foot asunder. The soil must be peat.

The Hardy Heath.

All the hardy Heaths are most desirable and useful plants. Considering the beauty of this tribe, the hardness of their constitution, their remarkable capacity for usefulness, and their cheapness, I am totally at a loss to conceive why they are so little used as permanent ornaments of our parterres. I know of nothing as dwarf flowering and permanent hardy shrubs so well worthy of a place in every well-devised pleasure-garden. All that is required is a dry subsoil, and a compost of sandy peat and maiden loam. Rough stones may be used to secure a dry subsoil: a foot or 20 inches of these put in the bottom of the bed, with a foot of peat, rough maiden loam, and turf, all chopped up with the spade, will grow Heaths well.

The *Erica vulgaris* forms one of the most beautiful beds possible, and for rockwork it is a splendid object. So are *E. cinerea purpurea* and numbers besides, all of which are hardy.

The propagation of Heaths is comparatively easy.

They may be obtained by seed, by cuttings, by offsets, or side-shoots, and by layers.

By Cuttings.—As soon as the young wood has become firm, take them off an inch or two long, trim off the lower leaves, cut clean at right angles below a leaflet, and insert the cuttings under a handlight on a shady border in a compost of fine sandy peat; or insert them in seed-pans, and set them in a close frame facing the north.

By Layers.—During the autumn or spring lay the branches in the ground, pegging them down, and, in the course of twelve months, an abundance of young plants may be taken off and planted out.

By Seed.—In the summer gather the seed, preserve it in dry bags till the spring, and in the month of April sow it under handlights or in seed-pans filled with fine peat. First let the drainage be good, then make the soil firm, and water it so as to soak it through; let it remain for an hour or two, then sow the seed over the even surface, and sprinkle enough fine sandy peat over it to barely cover it, and set a handlight over it. A little morning sun will be beneficial, but shade from the sun the rest of the day, until the seedlings are well up, then give air and light. The seed-pans may be set in a shady part of the propagating-house with advantage.

The Hypericum, or St. John's Wort.

These are all very useful and interesting shrubs, and are remarkable for their hardiness of constitution. *Calycinum* is distinguished for its fine foliage, large flowers, and for growing on embankments and in dry and poor soils, under shrubs, &c. All the St. John's Worts are remarkable for enduring poverty of soils and droughts, and as the foliage is pretty and the flowers are handsome, they would be most useful as low shrubs on those open and dry grounds in America and Australia, where few things else will live.

The propagation of the genus is by offsets, cuttings, and seed. By seed it may be raised freely. Sow in

seed-pans in March, and set on heat for the tender ones, and in a cold frame for the hardy sorts. By cuttings of the sound young wood in pots of peat and loam and sand. By offsets or suckers at any time during the autumn and the spring.

The Veronica (*Scrophulariaceæ*).

There are a great many varieties of Speedwells, all of which are more or less beautiful. They include some fine flowering shrubs, as *Lindleyana formosa, Sanguiniflora, Salicifolia, Madame Frezelle,* &c., all beautiful shrubs that attain to a good size in the West of England, where they flower abundantly; but I am not aware that they will stand the climate of the north through a sharp winter.

The propagation of the *Veronica* is by seed, by cuttings, and by layers.

By Cuttings.—Take cuttings off at any time during the summer, 2 or 3 inches long, of the young wood. Trim off the leaves, cut below a leaflet, and insert them in pots filled with peat or leaf-mould, sand, and maiden loam. Water and set them in a pit or frame.

By Seed.—Sow the seed in seed-pans in the spring, and set in a warm house, pit, or frame till well up, when they may be hardened off and finally set out of doors; and, as soon as large enough, plant the seedlings out into the ground or pot them off.

The Pomegranate (*Myrtaceæ*).

This tribe, when in infancy, might be mistaken for a Myrtle, but they are much more beautiful when in flower, and the fruit is of a fine apple shape. The Pomegranate is too tender to stand our climate, except on a warm south wall. It may be propagated by seed and by cuttings, which are the most convenient methods of multiplying them.

By Seed.—Sow the seed in deep seed-pans in the month of March. Cover it half an inch with fine

leaf-mould, silver sand, and maiden loam (equal parts), and set the pan or pans on a nice gentle heat. When the seedlings are 3 or 4 inches high, pot them off singly into small 60-size pots, and continue them in a close cold frame for a week, when air may be admitted. The following spring shift them into 5-inch pots, and continue them in a frame or in a good house: give but little water through the winter.

By Cuttings.—At any time they can be had, take short cuttings, 2 or 3 inches in length, of the sound, half-ripened young wood, with a heel of the old wood, trim off the leaves from one-half the cutting, and make a clean cut immediately through the base, leaving a heel of the old wood, and insert them in pots filled with sandy peat and maiden loam of equal parts. Give water, and plunge in a tan-bed, or in a sand-bed over a warm tank, or set in a mild heat in a frame, pit, or house. Pot off as soon as well rooted. The double-flowered Pomegranate is a most beautiful plant for the conservatory. Age is necessary for them to flower and bear fruit well.

The Rose.

The Rose family is divided into two classes—viz. Climbing Roses and the Shrubby Roses. I only include the last class under this head, and shall refer to the Climbing Roses under "Climbers." The Shrubby Roses are numerous, and severally include many divisions, as the *Provence, Gallica, Moss, Bourbon, Perpetual, China, Scotch, Damask, Austrian Briar, Macarteney, Rosa Lawrenciana,* or *Miniature Rose,* &c. The Provence Roses are, no doubt, among our noblest and finest Roses, being double and very beautiful. Another is the Crested Provence, or Crested Moss, as some call it; but I am convinced it is a Provence Rose, and a species, although sometimes it will produce flowers without the crested calyx, and then no one can tell it from a Provence. This is one of the most beautiful things it is possible to possess of the kind, and should be in every good garden. It is a summer Rose.

The *Gallica*, or French Roses, are unsurpassed, I may say unequalled, by anything in the whole Rose world for the character of the flower, richness of colour, and general beauty. As a Rose, the French, or *Gallica*, evidently far surpasses the Perpetuals for perfection of form. Many of them equal, if they do not excel, the Ranunculus, and no well-devised garden should be without a collection of them.

The *Bourbon* Rose is a very exquisite class. *Acidalie* may be taken as a type of a Bourbon Rose, and is well known. *Coupe d'Hébé* is another, and it would be difficult even now to find among all our new Roses a match for either of these, especially the last. No collection can be said to be perfect without *Coupe d'Hébé*, a *Crested Provence*, *Acidalie*, and *Chenédolé*, a most noble Rose.

The *Rosa Lawrenciana* are a class of miniature Roses only fit for pots, and they are most exquisite, and should be in every greenhouse. The *Austrian* Yellow Roses are most beautiful, and so are the Persian Yellow. This is a real golden yellow, and has a fine form. To get this Rose to flower well very little pruning must be done to it. It must be grown freely by giving it good soil and manure, and so to get strong growth annually. Then cut one half the growth back to within three or four buds in the early spring or autumn, and leave the other half of the preceding year's growth the full length, or nearly so, merely tipping the ends of the long shoots, and if a vigorous growth is maintained year by year, no lack of abundance of this Rose will be felt.

The propagation of Roses consists in multiplying them by seed, by cuttings, by grafting, and by budding.

By Seed.—Gather the heps in the autumn as soon as they are ripe, which generally is late; bury them in sand for a month or two, then take them out of the sand, break them up, and clean the seed. Sow it in deep seed-pans filled with maiden loam and dung of equal parts, and set the pans on a gentle heat, or in a warm forcing-house, and shade it till up.

By Cuttings.—Whenever Roses have done flowering,

cuttings may be taken of the wood that has borne flowers, immediately they have fallen off. The cuttings may be long or short; two buds will grow—one buried in the soil, and one above it, or the cuttings may be 7 or 8 inches long, but in this case they should be inserted in the ground during the months of August and September for summer outdoor Roses. When the cuttings are small they are best put into small pots. The pots must be filled one-third with broken crocks, and then up to the very top with the soil, and made moderately firm before inserting the cuttings. Set in a close frame or house; when the cuttings are from outdoor Roses they should be inserted on a warm border, and planted full half-way into the soil. The soil should be maiden loam and decayed stable dung, quite old, of equal parts, and well mixed. Make a clean cut at right angles at the base of the cutting, and just below a leaflet or bud, leaving all the leaves on the cuttings above soil. Close the soil well to the base of them, give a good soaking with water, and all is done till they are struck. In the March or April following they may be taken up carefully, and potted or planted out into beds. If potted, plunge the pots in cinder ash, tan, cocoa-nut fibre, or sawdust.

By Budding.—The time has been when buds of Roses must not have any wood attached to them. It was considered fatal if there were any, but now we find that it makes no difference to the thing whether the bud has all the wood that is taken off with the bud attached to it, or not. If the stock is in good order, *i.e.* if the bark of the stock will run, or separate freely from the wood, the bud may contain all the wood attached to it, or it may be taken out, whichever is most convenient. This is a very advantageous discovery, as it frequently cannot be detached on account of the ripeness of the wood of some Roses being in advance of the stocks to be budded. Budding may be done whenever stocks can be found in a proper condition, and may be performed close to the ground, or at all heights from the ground—(see page 69). Insert the bud, and tie in with rofea

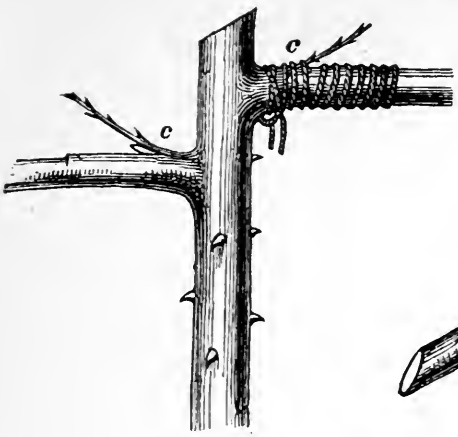

Fig. 10.

Fig. 11.

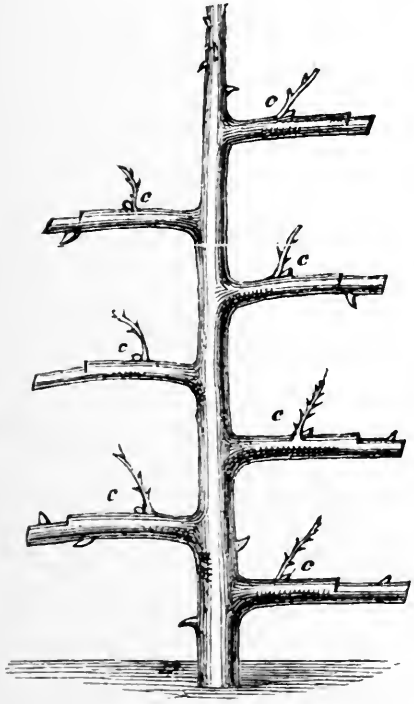

Fig. 12.

Fig. 13.

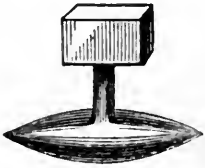

Fig. 14.

Fig. 10.—Standard Rose budded.

Fig. 11.—The part from which the bud is taken, showing the manner of taking the bud off; *a*, the blade of the knife, showing the best practical manner of taking the bud off; *b*, the bud.

Fig. 12.—The way to form a Union Rose of various colours by budding.

Fig. 13.—The Standard Rose, one year old, cut back.

Fig. 14.—The bark racers, for opening the bark previous to budding and to receive the buds, *c c c c*.

or cotton, or Berlin worsted. After a month release the ties, and finally remove them.

By Grafting.—During January, February, and March graft Roses in pots. The Dog Rose may be grafted as soon as potted, and put in a close frame. The grafts may consist of any of the classes, with three or four buds in them. Good sound last year's wood is the kind to use, 4 or 5 inches long. Use grafting-wax to exclude air after

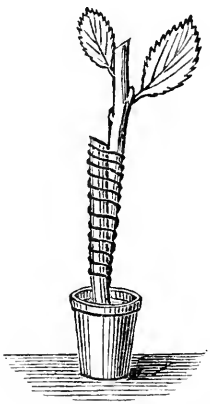

Fig. 15.—The Rose, whip-grafted.

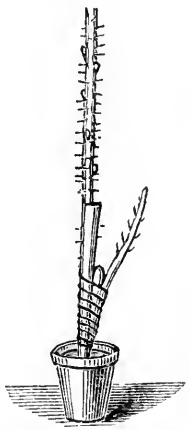

Fig. 16.—The Rose, bud-grafted.

the graft is firmly tied on. This is a very quick way of producing Roses on the Dwarf Dog Rose stock, as a good Dwarf Rose in a pot may be produced in three months in flower, and with a good head. I well remember, many years ago, trying this method of getting Dwarf Roses quickly in pots according to the directions given by Mr. Rivers in his "Rose Amateur's Guide," but I used no heat, only a cold close frame, with perfect success.

Good Dwarf Roses may be easily produced by grafting with nothing more than a close cold frame, set in a southern aspect by March or the beginning of April, by gathering the stocks from the hedges in January, and potting them, and grafting them at once; and if they are of the Perpetual classes they may be turned into the ground in May, where they will grow and flower freely all the summer.

By Layers.—Layering of Roses chiefly applies to the Climbing classes; still Dwarf Roses of the shrubby classes may be layered as a very sure way of getting some sorts that are difficult to obtain by cuttings, grafts, &c., as the Moss, and some of the Provence kinds. In layering bend the wood of the last season's growth, and find out what buds will be in the ground, then cut a tongue at one of the buds on the side that will be under when the branch is layered in. Let the tongue be an inch long from the bud upward; carefully bring the end of the shoot upright, and the tongue will open and stand out. If it will not do so, place a barley-corn, or an oat, between the tongue and the branch to keep it open. Then lay the branch in the ground 4 or 5 inches under the surface, and gently press the soil on the layer. The layering may be done in August, or in the early spring.

If the weather is dry, water must be given the layer to encourage it to emit roots, and a little mulch or moss, &c., put over the part layered will much benefit it if the weather is hot and dry. This is an easy and sure way of getting Roses on their own roots, if any of the sorts are difficult to obtain by cuttings.

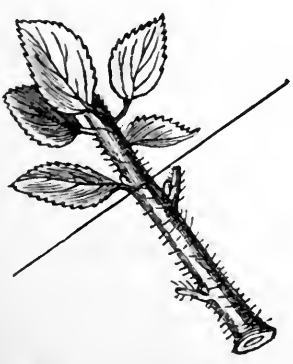

Fig. 17.—Ordinary Rose cutting.
The line shows the depth to insert it in the ground.

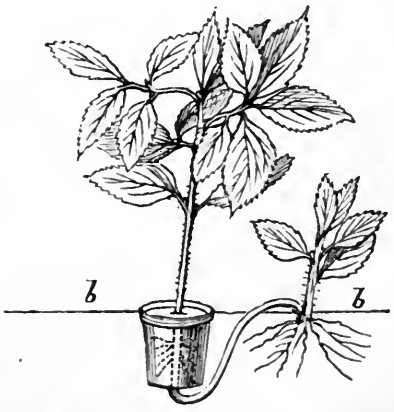

Fig. 18.—The Rose layered in a pot, passed through the bottom of the pot; *b b*, ground line.

BOOK IV.

ON THE PROPAGATION AND PLANTING OF HARDY AND OTHER CLIMBING PLANTS.

The Ivy (*Araliaceæ*).

As an evergreen climber there is nothing comparable to the Ivy, and as such it is both ornamental and useful. The ways in which the Ivy may be used as an ornament are almost too numerous to mention. As a waterproof covering to a dwelling-house, shed, &c., nothing can equal it. My master, from whom I learnt gardening, had the back of his dwelling-houses covered with Irish Ivy as a protection for them. The walls being boards, we used to clip it close once a year in the spring, and in the course of a few weeks it would be covered again with close foliage as thick as a mat; and soon it would be completely coated with leaves like tiling, so that no water could get at the walls, while the appearance was charming—a beautiful foliaged-clothed wall, far before a whitewashed one.

For covering walls, and as an under shrub for shrubberies and banks, nothing can surpass the Irish Ivy. The variegated kinds are exquisite subjects for covering walls of every description where diversity is required. The Gold and Silver Ivies are beautiful kinds for dwelling-houses; being of a more compact and less rapid growth than the Irish, they form a very neat and secure covering. It is necessary that these Ivies be planted when young, so that the new growth may be made on

the spot where it is permanently planted, then it will adhere to the fence or wall of itself as it grows; but when old plants are used, nailing must be resorted to, which is not the thing. The Ivy will cling to the wall of itself if the young growth is made at the base of the wall, and no further trouble is needed.

The propagation of the Ivy is simple. During the months of October and November, or in the spring, take cuttings of the last growth 6 or 9 inches in length, and plant them in a shady border or bed; dig them in with a spade, burying them half-way in the soil, which should be of a light nature. With some of the variegated kinds it will be necessary to put the cuttings in pots, and strike them in a mild heat, for they are not so free to root as the green kinds.

A uniform moisture is required to strike the cuttings of Ivies. If they do well they will be fit for planting out within a twelvemonth from the cutting.

The Clematis (*Ranunculaceæ*).

There are a great number of varieties of this tribe, all of which are more or less desirable, being beautiful and useful climbers. The uses to which they may be put as ornaments of the garden, the conservatory, and even the window, are nearly unparalleled among climbers. Some of them make beautiful wreaths to the window of the sitting-room, grown in pots inside the house, and trained on the frame of the window; whilst others are splendid subjects to train on umbrella wire-work—as *Montana*, *Flammula*, and *Viorna;* the first two white, the last purple—while for festoons and arches nothing can match them, at least in my opinion. Even as bedding plants many of them are superb. One thing, as a rule, must be borne in mind—*i.e.* the Clematis must be permanently planted where it is to remain for some years, or else it will not prove itself what it is capable of as regards effect. The Clematis tribe may be propagated by seed, by

cuttings, by layers, and by division of the root in the case of some.

By Seed.—Sow the seed in deep seed-pans in March, using maiden loam, sandy peat, and pulverised manure. Cover the seed half an inch with soil, and set in a cold frame. Some will require heat if the seed is imported.

By Cuttings.—Take short side-shoots of the young firm wood, insert them in pots of fine peat and maiden loam, and place them under a handlight or large bell-glass on a mild heat—a tan-bed is the best.

By Layers.—In the spring or early autumn lay the last season's growth 2 or 3 inches below the surface, and put some fine sandy peat and maiden loam on each joint laid; each branchlet of young wood will emit roots at the base. By the following autumn the young plants may be taken off the stool. The tender sorts must be laid in pots.

By Division.—When shoots spring from the roots, they may be taken off as soon as they are 3 or 4 inches long in the spring, and potted.

The Wistaria (*Fabaceæ*).

The Wistarias are a small genus of very beautiful climbing plants, of which *Sinensis* is about the best. This is a magnificent plant to train on the roof of conservatories, on walls, doorways, &c. It makes a splendid object trained on window-hoods, along verandahs, entrances, &c., where it can display its lovely laburnum-like blue racemes of pea-shaped flowers to advantage. The Wistarias may be grown in any good soil containing sand. The propagation is by seed, by layers, and by cuttings.

By Seed.—Sow the seed in pots or pans in the spring, using sandy peat and maiden loam; bury the seed one inch, and set the pan or pot containing it in a good lively heat As soon as the seedlings are large enough, pot them off singly, and set them in a warm frame for a few weeks; then harden off, and continue them in a cold frame for a season.

By Layers.—In the autumn or early spring take the last season's ripe wood and lay it in the ground, or set 6-inch pots close to the old plant, and draw the shoot through the hole at the bottom of the pot, and cut a tongue as for Rose layering; or scrape the bark of the shoot on one side at an eye (let this be about the middle of the pot), and fill it up with the same kind of soil as used to sow the seed in, employing a little more sand. The shoot layered must not be detached from the old plant for a year.

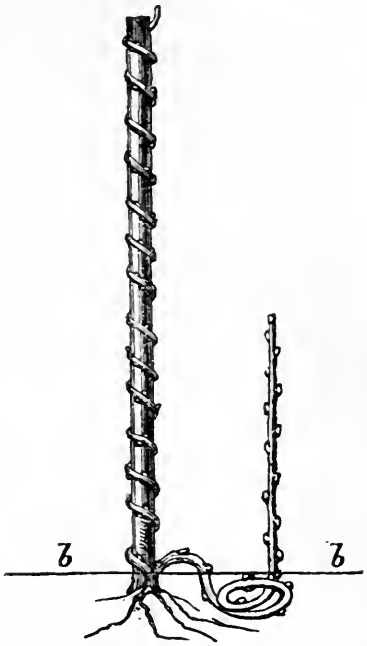

Fig.19.—The Wistaria layered; *b b*, the ground line.

By Cuttings.—Cuttings may be struck, if taken off in the autumn of the last growth. They should be 7 or 8 inches long, and put into 7-inch pots, and set or plunged in a mild heat.

The Jasmine (*Jasminaceæ*).

The Jasmine can scarcely be called a climber, but a rambler like the Rose: nevertheless, it is used for the same purpose as a true climber, and is as well suited for covering walls, fronts of dwelling-houses, &c. *Jasminum officinale* is the most useful, and is also a great favourite among the fair sex. The agreeable fragrance of this variety is seldom at fault, as is the case sometimes with the Hyacinth. In some localities the Jasmine grows like a bramble for luxuriance. The yellow-flowered sorts are very pretty, but not so sweet as *officinale*. The propagation of the Jasmine is by cuttings, by layers, and by grafting.

By Cuttings.—Take cuttings, 6 to 9 inches long, of the sound last season's growth; the lower part of the young wood is the best. Trim them as for Currant cuttings, and insert them into 7 or 8-inch pots filled with maiden loam and sandy peat, and set in a cold pit or frame; or insert them in the ground on a warm border in the autumn.

By Layers.—The layering may be done in the autumn. The base of the young wood will emit roots freely when laid in a nice light soil.

By Grafting.—Any of the rare tender varieties may be grafted on stocks of *officinalis*. Graft close to the ground, using clean grafts of the last season's growth.

The Lonicera, or Honeysuckle.

These are so well known that any detailed description of the tribe would be superfluous; I will, therefore, merely mention a few things in connection with them. All the evergreen sorts are very desirable climbers. The Trumpet Honeysuckle is an excellent species—I mean the scarlet Trumpet: very little of this is seen, which is surprising to me, for it is a really good thing. It presents a fine appearance on a pillar in a conservatory, or trained along a verandah facing the south, or around a window. The *L. reticulata* is one of the most splendid objects it is possible to have for a sheltered place out of doors, or in a cool conservatory; trained on a trellis, it forms a beautiful chequered background. The Honeysuckles may be propagated by seed, cuttings, and layers.

Fig. 20.—Honeysuckle cutting. The line shows the depth to insert it in the soil.

By Seed.—Some do not bear seed well, but those that do may be multiplied by seed sown in the spring in deep seed-pans, and set in a cold frame; or, if of the more tender sorts, set in a warm pit or frame.

By Cuttings.—Cuttings of Honeysuckles may be

struck if they are of the current season's growth, short, and not hollow; but when the wood gets old and hollow, it is of no use attempting to strike such cuttings. They should be nicely cut at the base, and inserted in pots filled with peat, maiden loam, and a little sand, and set in a mild heat till rooted.

By Layers.—All the Honeysuckles will strike root freely by layers. In the early spring lay any of the

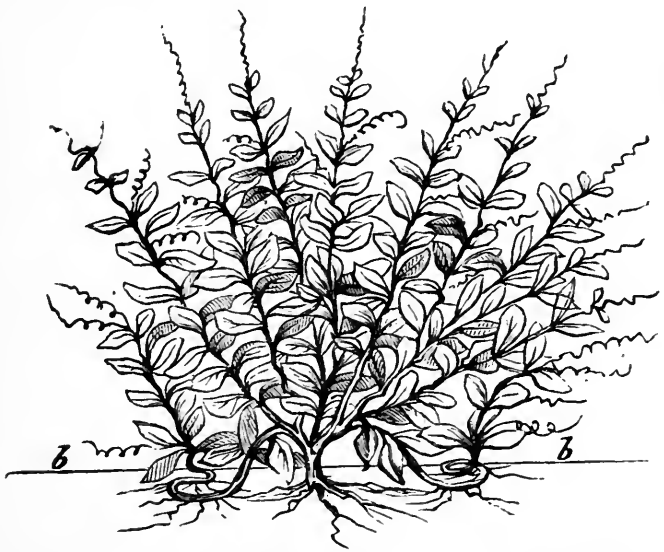

Fig. 21.—The Honeysuckle layered; *b b*, ground line.

spare wood in the ground or in pots, and it will root well by the autumn.

The Bignonia (or *Tecoma Bignoniaceæ*).

This is a tribe of the most magnificent hardy and half-hardy climbing plants we possess. *B. radicans* and its varieties are deserving of more favour than they have ever had as yet. Its fine foliage and large trumpet-shaped flowers, with their rich colour, should certainly command all the attention good climbers deserve. *B. radicans atro-purpurea* is of a rich dark crimson purple; *B. flava* is a yellowish flower; *B. radicans sanguinea* is of a blood-red; and *B. grandifolia*

is a splendid fiery-red flower. All these will do well on a south wall and a dry soil, and no house wall should be without one or more of them. They are not dear, nor difficult to grow, and their propagation is easy.

By Seed.—When seed can be had, sow it in pots or deep seed-pans in the spring, in peat, maiden loam, and sand. Cover the seed half an inch, and set in a good heat till it is up; then give air and harden off, and pot off as soon as the seedlings can be well handled.

By Cuttings.—During the summer months select the short side-shoots half ripened; take them off with a heel or good sound base. Trim the cuttings neatly at the base, and insert them in pots of fine sandy peat and maiden loam. Set the pots, or plunge them into a tan-bed, and put a light over them until the cuttings are rooted; then lift it off, and continue the pots plunged for a fortnight longer. Many of them may be propagated by cuttings of the roots inserted in pots of sand and peat of equal parts. The choicer kinds may be propagated by grafting them upon seedling stocks of *Radicans*. The grafting must be done close to the pot, using the sound young wood well ripened; do it in the spring as for Roses.

The management of the Bignonias may be assimilated to that of the Grape Vine, on the long-spur plan of pruning, as the flowers come from well-ripened eyes of the previous year's wood. Seeds of the common varieties may be had of most seedsmen. *Catalpa* and *Stans* seed can easily be had for plants or stocks.

Layering may also be resorted to with advantage. The base of the young wood will quickly emit roots if kept in a moist state and some heat.

The Passion-flower.

There are several varieties of hardy Passion-flowers, but none can excel the *Cærulea* for the beauty of its flowers and the abundance of its dark foliage.

The Passion-flower is generally seen to much disadvantage on account of the state of the plant, for it is seldom sufficiently cared for to prevent a wilderness confusion about it. Being a rapid grower, a slight omission in the training in the growing season results in complete disorder and a want of display of the beauty of its marvellous flowers. These flowers come on the current year's wood, consequently it should be thinned out, as for a Grape Vine, leaving, say, one principal leader on a space of about 2 feet. This leader may be permanent, and should be spurred in, from which will come the young wood bearing abundance of flowers. This young growth should be tied or nailed in, so as to just cover the trellis, wall, or whatever else it may be, and no more; then there will be as much order as will display the flowers to advantage.

The propagation of the Passion-flower is by seed, by cuttings, by suckers, and by grafting.

By Seed.—Sow the seed in pots or seed-pans in the month of March, using maiden loam and pulverised dung, or leaf-mould and a little sand. Cover the seed half an inch with fine soil, and set it in a mild heat.

By Cuttings.—Cuttings of Passion-flowers may be taken at any time and inserted in fine peat soil, and set in a mild heat. They should be short-jointed and of the young wood.

By Grafting.—Use the common *Cærulea* for stocks; any of the choice tender species may be grafted on it. Graft close to the pot, and at any time ripe young wood can be had. Common whip-grafting will answer. Plunge the pot, and cover the union with the plunging material. The graft will soon unite with the stock.

The Rubus (*Double Bramble*).

This is a very uncommon thing, although it is a beautiful flowering climber. The leaf much resembles the common Bramble, but is of greater density and more abundant. The flowers are large, and as double as a small Rose. The plant, as a fine dark-foliaged

climber on a trellis, or on the walls of the dwelling-house, is very desirable, and well worthy of a place on any good house.

R. Fruticosa bellidiformis is a fine rose-coloured flower, and very pretty. The Double Brambles may be propagated by cuttings, by seed, and by layers.

By Cuttings.—Take short stout cuttings of the current season's growth, and insert them in pots of maiden loam and leaf-mould, and plunge the pots in a tan-bed or in sawdust.

By Seed.—Sow the seed in pots or pans filled with maiden loam and leaf-mould, cover it a quarter of an inch, and set in a mild heat till the seedlings are up, when they may be set in a cold frame, if of the hardy kinds, but if from the tender sorts continue the seedlings in a warm house.

By Layers.—Any of the half-ripened wood will emit roots, and may be laid in pots for the tender sorts, and in the ground for the hardy ones, keeping them damp.

The Aristolochia (*Aristolochiaceæ*).

The Aristolochias are a curious class of climbers, scarcely worth notice except for their foliage, which is certainly handsome in some sorts, such as *Ciliosa*, which is beautifully marked. *Sipho* also has noble foliage, but the flowers are very insignificant. They are extraordinarily liable to insect pests, and a very disagreeable smell attends the handling of them. Still, some of them are desirable and fast climbers as foliage plants. They may be propagated by seed, by cuttings, and by offshoots from the root. Sow the seed in March in pans or pots, and set in a mild heat. Cuttings of the side shoots during summer in sandy peat, and in a mild heat; shoots from the roots in the spring.

The Virginian Creeper (*Vitaceæ*).

The *Ampelopsis*, as it is called, is a tribe of rapid climbers, resembling the Grape Vine. *Hederacea* is a

very useful and peculiarly rapid climber. A plant of this will cover a larger space of wall than any known climber in the same time. This clinging creeper will cover a brick wall most rapidly, and will support itself. It has a peculiar and beautiful disposition attached to it, viz. it changes the colour of its foliage from green to a light red in the autumn, which gives it a quality equal in value to a flowering climber. I know of none better adapted for quickly and neatly covering the walls of the dwelling-house than this. It is a deciduous plant, which may be some objection to it.

The propagation of the *Ampelopsis* consists in taking cuttings, and inserting them in pots or in the ground during the autumn: also by layers, which strike root freely by merely laying the vines on the ground, with a stone or peg to fasten them down.

The Pyracantha (*Pomaceæ*).

This well-known, beautiful berry-bearing plant is of the Thorn class. It is not a true climber, but will cover a wall by nailing and training, and make a permanent wall plant of considerable beauty for a much longer period than any other known evergreen, with much less trouble. It is not particular as to soil or situation. It bears beautiful vermilion berries in large clusters, which are of a lengthy duration, from the early autumn even till late spring—which renders it desirable for a permanent wall plant, the berries being very conspicuous during the dull winter months.

The propagation of the *Pyracantha* is by seed, sown as for Haws—(see page 24)—by budding and grafting.

The Periploca (*Asclepiadaceæ*).

A very small genus of narrow-leaved, light-foliaged climbers. *P. Græca* is the chief one, and has the advantage of rapidly covering a wall or trellis, which is its principal recommendation. They may be propa-

gated by cuttings and by layers. Short side-shoots for cuttings inserted in pots of peat and maiden loam, and set in a mild heat during the summer. Layering may be done from spring to autumn.

The Kerria, or *Corchorus Japonica* (*Rosaceæ*).

This is a small genus of very beautifully-flowered plants, which can hardly be put with the climbers, but as it makes a capital covering for a wall of, say, 6 or 8 feet high, I have put it under this head. It is a plant seldom met with now—for what reason I cannot tell, for I know of nothing comparable to either the single or double variety in regard to its flowers. Those of the last named are not equalled by the double Banksian Rose, except in fragrance. They are of a lovely soft yellow colour, and have a pretty effect in bouquets. The foliage is of a fine, elongated, serrated, and undulated form.

It may be propagated by cuttings, by a division of the stool, and by layers. Cuttings may be struck from the side-shoots during the summer, inserted in pots of fine peat and maiden loam.

The Solanum.

Solanum Jasminifolium is a shrubby climber, bearing fine foliage and large clusters of pale blue flowers, which are very showy and pretty. It is a strong grower, and will cover a good space of wall in two years from a moderate-sized plant. It is propagated by cuttings, and strikes freely. Cuttings 4 or 6 inches long, taken from the season's growth in the autumn, and put into pots filled with maiden loam and dung, or sound young wood 3 inches long, and inserted in pots of fine peat, maiden loam, and dung, and set in a gentle heat, will root freely. It forms a pretty pot plant from small cuttings, as above, for a year or two, flowering dwarf and freely for some time, and has a good effect in the conservatory.

The Climbing Rose.

The Climbing Roses are divided into six natural classes, of which some distinct feature characterizes each division: for example, the *Banksian Rose* is a peculiar and unique, small-flowered class, differing considerably from all other climbing Roses. Then there is the Ayrshire Rose, which class contains a tribe of most rapid growers, with flowers not so double as could be wished for in some varieties; but for rapidly covering a wall or trellis-work of any kind in any aspect, or making a "wilderness," &c., nothing can well compete with this division. For budding on 9 or 10 feet stout stocks they make noble objects as weepers. Then there is what is called *Rosa multiflora*, so termed on account of its abundance of flowers, which grow in immense clusters, and form grand objects as pillar Roses trained on high larch poles, over archways, &c.

The *Rosa sempervirens*, or Evergreen Rose, is a beautiful class. To this division belongs the favourite *Félicité perpétuelle*—a most abundant flowering, soft, white, double Rose with small flowers. Then there is the *Boursault Rose*—a class remarkable for splendour of foliage, which may be considered its chief feature as a recommendation, except that they are extraordinarily fast growers, and therefore to be recommended as climbers, as well as for dwarf stocks on which to bud or graft Tea Roses.

Whenever a really great and good effect is a desideratum with Climbing Roses, it is necessary to lay a good foundation previous to planting, by deep digging and well manuring; then they will throw up strong and long shoots annually, and by training these in, and cutting the previous year's growth clean out to the ground, an abundant flower will be the result throughout. The propagation of Climbing Roses consists in layering and by cuttings.

By Cuttings.—In the month of September, towards the latter end, or the beginning of October, prepare a bed of fine maiden loam and decomposed stable dung,

well mixed, on a south side. Then select cuttings of the sorts to be multiplied, choose the last growth wood 6 or 8 inches long with a firm heel, cut the base of each over with a keen-edged knife, and trim the leaves from the lower half of them, and insert them into the prepared bed 2 or 3 inches asunder, with a dibber made out of a stick the size of a man's finger; set the cuttings well into the soil with this dibber up to the leaves left on, and close the soil well to the base of them, and when all are in, give the whole a good soaking with water from a medium rose, to settle the soil well to the cuttings. If a frame or handlight can be spared, it may be put on them and kept close for a few weeks until they have emitted root, then air may be given. If they are doing well, the leaves left on them will soon drop off, and the cuttings will carry a healthy appearance. Good drainage must be secured for the bed by a layer of coarse siftings. By the following March the plants may be taken up and potted, or planted out.

For the Banksian Roses it is requisite to insert the cuttings in pots of maiden loam and fine peat, and set in a frame or pit. It is necessary to be very careful not to over-water the cuttings.

The Ceanothus (*Rhamnaceæ*).

This is a lovely wall plant, but it requires to be nailed. It is of a lively blue when in flower. The foliage is small, but moderately free, and it should have a south or west aspect, being well adapted for training on a wall between windows where the spaces are small, and on verandah trellis-work, &c., or at the back of a cool conservatory. The propagation of this species consists in multiplying them by seed, and by cuttings. *Ceanothus Azureus* will do well on open walls in the western counties, and may be easily multiplied by seed. Sow the seed in pots or seed-pans in the spring, filled with sandy peat or maiden loam and leaf-mould made fine, and set on a mild heat till up.

By Cuttings.—At any time during the summer take cuttings of the short firm laterals, and insert them in pots of sandy peat, and plunge in a tan-bed, or over a tank with a very mild heat, or cover them with a handlight.

The Myrtle (*Myrtaceæ*).

The Myrtle is not a climber, but I have brought it under this head because it makes a capital wall plant by training, and the broad-leaved variety flowers splendidly on a wall. In the western counties, about Torquay, &c., the Myrtle flourishes exceedingly as a standard on lawns, &c., where it attains to the size of the Laurestine in the midland and northern counties; and in some places it luxuriates on walls to an amazing size, growing to as much as 10 or 15 feet high on a wall. No comment is really needed here, for every one knows the Myrtle as a pot plant.

The propagation is by seed and by cuttings. In the month of September take cuttings from the last summer's growth, 2 or at most 3 inches long. Make the cuttings just below the new growth, but not much into the hard wood; trim off the leaves with a pair of propagating scissors from one-half of it, and make a clean cut at its base with a small fine-edged knife, and then insert them in 5-inch pots filled well up with fine sandy peat, or maiden loam, and pulverised old dung, or leaf-mould of equal parts, together with a little silver sand. Give good drainage to the pot by placing a handful of siftings over the crocks, and fill the pot up to the rim firmly. Then insert the cuttings 1 inch apart all over the pot, letting them into the soil up to the leaves, and close it well round them.

The proper way is to insert a row all round the pot, close to the pot first, and then fill up the middle so as to give a neatness to it. This holds good in all such cases. When the pot of Myrtle cuttings is filled give them water, and set the pot in a cold frame, or under a handlight, or put a bell-glass over it, plunging the pot

in sawdust, sand, or tan, and shade the cuttings. The seed may be sown in March in pots or seed-pans, covering the seed half an inch, and set in heat.

The Lathyrus, or *Everlasting Sweet Pea.*

The *Lathyrus* is a class of the Sweet Pea genus, much to be recommended as an ornament for our cottage and villa gardens. The *L. grandiflorus* is no doubt one of the most magnificent hardy perennials we can possess, and *L. Latifolius* is a truly splendid thing, flowering in large clusters of white, and one with what are called scarlet flowers, although they are not scarlet, but a very deep pink. It is difficult to get the seed of *Grandiflorus*, but it can be propagated easily from the division of the root. *Latifolius* may be freely multiplied by seed sown in pots in the spring, on a gentle heat first, and then planted out. It may also be propagated by division of the root, like *Grandiflorus*. This should be done in March or April.

The Atragene (*Ranunculaceæ*).

This is a very peculiar Clematis, on account of the compactness of the foliage upon the stems, and for the fact that it clasps the object on which it grows or climbs. *Austriaca* is of a fine dark foliage, and has double white flowers. It answers admirably for an archway, pillars, &c. One or two main leaders should be permanently laid in, and then all the laterals cut back close to the leader; thus a neat archway or pillar will be formed.

The propagation of this class of Clematis is by cuttings, by seed, and by layers. Cuttings of the ripe young wood in the autumn, 6 or 8 inches long, and planted half the length in the soil, as in the case of the Gooseberry or Currant. The soil should be dry naturally, and of a sandy kind. By seed:—Sow the seed in the spring in deep seed-pans, using sandy maiden loam and leaf-mould of equal parts. Cover it a full

half-inch, and set in a cold frame, and keep close and moderately moist, till up well above the soil, when the seedlings may be set out in a shady spot. The ripe young wood may be layered in the autumn or early spring.

ON GREENHOUSE CLIMBERS.

As these include our best ornaments of the conservatory, and outdoor decoration for summer, no collection of plants can be said to be complete without a good proportion of these half-hardy and tender climbers, twiners, and trailers. In my opinion this class of plants far excels in beauty of character, as well as disposition of the flowers, those of the bushy or shrubby classes; for while the latter can by no means be made a substitute for the climber, the climbing classes can be made to assume the character of the shrubby classes by training them on trellises suitable to the object in view. Let that be as it may, our greenhouse climbers cannot be dispensed with. It is seldom, indeed, that they get the attention they deserve, for poor miserable objects are frequently made to degrade the species.

The Cobœa Scandens (*Palemoniaceæ*).

There is no doubt that the Cobœa is one of the grandest rapid climbers we possess for lofty conservatories. Space is a great consideration in planting this climber, for it will last for many years if planted well, and if it has space in which to develop itself. The flowers are as large as an egg-cup or a wine-glass, of a fine bell shape, purple colour, and are perpetual on healthy plants, and not liable to insect pest. There is a variegated-leaved one, which is a fine acquisition to the species. The Cobœas may be propagated by seed and by cuttings.

By Seed.—Sow the seed in March in pots of fine maiden loam and leaf-mould of equal parts, and set in a mild heat. In sowing, set the seeds up edgeways, stick them into the soil instead of laying them flat, as sometimes they will rot if allowed to lie flat, instead of coming up.

By Cuttings.—Cuttings may be struck freely at any time through the summer by taking them from the young growth with two or three eyes; insert them in small pots of maiden loam and fine peat or leaf-mould, and set in a mild heat.

The Maurandya (*Scrophulariaceæ*).

There is no handsomer charactered climber than the Maurandya, both for the beauty of the foliage, disposition of the flowers, and colour. *Barclayana grandiflora* and *Atro-purpurea* are two splendid subjects of this genus. For a low wall and spaces between windows of the dwelling-house, or pillars in conservatories, nothing can surpass it. The beautiful arrangement of both foliage and flowers is extraordinary. The foliage is close and regular, and the flowers, which are deep blue, are so disposed as to show themselves to great advantage.

The propagation of this species is by seed and by cuttings. The cuttings will strike freely through the summer if inserted in small pots of fine peat, and set on a gentle heat.

By Seed.—The seed may be sown in the spring in pots or seed-pans of fine peat and maiden loam, or maiden loam and leaf-mould, adding a little sand. Set the pans of seed in a mild heat in a pit, frame, or house; pot off as soon as they are large enough to handle well.

The Lophospermum (*Scrophulariaceæ*).

This rapid climber is similar to the Maurandya, only larger as to foliage and flowers; but the flowers are not so bright. It requires about the same treatment as the

Maurandya. The propagation is the same; but it is a faster grower, and will climb over a much larger space than the Maurandya.

The Calampelis Scabra (*Bignoniaceæ*).

This is a very handsome and rapid climber, with clusters of orange and yellow trumpet-shaped small flowers of great substance. It is not a very kindly-growing plant, and requires timely care to avoid confusion; for if left to itself for a short time in the growing season it gets so confused that any attempt to disentangle it proves fatal, on account of the extreme tenderness of the young growth. It may be termed a deciduous perennial. It dies down in the late autumn, and shoots up from the root in the spring, if the stool is protected from too much wet and frost through the winter.

The propagation is by seed and by cuttings. Cuttings may be struck through the summer of the short side-shoots, inserted in fine sandy peat and maiden loam, set in a house or frame. The seed should be sown in March, in pots filled with maiden loam and leaf-mould of equal parts, and set in a mild heat till up, when the seedlings should be hardened off and set in a cold frame, and potted off before they get entangled.

The Clianthus (*Fabaceæ*).

A small genus of very rich bean-shaped flowers. There is nothing among the half-hardy dwarf climbers that can well compete with this tribe for abundance of rich-coloured flowers of great substance. This genus is a thorough warm greenhouse class, fit for flat trellises of 3 or 4 square feet super, more or less, according to the management of them. *C. Puniceus* and *Magnificus* are two which can be very easily raised from seed and grown from cuttings; but *Dampieri* is rather a peculiar subject to manage. It is very curious, but this variety is, no doubt, called *Dampieri*, from

being discovered or raised by a person of that name, the "i" being attached; yet the greatest difficulty connected with raising this variety is its disposition to damp off when the plants get 7 or 8 inches high. Whole batches will drop off by this disease in spite of all you can do. The others are not liable to this failing. The seed should be sown in the spring, in pots filled with sandy peat and maiden loam; cover the seed half an inch with soil, and set in a brisk heat.

Cuttings will strike freely in sandy peat during the summer if covered with a bell-glass. Use a bell-glass large enough to cover pot and all, plunging the pot in a tan-bed or in sawdust or cocoa-nut fibre, over a mild sweet heat over a tank. Short side-shoots are best to strike. The plants are very liable to red spider: when this is seen, at once give them a syringing with a clean solution of some insecticide.

The Loasa (*Loaseæ*).

This is a genus but little known or seen, yet it possesses a class of splendid dwarf climbers for the greenhouse. *Loasa Aurantiaca* is scarcely ever without flowers, which are of an orange colour and of a peculiar and handsome form. They may be raised from seed annually, or propagated by cuttings of the stiff young wood during the summer. Sow the seed in March, in pots or seed-pans filled with leaf-mould and maiden loam and some sand, and set the pans or pots containing the seed in a mild heat until it is up, when air must be given, and, finally, set the seedlings in a greenhouse or pit. Pot them off, as soon as they can be well handled, into small pots first, and soon shift them into 5-inch pots, and place a stick or trellis to them; or one plant may be planted against a pillar in the greenhouse.

The Kennedya (*Fabaceæ*).

So called from the name of a man. This beautiful tribe has various-coloured pea-shaped flowers. They

are of rapid growth, and are fitted for large trellis pot work, for pillars and trellises in the conservatory, and for training over baskets, &c. They are rather liable to the attacks of the red spider, and should, therefore, be frequently syringed.

The *Kennedya* may be propagated by seed and by cuttings of the firm young side-shoots during the summer, put into small pots of fine peat, and placed in a gentle heat. By seed:—Sow the seed in March or April, in pots of peat and maiden loam. Cover it half an inch, and set the pot in a brisk heat till it is up, then give it air; pot the young seedlings off as soon as they are 3 or 4 inches high.

The Sollya (*Pittosporaceæ*).

A tribe of dwarf climbers, named after a man, having very pretty salver-shaped flowers of a bright blue. They are evergreen, are free to flower, and are good, tough greenhouse subjects for growing in pots or on trellises to form a thin sunshade trained flat, to set along the sunny side for screens during the summer, or to train at the back of the conservatory.

They are propagated by seed and by cuttings. Sow the seed in March or April, in pots filled with fine sandy peat and maiden loam of equal parts, and set in a mild heat till well up, when air must be given; and in the course of a fortnight set them in a cooler pit, frame, or house. Pot the seedlings off as soon as they are 2 or 3 inches high. Cuttings may be readily struck by selecting the young side-shoots in the spring, 2 inches long, and inserting them in pots of fine peat soil and sand, plunged in a mild heat; or by setting a bell-glass over them in a window or greenhouse.

The Hoya (*Asclepiadaceæ*).

This is named after a man, and is a small genus of slow climbers. They are very thick foliaged—*i.e.* the leaf is of great substance. Some of them

are fine subjects for the warm conservatory, and others form splendid objects on the roof of the hothouse; others being well adapted for suspension baskets for the warm greenhouse and stove. The old *Hoya carnosa* will do very well in the common greenhouse, or even in a window; I have grown it well in both places. The flowers are of a remarkably waxy substance, and last a long time, producing honey to such an extent that it even drops clear from the flowers. The same footstalks of the trusses produce flowers two or three successive seasons; therefore do not cut them off. The propagation of this species is by cuttings of the sound young growth—one or two buds or leaflets will grow—either will do, or even a leaf will strike root. Insert either in pots of peat and maiden soil, and plunge the pots in a moist heat of 60°.

The Tacsonia (*Passifloraceæ*).

This is a subdivision of the *Passiflora* tribe. The genus are subjects of the warm greenhouse or hothouse. In the cold counties the latter is safest for them, but in the mild western counties they do well in common conservatories, where they may be seen displaying their beautiful flowers suspended from the roofs of these glass houses.

Their propagation is by seed and by cuttings. The seed should be sown in the spring, in pots filled with sandy peat, leaf-mould, and maiden loam of about equal parts.

For Cuttings:—Put a good drainage first, then fill the pot up to the rim with the above soil. Insert the cuttings (three or four) in a 3-inch pot, water, and plunge it in a bottom heat of 55° or 60°; when struck, pot off at once, and grow them on a trellis, or plant them in good peat and maiden loam against pillars in the conservatory, and train them over the roof. They may also be grown on globe open wire trellises in pots so as to show the flowers in suspension.

The Tropæolum (*Tropæolaceæ*).

This is a class of plant too well known to require description here, but as we rarely see so much of some of the best specimens of this family as we could wish, I think it not out of place to say a few words in reference to them. There is that unique little dwarf climber *Jarrattii*, which has no equal as a greenhouse plant when well grown. Here I beg to caution the reader against a mistake which frequently occurs. *Jarrattii* and *Tricolorum* are two different things in character, although the flowers are so much alike that few, if any, can discover the difference. But *Jarrattii* has a nearly round tuber, and flowers much more freely, while *Tricolorum* has a thin finger-like tuber, and flowers very shyly. Some of the roots will not flower at all, yet *Tricolorum* is frequently sent out for *Jarrattii*. There is nothing among dwarf climbers to equal *Jarrattii* trained on a fine wire, salver-shaped trellis of about the size of a small cinder-sieve. The trellis should be set in the pot so as to lean over a bit, then the flowers will hang on the under side of the dishing trellis.

The propagation of the *Tropæolums* is by seed, by layers, and in some cases by cuttings. The seed should be sown in the spring, in pots filled with peat and maiden loam of equal parts, and set in a mild heat. *Jarrattii*, *Tricolorum*, *Polyphyllum*, *Pentaphyllum*, &c., may be propagated by laying the vines on a bed of fine peat and leaf-mould in a frame during the summer. Bury the joints of the vines by laying a handful of the fine-sifted soil on each alternate joint; shade for a few days, and keep the soil a little damp; give air; thus little bulblets will be formed in the course of the summer, which, by the end of August or September, may be taken off and kept in dry clean sand. Cuttings may be struck of the perennial and annual kinds which are not bulbous, such as *Lobbianum*, *Triomphe de Gand*, and *Lilli Schmidt*, &c. They should be of the short-jointed side stuff, inserted in pots filled with peat and maiden loam, and set in a mild heat till they have struck root.

The Thunbergia (*Acanthaceæ*).

The name of a man. This is no doubt one of the most beautiful tribes of dwarf climbing plants we possess. I know of no class of dwarf climbers more beautiful when well grown. Some object to them on account of their being subject to the red spider, but I was never much troubled in this way in growing *Thunbergias*. They possess every shade of rich colour from white to blue. *Aurantiaca* is orange; *Alata* yellow; *Alba* white; *Chrysops* blue; *Coccinea* scarlet.

They may be propagated by seed sown in the spring, in pots of maiden loam, dung, and leaf-mould. Bury the seed half an inch, and set the pots containing it in a brisk bottom heat; pot off soon, and grow fast, frequently syringing them. Train the plants on trellises, and give abundance of water, with a weekly watering of liquid manure. Cuttings may be easily struck from the side-shoots, inserted in pots filled with peat soil, and set in heat. They require a warm house through the winter.

The Plumbago (*Plumbaginaceæ*).

These are not proper climbers, but as *P. capensis* is well adapted for covering a trellis, I have ventured to bring it in under this head. This variety has trusses of beautiful light blue flowers at the end of every young growth. The plant is wood, and of moderately fast growth during the summer, or in a warm greenhouse. It answers well for training at the back of a conservatory to cover the walls, or on a pillar, or in a 7 or 8-inch pot, grown in peat and maiden loam. Frequently stopped when young, it soon makes a fine specimen.

The propagation of this species is by cuttings of the short side-shoots half ripe, inserted in sandy peat, and plunged in a very mild heat. The herbaceous kinds are propagated by division of the root as well as by cuttings. The old wood will strike root in a very sandy soil, and if covered with a glass.

The Lapageria (*Philesiaceæ*).

This is a remarkably fine herbaceous climber, with splendid bell-shaped flowers of a good substance, and in great abundance. It requires a cool conservatory or greenhouse. *L. rosea* and *alba* are two fine plants of great value for globe trellis-work, for large specimens. Without doubt these are the two most valuable climbing plants we possess for the conservatory. The propagation of them consists in striking cuttings of the firm young wood during the growing season, in pots of fine peat and maiden loam, with a gentle bottom heat.

The Ipomœa (*Convolvulaceæ*).

This is a slight remove from the Convolvulus. *I. Learii* is a splendid rapid greenhouse climber, fit for training on the roof, which it will soon cover, if of a moderate-sized house, so that it will afford a most desirable summer shade for other plants, and where it will develop its beautiful dark blue flowers to advantage. It is an herbaceous perennial. The tribe consists of annuals and perennials. The annuals must be sown every year. The perennials are propagated by cuttings, or by division of the roots, as well as by seed.

The Habrothamnus (*Solanaceæ*).

This is a most extraordinary flowering plant, not exactly a climber, but a fast grower. It is well adapted for growing at the back of a conservatory, where it will display its large clusters of carmine flowers to advantage. This chiefly relates to *elegans;* but there are many others, some with rose and some with purple flowers. The species require peat and maiden loam to grow them well.

Their propagation consists in raising them from seed, and by cuttings. The seed should be sown in pots of fine peat and maiden loam in the month of March, and set in a mild heat. Cover the seed moderately with fine

sandy soil. Cuttings will strike freely. Take the side-shoots 3 or 4 inches long during the early summer, and insert them in pots filled with the above-named soil, and set them in a mild heat till they have struck root, when a common greenhouse will do for them.

If they are to be grown in pots for specimens, they may be trained on a tall cylindrical trellis, or they may be made to assume a bushy character by frequent stopping, omitting this after midsummer so as to give time for numerous short growths of wood, on which will come the flowers next season in great abundance, forming a magnificent plant. There is a splendid variegated kind of great beauty to be had for this purpose.

The Abutilon (*Malvaceæ*).

These are not climbers, but fast-growing greenhouse shrubs, well suited for covering pillars and trellises. Indeed, I know of few plants better suited for the purpose, or possessed of more beauty in this respect, than this tribe, on account of their ample foliage, their freedom of growth, and the beauty of their large, pendulous, cup-shaped flowers. These latter have rich markings of crimson on a soft white ground; and again, yellow and blue markings, orange and red, &c. They may be grown as bushy shrubs, and will soon form fine specimens by frequent stopping during the growing season.

The propagation of the Abutilons may be by sowing the seed in pans filled with fine peat, leaf-mould, and maiden loam of equal parts. Put a good drainage, then some rough siftings over them, fill the pan firmly, make even, and sow the seed thinly over the surface, and cover it as thick as a shilling; set in a frame or heated pit.

By Cuttings.—Take cuttings of the firm side-shoots with short joints, trim off the leaves below, make a clean cut at the base, and insert them around a 4-inch pot filled with fine sandy peat; water, and plunge the

pot in a tan-bed, over a warm tank, or in a hotbed frame with a mild heat.

The Dolichos (*Fabaceæ*).

A curious class of bean-shaped flowered plants, not much grown. They are propagated by seed sown in pots, set in heat, and by cuttings in sandy peat, placed on heat.

The Dipladenia (*Apocynaceæ*).

This is generally classed among our stove climbers, but I have grown *Crassinoda* in a warm greenhouse well. It is a beautiful dwarf climber, and there are some improved varieties of this genus now; *D. Williamsii* is one of them.

They are all splendid plants for training on globe trellises, but they require a thoroughly good drainage, and should be grown in rough peat with some good maiden loam, and be very sparingly watered during the dull winter months. Their propagation is by cuttings of the short side-shoots during the summer months. Insert them in pots filled with pure sandy fine peat, and plunged in a sweet mild heat under a large bell-glass.

The Clematis (*Ranunculaceæ*).

Sieboldii is one of the finest greenhouse varieties we have; it is a very nice grower, and a free flowerer. It will flower in the most beautiful order all along the new growth at every leaflet. The flowers are white, with a clear purple centre. The propagation of the Clematis is referred to at page 73.

BOOK V.

THE PROPAGATION AND USES OF GREEN-HOUSE PLANTS.

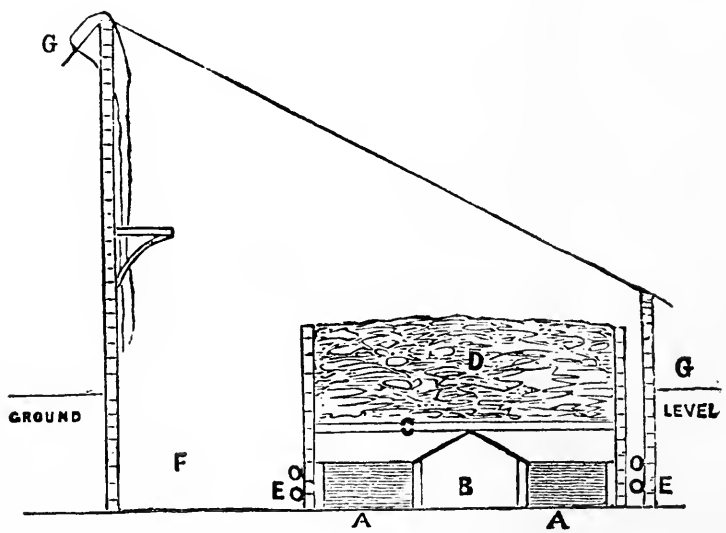

Fig. 22.—End Section of Cucumber Pit and Propagating House for the Profession.

Reference to Plan.—A A, tank, flow and return; B, chamber in which rhubarb may be forced; C, floor in which the bed or plunging material rests; D, bed, &c.; E E, flow and return pipes; F, pathway; G G, ventilators.

This class of house is adapted for the propagation of all classes of plants to any extent; and also for the forcing of flowers, cucumbers, &c. It is admirably adapted for cold counties, being completely under control in severe weather.

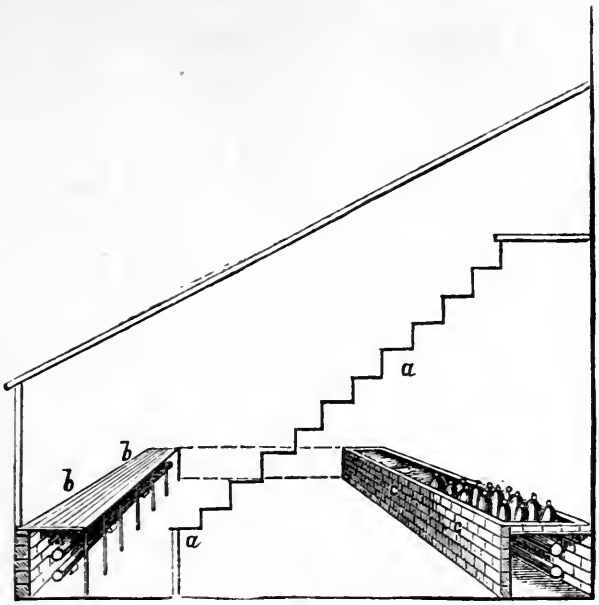

Fig. 23. End section.

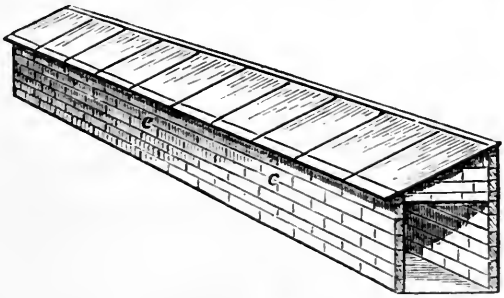

Fig. 24.

THE AMATEUR'S PLANT AND PROPAGATING HOUSE.

REFERENCE TO PLAN.—*a a*, section of staging; *b b*, stage along the front of house; *c c*, propagating-pit at the back of house, with pipes to heat it. Fig. 24, *c c*, the propagating-pit, with small open-and-shut sashes. This house will be found one of the most useful and convenient kind for small professionals, and for all amateurs.

THE CHOROZEMA (*Fabaceæ*).

THESE are among our choicest greenhouse shrubs, and as they are comparatively easy to grow to great perfection, it is quite marvellous to find so few of them in our villa conservatories. There is no plant, or class of

plants, more deserving of general cultivation than the Chorozemas. They are capable of assuming, by timely stopping, a beautiful, compact, symmetrical form, specially suited for exhibition, being of a robust, stiff character, and carrying a multitude of handsome pea-shaped flowers, which are, as a rule, orange and red, yellow and red, or scarlet and yellow; nor can any plant be matched with these as cut flowers.

They should be grown in peat soil, with sand, and one part fibrous loam. The species is propagated by seed and by cuttings.

By Seed.—Sow the seed, which is small, on the surface of seed-pans filled with sandy fine peat and sifted maiden loam of equal parts. First insure a good drainage with crocks, then put a good layer of siftings over these; fill the pans up to within half an inch of the rim, and press the soil firmly in, so as to make a smooth surface, and then sow the seed evenly over it,

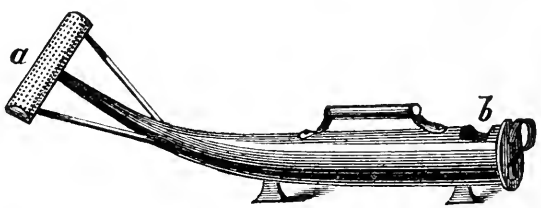

Fig. 25.—The dewpot, or irrigator. This utensil is one of the most useful implements a garden can possess for watering beds and pans containing fine seeds, and the foliage of plants. The jet, *a*, is full of holes as small as a needle point, so that the water emitted from them is as fine as the smallest rain, like dew; *b*, an opening to admit of pouring in water to fill the pot. The implement should be made of good light copper or zinc, but the jet should be of copper or brass.

covering it one-eighth of an inch with fine soil, and set the pan in a warm pit or frame or propagating-house. Lay a square of flat glass over the pan till the seed is up, when air must be freely admitted to the young seedlings. Give tepid water sparingly with the "dewpot," or a very fine rose water-pot; let the glass remain off for an hour or two to dry the young plants, and remove it altogether as soon as the seedlings

are well up. Pot off as soon as the young plants have four or five leaves.

By Cuttings.—Take short side-shoots of the firm young wood at any time during the summer; trim them clean at the base with a keen-edged small knife, and insert them, in small pots half an inch apart, in soil composed of half fine sandy peat and half maiden loam and silver sand, insuring a good drainage first by filling the pot with fine broken potsherds, one-third full, with some fine cracked-up charcoal over them. Then fill the pot well up to the rim quite firm, insert the cuttings, and close the soil well to the base of them, and water them with a fine rose water-pot. Dry them for an hour, and put a bell-glass over them—one that will fit inside the rim of the pot—and set them in a mild bottom heat, not in a hotbed frame (that would be too damp), but in a propagating-house, in sand, over a good tank. The glasses must be taken off every morning, wiped dry, and put on again immediately till the cuttings have struck root, which will be known

Fig. 26.

Fig. 27.

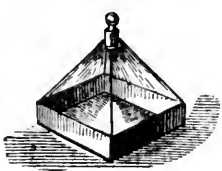

Fig. 28.

Fig. 26 shows the manner of placing a bell-glass over some pots of the cuttings referred to in this work.

Fig. 27 shows the manner of placing a small bell-glass over a pot of the cuttings referred to throughout this book.

Fig. 28.—A new class of handlight, easy of construction and cheap.

by their making new growth; then the glasses may be taken off, and a large bell-glass set over the pot for a few days or a week, admitting air either at the top or below.

The Leucopogon (*Epacridaceæ*).

L. Cunninghamii is a good specimen of this genus. This shrub is a most useful and beautiful subject for

the greenhouse, and should be in the possession of every one who has a good house, as it bears numerous small and beautiful waxy white spikes of flowers, admirably suited for small hand bouquets or the buttonhole. It is quite a ladies' flower, superior to the Heaths or the Epacris for this purpose, and equal to the Lily of the Valley, except in fragrance.

This plant should be grown in good peat, and stimulated after it has done flowering (which is in the spring) by stopping the young growth at an early stage, so as to induce a bushy habit and to form a good specimen, as well as to get a full crop of flowers the ensuing season. It is easy to grow, and not at all subject to insect pests or disease.

Its propagation is effected in the same manner as for the Chorozema, but the cuttings must not be of wood more than half ripe, or they will not strike; the fully ripe wood gets very hard.

The Epacris (*Epacridaceæ*).

The Epacrises are too well known to require any detailed description here. Suffice it to say that there is no better tribe of greenhouse plants to be found for growing as large specimens, and they require comparatively little care beyond the frequent stopping of the young growth up to July or even August; this will insure plants full of short spikes of flower. They require good sandy peat soil, a sound drainage, good-sized pots, and a liberal supply of water during the summer.

Their propagation consists in taking cuttings of the firm young wood, but not at all ripened; they should be not more than two inches long, and of the medium growth. Trim them carefully with a pair of propagating-scissors, divesting the cutting of the leaves halfway up from the base, and with a fine-edged small knife cut the base of it at right angles, making a very clean cut; and then insert five or six of them in a large 60-size pot, leaving room enough next the pot for a small bell-glass to go over them, and which

should be just as large as the pot is inside. The pot must be well drained, and filled with fine peat one part, and silver sand one part; give water, dry, and put the glass on, and set in a mild heat as for Chorozema, &c.

The Heath (*Ericaceæ*).

There is nothing, as a genus among plants, that contains so much diversified beauty as the Heaths; but there is one drawback to the general culture of this lovely tribe, and that is, no person can grow them among other plants. The Heath must have a department specially for itself in order to insure success. The reason is, not that they are more tender or so tender as the Geranium or Fuchsia, but they will neither endure fluctuations nor the atmosphere which a general collection of plants frequently must induce.

The Heath does not require a high temperature, but a very even one, and the most uniform treatment possible, both as regards water and air. I wish particularly to impress on the minds of my readers the nature of the greenhouse Heaths, and the difficulty that even good gardeners find in succeeding at all in growing them in the same house as any ordinary collection of plants—such as Geraniums, Fuchsias, &c.; so that no amateur can possibly expect success without a good pit or house on purpose for them. I do this to prevent disappointment, as they may be frequently told by some sellers of Heaths that they will grow in any common greenhouse with other plants; but I say they are sure to fail ultimately. I recommend a good dry span-roof pit, or a low house with just as much heating power as will exclude frost, and no more. Covering up with mats is far better than a fire heat; still, a sufficiency of hot piping in the house or pit to dry off damp is necessary. Give abundance of air daily, and always be careful to maintain the root in a fair state of moisture, but not over-wet, nor ever quite dry, for if a Heath once gets thoroughly dry through the root it is sure to prove fatal. On the other hand, to super-

saturate the root with water—*i.e.* to continue giving water when it is already damp enough—will be sure to prove fatal also.

The young plants should be frequently stopped to induce a dwarf and bushy nature. All the Heaths require a pure, sandy, fine peat.

The propagation of Heaths is by seed and by cuttings.

By seed some new sorts will, no doubt, arise. The seed is very fine, and requires care to raise plants from it. The seed-pan in which you mean to sow it must be well drained first, then fill it up to within half an inch of the rim with fine sandy peat and silver sand, one part of the latter to two parts of the former, well mixed; shake and press the soil well into the pan, so as to make it pretty firm, then with a fine rose water-pot water the soil so as to soak it through. Let it stand for an hour or two, then sow the seed evenly over the surface, and sprinkle as much very fine soil over it as will barely cover it, and place a square of flat glass over the pan till the seed is up, as we call it; place the pan in a shady part of the propagating-house.

By Cuttings.—Cuttings of the firm young growth may be struck whenever they can be had. The same methods of treatment for striking these as was recommended for the Chorozema and Epacris are equally good here. The daily wiping of the striking-glasses in this case is of much importance.

The Correa (*Rutaceæ*).

This tribe comes from New Holland. They are all pretty, dwarf, stiff-growing shrubs, very free to flower, and not at all difficult to grow. Any ordinary culture will grow them, and any common greenhouse will suit them; some little stopping at an early stage in the growth of the young plant will induce a dwarf habit, and form a handsome specimen; peat and maiden loam of equal parts will grow them well.

The propagation of this species is chiefly by cuttings. Take cuttings of the half-ripe young wood, make a clean cut at the base, and insert them (five or six) in a 4-inch pot filled with fine sandy peat; water, and place a bell-glass over them, and plunge in a mild bottom heat as for the Leucopogon, &c. The Corrœas may be raised from seed, when it can be had, by the same treatment as for the Chorozema. Grafting is sometimes resorted to with some difficult sorts, using the common *Alba*, *Virens*, &c.

The Orange.

The raising of Orange-trees is a very interesting art in horticulture. The seed should be sown in the spring, in deep seed-pans, or in pots filled with sandy peat and maiden loam. Cover it from 1 to 2 inches with the soil, and plunge the pots in a good mild heat; keep the seed moderately moist and close, when it will soon come up. Pot off as soon as the seedlings are 3 inches high, and plunge the pots in a mild heat. When the seedlings are as large in the stem as that of a common tobacco-pipe, graft them with any desirable sort. Do the grafting close to the top of the pot, and tie the grafts on well, using some grafting-wax over the ties, and then plunge the pot into a mild heat over the union, when they will soon unite. Shift the plants as soon as the grafts have made a little growth, continue the young plants in a close pit or house, and give liquid manure frequently, when fine plants will soon be the result.

The soil in which to grow the Orange well must be one part good peat, one part maiden loam, and one part old decayed manure.

By Cuttings.—Take half-ripened young wood whenever it can be had, trim them as usual, and insert them (four or five) in a 4-inch pot, of peat one part, and silver sand one part, and plunge the pots up to the rims in a mild bottom heat, and set a handlight over them.

The Acacia (*Fabaceæ*).

The tribe of Acacias is, in many instances, a noble class of fine-foliaged as well as flowering plants. Many of them assume somewhat of the character of Ferns, and persons sometimes say to me, "What fine ferns!" referring to some specimens of *Lophantha*. This variety has very fern-like foliage, and when well grown forms a fine feature in a conservatory, or even a good large window. *A. longifolia* is a very free-flowering species, differing from *Lophantha* in foliage as well as in its flowers. The old "Soldier's Bush," as it has been called, or *Armata*, is a general favourite, and well deserves its place.

The propagation of the Acacias consists in raising most of them from seed, although some are raised from cuttings. *Armata* should be always multiplied by cuttings of the short side-shoots, trimmed neatly, and the base of them cut clean with a fine-edged knife, and inserted in pots filled with one part fine peat, and one part clean sand. First put a good drainage at the bottom of the pot, then fill well up to the rim of it with the soil, and make it firm; then insert the cuttings, one inch apart, all over the pot, leaving room enough between the inside of the pot and the cuttings for a striking-glass to go over them.

After the cuttings are in, give them water with a fine rose water-pot, so as to soak the soil through; let them dry, and place the glass over them, and plunge the pot or pots up to the rim in a warm tank or plunging trough over hot-water pipes, in clean sand, sawdust, tan, or cocoa-nut fibre; wipe the glasses once or twice a week, as for the Heath, &c.

By Seed.—Sow the seed in the spring in a brisk heat. It is a good plan first to soak it in hot water for twelve hours; then sow it in peat and sand of equal parts, and cover it one inch. Plunge the pots in a brisk heat till the seed is up, when they may be lifted and set above, and finally placed in the warm greenhouse, and potted off soon afterwards.

The Leschenaultia (*Goodeniaceæ*).

This New Holland plant is named after Leschenault, a Frenchman. It is a tribe of the most beautiful dwarf recumbent plants we possess. To obtain well-grown specimens of a healthy, symmetrical character, begin with young plants. They will strike freely from cuttings of the young growth inserted in pots filled with fine sandy peat, put under a large bell-glass, and set in some shady part of the propagating-house or greenhouse during the summer months. Pot the young plants off as soon as they are fairly rooted, using small pots at first, and stop the points of every shoot as soon as they are an inch or two long. Continue to do this as they advance, and by shifting them from one pot to the next size up to 8-inch pots, using good sandy peat, fine symmetrical specimens, fit for any first-class conservatory or floral exhibition, will be the result. These are comparatively easy to grow in any good ordinary greenhouse, and no one possessing such a house should be without *Leschenaultias*, for there can be no plants possessing better characteristics than they do for handsome, Heath-like foliage, and which cover the pots as well as the plants themselves with flowers of scarlet, blue, or yellow. *Formosa* is a perfect gem.

The Pimelea (*Thymelaceæ*).

The *Pimeleas* are a well-known genus of choice greenhouse dwarf shrubs, with white, pink, or blush-coloured waxy heads of flowers. They are evergreen, very free to flower, and not at all difficult to grow. For cut flowers no better class can be grown, as the plants will bear cutting to any extent without the least disadvantage to them. On the contrary, cutting all the flowers off, with a good bit of the plant, will improve the habit of it by keeping it back, as the flowers are rather disposed to run to the extremities, and the plant to get deficient in foliage below. *P. Spectabilis* is as good as any, and should be in every

greenhouse. It delights in good sandy peat one part, and maiden loam one part; both should be merely chopped up with the spade, but not sifted. Use good drainage in the pot, and mix some broken charcoal among the compost.

The plants may be propagated by cuttings and by seed, but as they will grow from cuttings freely, it is not necessary to sow seed. Select the firm young wood during the spring and early summer months; trim the cuttings neatly at the base, and clip the leaves off them half-way up, and then insert them in pots firmly filled with fine sandy peat, using a good proportion of sand. Water them, and place a bell-glass over them, and set the pots in a shady part of the greenhouse or propagating-house to strike; pot off as soon as they are well rooted, stop the points of the shoots, and continue the plants in the greenhouse.

The Kalosanthes (*Crassulaceæ*).

This is a tribe of plants possessed of an enduring constitution under heat and drought. *Crassulaceæ* means "thick-leaved," and that is all, so that it conveys no idea as to the characteristics of the flower. But the present genus possesses flowers of great beauty and substance. *Kalosanthes miniata* is one of the grandest-flowering varieties we possess. In well-grown and large specimens it forms an object worth seeing, with its numerous heads of scarlet flowers, which are of great substance and of long duration, being fragrant also. Young plants should be stopped, to induce dwarf and finely formed specimens; when in flower they look well, but a plant three or four years old forms a still finer feature when in full flower.

The propagation of this species is by cuttings, by seed, and by offsets; but that of *K. miniata* and its allies is by cuttings of old or young growth, whichever may be most convenient. After a plant has done flowering, immediately cut it back, and put the cuttings into pots filled with sandy peat and maiden loam;

cuttings three inches long are quite enough. Insert them half-way in the soil, and plunge the pots containing them up to the rims in plunging material of some kind over a warm tank, or in a propagating-pit over hot-water pipes, &c. Give water sparingly at first. The old cut-back plant should be subjected to a good lively heat, and have an abundance of water, to induce a free young growth for flowering the following season.

The Begonia (*Begoniaceæ*).

This is a genus too well known to require much detailed description here; but being a splendid as well as a useful class of plant (although comparatively so few of them are to be seen in common greenhouses or windows, for which they are admirably suited), I may venture to make a few remarks upon them.

This genus is no doubt one of the most diversified in character of any we possess, as subjects of the stove and greenhouse. We have two distinct classes of it, viz. the bulbous and the evergreen shrubby class. *B. Fuchsioides* and *B. Rex* may be taken as two extreme types of the shrubby class, and *B. Sedenii* as a type of the bulbous class. Each of these divisions possesses numerous varieties, all of which are beautiful in the extreme, either as regards their foliage or their flowers. Nothing can surpass a well-grown specimen of *B. Rex*, with its large zebra-like marked leaves. The same may be said of *B. Fuchsioides*. Nor can any plant or class of plants equal a well-grown *B. Sedenii*. Strong bulbs of this variety may be easily grown into specimens 3 feet in diameter and 3 feet high, as full of large crimson flowers as any scarlet Tom Thumb Geranium can possibly produce.

The Begonias are easy to grow, and will continue in flower for many months. The bulbous classes die down in the autumn, when the bulbs must be kept dry during the winter season, but they may remain in the same pots, and be started into growth in the spring in a mild heat. Give no water, or but very little, until signs

of growth appear, and as soon as the bulbs have made an inch or two of growth, repot them, using the same pots. Take the bulbs out, and shake most of the soil from them; put a good drainage at the bottom, and some rough peat and rough turfy maiden loam mixed over the crocks, and then fill up with the same compost, the fine mixed with it, but not sifted. Place the bulbs in the pots, and fill in all round up to the top of the pots, and set them in a warm greenhouse. All the shoots may be removed from the crown of the bulbs, except one or two, and each crown shoot may be potted singly for plants. Give a moderate quantity of water, with a weekly watering of liquid manure, all through the growing season, and I am sure there is no plant nor class of plants that will better repay the small amount of trouble.

The Shrubby Begonias.—*B. Rex* is a remarkable plant for splendid foliage. It is easy to grow in any ordinary warm greenhouse, in large pots of rough peat and maiden loam, with some decayed manure. It may be propagated by cuttings of the stems or by the leaves, inserting them in pots of fine peat, and set in a mild heat. *Fuchsioides* and its class require a warm greenhouse or a stove in winter. All the shrubby class are propagated by cuttings of the firm young growth during the spring or summer. Most of the Begonias can also be raised from seed sown in seed-pans filled with fine peat and maiden soil and leaf-mould in the spring, and set in a mild heat. The seed is very fine, and should have a flat square of glass laid on the pan to prevent the soil drying till the seed is up.

The Cineraria (*Asteraceæ*).

This is an extraordinary free-flowering class of plants, and is also most showy in the display of its flowers. In their natural state they possess a rich yellow as their prevailing colour; every one knows the English variety, displaying its bright golden-yellow flowers in large heads in the open fields and in the hedges during

the month of June. The florists' varieties have now arrived at a pitch of perfection never before known. The flowers have attained to a size and character that can scarcely be excelled. There is no flower more accommodating than the Cineraria: nor can a substitute for it be found for display during the early spring months.

The propagation of it consists in raising it from seed, and by offsets or young side crown shoots which arise from the old plants after flowering. These are taken off with the knife, with a small quantity of root if possible, and at once potted into small 60-size pots, using a compost of two parts of decayed leaf-mould, or pulverised hotbed manure, and one part of maiden soil, mixed together and sifted through a $\frac{3}{8}$-mesh sieve. Pot the offsets well, and set the pots in a cold frame facing the north. Shade them in the middle of the day, and keep them close for a week or a fortnight. Water them well at the first potting, and slightly sprinkle them with a fine rose every evening at four o'clock. When these pots are filled with root, shift the plants into small 48-size pots, set them in the frame, and give abundance of air day and night, and continue the sprinkling overhead every evening. As soon as these pots are filled with root, shift them into 32-size (6-inch) pots, and set them out of doors under a north wall, and continue the sprinkling overhead daily if the weather is dry. If large plants are wished for, shift the plants from these pots into 8-inch.

By Seed.—Sow the seed under a handlight in a shady spot in June—or May, if early plants are wanted. Choose the spot, and prepare a bed (with the same kind of soil as recommended for the offsets) 2 inches thick, press the soil down firmly, make quite even, and then water the bed: let it remain for a few minutes, then sow the seed evenly over the surface, sprinkling as much fine soil over it as will just cover it, and put the light on. Keep it close, and the seed will soon vegetate. When the plants are possessed of four leaves

give them air. Pot off as soon as they can be handled well, and treat them as for the offsets before referred to. In all cases house the Cinerarias as soon as there is danger of frost, but use no more fire than is necessary to exclude the frost, and continue the syringing daily.

The Calceolaria (*Scrophulariaceæ*).

Many declare that the Calceolaria is so difficult to grow that they are obliged to abandon the cultivation of it altogether; but I must say I cannot understand this, for I have grown it for many years, and I never found it a difficult matter. Too much coddling and nursing is, I am convinced, the chief cause of failure. The herbaceous Calceolarias must be raised annually from seed; the shrubby kinds are propagated by cuttings.

Sow the seed in May in a seed-pan filled with fine-sifted maiden loam and good leaf-mould of equal parts, with some silver sand added. Well drain the pan by covering the crocks with a layer of rough siftings of the above compost; then fill up with the fine compost (an inch of this will do). Make it firm and even, then water the soil so as to soak it fairly, and sow the seed at once, sprinkling as much clean silver sand over the surface as will barely cover it, and no more. Lay a flat square of glass over the pan, and set it in a cold frame or in the shady part of the greenhouse, where very little or no sun can come to it. No water will be required till the seed is up, when air must be admitted; pot off as soon as the plants can be handled well, and set them in a cold frame facing the north, and continue them in the cold frame, giving an abundance of air night and day all through the summer months.

By the month of September shift the plants into 5-inch (48) size pots, and place them in a deep pit as soon as any danger of frost arises. Here they should remain all the winter to protect them. In March shift them into their flowering-pots (6-inch), and continue

them in the cold pit; in April remove them into the house for flowering. By this treatment no one will be much troubled with insect pest, the universal drawback to growing the Calceolaria.

SHRUBBY CALCEOLARIAS.—These are propagated by cuttings in September, short young side-shoots taken off, trimmed, and inserted either in pots filled with sandy maiden soil or under handlights in a shady place, and kept moist. Again in the early spring the tops may be taken off and inserted in pots, and placed in a mild heat.

THE GERANIUM.

A great deal has been written upon the propagation and cultivation of the Geranium, which may be condensed into a few words. Some of the species are certainly more difficult to strike from cuttings than others; but, as a rule, the Geranium will strike freely from cuttings, if taken off and inserted in a prepared bed on an open border facing the south, well closed at the base of the cutting, and kept well watered. A small amount of shade may be afforded them for a week, just to break off the mid-day sun only. They will strike root much better this way than by over-nursing them; or many of the more robust sorts will strike root well if merely inserted in a shady border of any good common soil during the summer months. This applies to both the fancy and the scarlet classes; the "Tricolours" are an exception, for they seem to require heat in order to grow well.

The successful growing of the fancy Geranium may be summed up thus:—Get the young plants potted up by September in small 48-size pots, stop them at once, and every succeeding shoot after, up to February or March. Keep the plants in an airy, light, and cool house, and give them no more water through the winter than will just keep them going, and no more fire heat than will exclude frost. Keep down insect pest by fumigating as soon as anything of the kind appears, shift the plants into their blooming-pots in March, and

tie out the branches early. This is the whole matter in principle and practice to insure success. They should be grown in one-half good tender maiden soil and one-half decomposed hotbed manure, well incorporated, chopped fine with the spade, but never sifted.

The Fuchsia (*Onagraceæ*).

The propagation of the Fuchsia is very easy, and the attainment of a large and well-formed specimen equally so. Take short cuttings of the young wood in February, or early in March; two joints are enough. Make a clean cut below the joint, and insert them in pots filled up to the rim firmly with one part good maiden soil, and one part peat or decomposed leaf-mould or manure sifted fine. Close the soil well to the base of the cuttings, give them water, and plunge the pots in a mild heat. Pot off as soon as they are rooted, using rough compost (not sifted); set the plants in a light, warm house, and give air as opportunities offer daily. Give plenty of water, and train the leader to a straight stick, and by August and September specimens will be formed at least 3 feet high, with laterals from the base up to the top, within a few inches, each of which will be well ornamented with flowers, forming a pyramid.

New sorts may be obtained from seed, which should be sown in March in pots, and set in heat. Old plants are scarcely worth saving, as young and fine ones can be so easily obtained from cuttings every season; and besides, they never form such good plants as the young ones.

The Erythrina (*Fabaceæ*).

Without doubt this genus may be considered one of the grandest and most conspicuous flowering subjects we possess. It is somewhat of a marvel to me that so little of it is to be found in our gardens. Gardens I say, because some of them will do well in sheltered places in the open ground. However, to insure complete success, it should be afforded a cool house. It possesses

the most peculiar as well as the richest colouring in the flower. *E. Crista-galli*, or "cock's-comb," resembles a comb in shape as well as in colour. This variety should be planted at the foot of a front or south wall of a dwelling-house, and nailed to it, where it will do well, if it is planted in rough peat and manure, and has a good drainage. It will die down every autumn unless the summer's growth can be so far ripened as to endure the winter by covering it up—which, however, is not at all likely in this fickle climate.

The *Erythrina* is a native of the Brazils, South America, and the East and West Indies. In its native air, which of course is one of constant heat, and which drives vegetation along amazingly fast, it attains to the height of 30 or 40 feet, but this can never be expected in England.

The propagation of the *Erythrina* is by seed, and by cuttings from the crown shoots. An old crown or root will throw up a number of shoots in the spring, and as soon as these are 2 or 3 inches long, take all of them off except one or two, with a sharp knife, with a good heel of the old wood. Trim these cuttings at the base, and insert them in pots filled with sandy peat, and plunge the pots in a mild heat.

By Seed.—The seed of the *Erythrina* is very hard, and should be soaked in warm water for a few hours previous to sowing. Then sow it in fine sandy peat, covering it 1 inch, and plunge the pots in a brisk bottom heat. Pot off as soon as the seedlings can be handled well. These seedlings will not flower under three or four years.

The Bouvardia (*Cinchonaceæ*).

This is comparatively little known among amateurs, except in bouquets, where it is admired for its exquisite beauty and delicacy of tint. Why this genus is so little grown I cannot tell. It cannot be on account of its fickle disposition, or tenderness, nor for want of beauty as a greenhouse plant, for a well-grown old

plant forms an object worthy of a good house. Some use it for beds, but upon the whole it is not robust enough for this climate, nor is it of a character well adapted for this purpose.

The propagation of this genus consists in the same treatment as for the *Erythrina*, by crown cuttings inserted in fine sandy peat and fine leaf-mould, plunged in a mild bottom heat. These cuttings will soon root, when they should be potted off, using 60-sized pots, and kept in a good house, being stopped early to form bushy plants. They may also be propagated by cuttings of the roots. They should be grown moderately free, and kept clean.

The Coleus (*Lamiaceæ*).

The Coleus is properly a hothouse plant; still it may be successfully grown in any good ordinary greenhouse through the winter, if a moderate heat is kept up, and the house kept close. It is used for bedding, but it is not every season that is hot enough for it. It makes splendid specimens when grown in large pots, and if frequently stopped.

Its propagation consists in striking points of the shoots in heat in the spring, and inserting them in pots of fine peat and maiden soil of equal parts. The cuttings strike very freely.

By Seed.—The seed of the Coleus is very fine, and should be sown on the surface of a seed-pan filled with fine peat and maiden soil, and some leaf-mould. First fill the pan with the compost, make it firm, and then water the surface and sow the seed; slightly cover it with fine soil, and lay a square of flat glass over the pan, and set it in a lively heat.

Ferns (*Greenhouse*).

The greenhouse Ferns are a most useful and beautiful class. As a type of the Maiden-hair section, we may refer to *Farleyense*, evidently a variety of *Cuneatum*, and this is no doubt the *ne plus ultra* among this class.

The Maiden-hairs are all more or less a graceful species, but the *Farleyense* outstrips them in regard to this characteristic. The interest that is attached to greenhouse Fern-growing no doubt far exceeds that pertaining to all other classes of similar plants. Their various dispositions, beautiful shades of green, and the rapidity with which they develop themselves into perfect specimens by careful culture—all these excite admiration, yea, I may say affection for them beyond every other species of plant. This arises, no doubt, from the fact of their possessing the charm of being of a constant character, and in having a quiet favourable colour most agreeable to the sense of sight; having, moreover, no fluctuations like the Geranium, Fuchsia, &c., whose charm lies in their gaudy flowers only, which last but a comparatively short time.

Ferns can be grown in a common greenhouse with other plants, but to be really successful a shaded house should be devoted to them alone. Such a house should be glazed with green glass. I find that the foliage of plants assumes a much deeper green, and that they do so much better, under green glass than under white. I have lately proved this to demonstration. I had a large frame of six sashes with *Primula Sinensis,* two or three of which sashes (lights) were done over (painted) outside with light green oil paint, a fair coat. The plants that were under this coloured light assumed many shades of deeper green, and were more healthy and robust than those under the light with clear glass. Green glass is especially adapted for growing Ferns under, even more than flowering plants, for they prefer a subdued light.

The house for Fern-growing should be low, and fitted up with broad close stages. The walls may be of a rough description, so as to hold moss and *sphagnum* stuffed into the crevices; this will contain moisture, and serve to supply an atmospheric vapour by syringing daily. It will also serve as a reserve for the production of seedlings, by throwing seed over it. The fernery should have an apparatus for supplying a

moderate heat; hot-water pipes with water gutters attached to them are as good as anything.

The propagation of Ferns consists in dividing the roots, and multiplying them from seed. There appears to be no means of obtaining new varieties by fertilising the seed-producing organs, so that if new sorts arise from seed it is by a freak of nature. I think such a thing quite possible, especially with Ferns. Sow the seed at any time in the house—the autumn, perhaps, is the best for this. Propagating them from a division of the root may be done whenever offsets can be obtained. The soil for growing Ferns should be of good rough peat chopped up with the spade, turf and all, two parts, and rough maiden soil one part; good drainage and plenty of water, with a few waterings of weak liquid manure in the case of old plants.

The Gloxinia (*Gesneraceæ*).

Properly speaking, the Gloxinias are stove plants. They may, however, be grown successfully in a good warm greenhouse, and I have done this. It is a class of very desirable plants, possessing as it does remarkable and decided colouring in the flowers, its whole character being superb beyond description. The beautiful leaf, the dwarf and compact habit, the abundance of its rich and wonderfully varied flowers, demand for this genus a well-deserved place in every collection of good plants, whether small or great.

Fig. 29.—Leaf of Gloxinia cutting.
The line shows the depth to insert it in the soil.

The propagation of the Gloxinias consists in striking the leaves of them as cuttings, with a base of the petiole or footstalk of the leaf inserted a little way into the soil, half-way,

or a little less, up the leaf. The pot should be a large 60 ($3\frac{1}{2}$-inch) filled with fibrous peat and fine-sifted leaf-mould of equal parts, and carefully watered, dried a little, and then plunged in a mild bottom heat, such as a good tan-bed, and having a large bell-glass placed over pot and all. They may also be multiplied by seed sown in a seed-pan filled with sandy peat and fine leaf-mould, slightly covering the seed, which is very fine. Lay a square of flat glass over the pan, and set it in a mild heat. The bulbs must not have much water (or none at all, unless the plants are growing in a stove) through the winter. Keep them dry in the pots from the time they begin to die off until February, when they may be set in a brisk heat, and a little water given them soon after. As soon as the bulbs have broken leaf a little, shift them, shaking all the old soil from them.

The Achimenes (*Gesneraceæ*).

I am much surprised when I visit gardens to find so little, comparatively, of this splendid tribe as an inmate of the glass house. Like the Gloxinia, the Achimenes is considered a stove plant, but it can be as easily grown in a good common greenhouse with a general collection as the Fuchsia or Geranium. I have done so to a great extent, and I might, I think, have challenged all that could be found which had been reared in stoves for effect. Be that as it may, the Achimenes can be grown well year by year in an ordinary greenhouse. My way was this. I started the bulbs in a lively heat in a common hotbed with a sweet heat. I used fine-sifted leaf-mould alone, with silver sand well mixed, and put some moss at the bottom of the pans for drainage, or siftings. Then I filled the pans up with the leaf-mould and sand to within half an inch or so, placed the little *rhizomas* (bulbs) all over the surface pretty thick, and covered them with the half-inch of leaf-mould to fill the pans quite up, and set them in a heat, as I have said.

No water should be given till they begin to grow, and when 2 inches of growth have been made, I would pot them off, putting three in a 4-inch pot, and put them back for a week or fortnight. When re-established, harden them off, and shift them into larger pots, or use them at pleasure.

I used to fill wire baskets with them, having moss for the outside, and leaf-mould and moss for the inside, bedding them in, roots inward, and with the tops of the small plants through the wires. Give them a good watering, and suspend the baskets from the roof of the conservatory or greenhouse by a wire; here they will form balls of flower, and give a kind of celestial beauty to the house.

Their propagation consists in obtaining young bulbs from the root, and by seed sown as for the Gloxinia—(see page 118).

The Petunia (*Solanaceæ*).

The Petunias are too well known to require any description here; suffice it to say they make very good plants for the conservatory if they are frequently stopped, and get plenty of air and light; but they will not bear much heat and close confinement, nor a dull house. The propagation of the Petunia is by cuttings and by seed; the best plants are from cuttings. They are easily struck at any time by selecting short young growth, and inserting them in pots filled with peat, leaf-mould, and sand, and put in a mild heat in the spring, and under a handlight in the summer without heat.

By Seed.—Sow it in seed-pans in the spring, and set them in a mild heat; prick them off into other pans or pots as soon as they can be handled. I rather prefer seedlings for bedding purposes.

The Verbena (*Verbenaceæ*).

The Verbena is a most accommodating class of greenhouse plant. As a pot plant for the conservatory

nothing can surpass it, and as a bedder it no doubt excels most things, possessed as it is of every shade of colour, and having a distinct beauty of its own. This genus has now arrived at a state of perfection that probably can never be surpassed.

The propagation of the Verbena is by cuttings of the points of the young growth during the month of August for stock plants for the winter, from which cuttings may be taken again through the spring months for bedding. The cuttings strike freely in pans filled with any sharp clean sand, and kept saturated with water, in heat, in the spring, and set full in the sun without any other heat in August. These August-struck cuttings will make nice pot plants for flowering in the spring, and on through the summer in the conservatory, if grown freely, and frequently stopped. New sorts are raised from seed sown in the early autumn, or very early in the spring, so as to get them to flower in the following summer.

The Lantana (*Verbenaceæ*).

This genus has been much improved of late years. There was a time when but one or two colours were cultivated, but now we have many beautiful tints. They are well worthy of cultivation as pot plants, or for bedding, pegged down. Cuttings may be easily struck in pots of sandy peat in a similar way to that of the Verbena, except that a mild heat is necessary for them.

By Seed.—Sow the seed in pots or pans of fine peat, or leaf-mould and maiden soil, and set in heat in the early spring. As a pot plant, frequently stop the young plants, to induce a dwarf condition, and grow them slowly, or they are apt to get beyond a neat habit; but as soon as flower-buds begin to show themselves, give liquid manure; this will develop fine trusses of flower.

The Solanum (*Solanaceæ*).

The Solanums have now become quite prominent articles of commerce as decorative subjects, and many pretty dwarf varieties are the result of hybridization. I find it a useful plan to put the young plants out into a good bed in a sunny spot in the month of May. If they are struck from cuttings in the month of August, and potted off into small 60-size pots, the points of the leaders being nipped out, and then having a bed of decayed manure and fine earth ready, they are turned out in May into the ground one foot apart, and kept well supplied with water, and frequently stopped through the early summer months, very fine and bushy plants full of berries will be had by the early autumn. Then a good soaking with water should be given them, and they may be safely taken up with a good ball of earth, potted with fine sandy peat and dung, well watered, and housed; they will then be none the worse for the moving if this is carefully done. The points of the young growth will strike freely in fine peat, in a mild heat.

By Seed.—Sow the seed in the spring, in pots of peat and old dung, or maiden loam and fine leaf-mould, on heat. Plant out as soon as large enough, or put into pots according to the object in view: small pots if for reserve stock, and large pots if the plants are for quick-fruiting ones.

The Cyclamen (*Primulaceæ*).

This genus is a great favourite, being a very free and pretty flowerer. It is, generally speaking, easy to grow, and is used for early and late flowering, and serves well for cut blooms. There is, however, but one method of propagating it, and that is by seed, which, however, will not always answer for perpetuating the particular species or variety, for, like all the genus, it will most probably vary more or less in the seedlings from the parent plant.

The bulbs will live to a great age, keep sound, and flower annually, if not injured at the crown. If this is destroyed, it is worth nothing. After the Cyclamen has done flowering the bulbs may be put outside, from the month of May till October, behind a north wall or in a shady place, and some manure-water should be given it, to help the development of a good flowering crown for the following season.

The seed should be sown in the spring, about the end of February, in deep seed-pans filled with fine sandy peat and pulverised manure of equal parts, or maiden loam and leaf-mould and silver sand of equal parts. Make the soil firm, sow the seed, cover it half an inch with soil, and set it in a good lively heat till it is up, when the pans should be put in a little lower temperature until large enough to prick off into other pans. Or they may be planted out in a fine bed of the above compost till the autumn, when they may be taken up carefully with balls of earth, and put into small pots, and then placed in a warm house or pit, where they will give some little flower; and by bedding them out the next summer under a north wall in a bed of leaf-mould with a little maiden loam mixed with it—one part to three of the leaf-mould—the bulbs will be good flowering corms by the autumn.

The Primula (*Primulaceæ*).

The *Primula Chinensis,* or *Sinensis,* as it is called, has been brought to a pitch of perfection, combined with the greatest diversity, never perhaps reached before. This division of the genus contains enough diversity of colour and character to constitute sufficient variety for the most fastidious taste, as a collection of plants for a house, without any other. Nearly every shade of colour may be had from a five-shilling paper of carefully saved seed from a good collection, of which there are now many in this country.

If large specimens are required, the seed should be sown as early as March, and grown freely, the flower-

buds being nipped out as they appear, and shifted from 3-inch pots on successively till they are in 6 or 7-inch pots; but I think they look much prettier, and they certainly possess many more flowers, if they are sown in the middle of April or the beginning of May, and are allowed to flower in 4-inch pots.

Fill some seed-pans with a compost of two parts decayed old leaf-mould and one part maiden loam, sifted fine; then add enough silver sand to insure freedom, put in a good drainage of sherds, and a layer of siftings over them; then fill up with the fine compost, and press it firmly into the pan. Make smooth on the surface, and sow the seed evenly over it, but not too thick, and sprinkle as much fine soil over the seed as will cover it as thick as a new halfpenny, and set the pan in a mild heat, shading it from the sun. Keep the seed moderately moist, but not saturated with water, and do not let the pan ever get quite dry. The seed is slow in germinating; it will not come up under four or five weeks.

The Primula is also propagated by cuttings of the side-shoots at the base of the plant after flowering. Take these off with a keen-edged knife, with a small heel of the old wood, trim neatly, and insert them in small pots, each singly, and give them a little water; then set them in a very mild heat, and in the shade.

The Coronilla (*Fabaceæ*).

The Coronillas do exceedingly well in the open air as permanent shrubs in mild climates, such as the West of England counties, at Torquay, &c., where they flourish and flower abundantly, forming a pretty moderate-sized shrub; but in the northern counties they require the protection of a greenhouse, where they are a very free-flowering ornament, and too well known to require further comment. Their propagation consists in striking cuttings of the points of the shoots 2 or 3 inches long, at any time, without heat in summer, and in a mild heat during the winter, in pots

of fine peat or decayed manure and maiden soil, with a small portion of sand added.

The Ixora (*Cinchonaceæ*).

This is one of the grandest-flowering evergreen greenhouse dwarf shrubs we possess. Generally they are classed among stove plants, but they will do very well in a good greenhouse, at the warm end, during the winter.

Their propagation is by cuttings of the half-ripened young wood in pots of fine sandy peat, under a bell-glass, in bottom heat.

The Abelia (*Caprifoliaceæ*).

A pretty tribe of showy evergreen shrubs with bright flowers, which are produced in abundance. Their propagation is by cuttings of the half-ripened young wood in pots of fine peat, and set in a frame, or under a handlight, and potted off as soon as they have struck root into 3-inch pots, and housed, or kept in a frame or pit.

The Polygala (*Polygalaceæ*).

A pretty-flowering genus, much resembling small pea-blossom. The greenhouse varieties are useful for cut flowers for bouquets, among other things. *P. Dalmaisiana* is a very pretty variety, and of free growth. It requires frequent stopping to induce a dwarf habit. The flowers come on the ends of the young growth, so that the more there is of this, the greater number of flowers there will be. The propagation of this species consists in sowing the seed in the spring, in pots filled with peat and maiden loam, or maiden loam and leaf-mould and some sand, and set in a mild heat; also by cuttings of the points of the young shoots with short joints, and a little firm. Insert them in pots filled with fine sandy peat, with a third maiden soil, and plunge in a mild heat.

The Siphocampylus (*Lobeliaceæ*).

This is one of the most splendid tribes our warm greenhouse or stoves can possess. *S. Coccineus* and *Longipedunculatus* are fine subjects for the conservatory. They are ample as regards their foliage, and the flowers are rich, and are not of the common class in their general features. They belong to the natural order Lobelia, which, however, they little resemble, either in the character of the plant or in the flower. The leaves are long and the flowers equally so, and somewhat like *Salvia fulgens*, only the latter are much longer. They require frequent stopping to induce a dwarf habit. They should be grown in one part peat and one part maiden soil, or maiden soil one part, and leaf-mould two parts, with a good drainage. They may likewise be propagated by cuttings of the firm side-shoots, 4 or 5 inches long, inserted in pots filled with fine peat, and plunged in a mild dry heat.

The Streptocarpus (*Gesneraceæ*).

This is a small genus of beautiful-flowering greenhouse plants. The flowers are much like a Foxglove in shape, but of a fine purple blue, and are thrown up above the plant in a very conspicuous manner. The plant is a dwarf, not rising above the pot more than a *Primula Japonica* does, and continues in flower for many weeks. I refer more particularly to *S. Rexii*. It is easy to grow, and makes a pretty object when it becomes a large and strong plant. It should be grown in good rough peat, maiden loam, and some sand, and may be multiplied by seed sown on the surface of fine peat and maiden loam and some sand, and slightly covered with fine soil, with a square of flat glass laid over the pan or pot. Care is necessary in watering the seed; use the dewpot—(see page 100). The Streptocarpus may be propagated by division of the root also, after it has flowered.

The Statice (*Plumbaginaceæ*).

This is sometimes called Armeria, Thrift, &c., neither of which, however, comes under this head. The tender and half-hardy species are pretty, and useful subjects of the greenhouse, and none more so than *Sinuata*. This variety is well worthy of cultivation, if only as cut flowers. It is very free in flowering, and is seldom or never out of flower. A large pot or two of this may be turned to good account for cut blooms, with other things, for vases. The flowers are pale blue with white, and last a long time. Their propagation consists in sowing seed in pans in the spring, and setting them in a mild heat; also by division of the root.

The Phormium (*Liliaceæ*).

This is a small genus, which, however, has of late had some splendid additions. The old *tenax* is a beautiful thing of itself, but *P. Colensoi*, *P. Cookii*, and *P. tenax variegatum* surpass it, inasmuch as these possess a lovely striped foliage. Large plants of these Phormiums, when well grown, are grand objects for the conservatory. They may be multiplied by seed, and by division of the root. Sow the seed in deep seed-pans, filled with fine peat and maiden soil of equal parts, and subject the seed-pans to a good heat. Offsets may be taken as soon as the plants have done flowering, and potted singly in 4 or 5-inch pots, using the same compost, and plunging the pots in a mild heat.

The Dracæna (*Liliaceæ*).

These are a grand tribe of foliage plants, some attaining to the stature of trees. Some of them are hardy enough to stand our climate in the western counties unprotected. *D. Australis*, *Indivisa*, &c., will do well in a sheltered place out of doors in Torquay. The propagation of the Dracænas consists in raising them

from seed; and some by cuttings when they offer themselves, which is not very often, as these can only be had from the branches, pieces of which are put in a strong bottom heat to root. The seed should be sown in the spring in deep seed-pans, filled with sandy peat and maiden soil, two parts of the former to one part of the latter, and put in a good brisk bottom heat. Cover it from 1 to 3 inches according to the strength of the seed.

The Cactus (*Cactaceæ*).

In this genus we possess some of the most grotesque as well as beautiful subjects to be found in natural history. It is judiciously classed under several distinct heads—viz. *Echino-cactus*, *Melo-cactus*, *Mammillaria*, and *Epiphyllum*. Under each of these we have a class possessing some distinct peculiarity. In the first we have what may be called the Hedgehog Cactus, being all thorns; in the second, one resembling the Turk's Cap, or a deeply corrugated class with a round top; in the third, one that bears numerous small nipple-like young ones; and, under the fourth, we have that with flat leaf-like branches, and which is the most common.

The cultivation of the Cactus may be considered under two heads—viz. by active stimulation during the growing season, and by a perfect suspension of the stimulating agents during the season of rest. The active season is during the summer, and the resting season is during the winter. The stimulating agents are heat and liquid manure, which must be entirely withheld from October until March, when they may be renewed.

The propagation of the Cactus tribes consists in striking cuttings, by offsets, and by seed. All classes of the Cactus produce offsets more or less; but the first three are the most remarkable in this respect, especially the *Melo-cactus* and the *Echino-cactus*. All those that produce these young ones, which are perfect in themselves, may be detached at any time, dried for a week

by allowing them to remain unpotted for that time, then put into small pots (3-inch), using a rough maiden loam, with pulverised old manure and some crushed bones mixed in the compost, and set in a warm house. Those which are flat, triangular, and four-sided can be freely propagated by cuttings of the branches or segments of the plants. Take the cuttings off at any time, the summer being the best, trim them, and let them lie on the shelf for a week, then insert them in pots filled with the above compost, and set them in a mild dry heat, and give them a little water. The seed of the Cactus should be sown in pots or seed-pans filled with the above compost, and put in a good heat.

The Gesnera (*Gesneraceæ*).

These are always classed with stove plants, but they may be successfully reared in a good greenhouse after they are once started into growth. This must be done in a hotbed frame or a pit in the spring. What has been said about the *Achimenes*, as regards starting the roots into growth, applies to this plant also. The *Gesneras* are a superb genus, remarkable for the richness of their leaves as well as for their flowers. There is no tribe of plants more diversified and beautiful than these. When the plants have done flowering, dry them off gradually, and, finally, take the bulbs out of the pots, and store them away in dry pure sand in a warm drawer till February or March. Their propagation is by division of the root in some cases, by cuttings of the leaves and stems, and by seed—(see the Achimenes and the Gloxinia, pages 118—120).

The Mitraria (*Gesneraceæ*).

This is a very free-flowering, beautiful greenhouse shrub. It produces Gesnera-like scarlet flowers on long footstalks, which give to the flowers a beautiful drop-like feature, somewhat similar to a Fuchsia, excepting in the flowers themselves, which, instead of being sepaled

as the Fuchsia is, are mitre-like—*i.e.* contracted at the orifice. The plant should be trained, when young, to a single clean stem up to a foot high, then stopped to induce a head; for if it is allowed to take its own course it will throw up a lot of suckers and young stuff at the base, which will give quite a confused feature to it, and hide all its beauty, for most of the flowers will be in the interior of the plant. The soil should be peat and maiden loam, two parts of the former to one of the latter. It may be propagated by cuttings of the solid young wood 2 or 3 inches long, trimmed and inserted in pots filled with fine sandy peat, and set in a mild heat.

BOOK VI.

ON THE PROPAGATION OF SUFFRUTICOSE AND HERBACEOUS PLANTS.

Suffruticose Plants.

The word "suffruticose" refers to all those plants that possess half woody and half herbaceous stems or branches, such as the shrubby *Calceolaria*, the *Wall-flower*, the *Pentstemon*, some of the *Begonias* and *Mesembryanthemums*, the *Heliotropes*, &c. All suffruticose plants may be propagated either by seed or by cuttings of the young growth, or raised from seed whenever it can be obtained.

Alonsoa.—Sow the seed in pots or pans of fine leaf-mould and maiden soil of equal parts in the spring, and set them in a mild heat. Cuttings may be struck at any time, the early spring and the autumn being the best. Set them in a mild heat.

Ageratum.—A beautiful genus for the greenhouse and for bedding. Sow the seed early in the spring, on heat. Cuttings of the young growth in the spring or autumn.

Antirrhinum.—A well-known and superb genus for borders, beds, and for ornamenting walls. Sow the seed in the open ground, either in the month of August for early flowering next year, or in April for flowering late in the following autumn. Cuttings may be struck at all times of the short side-shoots, August being the best time for young plants for the following season.

Alyssum.—A dwarf hardy suffruticose plant, well

adapted for edgings, borders, beds, and rockeries. Sow the seed in the spring, in the open ground, in fine soil. Cuttings may be struck during July, in pots or under a handlight, selecting the young growth. I refer more particularly to *A. Saxatile.*

BEGONIA.—See p. 109.

CALCEOLARIA (Shrubby).—See p. 113.

HELIOTROPE.—A well-known plant. Cuttings in the spring and autumn, in heat. Sow the seed in the early spring, in pots or pans filled with fine leaf-mould, maiden soil, and sand, and set in a good heat.

MESEMBRYANTHEMUM.—Shrubby, purple, and yellow. The purple is one of the most showy dwarf plants it is possible to possess, either as a pot plant or for small beds. Cuttings of the young growth in the early autumn.

PENTSTEMON.—A splendid genus. Some very fine additions have been made to this tribe of late, fit for pots as well as for beds. Sow the seed in pans of fine leaf-mould and maiden loam of equal parts, with some sand added. Set in a mild heat till it is up. Cuttings may be struck at any time, the autumn being the best for strong plants for the following season.

WALLFLOWER.—Too well known to require any description. Lady Alice Peel, the Double-blood, and the Double German are the best. The first eclipses all others for purity of colour—golden yellow—and for the quality of its flowers. Cuttings only, in the months of April and May. The cuttings, or slips, which are the best, should not be more than 3 inches long—2 inches are enough—of the young side-shoots. Slip them off, and just trim off the tip of the jagged end of the base of the slip, and insert them in ground a little bit shady, or in pots or deep seed-pans, and water them.

HERBACEOUS PERENNIAL PLANTS.

THE AURICULA.—By seed and by offshoots. Sow the seed in deep seed-pans or good boxes in the month of February and early part of March. First put a good

drainage at the bottom, then a layer of coarse siftings from the same soil over the crocks, and fill the pans up to the rim with a compost of one part good maiden loam and one part leaf-mould, with as much silver sand added as will give the compost a porous texture only—two quarts of sand to two pecks of compost will answer the purpose. Press the soil (which should be sifted fine) well into the pans or boxes, making it firm, and make it smooth on the surface; then sow the seed thinly over the surface, and cover it as thick as a new shilling. Set the pans in a cold frame till the seed is up, and then set the seedlings outside in a shady place from May until the autumn. Prick off the seedlings into other pans or boxes as soon as they are large enough to handle, and set them in a shady place till October.

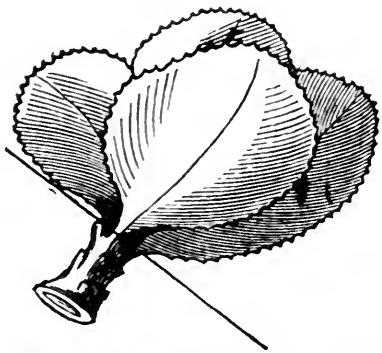

Fig. 30.—Auricula cutting. The line shows the depth to insert it in the soil.

THE PRIMULA.—There are five or six classes of this genus, viz. the *Primula Chinensis* or *Sinensis*, the *Primula Japonica*, the *Primula Cortusoides*, allied to *Primula Japonica*, the *Primula Polyanthus*, a hybrid between the Polyanthus and the Primrose, and the *Primrose*, of which we have many beautiful double and single varieties. Each of these possesses some special peculiarity of its own. The Chinese Primrose is the most useful and popular, and contains the greatest variety. This is only fit for the greenhouse and the window. The single varieties of it are raised from seed sown in seed-pans filled with one part leaf-mould, one part maiden loam, and one part silver sand, and set in a mild heat. It should be sown in April. The double varieties must be propagated by cuttings or offshoots —(see page 123).

THE PRIMULA JAPONICA.—This comparatively new kind possesses some very curious and beautifully con-

structed varieties, but it is a most fastidious species to deal with: nothing will save the plants from total failure at times. The seed should be sown in the spring, in seed-pans filled with the same soil as for *Primula Chinensis*. The soil should be watered first, and then the seed should be sown and subjected to a moist mild heat. It would vegetate more quickly if it were first soaked for 3 or 4 hours in warm water in which a few grains of sulphate of ammonia had been dissolved—5 grains of the ammonia to a half-pint of water is about the safe quantity to use. Let the seed lie in this solution for 4 or 6 hours, then drain off the water, dry it by laying it between two sheets of blotting-paper, pressing them together, and then sow the seed immediately.

The Primula Cortusoides is a hardy border plant, and may be treated like the *Polyanthus*, by seed and by division of the root. All the single Primroses may be multiplied by seed sown in the spring, and all the double ones must be propagated by offshoots or by division of the root.

The Carnation.—The propagation of the Carnation, Picotee, and Pink is by one and the same process: by seed for new sorts, and by pipings and layers for multiplying all standard sorts, or any kind to be preserved. The seed should be sown in the month of March or April, in fine good ground in the open air, or in deep seed-pans, and set in a cold frame. The piping and layering should be done in June or July. "Piping" is nothing more nor less than cuttings of the young grass taken off with 3 or 4 joints without any flower on them, cut at right angles immediately below the third joint from the top. Pull off the leaves by a sudden jerk, and insert them in pots or deep seed-pans filled with one part of maiden soil, one part of leaf-mould, and one part of silver sand, sifted fine all together. Water the pipings, and set them in a close cold frame; or they may be advantageously plunged in a very mild bottom heat. Pink pipings will do very well inserted thickly under a handlight in the same compost on a warm border.

Layering is done on the spot where the plant is

growing. A good plan is to put half a peck of the fine compost down to each root where layers are to be made, and level it fairly down under the layers or the young grass to be layered. Then proceed to the layering; trim all the leaves off from the third joint from the top of the stuff to be layered; make a tongue on the under side upward, setting the knife in at the joint, cutting carefully half-way through, and drawing it upward to the next joint; then carefully spring the tongue out by bending the layer and bringing the top upright, scratch a hole in the soil, and bend the layer down into it, keeping the tongue open; peg the layer down with a wooden hook, and cover all with the fine soil. If the weather is dry, give a good watering when all the layers of a few plants are done.

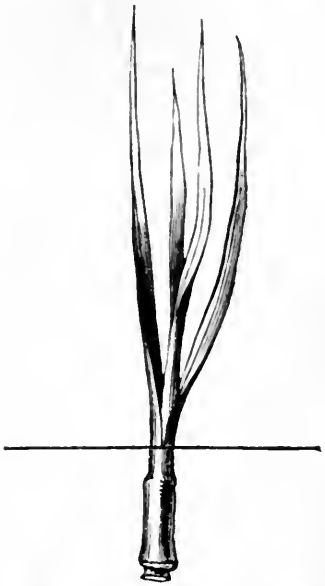

Fig. 31.—Carnation cutting. The line shows the depth to insert it in the soil.

The Carnation piping may contain one more joint with advantage.

The Delphinium.

The Delphiniums are a genus of as noble and hardy perennial plants as any we possess. The new addition, *D. Nudicauli*, is the only one that approaches scarlet, the prevailing colour being blue. No flower-garden should be without some good clumps of Delphinium, for I know of no hardy perennial so well deserving a prominent place in the borders as they do. They are multiplied by seed and by dividing the root. The seed should be sown in pans or in the open ground in the spring, and shaded a little till it is up. The roots may be divided after they have done flowering, or in the spring. The slugs are great enemies to the Delphiniums.

The Myosotis (Forget-me-not).

This genus is too well known to require any description from me; but I will just remark that the difference existing between the various kinds is great. *Alpina* and *Palustris*, for instance, are widely different although sometimes sold as the same. *Palustris* grows more compact, flowers more freely, and is of a brighter blue, and is, moreover, not so common. *Dissitiflora* and *Sylvatica* also differ, although resembling each other. *Dissitiflora* has larger and rather brighter flowers than *Sylvatica*. *Azorica* is a large-flowering species, which, however, does not flower so freely as the others; but it grows to a strong clump, and has a large and ample foliage.

All the Forget-me-nots can be multiplied by seed sown in pans or in the open ground in the spring; also by dividing the root; but seedlings make the best plants. Sow *Dissitiflora* in May, *Azorica* in April, and *Alpina* in July or August, for flowering the following spring. *Palustris* requires an abundance of water.

The Phlox.

In this genus we possess a character and diversity not to be equalled by any other tribe of hardy or half-hardy plants in the floral world. There is almost diversity enough of character and colour to constitute sufficient variety for a garden without anything else. There are the *Subulata*, *Nivalis*, *Reptans*, *Vernoniana*, *Setacea*, all creepers or procumbent varieties, fit for the edgings of beds as well as for small beds. Then we have the erect-growing ones, varying in height from 1 to 2½ feet, with colours from pure white to a dark purple; and nothing can equal some of these for the abundance of flowers on single plants.

The Phlox Drummondi is a well-known species, an annual for beds unequalled for intrinsic beauty. All the Phloxes may be raised from seed. The annual species must be raised in the spring. Sow the seed in pans filled with half leaf-mould and half maiden soil, set

in a mild heat. The perennial sorts may be raised from seed for new varieties. Sow in deep seed-pans, in soil as for the annual species, in a gentle heat till it is up. Also by cuttings of the short side-shoots in June, July, and August. Insert the cuttings in pots filled up with fine peat and a little sand, setting the pots in a close cold frame pit, or under hand-glasses. Propagate also by division of the root in the autumn or early spring.

The Viola.

There are several divisions in this genus, each possessing some peculiar feature of its own. There is the Pansy, with its numerous species and innumerable varieties. The Violet, with its several species and varieties. These are again subdivided. Of late years some sorts of hybrids have been introduced into the Viola class, partaking both of the Violet and the Pansy. These assume more of the features of the latter, and, to some extent, the property of the former.

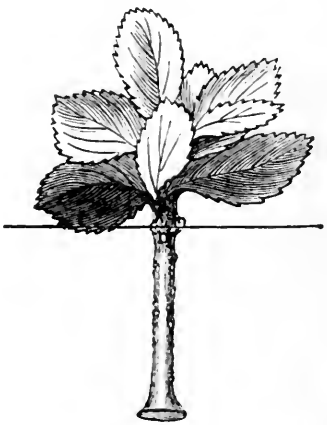

Fig. 32.—Pansy cutting.*

The Pansy class has produced some curious and novel, not to say beautiful, varieties of late years; but the much-coveted scarlet Pansy, pure and good, has not yet appeared, although some approaches to it have been made. I had one lately from the Belgian class.

The propagation of all the Viola genus may be assimilated; all may be propagated by cuttings of the young growth, taken off before it flowers, and inserted in pots, pans, or in the open ground; also in frames or under handlights in a somewhat shady spot, using

* Pansy and Auricula cuttings should contain a little root at the base in general when they are taken off the old plants. The line shows the depth to insert them in the soil.

any good common soil with some sand in it. All except the double Violets may be multiplied by seed sown in the autumn or the spring; in pans in the autumn in a cold frame, and in the spring in the open ground in fine soil. The double Violets should be propagated in April or May.

The Dianthus.

All the Dianthus tribe are more or less beautiful. The Indian Pink class contains, perhaps, the greatest diversity of any in regard to its colour and pencillings. These may be sown where they are to flower, every March, and treated as annuals. The Barbatus class contains some magnificent varieties, as the Auricula-eyed, which, when true, are superb border plants. This class must be propagated by layers of the young offshoots to preserve the kind true, for it will degenerate from seed, however carefully sown. The Heddewigii is perhaps the most splendid of the dwarf kind. This is no doubt an improved Indian Pink, and should be sown every spring. The Spanish class is very pretty. The Double Mule Pink is a beautiful class, very dwarf, and an abundant flowerer; a choice thing, and will come from seed pretty true, but should be propagated by divisions of the root. This is a hybrid. The Deltoides is a small and beautiful dwarf creeper or trailer, suited well for edgings and for covering stones, rockwork, &c., and may be obtained by seed and by division of the root.

The Oxalis.

This genus includes some beautiful species and varieties. The *O. tropæoloides* is a very conspicuous and useful one. Its foliage is of a dark copper or bronze, the flowers being of a bright yellow, but the foliage is most conspicuous on rockwork. The Oxalis requires a sunny open spot to display its flowers to advantage; and a sandy soil, good drainage, with an abundance of water in the growing season, and a season of rest for the tuberous and bulbous-rooted sorts, with

but little water at this time, though they must never be allowed to get perfectly dry.

Their propagation is by seed for those sorts from which it can be had, and by division of the root of the perennial species, and offsets of the bulbous kinds. Sow the seed on the surface of pans or pots filled with peat, leaf-mould, and maiden soil, slightly covered, and set in a mild heat, being a little shaded.

THE ŒNOTHERA.—By seed sown in the spring, and by cuttings during the summer. *O. macrocarpa*, yellow, and *O. taraxacifolia*, white. Both are procumbent varieties. By cuttings of the young growth, inserted in pots of peat and pulverised manure.

THE HEPATICA.—This is a species of Anemone, and may be treated in a similar manner. Each crown may be planted singly in the early autumn, but instead of frequently removing them, let them remain. Seed may be obtained from foreign merchants. Sow it in the spring in deep seed-pans, and set in a cold frame till up, then transplant out.

THE ECHEVARIA (*Crassulaceæ*).—These are a pretty tribe of hardy dwarf plants. The natural order (*Crassulaceæ*) conveys no idea of what the flowers of this genus are. As I have said before, the term means thick-leaved, and no more. The flowers of the Echevarias are very beautiful, and the plants themselves are handsome-growing, and admirably adapted for a very small bed on dry places, or for edgings, rockwork, &c. They may be had from seed sown in seed-pans well drained and filled with peat, leaf-mould, and maiden soil of equal parts, with some sand added. Make the soil firm and even, then sow the seed on the surface, and slightly cover it with fine soil, and set in a mild heat; use the dewpot when water is required. They may be readily propagated by offsets in the autumn.

THE SEDUM (*Crassulaceæ*).—Although similar in some instances to the Echevaria, the flowers are quite different. The Sedums are a hardy genus, flourishing on stone walls, rocks, &c., and are most useful, many of them being even beautiful. The leaves of some of them

are a specific for curing corns, rapidly allaying pain. The Sedums may be had from seed and from division of the root. There are a great many varieties, and all are dwarf rock plants.

The Saxifrage (*Saxifragaceæ*).

This genus varies much, some assuming a coarse and common, while others possess a graceful and fine character. By way of explanation I refer to *S. crassifolia* and *S. granulata*, also *S. umbrosa*—"London Pride." This last is no doubt a beautiful old plant, the flowers being extremely pretty and graceful. It may be raised from seed, and propagated by offshoots and division of the root.

The Campanula.—A genus of noble and very showy plants, assuming various characters, from the gigantic *C. pyramidalis* down to the insignificant dwarf *pumila*, 3 inches high. *C. pyramidalis* may be looked upon as the best and most noble species, of which there are two or three varieties—a deep blue, a pale blue, and a white. *Pyramidalis* may be easily grown to 6 feet high and 2 feet through. I find the best way to obtain large and well-formed specimens is to get them from seed sown in pans filled with fine peat and decayed manure on a mild heat in the spring. Pot off as soon as the seedlings can be well handled, and set in a cold frame; continue to grow them, and turn them out into the open ground in the following spring, giving the plants good room and strong manure during the summer. Take them up with a large ball of earth in the autumn, and use 11-inch pots; keep them in a cold frame through the winter, and as soon as March comes give the plants some strong liquid manure once a week. This must be continued carefully, and they will then start into growth for flowering, throwing up numerous strong flower-stems; the outside ones must be tied out to sticks.

This variety may also be propagated by cuttings of the roots 2 or 3 inches long, and inserted in pots filled with peat and rotten manure, and set in a cold frame or

pit. All the perennial Campanulas—viz. *Grandiflora*, *Nobilis*, and *Carpatica*, &c.—may be propagated by division of the root, and by seed when it can be had.

The Aquilegia (*Ranunculaceæ*).

All the Columbines are beautiful. The peculiar construction of the flower of the double ones renders this genus a curiosity. They are a handsome tribe of hardy perennials, and no garden should be without some of them; for borders in good-sized single clumps they are unsurpassed for effect. All of them may be raised from seed sown in fine soil in the open ground in April, and also by division of the root.

The Chrysanthemum (*Asteraceæ*).

There are three divisions in this favourite genus —the Chinese large-flowered, the Japan, a curious shaded class, and the Pompon. Each of these possesses some peculiar feature of its own. The Chinese class is the most noble-flowered; the Japan class possesses medium flowers of some two or three colours, frequently, in the same flower; the Pompon class possesses very small and perfect flowers of every tint.

The propagation of all these is by cuttings of the young growth 2 or 3 inches long in the month of February or the beginning of March, taken off and inserted in pots filled with fine-sifted old manure one part, maiden loam one part, and sand one part, and set in a mild heat; potted off as soon as rooted, and grown as fast as possible in a cold frame, being frequently stopped to induce a bushy growth, finally shifting them into 8 or 9-inch pots, and setting them outside in an open place where the plants can have the benefit of the full sun and light all round, frequently stopping the young growth up to the end of July, when it must be discontinued.

Layering may be resorted to as a good method of propagation. To do this well, put the plants out on a

quarter or bed in an open space in good ground. Plant them not less than 3 feet apart every way, when they will (or should) grow very strong, and will certainly do so if the ground is rich. About July or August bend the young stuff down carefully, and lay it in the ground near the tops, burying 6 inches of the growth in the soil, and letting 4 or 5 inches of the tops stand upright out of the ground. The leaves must be cut off the part to be buried in the soil, and a slight twist given to the layer just where the leaves are taken off; this will promote rooting. As these layers advance in growth, water may be required for the proper rooting of them, and by the time the layers are in bloom they will be sufficiently rooted to allow of them being taken up and potted. Good balls of earth must be attached to the layers, potted on the spot, carried away to a shady place, and thoroughly soaked with water. These layers will not much detract from the old plants, for they will maintain a good show of flower notwithstanding. The Chrysanthemum may be raised from seed for new sorts, but the chances for improved ones are very precarious. The seed must be sown in seed-pans in the spring, and set in a mild heat.

The Lily of the Valley (*Convallaria*).

The Lily of the Valley and all the *Polygonatum* genus may be propagated by offsets and division of the roots, which should always be done in the autumn. Single crowns may be selected, cut neatly out, and transplanted 3 or 4 inches apart in good sandy soil in a little shady aspect.

The Helleborus.

All the Helleborus tribe may be propagated by division of the roots in the early autumn, selecting a crown to each cutting. They may also be raised from seed when it can be had, which, however, is not often. Sow the seed in deep seed-pans, and set it in a mild heat till it is up, then remove to a cold frame to harden off.

The Hardy Orchis.

Here is a section of a genus at once not only beautiful, but most curious, and well worthy of the attention of all lovers of what is uncommon and peculiarly interesting. When I say uncommon, I mean that these singular plants are seldom seen in a state of cultivation, not because they are difficult to grow, or not worth the trouble, for I know of no class of plants that possesses so much real interest as the Hardy Orchis—"Terrestrial Orchids," as they are called, *i.e.* those that grow in the ground and in pots. Many of these grow in England in the woods, forests, &c., on dry, sandy soil. There is a spot in a large wood belonging to the Hill Hall Estate, Theydon Mount, near to Epping, Essex, on a dry, sandy hillside, where I have seen some of the *O. Apifera*—Bee Orchis—extraordinarily fine.

There are twelve or thirteen species and varieties of Orchis growing in England, and many more equally as hardy from other parts, that can be grown either in the open ground or in pots in cold frames, which would form a most interesting and curious collection not frequently to be seen nor easy to be matched; they may all be had from seed and by roots. The time to obtain the bulbs or tubers is early in the autumn, when they should be carefully potted in well-drained pots, using medium rough maiden soil and peat and sand of equal parts; set in a good dry cold frame. Give little or no water at the first potting, unless the soil is dry; water will be more liberally required as soon as growth commences. None of these terrestrials like removals, so that disturbing them often must be avoided.

The seed should be carefully sown on very rough peat and moss, chopped up, mixed, and pressed firmly into deep 10-inch seed-pans; watered first. Then sow the seed, and slightly cover it with some finer sifted peat and moss or leaf-mould, and set the pans in a shaded cold frame or pit; it should be sown as soon as ripe. Slight sprinklings with the dewpot will be

necessary at times, but never heavy waterings for the seedlings.

The Pyrus Japonica,
The Perennial Asters,
The Gentiana,
The Daisy,
The Pyrethrums,
The Lychnis,
The Arabis,
The Commelyna,
The Chelone, and all this class of perennial plants, may be freely propagated by dividing the roots in the spring, as soon as they begin to grow.

The Potentillas,
The Catananche,
The Rocket,
The Agrostemma,
The Perennial Lupine,
The Geum,
The Linarias,
The Perennial Poppy, and all this class, are best raised from seed; some, however, may be propagated by cuttings, as the double Rocket and the *Linaria.* All those perennials that throw up numerous stems from the root may be easily multiplied by division—for example, the Monk's Hood, the Aster (or Michaelmas Daisy), the Lychnis, &c. But such as only possess one crown, or rather one underground stem, as in the case of the Perennial Poppy, must, as a rule, be multiplied by seed.

The Class of Annuals that must be Raised on Heat first, and Transplanted to where they are to Flower.

The Aster, many varieties.
The Brachycome (*Asteraceæ*), two varieties.
The Browallia (*Scrophulariaceæ*).
The Celosia (*Amarantaceæ*).
The Fenzlia (*Polemoniaceæ*).

The Balsam (*Balsaminaceæ*).
The Jacobæa (*Compositæ*).
The Marigold (*Asteraceæ*).
The Mesembryanthemum (*Mesembryaceæ*), tricolour.
The Nycterinia, sweet-scented, choice.
The Phlox Drummondi (*Polemoniaceæ*).
The Portulaca (*Portulaceæ*).
The Salpiglossis (*Scrophulariaceæ*), a splendid large-flowered annual, having rich colours.
The Ten-Week Stocks, German.
The Sultan (*Compositæ*), one of the sweetest annuals we possess.
The Tagetes, a very dwarf Marigold.
The Zinnia (*Compositæ*).
The Xeranthemum (*Compositæ*), large-flowered everlastings.
The Anagallis (*Primulaceæ*), many choice dwarf splendid annuals.
The Acroclinium (*Compositæ*).

The Class of Annuals that may be Sown where they are to Flower.

I have adopted this class method, considering it quite a sufficient guide, without going into a long or short individual detail as to the treatment of each one. In every case the reader must bear in mind that the smaller the seed the finer must be the soil, and the seed must be buried less deep. For example, Love-lies-bleeding must first have the surface of the ground well prepared, and raked as if finished; then sow the fine seed evenly over it, and rub the back of a spade or a rake lightly over the surface. But those seeds that are larger, as the *Saponaria*, should not have the surface of the ground raked down quite so fine before the sowing.

Such as the *Nemophila* must have the surface less fine still, and be slightly heeled in with a fine rake—*i.e.* lightly chopped in; while Convolvulus Minor and similar kinds, and very small Lupines, should be either

chopped in with a coarse rake, or drilled in with the hoe about an inch below the surface. Those who observe this rule in sowing annual flower seeds will have no cause to complain about their seeds not coming up, as is so frequently the case, through either burying them too deep or not deep enough.

Hardy Annuals.

Adonis flos (*Ranunculaceæ*), showy.
Agrostemma cœli rosa.
Bartonia aurea (*Loasaceæ*).
Cacolia (*Compositæ*).
Calandrinia (*Portulacaceæ*), white and purple.
Calliopsis (*Compositæ*), many varieties.
Campanula (*Campanulaceæ*), many varieties.
Candytuft (*Cruciferæ*), many varieties.
Clarkia (*Onagraceæ*), many varieties.
Collinsia (*Scrophulariaceæ*), many varieties.
Convolvulus (*Convolvulaceæ*), many varieties.
Eutoca (*Hydrophyllaceæ*), several varieties.
Godetia (*Onagraceæ*), many varieties, showy.
Gilia (*Polemoniaceæ*), good annuals.
Gypsophila (*Caryophyllaceæ*), showy annuals.
Kaulfussia (*Compositæ*).
Larkspur (*Ranunculaceæ*).
Limnanthes (*Tropæolaceæ*), good annual.
Love-lies-bleeding (*Amarantaceæ*).
Lupines (*Fabaceæ*).
Mathiola (*Brassicaceæ*), Night-scented Stock.
Mignonnette (*Resedaceæ*).
Nemophila (*Hydrophyllaceæ*).
Nolana (*Nolanaceæ*), lovely trailers.

This list will be sufficient to show the class to which I refer, as to the sowing where they are to remain to flower.

BOOK VII.

ON THE PROPAGATION OF FRUITS.

The Apple.

There are a few sorts of the Apple tribe that will grow from slips or cuttings—such as the Keswick Codlin, Old English Codlin, &c.—and some will come true from seed; the Ribstone Pippin, for instance, will maintain its true character from the seed. But, as a rule, all Apples must be grafted on stocks; these stocks may be Apple or Crab. If grafted on the Crab, standards should be the object in view; if for dwarf-trained or bushes, or for tub or pot culture, then they should be grafted on the Apple stock—*i.e.* stocks two or three years old, from the seed or pips. The pips should be sown in February, in drills two or three inches deep, in a good light soil, and covered with some light material, as cocoa-nut fibre refuse, old tan, old hops, or decayed leaf-mould. At one year old the stocks may be transplanted if too thick, or they may remain where they were sown if not too thick, and the ground is good: here they may be grafted at one, two, or three years old, close to the ground. March and April are the best months for grafting Apples.

The raising stocks of either Apple or Crab is the same. The Crabs must be rotted to get the pips out. This is best done by burying them in the ground till the spring; then take them out, tread them, and wash

the seed out; dry it, and sow it as above. Apple pips can be had at cider pound-houses in any quantity.

The grafting of the Apple is a very easy operation. The grafts may or may not be cut from the tree a few weeks beforehand; some affirm that it is necessary to insure success to cut them some weeks before they are grafted, and to lay them in the ground. This may be a good plan with some sorts that are apt to get too forward, and with all sorts when the grafting has to be done late, as the stock should be in advance of the scion a little; but generally Apple grafts will grow well cut from the tree and grafted forthwith. Cut the stock clean off 4 or 5 inches from the ground, and, having the scions close at hand, slip off an inch of the stock up the side as far as the cut at the top, and a corresponding slip off the scion to match the stock (see page 149). Make a tongue in the graft and stock to hang the scion on by, and tie it on with rofea firmly, and clay the union, or unite with stout pug, putting on a little at a time, or use grafting-wax. The wax is made of pitch one pound, 2 ounces bees'-wax, and half a pound of mutton fat, melted. Put all together in a pipkin and melt over a fire, using it with a small painter's brush when half cold. But the pug, well worked up with fresh cowdung, is a good compost for covering the union.

Some sorts of Apples will not answer for dwarfs, and some will not do for standards. The "Cornish Gillyflower," for instance, will not do well as a standard, nor the "White Juneating, "Manx Codlin," "Norfolk Greening," and the "Foundling," as dwarfs. Those sorts that bear early and freely, and grow moderately or feebly, are best for dwarfs, and *vice versâ* for standards. Those intended for the latter must be on good rich ground, so as to insure a fast strong growth from the grafting, or else decrepit, crooked stems will be the result. All spray up the stems, to the height of six feet at the least, should be removed as it comes, with a sharp knife, and the leader maintained unchecked to that height, when the

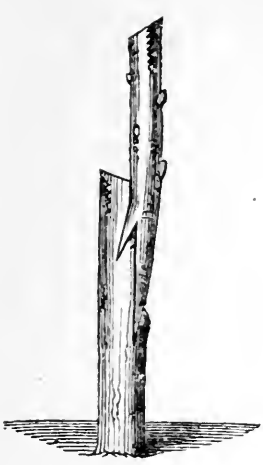

Fig. 33.

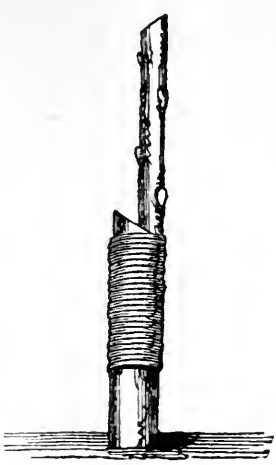

Fig. 34.

Fig. 35.

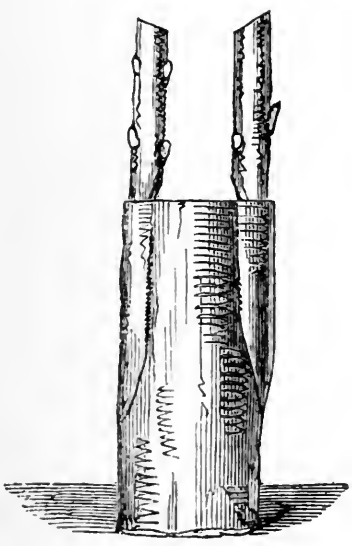

Fig. 36.

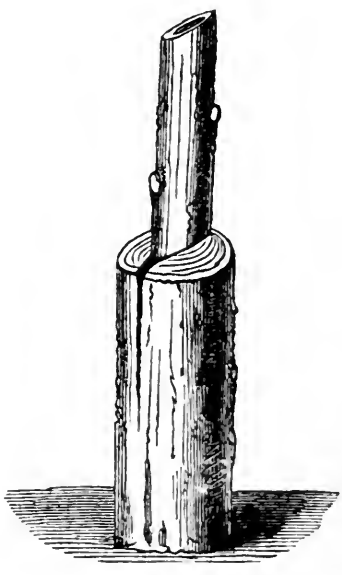

Fig. 37.

Fig. 33.—The Apple, Pear, or Plum grafted, called whip-grafted.
Fig. 34.—The graft tied on.
Fig. 35.—The graft clayed over; for stocks about the same size as the scion.
Fig. 36.—The Apple or Pear rind-grafted.
Fig. 37.—The Apple or Pear cleft-grafted. Each of these kinds of grafting is adapted for large stems, stocks, &c.

top should be cut off; here the branching head will form.

After the first season's growth from the grafting, the shoot of the dwarf class must be cut back to within two or three buds of the union, to induce a good dwarf tree for training. If for dwarf bushes, 1 foot 6 inches may be left of the single shoot; and if for pyramidal trees, the single shoot should be left entire for 5 feet in length, and as many laterals left equally divided from the union up as will form a symmetrical tree.

The Pear.

All new varieties of both Pears and Apples are raised from the seed or pips; but the chances for a good and improved variety of either are very small, and some years must elapse before the result can be fully known. The Pear, when raised from seed, is especially liable to go back to the wild state. Stocks for grafting the Pear may be raised from Pear pips or Quince pips; in either case they must be sown as for the Apple, and grafted in the same way. Pear stocks are used for strong-growing standard Pears, although there are some exceptions to this rule; for instance, those sorts that crack before they are ripe, and possess a grizzly flesh, should not be grafted on Pear stocks, as a rule, but on the Quince. Most Pears seem to acquire a superior quality when grafted on the Quince stock; but the grizzly classes and those that split and crack should decidedly be grafted on the Quince. In some cases, Pears refuse to unite with this stock. When such is the case, some strong-growing variety may be first grafted on the Quince, and the next season re-grafted with the sort first intended for the stock; this is what is called "double grafting."

What has been said about grafting and forming the basis for standard, pyramidal, and dwarf trees under the Apple, applies equally to the Pear.

All Pears that are naturally liable to come into flower very early should, no doubt, be planted on a

south-west or a west wall; for generally those very early-flowering Pears in warm climates and in very mild seasons burst into full flower, and then are cut off by the cold winds afterwards, so that whole crops of fruit are thus lost through being exposed as standards.

The Plum.

The stocks for grafting or budding on the Plum are raised from the Mussel Plum, a very good cooking fruit. The stones are sown in deep drills of good light soil in January or February; the drills should be not less than 3 inches deep, clear from the general surface. The stocks from the stones will be fit for budding or grafting within two years, and the grafting must be done in the spring, but the budding in the early autumn. To rule the time for budding, take notice of two things—viz. the bark of the stock must run well, *i.e.* leave the wood freely, and the bud must be well up, *i.e.* plump; then insert it in the stem near the ground, and bind the bud in. The grafting is done in the same manner as for the Apple. In all cases of grafting, when whip-grafting is the method employed, the stock and the scion must be of the same size. Budding is a more certain method for Plums than grafting. For good results in fruiting Plums, a dry, warm, and gravelly soil is best; in cold clayey soils Plums seldom do well.

Fig. 38.—The Plum budded.

The Cherry.

The propagation of the Cherry is the same as that of the Plum; generally by budding, however, instead

of grafting. The stocks are raised from Cherry stones in the same way as for the Plum. The grafting of the Cherry is very precarious unless judiciously performed, but the budding method is a certain one. See that the bark of the stock runs free, and then that the bud is well up, *i.e.* developed. These are the conditions for successful budding:—Insert the buds at the height the tree is to be; *i.e.* if for standards, let the stocks attain to the height they are to be before the buds are inserted, and if for dwarfs they must be put in the stocks near the ground. The kind of stock to be used should be determined by the character of the tree required. For ordinary standards, stocks raised from the common wild Cherry may be used, but for dwarfs and trained wall Cherries use the *Cerasus Mahaleb* stock; this may be obtained from layers and cuttings. Cherries will not fruit well in a cold clay, but require a stony or gravelly soil, and great care should be taken not to bruise the bark with the spade, or with the hammer or nails.

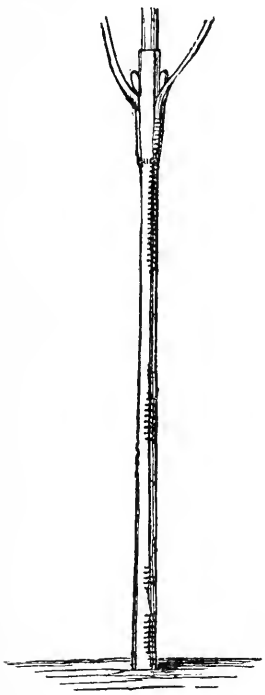

Fig. 39.—The Standard Cherry budded.

The Cherry must be budded close to the ground for dwarfs.

The Peach, Nectarine, &c.

The Peach and Nectarine require a similar soil to that of the Plum and Cherry, although the Peach requires a somewhat adhesive one; but a cold clay subsoil is much against success in Peach-growing. There is no constitutional difference between a Peach and a Nectarine; the difference exists in the flower and fruit, which gives rather an advantage to the Nectarine on

account of the flower being more robust than that of the Peach. The Peach flower consists of broad petals, which, when fully developed, are more liable to be injured by cutting winds than the Nectarine blossom; and, again, it possesses a broader surface when fully expanded, so that more damp gets condensed upon its surface, and renders it more susceptible of injury by the night frosts; hence the more frequent failures with some of the finer Peaches than with the more common ones. The Royal George Peach, for instance, possesses a very broad petal blossom, and more frequently fails to produce a full crop than most others, which may be attributed to the aforesaid cause. The Nectarine, on the contrary, carrying a much smaller flower, is less liable to the same effects.

The stocks on which the Peach and Nectarine are budded are raised from the Mussel Plum. The stones of this Plum should either be sown in the autumn or kept in sand till February, but it is preferable to sow them in large and deep seed-pans in the autumn, and to set them in a pit with a mild heat. The seed or stones must be sown in pans 12 or 13 inches in diameter, and not less than 6 or 7 inches deep, fairly drained, and filled with a compost of two parts good sandy maiden loam and one part pulverised manure. Bury the stones 2 or 3 inches deep; they may be sown nearly as thick as they can lie over the surface. The soil must be made moderately firm. These young seedling stocks must be transplanted into the ground the following autumn, where they are to remain for budding, which they will be ready for about the second July or August from the sowing. The following spring after the

Fig. 40.—The Peach budded.

Of course, tying in the buds is necessary in all cases; and it is so simple that I think it superfluous to give illustrations of it here.

budding, cut the stock down to within a few inches of the bud, and as soon as the latter has made some good growth, cut the remainder of the stump of the stock clean down to the bud in the autumn, a little slanting from the bud (see p. 153). The autumn or spring following cut the shoot the bud has made down to within three or four eyes of the place of insertion; this will form a basis for a dwarf-trained tree. Standards must be trained to the desired height before the shoot is topped—*i.e.* the single shoot from the bud must be allowed to grow to the proper height for a standard-trained tree, which, probably, it will take two years to do; then decapitate the shoot at the proper height.

The Grape.

Various are the opinions on Grape-growing. Some affirm that Grape-vines are best planted inside the house, and others assert that they are best planted outside. Now here I will just give my opinion, founded on experience. Lately I had a large vinery in which there were a set of strong young vines planted inside the house, a great depth of good maiden soil, manure, &c., &c., being well laid in before the vines were planted. They did very well and made a vigorous growth for a year or two, and a fine show of fruit the third year; but when the fruit was about changing colour they were attacked with mildew, and do all I could the crop was poor except on one of them, the fruit of which was fine and healthy. "Now," said I, "we will see how this is;" and as I thought, so it was. We dug down outside the front wall close to it, and there we found the roots of this vine had discovered an opening in the brickwork, and had made some strong feeding-roots, which had been working outside in the ordinary ground, while the others had not. This was the only vine that was really in good health, and the fruit of it was much finer than that of the others.

Some say that the fruit cannot be kept late on late vines if they are not planted inside the house. Now I

think I can prove that being inside the house has nothing to do with it. Every physiologist must be aware, and is aware, that as soon as the circulation of the juices is suspended no further supply, either good or bad, can be communicated from the root to the fruit or branches, and that this communication is really suspended, finally and completely, as soon as the leaves die off and the wood is ripe. To prove this, cut a lateral containing a bunch of fruit off—*i.e.* pass the knife through the limb—and then see if there are any signs of the flow of sap, and let this bunch of fruit and the limb remain as long as the others. If anything is the cause of the fruit not keeping, it is, no doubt, from a want of strength in its early stages, or too much maiming of the bunches in the process of thinning it. Much handling of the bunch and mutilating it give a detrimental check to the process of maturity, checking the onward progress of the juices, and inducing a more or less retrograde action; and then, should there be a want of the supply at the time through a deficiency of the liquid juices in the ground (which is frequently the case under glass), there must be and is a loss to the woody segments of the bunches, and consequently a failure in those parts called "shanking." This shanking may occur at any time, before or after the fruit has matured. I have no doubt it will be found to arise from the same cause, primarily; for it will be seen that in general those bunches of fruit that carry the strongest woody segments maintain an effective resistance, while the weaker ones succumb.

The propagation of the Grape-vine is by various processes—by seed for new ones, by layers, by cuttings, by eyes, and by grafting. By eyes is the most popular; *i.e.* as soon as the wood is thoroughly ripe, select those parts of the young wood that possess sound and bold eyes, and cut them off at right angles above and below each eye, leaving half an inch of wood each way from it. Insert them singly in large 60-size pots of rotten manure and maiden soil, bury them an inch or so, put them in a brisk heat, and keep them moist. As soon

as these have made a foot of growth, shift them into 32-size pots, and continue them in a lively heat, giving them liquid manure.

By Cuttings.—Any ordinary cuttings from the general pruning may be made into lengths of 10 or 12 inches, trimmed at the base just below a bud, and dug into the ground in some moist and warm spot.

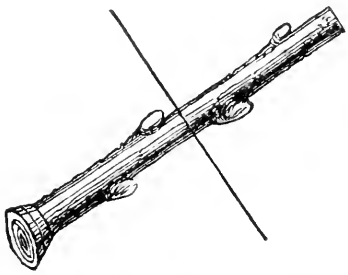

Fig. 41.—Grape-vine cutting, with a heel. The line shows the depth to insert it in the soil.

Fig. 42.—Grape-vine Eye.

Grafting is done in some particular cases, with scarce sorts, on strong-growing common kinds. The stock should be excited a bit before the scion is put on. The scion may consist of two or more eyes, and is done as for Apples or Pears, except that the pots containing the stock grafted must be plunged in a gentle bottom heat, and the union should be covered.

Layering may be done in pots indoors, or in the soil with outdoor vines, in the spring or autumn. Let an eye or two be buried below the surface of the earth, or a young rod may be drawn through the hole in the bottom of the pot, and an eye scraped with the knife, or at least just below the eye, so as to give a check to the sap; this eye must be fixed about the middle of the pot, and the pot then filled up with a good compost of dung and maiden soil.

Seed-sowing may be resorted to when new sorts are wished for. Sow the seed in the early spring in pots or pans, and set in a good lively heat; pot off as soon as possible, and encourage them on.

The Gooseberry.

The Gooseberry is a favourite fruit of our English gardens, and a great acquisition it is, too, in the early seasons. If Gooseberries can be had fit for tarts on Whit-Sunday, untold joy is felt by the millions of our juvenile and adult friends all over the country; but as our climate is fickle, and the seasons vary considerably, it is a matter of some little uncertainty about getting this fruit fit for the purpose at the important time referred to. I think this uncertainty may be obviated to a great extent by planting the Gooseberry on low walls facing the south, or in rows a few feet from the foot of a wall on which Peach-trees are planted, and trained as dwarf espalier trees. Plant a single row 2 feet from such a wall, 4 feet apart, and train them on stakes as for espalier Apple-trees. The stakes may be iron rods or small stakes of wood, 3 feet long, driven 1 foot in the ground, and there will be 2 feet out of it on which to train the fruit trees, laying in the wood right and left 4 inches apart. These dwarf-trained Gooseberries will give an abundance of fine early fruit, and will be somewhat earlier still if trained on a wall. They will look very pretty and neat if done well, occupy but little ground, and amply reward the trouble taken to get extra early fruit.

The propagation of the Gooseberry consists of striking cuttings of the last growth in the early autumn and winter. Any spare stuff may be made into cuttings, which should be 10 or 12 inches long, straight, and stout. Trim the base of it just below a bud, cut it smooth at right angles, leaving the bud untouched at the base, and cut three or four off above it, leaving three or four buds at the top part of the cutting. When a number are done, dig them into the ground, making a trench as for planting Box edging, and lay the cuttings in up to the buds left on them at the top; dig some good earth on to them, and set the foot on the lower part of them, treading the soil on them pretty firmly; dig on, and cut another trench 9 or 10 inches

from the last, and so proceed. Four-feet beds are perhaps the best. Early in September is the best time to put in Gooseberry cuttings, for by so doing a season is gained over those put in late in the autumn, winter, and spring. Seed may be used to raise new sorts. It may be sown in deep seed-pans, or in fine beds under a handlight, in the spring.

The Currant.

The Currant is a most useful fruit, especially the white and the red kinds, the latter being valuable for tarts and jellies. To get fine fruit and possess it longer than ordinary, plant the trees on a west or north wall (see "Multum in Parvo Gardening"), and hang nets over them as a guard against the birds. Red and white Currants may be preserved in their natural state a long time.

The propagation of the Currant may be assimilated to that of the Gooseberry, with this slight difference—all the Currants, red, white, and black, may be made into cuttings, and planted at any time from October until February.

The Raspberry.

The cultivation of the Raspberry is comparatively simple, but one thing should always be borne in mind, viz. that the Raspberry plant objects to frequent removals. The situation is not of so much consequence as a good soil and a permanent standing. The soil should be good sandy loam of a moderate depth, well manured annually, and forked in.

The propagation of the Raspberry is by the young suckers which spring from the distant roots that ramble from the main plant. The suckers should be dug up with the spade, reserving as much of the fibre about it as possible. October and November are the best months to remove them and to make new plantations. I recommend strong one-year-old canes for planting

rather than old stools that have stood some time on the same ground. Next to these one-year-old plants, I advise stools not more than two years old planted out. These will carry an abundance of fibre root, but old stools become barren at the root, and often fail. Any of the spawny roots with crowns will make plants. Seed may be sown to raise new ones, which will often produce the same kind. The seed may be sown in a fine bed of soil on a border, and covered with a hand-light till it is up.

The Strawberry.

There are so many varieties of the Strawberry that it has become quite confounding to know how to choose the best, for all are recommended for some good quality. But while we have some improved varieties in some particular points, there are many that fall short in other points of value which yet are commended. Well, I am of opinion that there are very few, if any, that can excel on all points Keen's Seedling and the British Queen. The first of these is a sure bearer, an abundant cropper, of hardy constitution, and good flavour. The latter is a robust Strawberry and a great fruiter; the fruit is large and of the finest flavour. These can be recommended, but I care but little for many others, although strongly approved. Both of the kinds named will bear a crop of good fruit under the most ordinary treatment, while I find some of the new and highly praised sorts are very reluctant to give a crop in some grounds.

The arrangement of Strawberry plantations requires some precaution as to the choice of soil and situation —a southern aspect for early fruit and a north-west aspect for a later crop. The Strawberry delights in a close adhesive maiden loam. This as a top-dressing for them is far better than any dung. The land should be half-trenched or dug fifteen or eighteen inches deep before setting the plants. Strong-rooted runners are best to plant.

The propagation of the Strawberry is simple. The first good runners that come should be laid on the surface of small pots filled with maiden loam, and either pegged on the pot or a stone laid on it to keep them from being removed. They will soon emit roots and fill the pot, and as soon as this is the case separate the runner or rooted plant from the mother, and remove the pots. After a week or so, shift these into 6 or 7-inch pots, and set them in a sunny open spot, and thoroughly soak them with water. Keep these plants clean of all runners: these are for forcing; for sale they may remain in the small pots. Runners will strike root freely in any soil, and are generally used for making Strawberry plantations. The seed may be washed out of the pulp and sown in seed-pans to obtain new sorts.

The Filbert.

The Filbert is a most desirable dry fruit, and being much in request, a high price has to be paid for it on account of its comparative scarcity. If, however, there was a fixed determination to grow this nut in this country more generally, we have ample means for doing so. In the West of England it bears abundantly, far above the produce of the northern counties, and much earlier; *i.e.* the plant bears much younger than it does in the northern counties. I took particular notice of this when I first came into the west, and the crop seems to be certain. This is easy to be understood, and the reason is that the climate is not subject to such severe frosts as in the north, which frequently destroy the flower, as it possesses no kind of covering to protect it against them.

I have noticed in the northern counties that in some seasons the fruit-bearing flowers get considerably in advance of the male flowers, consequently they die off long before the latter can develop their pollen, which when discharged in due time fertilises the fruit-bearing flowers. This disparity in the north is another cause

of a short crop, and often results in none at all. But in the milder western counties there is a more rapid development of the male flowers, which meets the case. As a consequence there are abundant crops of nuts annually. Here, then, is the field for growing the Filbert.

To plant a Filbert ground a spot should be selected sheltered from the sea, and protected from the cutting east winds. The soil should be moderately dry, and the plants should be placed in rows ten feet apart from row to row, and six feet from plant to plant. Clean two or three-year old plants should be used, and they should be planted in the early part of November.

The propagation of the Filbert is by sowing the nuts and by suckers. The nuts should be sown in the autumn or in February. If deferred till the spring, it is necessary to preserve them in a cellar or in some damp place, but to insure success sow the nuts three or four inches deep in drills of fine soil. After the first or second season plant the seedlings out in rows one foot apart; here they may remain for two seasons, then transplant them to where they are to be placed permanently. The suckers may be taken off in the autumn, and transplanted as for seedlings. The fruit comes on not less than two-year-old wood, therefore only the young wood must be pruned off in the pruning time, which should be in December or January.

The Walnut.

They say the more you thrash a Walnut-tree the better it bears. The reason is, that the Walnut bears its fruit on the young growth, like the Grape, so that by beating the nuts off the tree with a pole, and thus breaking the ends off the branches, additional growth is made the following season. The Walnut will not bear till the tree is of a good age, then it will do so successively for fifty or a hundred years.

Its propagation is by seed only. The nuts should be sown in deep drills, or dibbed in four or five inches

deep, putting them in holes one foot apart in lines, in a deep sandy loam.

The Mulberry.

The Mulberry is a useful tree, both on account of its fruit and its foliage. The leaves are much used as food for the silkworm. The tree itself is a fine lawn tree; its growth is noble and pretty, and the foliage very dense.

The propagation of the Mulberry is by seed, layers, and cuttings. The seed, which is obtained from the fruit, should be sown in deep seed-pans, and set in a mild heat in February. By layers is not very convenient. By cuttings of the two or three year old wood made as for Currant cuttings, and inserted in sandy soil in the month of November.

The Medlar.

The Medlar is a species of Pear, and may be grafted on that stock, as for that fruit. It may also be multiplied by seed. This is in the fruit, and can only be got out as it decays, or is ripe, for that is really the case with the Medlar. It is ripe when it is what is called "rotten." The seed should be sown in the autumn, in a good light soil, two or three inches deep. By grafting: use the young stuff, as for Apples or Pears, and proceed in the same way. It may also be grafted on the Thorn. The Medlar must not be gathered too soon, or the fruit will not be good.

The Fig-tree.

In some counties Figs are difficult to get, but in the mild climate of the West of England standard Fig-trees bear abundantly, and require no winter protection whatever, two good crops of Figs being easily obtained. The crop that comes late in the autumn ripens early in the following spring or summer. On walls extra fine crops are obtained without any kind of protection through the winter.

The propagation of the Fig is most simple. By layers it is very convenient, for the Fig is as easily layered as the Grape-vine, as it generally grows in branches close to the ground. Lay some of these in the ground as for the Grape-vine, and scrape the bark of the layer at a joint or bud on the upper side; this will check the sap, and induce the emission of roots more freely. The layering should be done in the autumn or early spring. By cuttings: these should be of the ripe young wood, six or nine inches long; cut above and below a bud, as for the Vine, will answer. Put them into pots filled with maiden soil and decayed dung and some sand, and plunge the pots into a mild bottom heat. The cuttings should be taken off with a heel of the last season's growth, and neatly cut over, immediately below the joint. Cuttings of this sort may be short, say six inches long; these will strike surely.

The Quince.

The Quince is a useful tree. The fragrance of the pear-like fruit is very agreeable, and the peculiar rough acid is also a most suitable adjunct in sharpening some jams, such as vegetable marrow, for pies, &c. The Quince requires a moist soil. It may be planted on west walls, and pruned and trained like the Pear, or even as an espalier. Generally the Quince is planted in some out-of-the-way place, where it is perhaps shut away from the sun and good air; but this is a great mistake for those who want fruit; it should be planted in a good open spot.

The propagation of the Quince consists in striking cuttings of the ripe young wood 6 or 9 inches long, cut off with a heel of old wood, in the month of October or early in November, at the base, immediately below the connection, and inserted in the ground as in the case of Gooseberry cuttings, &c.

By Layers.—Layering of the Quince is done in the autumn or spring. Bend down a branch, and, after trimming off the useless small spray, select the strong

growth for laying; open the ground and lay the branch in, agitating the bark (or cutting a small tongue) at a joint; peg the layers down fast, and cover the part to emit roots with some fine soil. Seedlings may be raised from the pips (see the Pear, p. 150).

Grafting may be resorted to as a quick means of getting Quince-trees. Graft them on the Pear stock precisely as for Pears. For standard Quinces the stems must be tied to a stake, to prevent them from growing crooked.

ON THE PROPAGATION AND PLANTING OF HERBS.

The Sage.

The propagation of the Sage consists in taking cuttings of the young wood in May or the beginning of June. Let them be of the firm stout young growth, 5 or 6 inches long, cut clean below a leaflet, and insert them in the ground in a shady border of good soil with a hand-dibber. Sage seed may be sown to raise plants from, but I find such plants are more liable to run to seed than those which are raised from cuttings. The seed may be sown on a warm border, or in a seed-pan, and transplanted out afterwards. The Sage delights in a shady, damp place; it requires replanting every two or three years, or it will get barren.

The Thyme.

There are several sorts of Thyme, but two only are used for domestic purposes. The upright French Thyme is preferred to all others; it is very strong and hardy, although it prefers a friable good sandy soil and a dry subsoil. The other is a trailer, or procumbent plant, aud is lemon-scented; useful in some

kinds of cookery, but the French Thyme is by far the best for stuffing purposes. The Thymes require good soil and an open space, and to be replanted every second or third season. Take up the plants in September or March, and part them if they are large, and then dig them in, laying them in up to the young growth.

Thyme may be raised from seed sown on the surface of fine earth, on a warm border, in March or April. Make the surface of the bed fine with the rake, and then sow the seed thinly over it, and gently touch it in with the back of the rake, or draw the back of the spade over the surface; this will bury the seed quite deep enough. As soon as the seedlings are 2 or 3 inches high, plant them out (6 or 9 inches apart) in good fine ground, and water them if the weather is dry.

The Marjoram.

There are two kinds of this herb in domestic use—one called "pot Marjoram," a perennial; the other "sweet" or "knotted Marjoram," and this is really an annual, and requires sowing every spring. The former is a hardy perennial, and may be propagated by seed and by division of the root; but the "sweet Marjoram" is most in use, and should be cut during the summer, when it is in perfection, and dried out of the sun. The seed may be sown on a warm border in April as for Thyme; it should be planted on good light ground, and in an open spot.

The Savory.

There are also two kinds of Savory in use. There is that which is called "Summer Savory," and must be sown annually as for the Marjoram; and the other, which is termed "Winter Savory," because it is green all the winter. Each of these is much used for flavouring soups, &c. Their propagation and after-treatment are the same as for the Marjoram.

The Mint.

There are two kinds of Mint, but they are used for quite different purposes. Lamb or Spear Mint, the leaves of which are long and very narrow-pointed, is the only one used in cookery; the other is most useful as a medicine, and no one, rich or poor, should be without a good bed of Peppermint. This has quite a different flavour from that of the Spear Mint, and does not answer the same purpose. Mint should be replanted on good light land once in two years, and be top-dressed with rotten dung every November.

Basil.

There are also two sorts of Basil in use, but they are much the same, both possessing a Clove flavour. and are much used by good cooks for flavouring soups. Basil must be sown annually in seed-pans, and transplanted out on good ground on a warm border afterwards. Sow the seed in February or the beginning of March, and set the pans on a mild heat; harden off as soon as an inch high, and plant out in May, 6 or 9 inches apart. It is an annual.

Tarragon.

Tarragon is a herb not much in use, but it is occasionally employed for correcting other herbs. It should be used green. It is a perennial, and may be raised from seed or multiplied by division of the root. Plant it out on poor ground in an open space.

Tansy.

This is a beautiful-foliaged plant, and possesses a very peculiar scent. It is often used to flavour soups, as well as for medicinal purposes. It is a hardy perennial, and will grow in almost any soil. It may be propagated by division of the root.

Rue.

Rue is a useful antidote against infectious diseases. If any one puts a small sprig of the plant in the mouth before going into a room where there is fever, &c., the disease, it is said, will not affect the visitor. Rue is a warm tonic, and will create appetite. The plant may be multiplied by seed and by slips in the months of May and June. It is a very pretty-growing evergreen shrub, and might be used as an ornament for borders among other dwarf shrubs.

The Hyssop (*Lamiaceæ*).

The Hyssop is a useful and beautiful little plant, of a dwarf habit, and belongs to the same order as the Thyme. It may be raised from seed, and propagated by cuttings put under a handlight, and by division of the root, as for Thyme.

Lavender.

The Lavender is well known, the flowers being the useful part. These make a fine distillation for various purposes; or the flowers may be dried and put into muslin bags, and laid among clothes as a preventive against moths entering the box or drawers. The cultivation of the Lavender for commercial purposes pays very well on good, open, light land. The plant will live for a great many years, and produce an abundant supply of flowers every season, if the land is dry or well drained, and exposed to the full influence of the sun. The flowers should be cut as soon as they are fully expanded, and never left a day longer: they should be also thoroughly dry before cutting them.

The propagation of the Lavender is by slips or cuttings of the old and young wood. Cuttings of the young firm wood in June under a handlight, and slips of the older growth inserted in the ground in August or September, will make good plants.

By Seed.—The seed may be sown in the spring in deep seed-pans, and raised under glass, or sown on a warm border of fine soil.

The Rosemary.

The Rosemary is a very useful medicinal herb: a sprig of this put into boiling milk and drunk when going to bed will relieve a bad cold. The propagation of Rosemary is by slips, cuttings, and seeds, as for the Lavender.

The Caraway, Dill, and Coriander.

The above are all grown chiefly for their seeds, which possess a warm aromatic nature, and are used in medicine, for drinks, and in cookery. Each must be sown on fine ground annually in the month of April.

The Parsley.

Every one knows what Parsley is, but I would just say that every one does not know how to grow it, for it is often put in the wrong place and sown at the wrong time. To have good Parsley without running to seed the second season, it should be sown on well-drained land about the end of May or the beginning of June, and not before; nor must it be buried more than half an inch deep.

Chervil

Is very similar to Parsley, and is used for much the same purposes. It should be sown in the same manner as Parsley.

The Rhubarb.

Rhubarb should be planted in good deep land, and well dressed annually with strong manure. It may be raised from seed, and propagated by dividing the root,

securing a crown to each piece taken off. The seed may be sown in seed-pans and raised on heat, being planted out afterwards, or sown on a warm border in the spring in drills. If Rhubarb is allowed to remain on the same ground undisturbed for three years, it generally degenerates and throws up flower-stems, which prove very deteriorating to the roots.

Artichokes.

The Artichokes I refer to here are the ones belonging to the class of compound flowers with thistle heads—the *Cynara* genus. This species is grown only for its heads, which should be cut as soon as they have well filled up the numerous calyxes with flesh, and before they begin to separate from the bud, or the least sign of the flowers appears. They should be planted in good and deep soil, 3 feet apart, and earthed up a bit in severe weather to protect the plants from frosts, and should have a covering of long dung or ferns over them during protracted frosts. In the spring the banks should be thrown down, burying the manure about the plants. They are propagated by suckers in the spring of the year.

Garlic, Shallot, and Potato Onion.

The two former should be planted every February, or in the beginning of March, in good ground in an open space, in drills 1 foot apart from row, to row and 6 inches in the drill. Single bulbs are sufficient.

The Onion should be planted in January, in good light rich land, in the same way as the Garlic and Shallot. The Onion will be ripe for use or housing about midsummer, and should be tied up in bunches, and then suspended from the roof of some cool, airy outhouse.

BOOK VIII.

CHAPTER ON SOILS, MANURES, ETC.

The technical terms used for the various descriptions of soils are frequently misunderstood, and this sometimes proves detrimental instead of being an advantage. Peat, for instance, is a term much misunderstood, even by young gardeners. Peat has three distinct meanings, and this fact makes a material difference when applied to the cultivation of plants, especially those that really refuse to grow in two of the three sorts of peat; so that it is of more consequence to know what good peat is than it may at first appear. There is that which is procured from bogs; but this has nothing to do with the peat referred to in this work, nor in any of my books. Some recommend this kind, but it is of little or no use for plant-growing, except for some Orchids. Few things indeed will do any good in it. It is so soured that no good plants will grow freely in it, and even such as Heaths, New Holland plants, and Camellias will pine away. Again, there are two other kinds of peat, one of which is not good; this is composed of minerals very detrimental to some choice plants. I found this out by experience before I was well aware of the thing, and paid for it bitterly. This peat appears to be good, but possesses more or less mundic, and is obtained from mining districts, such as Dartmoor and other mineral localities.

Heaths will pine away and die in it, but the Hydrangea will produce the blue sort to perfection if grown in it.

The other class to which I refer in this work will not only grow Heaths, but everything else, even Cucumbers; and when peat will do this it is composed of rich and nutritious qualities, and is also free from impurities. If a Heath will not grow in peat, it may be looked upon as not safe for other plants; for it certainly possesses some dangerous compound in the way of a mineral, or is poisoned by supersaturation with mineral waters, &c. The peat alluded to in this book is plentiful enough, but some distance has often to be gone to get it. Epping Forest (around High Beech), Wimbledon Common, &c., are the best places to obtain it, but a few sacks of it can now easily be had by railway. This class of peat, when handled, feels plum, and does not contain great stones nor coarse sand, but it adheres slightly together when pressed with the hand, although it is dry. But the other peats are harsh, and the Dartmoor peat contains coarse sand, and will not cling together under the same circumstances.

Maiden Loam.

"Maiden loam" is a term easily understood, but the quality of it is a frequent source of anxiety to amateurs. By "maiden loam" is meant the top spit from a breify common or a pasture. The best kind possesses a nature similar to that of good peat, except that it contains no sand, and bears good grass and herbage. It will grow Cucumbers and Melons without any addition to it. The best I ever knew came from the Lower Epping Forest, although good maiden loam can be had in most localities. I need scarcely add that the term "maiden loam" implies that the top soil has not been cropped beyond the natural herbage. This soil, as well as the peat, should be dug up during the early autumn, turf and all, in solid spits, and packed up in stacks, turf downwards, out of doors—not under trees, but in an

open spot where the sun and free air can get to them. Whenever any quantity of either is required to put into the potting-shed, as much as is wanted should be cut clean down off the end in a perpendicular manner from the top of the heap to the bottom; it should never be taken off the top only, thereby leaving the under part to get saturated by the rains. There is another kind of loam which comes out of pits, which is tender, and good for dressing some gravelly and drying soils, which is very retentive of moisture.

Leaf-Mould.

Leaf-mould is a most important and useful article in gardening. It may be procured from under trees and where the leaves fall from the trees and get blown together into heaps under the brushwood, where they decay; but this leaf-mould is scarcely safe to use for pot plants, seed-pans, &c., on account of its liability to harbour embryo insects, which often hatch quickly after they get into the warmth of a frame or house, and fill the structure with myriads of various insect pests, especially the wood-louse and red spider. I have found it so. The safest method of getting pure leaf-mould is to pack up all the leaves possible in a heap in the fall of the leaf, and to let them remain to decay, turning the heap two or three times in the course of the year. Or the leaves may be used to grow Marrows or Cucumbers on during the first season, when they will decay and come into use for pot-plant work in the following spring—*i.e.* the spring twelve months after the fall.

Any leaves will make leaf-mould, but those of the Oak are preferable, being stronger, and perhaps containing less injurious matter. Successful gardening cannot be done without peat, maiden loam, and good leaf-mould. Leaf-mould must be used for raising seedlings, and also in some cases for delicate bedding plants, as an addition to the original soil; and in the composition of fresh-made beds to suit the thing in

hand. This I have found to be the case. Success in the flower-garden cannot be looked for unless the soil of the bed is adapted to the nature or constitution of the subject.

Cowdung.

Old pulverised cowdung is one of the most useful adjuncts possible in choice flower work. In the cultivation of Auriculas, choice Polyanthuses, Primulas, and even Geraniums, this is most beneficial in conjunction with maiden loam, &c. Every one who has a collection of plants, whether great or small, should procure and lay up in a round heap a load of cowdung every season, so that there may be no lack of it. It will require not less than two years for it to pulverise, and if it is four years old so much the better. The heap should be turned two or three times a year. Two parts of this and one part of good maiden loam, and one part of silver sand, will grow Auriculas and the Primula Sinensis to perfection. This is much better than leaf-mould, more nutritious, and answers the same mechanical purpose.

Sheep's Droppings,

laid up until very old, are excellent, in conjunction with maiden loam, for various plant purposes, as well as in the fresh state for watering Roses and Geraniums; also for Auriculas and late Primulas. The liquid manure made with this is no doubt one of the best—if not the best—that can be used to bring up a first-class flower, and insure a good colour. Put a peck of fresh droppings into a tub holding 5 gallons of water, and fill the tub up; then with a broomstick stir the contents well, and do so again the following day; then let it settle, and dip the clear liquid out as wanted. Give the plants a good watering with it once a week till the flowering is over, when it may be discontinued for the season. Do not plaster the top of the pot containing a plant over with cowdung, nor with sheep's droppings; some do this, but it excludes the fertilising properties of the air,

which are equally as beneficial to the root as to the branches. Giving manure in the liquid state is by far the most beneficial, and produces immediate results, while at the same time it admits the action of the air to the root of the plant. The tub containing this manure should be set so as to get the free air out of doors.

Fowls' Dung.

Fowls' dung is, no doubt, equal to some guano. Its application to crops we find requires care, for too much of it burns them up, as the saying is. The best application of this manure is in a thoroughly pulverised form, mixed with wood ashes and sifted. This, sown at the rate of 2 or 3 pounds per rod on turnips as soon as the crop is up, will prove a fine preventive against the fly, and act as a rare stimulant to the crop. In a thoroughly pulverised state it may be mixed, in a small proportion, with the soil for potting Roses, Fuchsias, &c. It may also be dug into the ground in its fresh state for Onions, Leeks, Celery, Cabbage, &c.

Rabbits' Dung.

This proves a very good dressing for lawns, as it produces fine herbage—*i.e.* of a fine and not a coarse texture. I have particularly noticed this, while, on the contrary, cowdung acts in the opposite manner. This manure, as well as fowls' and pigeons' dung, should be mixed with some earth, and allowed to lie in heaps for some months before using it, when it may be used on the garden for flowers and vegetables, especially for Onions, Celery, Cabbage, Broccoli, Roses on their own roots, the Gladiolus, Pæonia, &c.

Night Soil.

What a waste to the community is the system of washing away the common sewage into the Thames and the sea! We get rid of this, and then are obliged to have recourse to the manufacture of all sorts of

stuff for manure not worth so much by 50 per cent. as the contents of the common sewers. Night soil is one of the strongest, if not the strongest, manures it is possible to get. I know that the Boards of Health have many scruples, and offer numerous objections to the contents of the common sewers being brought aboveground in the neighbourhood of a large population, and think by keeping it underground to avert disease and death; but I take particular notice that we have quite as much disease and death now as ever we had, even where £50,000 have been spent to carry the sewage of the town away underground into the sea. No harm can or will come from the exposure of night soil if some gypsum is put into it or thrown over it as soon as it is aboveground, and it is then covered over with earth. Empty the cesspools during December, when the evaporating power of the air is less than at any other time, and use the gypsum as a fixer of the ammonia; let it lie exposed until March, when it may be put upon the ground for Onions, Leeks, Cauliflowers, and Cabbage.

Night soil may be taken from the cesspool, and carried forthwith and put upon the ground occupied by Gooseberry-trees with great advantage. It will not injure the trees, but prove amazingly beneficial in the production of fine fruit. This is what my master used to do, and I am well acquainted with the results. It may also be wheeled direct from the cesspool to the ground to be cropped with Onions, and there and then spread over the surface, where it may remain till March, when it may be dug in for the crop. In a pulverised state it will prove equal to guano for a top dressing, and may be sown over Turnips and drilled in with them, and also with Mangel-wurzel.

Bone Manure.

Decomposed bones are a fine manure for all purposes, and may be used in small portions mixed in the compost for pot plants. The constitution of this

manure is very lasting and feeding, on account of its slow decomposition in its pure state; crushed bones, for instance, are perhaps more lasting than anything else, but in conjunction with alkalies or acids they do not last so long. Even then, however, bone manure is better than guano, and does not exhaust the ground as that does. Guano contains so much stimulant that it drives the plant too fast, so that it draws heavily upon the ground; consequently the land frequently will not grow a second crop without a good dressing of manure being put on it. Bone manure, however, will give a second and even a third crop; but a great deal depends, of course, upon the quality of the manure. Some kinds contain but a small proportion of bones, and are made up of ashes, soot, and alkalies. If a pound of proper bones is compounded with four pounds of alkalies of various constitutions, it will make a good manure; and if acids are used as solvents, and the bulk made up with good alkalies—such as wood ashes, dissolved fish-shells, chloride of lime, lime, soot, &c., a very strong and lasting manure will be the result.

Bones may be either dissolved with chloride of lime or sulphuric acid. When dissolved with the latter a more lasting manure is no doubt the result, because not so volatile; but much depends upon the fixed principle of the volatile agents. Gypsum may be added with soot to fix the ammonia. Every pound of bones dissolved is worth one shilling. This pound of pure bone dissolved with an acid will make ten pounds of compound manure fit for use, diluted with soot, ashes, &c., and will be quite as strong as guano, and more lasting.

Every farmer can make his own bone manure easily enough. Put the bones into a pan, and pour sulphuric acid on them; dissolve, and add soot, ashes, and gypsum; mix together, and let it remain for a few weeks.

The Fertilising Power of Soot.

Soot is, no doubt, the most powerful ready-made manure we possess; it is, moreover, a good insecticide. If in the early spring Gooseberry-trees are liable, as they often are, to the depredations of the caterpillar, which insect frequently destroys whole crops by eating all the leaves off the trees, it is a good plan to go over the whole plants, and sow a good dressing of soot completely over trees and ground before the leaf breaks out, and again as soon as the leaves are developed. Never mind about the look; no detriment will accrue to the fruit, nor will the fly deposit her eggs on the leaf, for it does not like soot.

Two pounds of soot and two of salt, mixed together and sown on one perch or rod of ground, dug in and well mixed with the soil, is the best manure I know of for Carrots—in fact, it is quite equal to bone manure. I tried the two side by side. I had the best crop of Carrots I think I ever saw from this manure; the land was light.

One pound of salt and two of soot, sown over one rod of ground, will produce a fine crop of Potatoes. Two pounds of soot, sown in the trench when the Potatoes are planted, will grow a good crop.

Three ounces of soot and six ounces of guano will produce finer Rhubarb than any other manure extant, and more quickly too. Apply it in a liquid state just before the crowns break, and once after the first pull of the crop. A thorough soaking to the roots with this is necessary each time.

Soot alone, sown at the rate of two pounds to the rod over young Cabbages in the months of February and March, is proved to be one of the finest stimulants possible in the production of these most desirable vegetables, giving them a beautiful rich dark green.

Soot alone, sown over grass during March and April, in showery weather, proves one of the most active agents in producing a large crop of hay; one pound per rod is enough.

Soot and wood ashes, two parts of the latter to one of the former, will be found equal to guano in producing a quick crop of Turnips, sown broadcast at the same time as the seed, or drilled in with the seed, or sown over and harrowed in after the seed is sown.

On Natural Soils.

There is a general idea that it is of no use to bring up to the surface the subsoils of some sorts of land; for, say those who are against it (and they are usually farmers), the unproductive nature of poor gravelly lands renders the subsoil of no use on the surface. Now it is quite the reverse; for if the land is gravelly and poor, the only effectual remedy, as a fundamental policy, for renovating such worn-out land, or for forming a permanent foundation for new land of this class, is to fetch up to the surface, by deep digging or deep ploughing, the poor subsoil, so that it may be fertilised by the influences of the sun and the air. And be it remembered that if the land is shallow and light, the deeper it is dug or ploughed the better are the chances for a good crop, because it will go down into the good soil below, and this is where all crops derive their sustenance, and whereby they live. I have proved to my own satisfaction that deep digging and deep ploughing are nearly as good as a dressing of manure. On very light land the deep ploughing and digging should be done some time previous to cropping, especially for Wheat or Strawberries. I use these two as illustrations—for farming on the one hand, and gardening on the other. Each of these requires solid land to get a good crop on light land, and, as a rule, the lighter in texture the less time will be required to settle the land after digging or ploughing; or rather heavy land may be allowed a freer drainage than light. I am more than ever convinced that all lands should be dug or ploughed deep once in the season.

It is a great mistake, in either farming or gardening, to pick out all the stones from land that is

naturally stony. Stones are active agents in promoting heat and retaining it: some lands would be greatly benefited by stones.

The most productive and profitable land is one possessing a subsoil of sandy clay of a tender texture, with a surface soil of a breify or mellow texture. This sort of land is peculiar in working; if wet immediately follows after it is ploughed, or it is dug before it can dry, nothing can be done with it by way of sowing seed for some time. Such land must be either cropped at once, or it must lie until it has thoroughly dried, and gets softened by a rain; then no land can equal it for working or for producing a good crop. Heavy lands are benefited greatly by a dressing of coarse sand, tan, and cinder ashes. This kind of land should be carefully managed, watching for fine weather to plough or dig it; but light, sandy, and gravelly soils may be dug or ploughed even during wet weather, and are even benefited by it, as it induces a closer texture —for the season at any rate.

The Action of the Air upon Soils.

The fertilising power of the air upon land may be attributed to the influence of the nitrogen gases which compose oxygen and carbon, forming carbonic acid gas, the chief fertiliser of the land. This influence is more readily exerted beneficially upon land exposed to the air by turning it up frequently. Thus land that has been heavily cropped and run out, as we say, will recover itself so as to bear good crops merely by rest and frequent ploughing and digging. The fact is, let the land be ever so unkind in its nature, it can be made fertile by judicious management; and the deeper it is dug or ploughed, the more fertile it will be. But it is necessary to dig or turn it up to the light and air at every sowing; and, as a rule, the longer it is exposed to atmospheric influences before sowing, the better, especially in the case of heavy lands. These should be turned up several times before cropping;

this is even better than manuring and not turning the land so much.

I have seen what might be called poor land bear fine crops of Wheat with simply frequent ploughings and a rest; and I have seen land that was manured and turned up and cropped forthwith bear but a poor crop. Heavy land will bear most abundantly without manure if often turned up to the influence of the air. It is a mistake often made when land has lain uncropped, or half cropped, or half tilled, and so on. Let the man who takes such a farm go into the deep ploughing and turning the land up to the influence of the air, and he will not regret having taken what was called a worn-out farm. So also in gardening.

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THE END.

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