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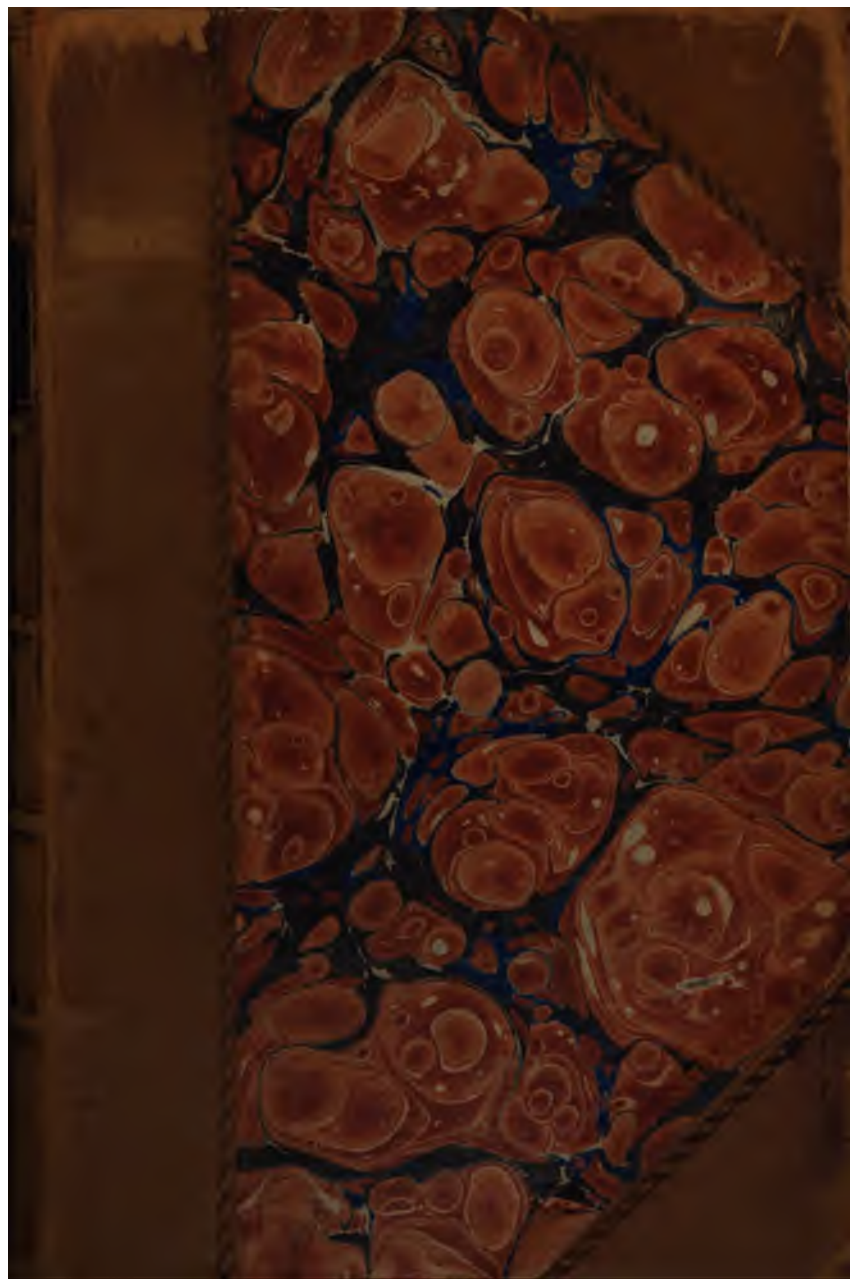
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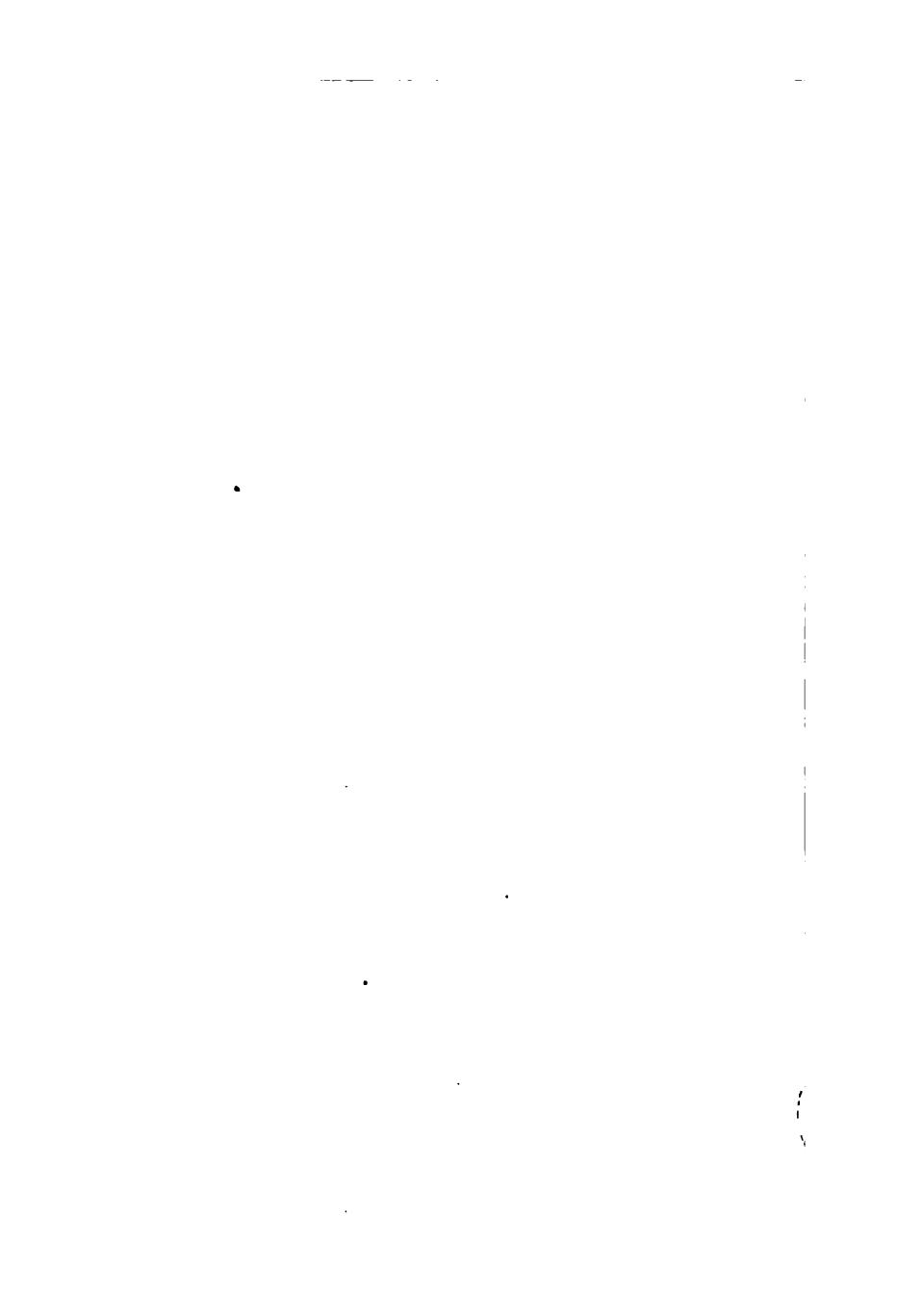
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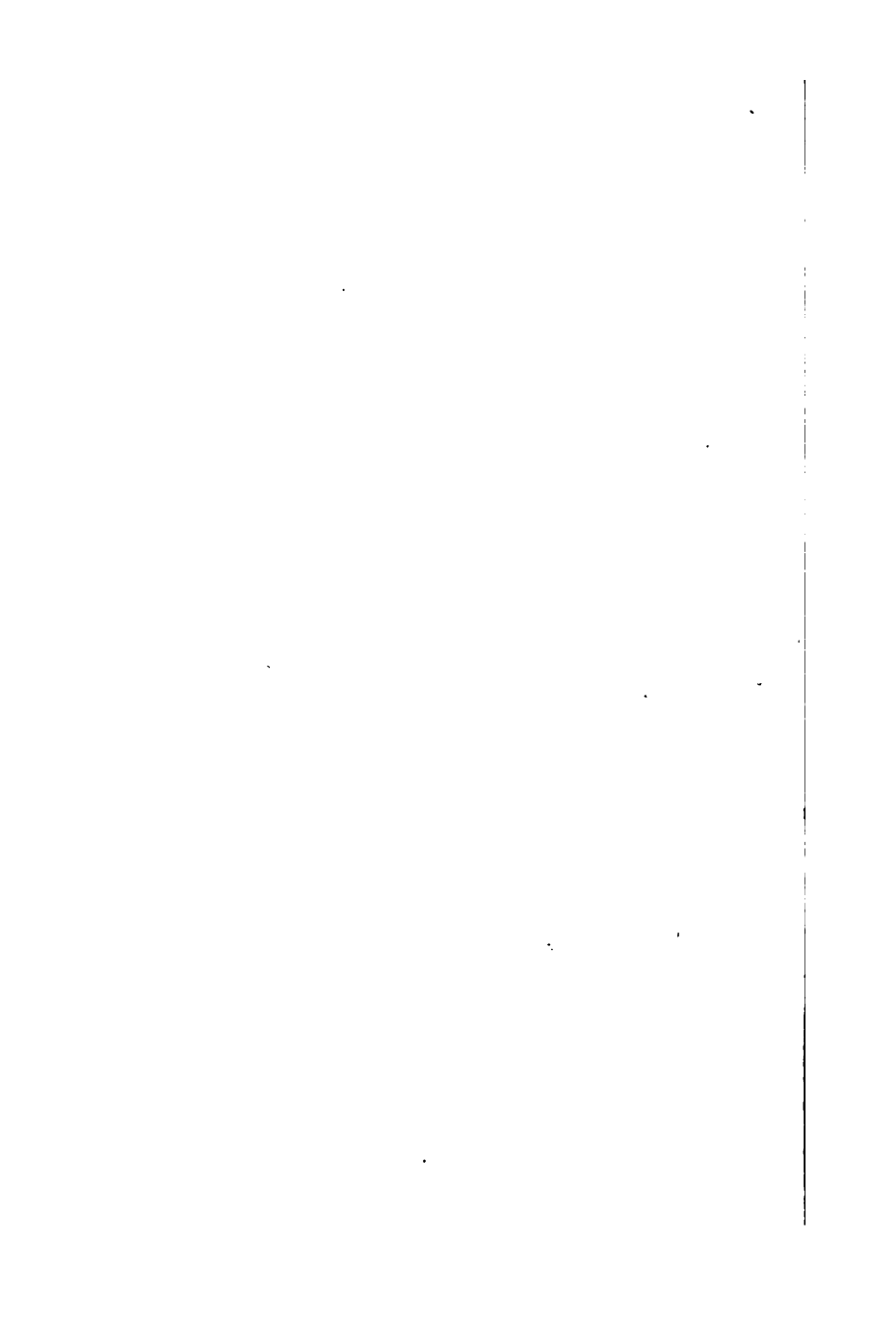




GARDENING

FOR

LADIES.





LONDON :
JOHN MURRAY, ALBEMARLE STREET.
1840.

INSTRUCTIONS
IN
GARDENING

FOR
LADIES.



BY
MRS. LOUDON,
AUTHOR OF "THE LADIES' FLOWER GARDEN," &c.

LONDON:
JOHN MURRAY, ALBEMARLE STREET.

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TO

J. C. LOUDON, Esq.

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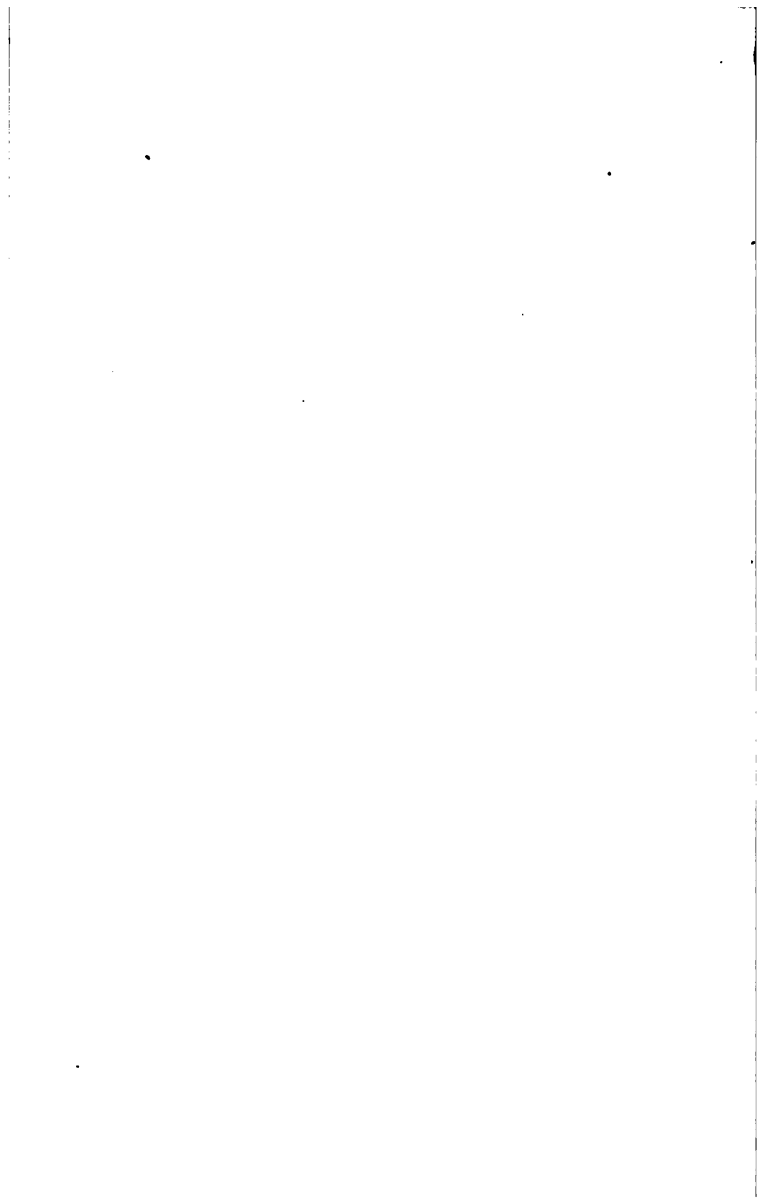
TO WHOM THE AUTHOR OF THE FOLLOWING
PAGES OWES ALL THE KNOWLEDGE OF
THE SUBJECT SHE POSSESSES,

THIS WORK

IS DEDICATED

BY HIS AFFECTIONATE WIFE,

J. W. L.



INTRODUCTION.

WHEN I married Mr. Loudon, it is scarcely possible to imagine any person more completely ignorant than I was, of every thing relating to plants and gardening; and, as may be easily imagined, I found every one about me so well acquainted with the subject, that I was soon heartily ashamed of my ignorance. My husband, of course, was quite as anxious to teach me as I was to learn, and it is the result of his instructions, that I now (after ten years experience of their efficacy) wish to make public for the benefit of others.

I do this, because I think books intended

for professional gardeners, are seldom suitable to the wants of amateurs. It is so very difficult for a person who has been acquainted with a subject all his life, to imagine the state of ignorance in which a person is who knows nothing of it, that adepts often find it impossible to communicate the knowledge they possess. Thus, though it may at first sight appear presumptuous in me to attempt to teach an art of which for three fourths of my life I was perfectly ignorant, it is in fact that very circumstance which is one of my chief qualifications for the task. Having been a full-grown pupil myself, I know the wants of others in a similar situation; and having never been satisfied without knowing the reason for every thing I was told to do, I am able to impart these reasons to others. Thus my readers will be able to judge for themselves, and to adapt their

practice to the circumstances in which they may be placed.

Such is the nature and purport of the present work, and I have only to add that I have spared no pains to render it as perfect as I could make it. The engravings have been made here from drawings of specimens previously prepared, and I can therefore vouch for their accuracy.

J. W. L.

Bayswater, May 21, 1840.

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CONTENTS.

	Page
INTRODUCTION	v
CHAPTER I.	
Stirring the soil.....	1
CHAPTER II.	
Manuring the soil, and making hotbeds	23
CHAPTER III.	
Sowing seeds—planting bulbs and tubers—trans- planting and watering	43
CHAPTER IV.	
Modes of propagation by division; <i>viz.</i> : taking off suckers, making layers and cuttings, budding, grafting, and inarching	70
CHAPTER V.	
Pruning, training, protecting from frost, and destroy- ing insects	110

CHAPTER VI.

	Page
The kitchen-garden—the management of culinary vegetables	134

CHAPTER VII.

The kitchen-garden continued—the management of fruit trees	195
--	-----

CHAPTER VIII.

The flower-garden, and the culture of flowers	244
---	-----

CHAPTER IX.

Management of the lawn, pleasure-grounds, and shrubbery, of a small villa	301
---	-----

CHAPTER X.

Rock-work, moss-houses, rustic baskets, and fountains	329
---	-----

CHAPTER XI.

Window gardening, and the management of plants in pots in small green-houses	347
--	-----

CHAPTER XII.

Calendar of operations	374
------------------------------	-----

GARDENING FOR LADIES.

CHAPTER I.

STIRRING THE SOIL.

Digging.—Every one knows that the first operation of the gardener, whether a new garden is to be made, or merely an old one re-planted, is to dig the ground; though but comparatively few persons are aware why this is so essentially necessary to be done. When a piece of rough ground is to be taken into cultivation, and a garden made where there was none before, the use of digging is obvious enough; as the ground requires to be levelled, and divided by walks, and thrown up into beds, to give it the shape and appearance of a garden, which could not be done

without stirring the soil: but why the beds in an old garden should be always dug or forked over, before they are re-planted, is quite another question, and one that it requires some consideration to answer.

When any soil, except sand or loose gravel, remains unstirred for any length of time, it becomes hard, and its particles adhere so firmly together as not to be separated without manual force. It is quite clear that when soil is in this state, it is unfit for the reception of seeds; as the tender roots of the young plants will not be able to penetrate it through without great difficulty, and neither air nor water can reach them in sufficient quantities to make them thrive. When a seed is put into the ground, it is the warmth and moisture by which it is surrounded that make it vegetate. It first swells, and the skin with which it is covered cracks and peels off; then two shoots issue from the vital knot, (a point easily discoverable in large seeds,) one of which descends and is called the root, while the other ascends to form the leaves, stem, flowers, and fruit.

This is what is meant by the germination

of the seed, and this may be effected by the aid of heat and moisture alone, as is done with mustard and cress, when raised on wet flannel in a saucer. But plants raised in this manner cannot be of long duration; as, though they will live for a short time on the albumen contained in the seed, on which they feed, as the chicken does on the nourishment contained in the egg, this is soon exhausted, and the plant will die if not supplied with fresh food, which it can only obtain by means of the root. Thus, the root is necessary, not only to form a base to support the plant and to keep it upright, but to supply it with food; and nature has given it a tendency to bury itself in the ground, not only to enable the plant to take a firm hold of the soil, but to preserve the root in a fitting state for absorbing food, which it can only do when it is kept warm, moist, and secluded from the light.

The manner in which the root is fitted for the purposes for which it was designed, affords an admirable illustration of the care and wisdom displayed by the Great Creator in all his works. In nature nothing is super-

fluous, and yet everything has been provided for. It has been already observed, that the two principal uses of the root are to give the plant a firm hold of the ground, and to supply it with food. For the first purpose the root either spreads so widely through the surface soil as to form a sufficient base for the height of the plant, or it descends a sufficient depth into the earth to steady the part above ground; and in either case the growth of the plant is wisely and wonderfully proportioned to the strength of the support which the root affords it. For the second purpose, that of supplying the plant with nourishment, the root divides at the extremity of each shoot into numerous fibres or fibrils, each furnished at its extremity with a spongiole or spongy substance, which affords the only means the plant possesses of absorbing the moisture necessary for its support. It is thus quite clear, that every thing that tends to nourish and increase the growth of the root, must contribute to the health and vigour of the rest of the plant; and that no plant can thrive, the root of which is cramped in its growth, or weakened for want of nourish-

ment. This being allowed, it is evident that the first step towards promoting the growth of any plant is to provide a fitting receptacle for the root; and this is done by pulverizing the ground in which the seed is to be sown so as to render it in a fit state for the roots to penetrate it easily. Thus they will neither be checked in their growth for want of room, nor be obliged to waste their strength in overcoming unnecessary obstacles; such as twining themselves round a stone, or trying to force their way through a hard clod of earth. The second point of affording the root abundance of nourishment may also be obtained by pulverizing the ground; as pulverization, by admitting the rain to percolate slowly through the soil, enables it to absorb and retain sufficient moisture to afford a proper and equable supply of food to the spongioles, without suffering the surplus water to remain so as to be in danger of rotting the main roots.

These then are the reasons why it may be laid down as a general rule, that all ground should be stirred before seeds are sown in it; but there are other reasons which

operate only partially, and are yet almost as necessary to be attended to. When manure is applied, the ground is generally well dug, in order to mix the manure intimately with the soil; and when the soil appears worn out, or poisoned with excrementitious matter, from the same kind of plants being too long grown in it, it is trenched; that is, the upper or surface soil is taken off by spadefuls and laid on one side, and the bottom or sub-soil is taken out to a certain depth previously agreed on, and laid in another heap. The surface soil is then thrown into the bottom of the trench, and the sub-soil laid on the surface, and thus a completely new and fresh soil is offered to the plants. These partial uses of digging should, however, always be applied with great caution, as in some cases manure does better laid on the surface, so that its juices only may drain into the ground, than when it is intimately mixed with the soil; and there are cases when, from the sub-soil being of an inferior quality, trenching must be manifestly injurious. Reason and experience are, in these cases, as in most others, the best guides.

The uses of digging having been thus explained, it is now necessary to say something of its practice, and particularly of its applicability to ladies. It must be confessed that digging appears, at first sight, a very laborious employment, and one peculiarly unfitted to small and delicately formed hands and feet; but, by a little attention to the principles of mechanics and the laws of motion, the labour may be much simplified and rendered comparatively easy. The operation of digging, as performed by a gardener, consists in thrusting the iron part of the spade, which acts as a wedge, perpendicularly into the ground by the application of the foot, and then using the long handle as a lever, to raise up the loosened earth and turn it over. The quantity of earth thus raised is called a spitful, and the gardener, when he has turned it, chops it to break the clods, with the sharp edge of his spade, and levels it with the back. During the whole operation, the gardener holds the cross part of the handle of the spade in his right-hand, while he grasps the smooth round lower part of the handle in his left, to assist him in raising

the earth and turning it, sliding his left hand backwards and forwards along the handle, as he may find it necessary.

This is the common mode of digging, and it certainly appears to require considerable strength in the foot to force the spade into the ground,—in the arms to raise it when loaded with the earth that is to be turned over,—and in the hands to grasp the handle. But it must be remembered that all operations that are effected rapidly by the exertion of great power, may be effected slowly by the exertion of very little power, if that comparatively feeble power be applied for a much greater length of time. For example, if a line be drawn by a child in the earth with a light cane, and the cane be drawn five or six times successively along the same line, it will be found that a furrow has been made in the soil with scarcely any exertion by the child, that the strongest man could not make by a single effort with all his force. In the same way a lady, with a small light spade may, by taking time, succeed in doing all the digging that can be required in a small garden, the soil of which, if it has been

long in cultivation, can never be very hard or difficult to penetrate, and she will not only have the satisfaction of seeing the garden created, as it were, by the labour of her own hands, but she will find her health and spirits wonderfully improved by the exercise, and by the reviving smell of the fresh earth.

The first point to be attended to, in order to render the operation of digging less laborious, is to provide a suitable spade; that is, one which shall be as light as is consistent with strength, and which will penetrate the ground with the least possible trouble. For this purpose, the blade of what is called a lady's spade is made of not more than half the usual breadth, say not wider than five inches or six inches, and of smooth polished iron, and it is surmounted, at the part where it joins the handle, by a piece of iron rather broader than itself, which is called the tread, to serve as a rest for the foot of the operator while digging. The handle is about the usual length, but quite smooth and sufficiently slender for a lady's hand to grasp it, and it is made of willow,

a close, smooth, and elastic wood, which is tough and tolerably strong, though much lighter than ash, the wood generally used for the handles to gardeners' spades. The lady should also be provided with clogs,* the soles of which are not jointed, to put over her

* Perhaps the most useful covering for the feet is a kind of clog and gaiter combined ; which may be made of some soft elastic leather, and rendered perfectly waterproof, by the new preparation which is now employed instead of cautchouc, and is preferable to that gum, as it does not impede perspiration.



A LADY'S GAUNTLET.

shoes, or if she should dislike these and prefer strong shoes, she should be provided with what gardeners call a tramp, that is, a small plate of iron to go under the sole of the shoe, and which is fastened round the foot with a leathern strap and buckle. She should also have a pair of stiff thick leathern gloves, or gauntlets, to protect her hands, not only from the handle of the spade, but from the stones, weeds, &c., which she may turn over with the earth, and which ought to be picked out and thrown into a small, light wheelbarrow, which may easily be moved from place to place.

A wheelbarrow is a lever of the second kind, in which the weight is carried between the operator, who is the moving power, and the fulcrum, which is represented by the lower part of the wheel. If it be so contrived that the wheel may roll on a plank, or on firm ground, a very slight power is sufficient to move the load contained in the barrow; particularly if the handles be long, curved, and thrown up as high as possible, in order to let the weight rest principally upon the wheel, without obliging the operator to

bend forward. When, on the contrary, the handles are short and straight, the weight is thrown principally on the arms of the operator, and much more strength is required to move the load, besides the inconvenience of stooping.

All the necessary implements for digging being provided, the next thing to be considered is the easiest manner of performing the operation. The usual way is for the gardener to thrust his spade perpendicularly into the ground, and then using the handle as a lever, to draw it back so as to raise the whole mass of earth in front of the spade at once. This requires great strength; but by inserting the spade in a slanting direction, and throwing the body slightly forward at the same time, the mass of earth to be raised will not only be much less, but the body of the operator will be in a much more convenient position for raising and turning it; which may thus be done with perfect ease.

The time for digging should always be chosen, if possible, when the ground is tolerably dry; not only on account of the dan-

ger of taking cold by standing on the damp earth, but because the soil, when damp, adheres to the spade, and is much more difficult to work (as the gardeners call it,) than when it is dry. The ground in fields, &c. becomes very hard in dry weather; but this is never the case in a garden, the soil of which is well pulverized by the constant digging, forking, hoeing and raking it must undergo, to keep the garden tolerably neat. Every lady should be careful, when she has finished digging, to have her spade dipped in water, and then wiped dry; after which it should be hung up in some warm dry shed, or harness room, to keep it free from rust; as nothing lessens the labour of digging more than having a perfectly smooth and polished spade. Should the earth adhere to the spade while digging, dipping the blade in water occasionally, will be found to facilitate the operation.

The purposes for which digging is applied in gardening are: simple digging for loosening the soil in order to prepare it for a crop; pointing; burying manure; exposing the soil to the action of the weather; trenching;

ridging; forming pits for planting trees and shrubs, or for filling with choice soil for sowing seeds; and taking up plants when they are to be removed.

In simple digging, as well as in most of the other kinds, it is customary to divide the bed to be dug, by a garden-line, into two parts: a trench, or furrow as it is called, is then opened across one of these divisions or half of the bed, the earth out of which is thrown up into a heap. The digging then commences by turning over a breadth of soil into the furrow thus made, and thus forming a new furrow to be filled up by the soil turned over from the breadth beyond it; and this is continued till the operator reaches the end of the first division, where the furrow is to be filled with the earth taken from the first furrow of the second division; after which the digging proceeds regularly as before, till the operator reaches the last furrow, which is filled with the ridge of earth thrown up when the first furrow was made. As few ladies are strong enough to throw the earth from the heap where it was laid from the first furrow to fill the last, the best way is to put it into

a small wheel-barrow, which may be wheeled to the place required, and filled and emptied as often as may be found convenient ; or the ground may be divided into narrower strips. It must also be observed, that as a spitful of earth taken up obliquely will be seldom found enough to loosen the soil to a proper depth, a second or even a third should be taken from the same place before the operator advances any further along the line. Or the whole of each furrow may first be made shallow, and then deepened by successive diggings before proceeding to the next furrow.

It is obvious that the great art in this kind of digging is to keep the furrows straight, and not to take up more earth in one place than in another, so that the surface of the ground, when finished, may be perfectly even. To keep the furrows straight, the first ought to be worked out with the rod and line, and every succeeding line should be frequently and carefully examined. It is more difficult to keep these lines straight than can be at first sight imagined ; and in proportion as the furrow is allowed to become crooked it will become narrower, and be in danger of being

choked up; or, if kept as wide as before, the surface of the ground will be rendered uneven, and the last furrow left without earth enough to fill it up. In digging each furrow also, care must be taken to carry it quite up to the line of demarcation; as, otherwise, what the gardeners call a baulk or piece of firm land would be left there, and, of course, the bed would neither look well, nor would the object for which it was dug be fully attained. Great care must also be taken to keep the surface of the bed even, and this it is extremely difficult for a novice to do. It is, indeed, very provoking, after watching the ease with which a gardener digs a bed, and looking at the perfectly smooth and even surface that he leaves, to find how very hard it is to imitate him; and yet it is essentially necessary to be done, for if there are any irregularities in the surface, the hollow places will collect the moisture, and the plants in them will grow vigorously, while those in the raised places will be speedily dried by the sun and wind, and will look poor and withered. Practice is certainly required to render digging easy, but, as the principal

points of keeping the furrows straight and the surface even, depend on skill more than strength, the art of digging well may be acquired by any one who thinks it worth while to take the trouble. Very little strength will, indeed, be necessary, if the rule of thrusting in the spade obliquely, and aiding it by the momentum of the body be always attended to.

Pointing, as it is called by gardeners, is in fact shallow digging, and it consists in merely turning over the ground to the depth of two or three inches. In spring, or in the beginning of summer, when the sun has only warmed the soil to the depth of a few inches, and when the seeds to be sown (as of annual flowers for example) are wanted to germinate as quickly as possible, pointing is preferable to digging; because the latter operation would bury the warm soil, and bring that up to the surface which is still as cold as in winter. Pointing is also used in stirring the ground among trees and other plants, in order that the spade may not go so deeply into the ground as to injure their roots.

Burying manure.—There are two ways of

digging the ground for the purpose of burying manure; according to the first method, the manure is spread evenly over the whole bed; and then the gardener proceeds to dig as though the manure were in fact a portion of the surface of the soil; and according to the second method, the manure having been first brought to the spot and thrown into a heap, is deposited, a small portion at a time, at the bottom of each furrow as it is formed, and the earth from the next furrow thrown over it. In both cases, the manure should be buried as speedily as possible; as if left long exposed in small quantities to the air in hot, dry weather, it loses a great part of its nutritious qualities by evaporation.

Digging for the purpose of exposing the soil to the action of the weather, trenching, and ridging on a large scale, are operations too laborious to be performed by any one but a gardener's labourer. To be done well, the earth in all these cases should be mixed in large spitsfuls at a time, and turned over without breaking, on which account they are best performed in moist weather, when the earth is in an adhesive state. Ridging on a

small scale may be useful in a flower garden, when the soil is much infested with insects, or where there are many weeds. It is performed by opening a trench, and throwing up the earth out of it in the form of a ridge; and then opening another trench, and forming another ridge in the same manner. The whole garden is thus thrown into a series of ridges and trenches, which should be suffered to remain all the winter, and be levelled in spring. It is obvious that this mode of ameliorating the soil can only be practised where the garden is not likely to be visited during winter; as it destroys all beauty, and has a peculiarly desolate and forlorn appearance. It is indeed a remedy only to be resorted to in extreme cases, but fortunately there are very few flower gardens in which the soil is in so bad a state as to require it.

The other kinds of digging, are to form pits for receiving plants, or for filling with choice soil, and to remove plants. In the first case, a hole of sufficient size to receive the plant is dug, and the earth thrown up beside it, to be filled in round the roots of the plant; and in the second case, the common garden earth

is thrown out of a pit, a foot or eighteen inches deep, and about the same in diameter, and its place supplied by peat, or whatever other kind of earth may be required. In removing a young tree or shrub, the ground is generally first dug out on one side, so as to form a small trench, and then the spade is driven perpendicularly into the ground, below the depth to which the roots descend, and the whole mass is raised like a spade full of earth. Small plants are raised by the spade at once without making any trench; and large trees require all the skill of a professed gardener.

Forking.—A broad-pronged garden fork may be defined as an implement consisting of a number of small sharply pointed spades, united by a shoulder or hilt, to which is fixed the handle; and forking differs from digging principally in its being used merely to stir the soil, and not to turn it over. In shrubberies, and among perennial herbaceous plants, which are not to be taken and replanted, forking is very useful; as it loosens the hard dry surface of the soil, and admits the warm air and rain to the roots of the

plants. This is very necessary, as the earth is a bad conductor of heat; and where the surface of the soil is become so hard as to exclude the air from the roots of the plants, the ground in which they grow will be nearly as cold in summer as in winter. Besides, when the surface of the ground is hard, the rain instead of soaking gradually into it, runs off; or evaporates, without being of any service to the roots. The operation of forking consists merely in thrusting the fork a little way into the ground by the application of the foot to the hilt, and then raising the ground by pulling back the handle as in digging, so as to loosen the earth without raising it. The ground may thus be roughly pulverized to a considerable depth, without dividing the roots of the plants; which would have been inevitable if the operator had used a spade.

Hoing.—There are several different kinds of hoes which are used for getting up weeds, for loosening the soil, for drawing it up round the stems of growing plants, and for making a shallow furrow or drill for sowing seeds. The different kinds all belong to two great divisions: viz. the draw hoe and the thrust

hoe, which may be seen at any ironmonger's shop. Either kind may be used for destroying weeds; as the weeds may either be loosened and lifted out of the soil by the thrust hoe, or torn out of it by the draw hoe. Both kinds may also be used for pulverizing the soil, or a third kind with two prongs may be substituted. In all these operations, the thrust hoe is best adapted for a lady's use, as requiring the least exertion of strength, and being most easily managed; but the draw hoe is best adapted for making a drill or furrow for the reception of seeds, and also for the last and most important use of hoeing, viz. the drawing up of the earth round the stems of growing plants.

The operation of hoeing up, though very commonly practised, is only suitable to some kind of plants, and it is intended to afford additional nourishment to those which have tap-roots, by inducing them to throw out more lateral fibres.

The plants which will bear to be hoed or earthed up, are those that throw out fibrous roots above the vital knot, like the cabbage tribe, &c.; or that are annuals with long

bushy stems, and very weak and slender roots like the pea. Ligneous plants should never be earthed up, to avoid injuring the vital knot, which forms the point of separation between the main root and the stem, and which gardeners call the collar, crown, neck or collet. This part in trees and shrubs should never be buried, as if it be injured by moisture so as to cause it to rot; or if it be wounded in any way, the plant will die. A deciduous tree may be cut down close above the collar, and it will throw up fresh shoots, or the roots may all be cut off close below the collar, and if that part be uninjured fresh roots will form; but if a tree be cut through at this vital part it never can recover.

A trowel is another instrument used in stirring the soil, but of course it can only be employed in boxes of earth in balconies, &c.

Raking is useful in smoothing the soil after digging, and in collecting weeds, stones, &c., and dragging them to one side, where they may be easily removed. An iron-toothed rake is generally used for the ground, and a

wooden one for collecting grass after mowing. When it is wished that the teeth of the rake should enter the ground, the handle should be held low ; but if the object be the collection of weeds, &c., the handle should be held high. Dry weather is essential to raking the ground, as the principal use of the operation is to break the clods left by the spade ; but raking together grass or weeds may be performed in wet weather.

The degree of strength required for raking depends partly upon the breadth of the head of the rake, and the number of its teeth, but principally upon the manner of holding it. If the rake be held low, it is obvious that greater strength will be required to drag it through the ground than if it is held high, in which case very little labour will be required to overcome the resistance it will meet with.

CHAPTER II.

MANURING THE SOIL AND MAKING HOTBEDS.

Most persons imagine that manure is all that is wanted to make a garden fruitful; and thus, if the fruit-trees do not bear, and the flowers and vegetables do not thrive, manure is considered the universal panacea. Now, the fact is, that so far from this being the case, most small gardens have been manured a great deal too much; and in many, the surface soil, instead of consisting of rich friable mould, only presents a soft black shining substance, which is the humic acid from the manure saturated with stagnant water. No appearance is more common in the gardens of street-houses than this, from these gardens being originally ill drained,

and yet continually watered; and from their possessors loading them with manure; in the hope of rendering them fertile.

As it is known to chemists that it is only the humic acid, and carbonic acid gas, contained in manure, which make that substance nourishing to plants; and as these acids must be dissolved in water before the roots can take them up, it may seem strange that any solution of them in water, however strong it may be, should be injurious to vegetation. The fact is, however, that it is the great quantity of food contained in the water that renders it unwholesome. When the roots of a plant and their little sponge-like terminations, are examined in a powerful microscope, it will be clearly seen that no thick substance can pass through them. Thus water loaded with gross coarse matter, as it is when saturated with humic acid, must be more than the poor spongioles can swallow; and yet, as they are truly sponge-like, their nature prompts them, whenever they find moisture, to attempt to take it up, without having the power of discriminating between what is good for them, and what

will be injurious. The spongioles thus imbibe the saturated liquid; and, loaded with this improper food, the fibrous roots, like an overgorged snake, become distended, the fine epidermis that covers them is torn asunder, their power of capillary attraction is gone, and they can neither force the food they have taken up, into the main roots, nor reject the excrementitious matter sent down to them from the leaves, after the elaboration of the sap. In this state of things, from the usual circulation of the fluids being impeded, it is not surprising that the plant should droop, that its leaves should turn yellow, that its flowers should not expand, that its fruit should shrivel and drop off prematurely, and that in the end it should die; as, in fact, it may be said to expire of apoplexy, brought on by indigestion.

All soil, to be in a fit state for growing plants, should be sufficiently loose and dry to allow of water passing through it intermixed with air; as water, when in this state is never more than slightly impregnated with the nutritious juices of the manure through which it has passed. The spongioles are

that is not supplied with more food at a time than they can properly take up and digest, and a healthy circulation of the fluids is kept up through the whole plant. But, what, it may be asked, is to be done with a garden, the soil of which has become black and slimy like half-rotten peat? The quickest remedy is covering it with lime, as that combines readily with the humic acid, and reduces it to a state of comparative dryness: or, if the sub-soil be good, the ground may be trenched, and the surface-soil buried two spits deep; in either case it will be necessary thoroughly to drain the garden to prevent a recurrence of the evil.

All the different kinds of soil found on level ground, consist of two parts, which are called the surface-soil and the sub-soil; and as the sub-soil always consists of one of the three primitive earths, so do these earths always enter, more or less, into the composition of every kind of surface-soil. The primitive earths are—silex, (which includes sand and gravel,) clay, and lime, which includes also chalk; and most sub-soils consist of a solid bed or rock of one or other of these

materials, probably in nearly the same state as it was left by the deluge. The surface-soils, on the contrary, are of comparatively recent date; and they have been slowly formed by the gradual crumbling of the sub-soil, and its inter-mixture with decayed animal and vegetable matter, and with other soils which may have been accidentally washed down upon, or purposely brought to it. In fields, and uncultivated places, the surface-soil is almost as hard, and as coarse in its texture, as the sub-soil on which it rests; but in gardens which have been long in cultivation, the surface-soil becomes so thoroughly pulverized by frequent diggings, and so mixed with the manure and decayed vegetables which have been added to it from time to time, that it is changed into the soft, light, fine, powdery substance, called garden-mould. If the sub-soil be naturally porous or well drained, this mould, however rich it may be made by the addition of decayed vegetable matter or animal manure, will always continue friable; and as long as it does so, it will be fit for the growth of plants: but if no vent be allowed for the

escape of the water; and it be continually enriched with manure, it will be changed in time into the black slimy substance that has been already described.

Surface-soil is called peat-earth when it is composed of decayed vegetable matter, without any mixture of animal manure; and, as this excess of vegetable matter could neither be produced nor decayed, without abundance of stagnant moisture, this kind of earth is almost always found on a clayey sub-soil, which prevents the water which falls upon it from escaping. Peat-earth has a spongy, elastic feeling when trodden upon; arising from the quantity of water that it holds, and it can only be rendered fit for cultivation by draining. In its elastic state it is what is called in Scotland a moss, and in England a peat-bog. Should the water, instead of being afforded a vent by drainage, be suffered to accumulate for many years, till it completely saturates the peat, the soil becomes what is called a morass, or quagmire; and it can no longer be trodden on, as it will engulf any substance resting upon it. A still further accumulation of water will,

in the course of years, cause the bog to burst, its bounds, and overflow the surrounding country; as the Solway-moss did many years ago, and as bogs in Ireland have done frequently. An excess of vegetable matter on a silicious sub-soil, differs from the common black-peat in retaining less water; and in being mixed with a portion of the primitive earth, which, from its loose texture, becomes easily detached from the sub-soil. Peat in this state is called heath mould.

The most productive soils are those in which several ingredients are combined in proper proportions; and if any one of the primitive earths preponderates, the soil becomes comparatively unfertile. Thus the best soil for gardening purposes is generally allowed to be a calcareous loam on a chalky sub-soil; and this sort of soil is composed of nearly equal parts of lime, sand, and clay, enriched depositions of decayed animal and vegetable matter. The next best soil is a sandy loam, composed of clay and sand, enriched by decayed animal and vegetable substances, and resting on a sandy or gravelly sub-soil. The worst soils are peat and

sand. A poor sandy soil is necessarily a nearly barren one; because it will not retain either water, or the nutritious juices from manure, long enough to afford nourishment to the plants grown upon it; and it is obvious that a soil of this kind can only be rendered fertile by mixing it with clay; which would change it into a sandy loam.

A stiff clay is unfertile from its attracting moisture and retaining it round the roots of the plants till they become swollen and unhealthy. It also retards the decomposition of manure, and obstructs the progress of the roots, which waste their strength in the efforts they make to penetrate, or twine round, its adhesive clods. Soils of this description are improved by a mixture of sand, gravel, road grit, or any substance which tends to separate the particles of the clay, and to render it light and friable.

Chalky soils succeed better unmixed, than any of the other kinds; but chalk being a carbonate of lime, can hardly be called a primitive soil. The chalk, however, from its whiteness is colder than any other soil; as it does not absorb, but reflects back the rays

of the sun. Rain also penetrates into it very slowly, and not to any great depth. Chalk mixed with sand forms a kind of calcareous loam admirably adapted for growing vegetables; and chalky soils are peculiarly susceptible of improvement from manure.

Manures.—The kinds of manure generally used in gardens are horse or cow dung, and decayed vegetable matters; the manure in both cases being suffered to lie in a heap to rot before it is spread on the ground, in order that its component parts may be decomposed by fermentation, and thus brought into a fit state to afford food to the plants. Old hot-beds or mushroom beds are thus well adapted for manuring a garden; and when fresh stable-dung is employed for that purpose, it is generally thrown into a heap, and turned over several times till the fermentation has abated, before it is dug into the ground. As, however, a great quantity of carbonic acid gas is evolved and escapes during the process of fermentation, and as it seems a great pity that so much of the nutritious properties of the manure should be lost, it is now customary to cover the dung-

hill with earth, into which the gases will rise during the process of fermentation, and in which they will deposit the greater part of their nutritious properties. A quantity of earth should also be laid round the dunghill to imbibe the liquid that runs from it, and this earth, part of which must be removed and fresh added every time the dunghill is turned over, will be found very nearly as valuable for manuring the beds of a garden, as the manure itself.

The modes of applying manure differ according to the difference of the soils. For sandy loams, thoroughly rotten dung, either from an old hotbed, or from a dunghill sufficiently decayed to be cut easily with the spade, or the earth that has covered a dunghill during the process of fermentation, should be laid on the surface of the soil, and dug in. In very poor sandy soils rotten manure, or earth from a dunghill, should be laid on the surface of the soil, and not dug in: being covered, if hot dry weather be expected, with leaves, straw, or the branches of trees cut off in pruning; or occasionally sprinkled with water. Soils of this description, and

loose sands, are frequently improved in the South of France and Italy, by sowing them with seeds of the common white lupine, and then, when the plants have come up and grown about a foot high, ploughing or digging them into the soil. The green succulent stems of the lupines, when thus buried in the soil, supply it with moisture during the process of their decay; and thus nourishment is afforded to the corn, which is immediately afterwards sown upon the soil for a crop. Clayey soils should have unfermented manure mixed with undecayed straw laid in the bottom of the furrows made in digging; that the process of fermentation, and the remains of the straw may operate in keeping the particles of the soil open, or, in other words, in preventing their too close adhesion. Lime (though when burnt it becomes violently caustic, and will destroy and waste all the manure applied with it), as carbonate of lime, or chalk (in which state only it can properly be called a soil), retains the manure applied to it longer than any other soil. Rotten manure may thus be dug into chalk, with the certainty that it will be preserved

from farther decay for a very long time, and that every shower will work a small portion of its fertilizing juices out of it, and carry them into the soil, where they will be thus presented to the plants in the best possible state for affording wholesome food.

Peat soils may be improved by the addition of quick-lime as a manure, which will absorb the superabundant moisture which they contain; or they may be mixed with sand, gravel, or clay to give them firmness and tenacity, and then with a small quantity of animal manure. Sandy peat or heath mould is very useful in gardens for growing heaths, rhododendrons, kalmias, or any plants with fine hair-like roots; and from the quantity of vegetable matter that it contains naturally, it does not require any manure, more than what is furnished by the decaying leaves of the plants grown in it.

Nearly the same rules apply to decaying leaves and other substances used as manure, as to stable-dung. They may be buried in an undecayed state in clayey soil, when it is the object to separate the adhesive particles of the clay by the process of fermentation;

but their component parts should be separated by fermentation before they are applied as a manure to growing plants. Vegetable mould (that is, leaves thoroughly decayed and mixed with a little rich loam) is admirably adapted for manuring the finer kinds of flowers, and plants in pots. There are many other kinds of manure used in gardens occasionally; such as the dung of pigs, rabbits and poultry, grass mown from lawns, parings of leather, horn shavings, bones, the sweeping of streets, the emptying of privies, cess-pools, and sewers, the clipping of hedges and pruning of trees, weeds, the refuse of vegetables, pea halm, &c. All these should be fermented, and applied, in the same manner as the common kinds of manure.

*The following is a summary of the general rules to be observed in manuring and improving soils:—*Never to use animal manure and quick-lime together, as the one will destroy the other. To use lime as a manure only in very sandy or peaty soils, or in soils abounding with sulphate of iron. To remember that rotten manure is considered to give solidity; and that unfermented manure, buried

in trenching, has a tendency to lighten the soil. To dilute liquid manure from a dung-hill with water, before applying it to growing plants; as otherwise, from the quantity of ammonia that it contains it will be apt to burn them. To cover and surround dung-hills with earth during the process of fermentation, to absorb the nutritious gases, that would otherwise escape. To remember that the manure of cows and all animals that chew the cud, is cold and suited to a light soil; and that the manure of horses, pigs, and poultry is hot and suited to a firm soil: also that all manure, when well rotten, becomes cold in its nature, and should be treated accordingly. To remember that all mixed soils are more fertile than soils consisting only of one of the three primitive earths, viz. lime, sand, or clay; and never to forget that too much manure is quite as injurious to plants as too little.

Formation of hotbeds.—Though nearly all the kinds of manure which have been enumerated may be used occasionally for hotbeds, the only materials in common use in gardens, are stable manure, dead leaves, and tan.

The first of these, which is by far the most general, consists partly of horse-dung, and partly of what gardeners call long litter, that is, straw moistened and discoloured, but not decayed. The manure is generally in this state, when it is purchased, or taken from the stable, for the purpose of making a hot-bed.

1. The necessary quantity of manure is procured at the rate of one cart load, or from twelve to fifteen large wheel-barrowfuls to every light, as the gardeners call the sashes of the frames, each light being about three feet wide; and this manure is laid in a heap to ferment. The heap should then be covered with earth to receive the gases evolved during fermentation, and earth laid round it to absorb the liquid manure that may drain from it. In about a week the earth may be removed, and the manure turned over with a dung-fork, and well shaken together; this operation being repeated two or three or more times, at intervals of two or three days, till the whole mass is become of one colour, and the straws are sufficiently decomposed to be torn to pieces with the fork.

The size of the hotbed must depend principally on the size of the frame which is to cover it; observing that the bed must be from six inches to a foot wider than the frame every way. The manure must then be spread in layers, each layer being beaten down with the back of the fork, till the bed is about three feet and a half high. The surface of the ground on which the hotbed is built, is generally raised about six inches above the general surface of the garden; and it is advisable to lay some earth round the bottom of the bed, nearly a foot wide, that it may receive the juices of the manure that will drain from the bed. As soon as the bed is made, the frame is put on and the sashes kept quite close, till a steam appears upon the glass, when the bed is considered in a fit state to be covered three or four inches deep with mould; observing, if the bed has settled unequally, to level the surface of the manure before covering it with earth. The seeds to be raised may either be sown in this earth, or in pots to be plunged in it.

The proper average heat for a hotbed in-

needed to raise flower seeds, or to grow cucumbers, is 60° : but melons require a heat of 65° to grow in, and 75° to ripen their fruit. This heat should be taken in a morning, and does not include that of the sun in the middle of the day. When the heat of the bed becomes so great as to be in danger of injuring the plants, the obvious remedy is to give air by raising the glasses; and if this be not sufficient, the general heat of the bed must be lowered by making excavations in the dung from the sides, so as to reach nearly to the middle of the bed, and filling up these excavations with cold dung which has already undergone fermentation, or with leaves, turf, or any other similar material which will receive heat, but not increase it. When the heat of the bed falls down to 48° or lower, it should be raised, by applying on the outside fresh coatings of dung, grass, or leaves, which are called linings.

When hotbeds are made of spent tanner's bark or decayed leaves, a kind of box or pit must be formed of bricks or boards, or even of layers of turf, or clay, and the tan or leaves filled in so as to make a bed. Where

neatness is an object, this kind of bed is preferable to any other; but a common hotbed of stable manure may be made to look neat by thatching the outside with straw, or covering it with bast mats, pegged down to keep them close to the bed.

CHAPTER III.

SOWING SEEDS — PLANTING BULBS AND TUBERS—TRANSPLANTING AND WATERING.

Sowing Seeds.—The principal points to be attended to in sowing seeds are, first, to prepare the ground so that the young and tender roots thrown out by the seeds may easily penetrate into it; secondly, to fix the seeds firmly in the soil; thirdly, to cover them, so as to exclude the light, which impedes vegetation, and to preserve a sufficiency of moisture round them to encourage it; and, fourthly, not to bury them so deeply as either to deprive them of the beneficial influence of the air, or to throw any unnecessary impediments in the way of their ascending shoots.

The preparation of the soil has been already

described in the chapter on digging; and the reasons why it is necessary have been there given; but why seeds should be firmly embedded in it, seems to require explanation. It is well known that gardeners, before they either sow a bed in the kitchen-garden, or a patch of flower-seeds in the flower-garden, generally "firm the ground," as they call it, by beating it well with the back of the spade, or pressing it with the saucer of a flower-pot; and there can be no doubt that this is done in order that the seeds may be firmly imbedded in the soil. When lawns are sown with grass-seeds also, the seeds are frequently rolled in, evidently for the same purpose. The only question, therefore, is, why is this necessary; and the answer appears to be, that a degree of permanence and stability is essential to enable nature to accommodate the plant to the situation in which it is placed. When there is this degree of permanence and stability, it is astonishing to observe the efforts that plants will make to provide for their wants; but without it, seeds will not even vegetate. Thus we often see large trees springing

from crevices in apparently bare rocks; while not even a blade of grass will grow among the moving sands of a desert.

The reasons for the second and third points of covering the seeds, and yet not covering them too deeply, appear more obvious; and yet they also require a little explanation. The seeds are covered to keep them in darkness, and to retain round them a proper quantity of moisture; not only to make them swell and begin to vegetate, but to enable the roots to perform their proper functions; since, if exposed to the air, they would become dry and withered, and lose the power of contracting and dilating, which is essential to enable them to imbibe and digest their food. Burying the seeds too deeply is obviously injurious in impeding the progress of the young shoot to the light; and in placing it in an unnatural position. When a seed vegetates too far below the surface, a part of the stem of the plant must be buried; and this part not being intended to remain under-ground, is not protected from the dangers it is likely to meet with there. It is thus peculiarly liable to be assailed by

slugs and all kinds of insects; and to become rotten by damp, or withered by heat. It is also very possible to bury a seed so deeply as to prevent it from vegetating at all. The ground has more of both warmth and moisture near the surface than at a great depth, as it is warmed by the rays of the sun, and moistened by the rain; but besides this, seeds will not vegetate, even when they are amply supplied with heat and moisture, if they are excluded from the influence of the air. Every ripe seed in a dry state is a concentration of carbon, which, when dissolved by moisture, and its particles set in motion by heat, is in a fit state to combine with the oxygen in the atmosphere, and thus to form the carbonic acid gas which is the nourishment of the expanding plant. For this reason, seeds, and newly sprung-up plants do not want to be supplied with manure, and air is much more essential to them: they have enough carbon in their cotyledons or seed-leaves, and they only want oxygen to combine with it, to enable them to develop their other leaves; and this is the reason why young plants, raised on a hotbed, are always given

air, or they become yellow and withered. Light absorbs the oxygen from plants, and occasions a deposition of the carbon. Thus seeds and seedlings do not require much light; it is indeed injurious to them, as it undoes in some degree what the air has been doing for them: but young plants, when they have expanded two or three pairs of leaves, and when the stock of carbon contained in their cotyledons, or seed-leaves, is exhausted, require light to enable them to elaborate their sap, without which the process of vegetation could not go on. Abundance of light also is favourable to the development of flowers, and the ripening of seeds; as it aids the concentration of carbon, which they require to make them fertile. The curious fact that seeds, though abundantly supplied with warmth and moisture, will not vegetate without the assistance of the air, was lately verified in Italy; where the Po, having overflowed its banks near Mantua, deposited a great quantity of mud on some meadows; and from this mud sprang up a plentiful crop of black poplars, no doubt from seeds that had fallen into the river from a row of trees

of that kind, which had formerly grown on its banks, but which had been cut down many years previously. Another instance occurred in the case of some raspberry seeds found in the body of an ancient Briton discovered in a tumulus in Dorsetshire. Some of these seeds were sown in the London Horticultural Society's Garden at Turnham Green, where they vegetated, and the plants produced from them are still (1839) growing. Numerous other nearly similar instances, will be found in *Jesse's Gleanings*, *Hooker's Botanical Miscellany*, and numerous other works. Steeping seeds in oxalic acid, &c. to make them vegetate, is efficacious; as there is a speedier combination between the carbon in the seeds, and the oxygen in the acid, than can be effected by the ordinary agency of the air in parting with its oxygen to them.

Planting bulbs and tubers bears considerable analogy to sowing seeds. The bulb or tuber may indeed be considered as only a seed of larger growth, since it requires the combined influence of air, warmth, and moisture to make it vegetate, and then it throws out a stem, leaves, and roots like a

seed. There is, however, one important difference between them; the seed expends its accumulated stock of carbon in giving birth to the root, stem, and leaves, after which it withers away and disappears; while the bulb or tuber continues to exist during the whole life of the plant, and appears to contain a reservoir of carbon, which it only parts with slowly, and as circumstances may require. Though bulbs and tubers have here been mentioned as almost synonymous, modern botanists make several distinctions between them. The tunicated bulbs, such as those of the hyacinth and the onion, and the squamose bulbs, such as those of the lily, they consider to be underground buds; while tubers such as those of the dahlia, and the potatoe, and solid bulbs or corms, such as those of the crocus, they regard as underground stems.

These distinctions, however, though they may be interesting to the botanist and vegetable physiologist, are of little or no use in practice; the practical gardener treating bulbs and tubers exactly alike, and planting them as he would sow a seed: that

is to say, he fixes them firmly in the ground, and covers them, but not so deeply as to exclude the air. In preparing a bed for hyacinths or other tunicated bulbs, it is necessary to pulverize the soil to a much greater depth than for ordinary seeds; as the fibrous roots of the hyacinth descend perpendicularly to a considerable depth, as may be seen when these plants are grown in glasses. The very circumstance of growing hyacinths in glasses, where they vegetate and send down their roots exposed to the full influence of the light, appears contrary to the usual effects of light on vegetation; and indeed the plants are said generally to thrive best, when the glasses are kept in the dark till the roots are half grown. However this may be, it is quite certain that hyacinths in glasses should never be kept in darkness when their leaves begin to expand; as, if there be not abundance of light to occasion rapid evaporation from the leaves, the plants will soon become surcharged with moisture from the quantity constantly supplied to their roots; and the leaves will turn yellow, and look flaccid, and unhealthy, while the flowers

will be stunted, or will fall off without expanding.

Transplanting.—The points to be attended to in transplanting, are—care in taking up, to avoid injuring the spongioles of the roots; planting firmly to enable the plant to take a secure hold of the soil; shading to prevent the evaporation from the leaves from being greater than the plant in its enfeebled state can support; and watering that it may be abundantly supplied with food in its new abode. The first point is to avoid injuring the roots, and it is only necessary to consider the construction and uses of these most important organs to perceive how impossible it is for the plant to thrive, unless they are in a perfectly healthy state. Roots generally consist of two parts; the main roots which are intended to act as grappling irons to enable the plants to take a firm hold of the ground, and the fibrous roots which are intended to supply the plant with nourishment. These fibrous roots are most liable to receive injury from transplanting, as they are covered with a very fine cellular integument, so delicate in its texture as to be very easily

bruised ; and they each terminate in a number of small pores of extraordinary delicacy and susceptibility, which act as little sponges to imbibe moisture for the use of the plant. It is well known that these spongioles are the only means which the plant possesses of imbibing food, and that if they should be all cut off, the plant must provide itself with others, or perish for want of nourishment. These spongioles are exactly of the nature of a sponge ; they expand at the approach of moisture, and when surcharged with it, they contract, and thus force it into the fibrous roots, the cellular integument of which dilates to receive it ; hence the moisture is forced, by capillary attraction, as it is supposed, into the main roots, and thence into the stem and branches of the plant ; circulating like the blood, and after it has been elaborated in the leaves, as the blood is in the lungs, dispensing nourishment to every part as it goes along.

The roots have no pores but those forming the spongioles ; and only the fibrous roots appear to possess the power of alternate dilation and contraction, which power evidently de-

depends on their cellular tissue being in an entire and healthy state. Thus, it is quite evident that if the spongiole of any fibril be crushed, or even the cellular tissue injured, it can no longer act as a mouth and throat to convey food to the plant. When this is the case, the injured part should be instantly removed; as its elasticity can never be restored, and it is much better for the plant to be forced to throw out a new fibril, than to be obliged to carry on its circulation weakly and imperfectly with a diseased one. Whenever a plant is taken up for transplanting, its roots should therefore be carefully examined, and all their injured parts cut off, before it is replaced in the ground. Deciduous plants, and particularly trees and shrubs, are generally transplanted when they are without their leaves; because at that season they are in no danger of suffering from the effects of evaporation.

Shading is necessary after transplanting all plants that retain their leaves; as the evaporation from the leaves, if exposed to the full action of the light, would be greater than the plant could support with a diminished

number of spongioles. If it were possible to transplant without injuring the fibrils, and if the plant were immediately supplied with plenty of water, shading would not be required; and, indeed, when plants are turned out of a pot into the open garden without breaking the ball of earth round their roots, they are never shaded. The reason for this is, that as long as a plant remains where it was first sown, and under favourable circumstances, the evaporation from its leaves is exactly adapted to its powers of absorbing moisture; it is therefore evident, that if, by any chance, the number of its mouths be diminished, the evaporation from its leaves should be checked also, till the means of supplying a more abundant evaporation are restored.

The use of watering a transplanted plant, is as obvious as that of shading. It is simply to supply the spongioles with an abundance of food, that the increased quantity imbibed by each, may, in some degree, supply their diminished number.

All plants will not bear transplanting, and those that have tap-roots, such as the carrot,

are peculiarly unfitted for it. When plants having tap-roots are transplanted, it should be into very light soil, and what is called a puddle should be made to receive them. To do this, a hole or pit should be formed, deeper than the root of the plant, and into this pit water should be poured and earth thrown in and stirred so as to half-fill it with mud. The tap-rooted plant should then be plunged into the mud, shaking it a little so as to let the mud penetrate among its fibrous roots, and the hole should be filled in with light soil. The plant must afterwards be shaded longer than is usual with other plants; and when water is given, it should be poured down nearer to the main root than in other cases, as the lateral fibrous roots never spread far from it. Plants with spreading roots, when transplanted, should have the pit intended to receive them made shallow, but very wide in its diameter; so that the roots may be spread out in it to their fullest extent, except those that appear at all bruised or injured, which, as before directed, should be cut off with a sharp knife.

It is a general rule, in transplanting, never

to bury the collar of a plant ; though this rule has some exceptions in the case of annuals. Some of these, such as balsams, send out roots from the stem above the collar ; and these plants are always very much improved by transplanting. Others, the fibrous roots of which are long and descending, such as hyacinths, bear transplanting very ill, and when it is absolutely necessary to remove them, it should be done with an instrument called a transplanter ; which may be purchased in any ironmonger's shop, and the use of which is to take up a sufficient quantity of earth with the plant to remove it without disturbing the roots.

The uses of transplanting are various. When seeds are sown, and the young plants from them begin to make their appearance, they will generally be found to be much too thick ; and they will require thinning, either by drawing some of them out and throwing them away, or by removing them to another bed by transplanting. This, in the case of annuals, is called by the gardeners pricking out. The young plants are taken up with a small trowel, and replaced in a hole made

for them, and the earth pressed round them, with the same trowel; the only care necessary being to make them firm at the root, and yet to avoid injuring the tender spongioles. Gardeners do this with a dibber, which they hold in the right hand, and after putting in the young plant with the left hand, they press the earth round it with the dibber in a manner that I never could manage to imitate. I have found the trowel, however, do equally well, though it takes up rather more time.

Another use of transplanting is to remove trees and shrubs from the nursery to where they are permanently to remain. To enable this to be done with safety, the trees and shrubs in commercial nurseries are prepared by being always removed every year, or every other year, whether they are sold or not. The effect of these frequent removals is to keep the roots short, and yet provided with numerous spongioles; for as they are always pruned on every removal, and as the effect of pruning is to induce the roots pruned to send out two short fibrous roots armed with spongioles, in the place of every one

cut off, the roots, though confined to a small space, become abundant. The reverse of this is the case, when plants are left in a natural state. It has been found, from experience, that plants imbibe more food than they absolutely require as nourishment from the soil, and that they eject part of it; also that their roots will not reimbibe this excrementitious matter, but are continually in search of fresh soil. To provide for this the fibrous roots are possessed of an extraordinary power of elongating themselves at their extremities; and thus the roots of even a small plant, left to nature, will be found to extend to a great distance on every side. It is obvious that this elongation of the roots must greatly increase the difficulties attending transplanting. Where the roots extend to a distance from the tree, a greater extent of ground has to be disturbed, both to take up the plant, and to make a pit for replanting it; the risk of injuring the fibrous roots is increased; and, as nearly all the spongioles will require to be cut off, from the great length of the roots, and consequent greater difficulty which will attend taking

them up entire, the plant will be nearly famished before new spongioles can be formed to supply it with food. All these dangers are avoided by the nursery system of transplanting; while the inconvenience of confining the roots to so small a space is obviated, by placing the plant, every time it is transplanted, in fresh soil.

It is customary, when trees or shrubs are transplanted to the places where they are permanently to remain, either to make a puddle for them, or to fix them, as it is called, with water; the object, in both cases, being to supply the plant with abundance of food in its new situation. Care is taken, also, to make the roots firm in the soil, and to let the earth penetrate through all their interstices. To attain these ends, one gardener generally holds the tree and gently shakes it, while another is shovelling in the earth among its roots; but this mode has the disadvantage of sometimes occasioning the roots to become matted. When the tree is to be fixed with water, after a little earth has been shovelled in over the roots, water is applied by pouring it from a watering-pot,

held as high as a man can raise it; the watering-pot used being large, and with a wide spout, the rose of which must be taken off. More earth is then shovelled in, and water applied again. This mode of planting has the great advantage of rendering the tree firm, without staking or treading the earth down round it, as is usually done. Other gardeners spread the roots out carefully at the bottom of the hole or pit made to receive them, and then fill in the earth. In all cases, the ground is either made firm with water, or trodden down or beaten flat with the spade after planting, so as to fix the roots firmly in the soil, for the same reasons as nearly a similar plan is adopted in sowing seeds. Newly transplanted trees are frequently staked, but this is not essential if the roots are made firm, and indeed the tree is generally found to do best when the head is left at liberty to be gently agitated by the wind.

It is a great point, in all cases of transplanting, to preserve the epidermis or cellular integument of the fibrous roots and spongioles in a flexible state; and for this reason,

the greatest care is taken to keep them moist. This is the end in view in puddling or fixing by water in transplanting; and many planters always dip the roots of trees and shrubs in water before replanting. When a tree or shrub is taken up that is to be conveyed any distance, the roots should be wrapped up as soon as it is taken out of the ground, in wet moss, and covered with bast matting; and where moss cannot be procured, they should be dipped in very wet mud, and then matted up. Cabbage-plants are frequently preserved in this manner; and are conveyed, without any other covering to their roots than a cake of mud, to a considerable distance. In all cases where plants are taken up long before they are replanted, their roots should be kept moist by opening a trench, and laying the plants along it, and then covering their roots with earth. This, gardeners call, laying plants in by the heels. Where this cannot be done, and the plants are kept long out of the ground, their roots should be examined, and moistened from time to time; and before replanting they should be laid in water

for some hours, and afterwards carefully examined, and the withered and decayed parts cut off.

In removing large trees, care is taken to prepare the roots by cutting a trench round the tree for a year or two before removal, and pruning off all the roots that project into it. This is to answer the same purpose as transplanting young trees in a nursery; while the bad effects of contracting the range of the roots is counteracted, by filling the trench with rich fresh earth. The removal is also conducted with much care; and either a large ball of earth is removed with the tree, or the roots are kept moist, and spread out carefully, at full length, when the tree is replanted. Some planters, before removing trees, mark which side stood to the south, in order to replant them with the same side turned towards the sun; and this is sometimes done with young trees from a nursery. The reason is, that the tree having generally largest branches, and being always most flourishing on the side exposed to the sun; it is thought that its vegetation might be checked, were a dif-

ferent side presented to that luminary, by the efforts it must make to accommodate itself to its new situation. On the other hand, however, it may be urged that changing the position of the plant, particularly while it is young, will be beneficial in preventing it from taking any particular bent, and in promoting the equal distribution of sap through all the branches.

Watering is a most essential branch of culture. It has been already fully explained that the seed cannot vegetate, and the plant cannot grow without water. Carbon, and all the other substances that form the food of plants, must be dissolved in water to enable the spongioles to take them up; and the spongioles themselves, unless they be kept moist, will soon lose their power of absorption. Nothing indeed can be more evident, even to a common observer, than the necessity that plants feel for water; if a mimulus or a pelargonium in a pot, for example, hang its head and droop its leaves, what an extraordinary and rapid effect is produced by giving it water! In an almost incredibly short time its leaves become firm, and its

stem erect; and the plant is not only preserved from death, but restored to full health and beauty.

Watering appears an extremely simple operation, yet nevertheless there are several points relating to it that it is necessary to attend to. One of these is, never to saturate the soil. Water, to be in the best state for being taken up by the plants, should be kept in detached globules by the admixture of air; and it should be only slightly impregnated with nourishing matter from decaying animal or vegetable substances: for, as already observed, when fully saturated with nourishment, it becomes unfit for the food of plants. Nothing can be more admirably and wonderfully adapted for supplying plants properly with water than rain. In falling through the atmosphere, it is thoroughly mixed with the air; and in sinking into the soil it becomes slightly impregnated with nutritious qualities, which it is thus enabled to convey, in the most beneficial manner, to the plants.

It is a very common mistake, in watering, to pour the water down close to the stem of

the plant. This is injurious in every respect. Water, when poured profusely on the collar of the plant, which is the point of junction between the root and the stem, is likely to rot, or otherwise seriously injure that vital part; while the spongioles, which alone can absorb the water, so as to benefit the plant, being at the extremity of the roots, are always as far removed from the stem as the nature of the plant will allow. Thus, the distance from the stem at which water should be given varies in different plants. In those that have tap-roots, such as the carrot, and many other culinary vegetables, the lateral fibrous roots are short, and the spongioles are comparatively near the stem; but in trees, and most plants having spreading roots, the spongioles are generally as far distant from the stem as the extremity of the branches; and the water, to be efficacious, should be given there.

The quantity of water to be given varies, not only according to the nature of the plant, but to the state of its growth. In spring, when the sap first begins to be in motion, and the young plant is every day unfolding

fresh leaves or blossoms, it requires abundance of water; as it does when in flower, or when the fruit is swelling. In autumn, on the contrary, when the fruit is ripening, and in winter, when the plant is in a state of perfect rest, very little water is necessary, and much is positively injurious, as being likely either to excite a morbid and unnatural action in the vessels, or even to bring on rottenness and decay. Water is necessary for seeds to induce them to germinate; but much of it is very injurious to young plants when they first come up, as it unsettles their roots, and almost washes them away. The roots, also, are at first too weak to imbibe water; and the plants feed on the nourishment contained in the cotyledons of the seeds. It is when the second pair of leaves has opened that water is required, though it should at first be given sparingly. When the plant begins to grow vigorously, it requires more food; and if it be then kept too short of nourishment, it becomes stunted in its growth. The quantity of water requisite also depends on the kind of leaves that the plant unfolds. A plant with large broad

leaves, like the tobacco, requires twice as much water as a plant with small pinnate leaves, like an acacia. Plants exposed to a strong light, also, require more than plants grown in the shade.

The time for watering plants varies according to the season. In spring and autumn it is best to water plants in the morning. But in summer, the usual time is the evening; while in winter, the very little that is required, should be given in the middle of the day. Many persons object to watering their plants when the sun is upon them; but this is not at all injurious, so long as the water is not too cold, and is only given to the roots. Watering the leaves when the sun is upon them will make them blister, and become covered with pale brown spots wherever the water has fallen. It is much better to water plants during sunshine, than to suffer them to become too dry; as when the spongioles are once withered, no art can restore them. When plants have been suffered to become too dry, the ground should be loosened before watering it; and water should be given a little at a time, and frequently, till the

plant appears to have recovered its vigour. A great deal of the good produced by watering depends on the state of the ground; as when the ground is hard and compact, it is very possible to throw a great quantity of water upon it without doing any service to the plants.

The kind of water used should also be considered. The best is pond-water, as it is always mixed with air, and is, moreover, generally impregnated with decayed animal and vegetable matter; and the worst is clear spring-water, as it is always cold, and is seldom impregnated with air, or with anything but some mineral substance, which, so far from doing good, is positively injurious to the plants. Rain-water collected in open cisterns, and river-water, are both very suitable; and when only spring-water can be obtained, it should be exposed for some time to the air before using it. It is always advisable to have the water at least as warm as the plants to be watered; and for this reason the water to be used in hot-houses and green-houses, is generally kept in an open vessel in the house some hours before using.

Watering with warm water is very efficacious in forwarding the flowering of plants. This was one of the things that was most repugnant to my prejudices in the course of my instruction in the art of gardening; and when Mr. Loudon had some nearly boiling hot-water poured on some boxes of hyacinths that I was very anxious to have brought forward, I could scarcely refrain from crying out when I saw the steam rising up from the earth. The hyacinths, however, so far from being injured, flowered splendidly; though such is the force of prejudice, that I could never see the little tin vessel containing the heated water carried out to them without a shudder. The effect of hot-water, not heated to above 200° , in forwarding bulbs is astonishing; but it must be observed that it should never be poured on the bulbs, or on the leaves, but on the earth near the rim of the pot. Hot water is also very efficacious in softening seeds with hard coverings when soaked in it; and some of the seeds of the New Holland acacias will not vegetate in this country till they have been actually boiled.

CHAPTER IV.

MODES OF PROPAGATION BY DIVISION, *viz.*
TAKING OFF SUCKERS, MAKING LAYERS
AND CUTTINGS, BUDDING, GRAFTING, AND
INARCHING.

PROPERLY speaking, there are only two modes of propagating plants, *viz.* : by seed and by division. The first raises a new individual, resembling the plant that produced the seed, as a child does its parent, but not perpetuating any accidental peculiarity; and the second method multiplies specimens of the individual itself. Species are propagated by seed, and new varieties are raised; but varieties are generally propagated by division, as they do not always come true from seed. Propagation, by division, may be divided into two kinds:—those in which the young

plants root in the ground, such as suckers, layers, and cuttings; and those in which they are made to root in another plant, as in budding, grafting, and inarching.

Suckers.—Sending up suckers, forming offsets, and throwing out runners, are all natural ways of propagation that require very little aid from the hand of man; and if all plants produced these, nothing more would be required than to divide the offspring from the parent, and replant it in any suitable soil. But only certain plants throw up suckers, such as the rose, the raspberry, the lilac, the English elm, &c. Offsets are only formed on bulbs, and runners are only thrown out by strawberries, brambles, and a few other plants; and thus these modes of propagation are extremely limited in practice. No plants produce suckers but those that send out strong horizontal roots; and the sucker is in fact a bud from one of these roots which has pushed its way up through the soil, and become a stem. As this stem generally forms fibrous roots of its own, above its point of junction with the parent root, it may in most cases, when it is thought

necessary to remove it, be slipped off the parent and planted like a rooted cutting. As, however, the nourishment it can expect to derive from its own resources will be at first much less than what it obtained from its parent, it is customary, when a sucker is removed, to cut in its head, to prevent the evaporation from its leaves being greater than its roots can supply food for. Sometimes, when the parent is strong, part of the horizontal root to which the sucker was attached is cut off and planted with the young plant.

Suckers of another kind spring up from the collar of the old plant, and when removed are always slipped, or cut off, with the fibrous roots that they may have made, attached. Offsets are young bulbs which form by the side of the old one, and merely require breaking off, and planting in rich light soil. Runners are shoots springing from the crown, or collar of the plant, which throw out roots at their joints; and which only require dividing from the parent plant and replanting in good soil to make new plants.

Layers.—Many plants, when kept in a

moist atmosphere; having a tendency to throw out roots from their joints, the idea of making layers must have very early occurred to gardeners. Where the roots are thrown out naturally, wherever a joint of the shoot touches the moist earth, (as is the case with some of the kinds of verbena, which only require pegging down to make them form new plants,) layers differ very little from runners; but layers, properly so called, are when the art of the gardener has been employed to make plants throw out roots when they would not have done so naturally. The most common method of doing this is to cut half through, and slit upwards, a shoot from a growing plant, putting a bit of twig or potsherd between the separated parts; and then to peg down the shoot, so as to bury the joint nearest to the wound in the earth; when the returning sap, being arrested in its progress to the main root, will accumulate at the joint, to which it will afford such abundance of nourishment, as to induce it to throw out a mass of fibrous roots, and to send up a leading shoot.



A *Verbena* layered.

The only art required in layering is to contrive the most effectual means of interrupting the returning sap, so as to produce as great an accumulation of it as possible, at the joint from which the roots are to be produced. For this purpose, sometimes, instead of cutting the branch half through, a ring of bark is taken off, care being taken that the knife does not penetrate into the wood;

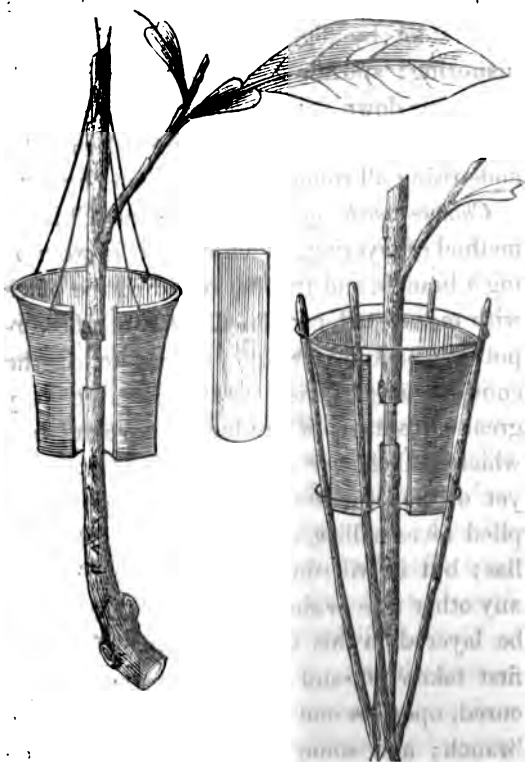
and at others a wire is twisted firmly round the shoot, so as to pinch in the bark; or a knife or any sharp instrument is passed through the branch several times in different directions: in short, any thing that wounds, or injures the shoot, so as to throw an impediment in the way of the returning sap, and yet not to prevent the passage of the sap that is ascending, will suffice.

Layering is a very common mode of propagating plants: and in nurseries often every shoot of a tree or shrub is thus wounded and pegged down. In this case, the central root is called a stool, from the verb, *to stole*, which signifies the power most deciduous trees possess, of sending up new stems from their roots when cut down. The seasons for performing the operation of layering are during the months of February and March, before the new sap begins to rise, or in June or July after all the summer supply of ascending sap has risen; as at these seasons there is no danger of injuring the tree by occasioning an overflow of the ascending sap, which sometimes takes place when the tree is wounded while the sap is in active motion. In most

cases the layers are left on twelve months, and in many two years, before they are divided from the parent plant, in order that they may be sufficiently supplied with roots. In nurseries, the ground is generally prepared round each stool by digging, and sometimes by manuring; and the gardener piques himself on laying down the branches neatly, so as to form a radiated circle round the stool, with the ends rising all round about the same height.

Chinese mode of layering.—The Chinese method of layering, which consists in wounding a branch, and then surrounding the place with moist earth contained either in a flower-pot or a basket, is frequently adopted in the continental gardens; and it has the very great advantage of producing a young tree which will flower and produce fruit while yet of very small size. It is generally applied to camellias, orange-trees, and magnolias; but it will do equally well for almost any other tree or shrub. When a plant is to be layered in this manner, a ring of bark is first taken off, and then a flower-pot is procured, open on one side, so as to admit the branch; and some moss being put at the

bottom of the flower-pot, it is filled up with earth, and a piece of wood is placed inside the pot before the open part, to prevent the earth from falling out. It may be fastened



in its place by wires hung over a branch, or supported by four little sticks, tied to the pot with string. The earth should be very moist before it is put into the pot, and if the season be dry, it may be re-moistened from time to time. When the layer is supposed to have rooted, a cut or rather notch should be made in the branch below the pot, and afterwards it may be cut off, and the young plant transferred with its ball of earth entire to another pot or the open ground. A simpler way of performing this operation is using a piece of lead instead of a flower-pot. A modification of this plan was adopted by Baron Humboldt in South America. He provided himself with strips of pitched cloth, with which he bound moist earth round the branches of several of the rare and curious trees he met with, after first taking off a ring of bark; and when he returned to the same place some time after, he found rooted plants which he brought to Europe.

Cuttings differ from layers in being removed without roots from the parent tree; and as the current of the ascending sap is stopped at once by this separation, they ge-

nerally require shading, which layers do not; and also, occasionally, what gardeners call bottom heat, to induce them to throw out roots. The branches most suitable for making cuttings are those which grow nearest to the ground, especially those which recline on it, as they have always the greatest tendency to throw out roots; and the side shoots are considered preferable to those which grow erect at the upper part of the plant. The best season for making cuttings is summer, when the sap is in full motion; as the returning sap is then most likely to form the ring or mass of accumulated matter from which the new roots are to spring. It has been already mentioned under the head of layers, that it is from the joints only that roots can be expected to grow; and, accordingly, in making cuttings, the shoot is divided at a joint; and it is reckoned best to choose the joint at the point of junction between the young wood and the wood of the previous season. The cut should be quite smooth; as if the shoot be bruised, the returning sap will not be able to reach the joint in a sufficient quantity to effect the desired end. Some plants are

much more difficult to strike as cuttings than others; but some, such as the willow, the currant, the vine, &c., will throw out roots not only from the ring, but from every part of the stem. These plants do not require so much care as to cutting off at a joint; and in fact, will throw out roots from whatever part may be put into the ground, but even they succeed best when properly prepared.

The cutting being taken off, and the division at the joint being made perfectly smooth, the greater part of the leaves should be cut off close to the stem, with a sharp knife; and a hole being made in the soil, the cutting should be put in, and the earth pressed close to its extremity, or it will never strike out roots. This necessity of the part which is to send out roots being fixed firmly in the soil, has been already mentioned with regard to seeds, transplanted trees, and layers; and this necessity exists with equal or greater force with regard to cuttings. When these are made in a pot, the cutting will much more readily strike (as gardeners call it throwing out roots), if it rest against the side of the pot, or even against the bottom.



A cutting of the LEMON-SCENTED VERBENA (*Aloysia citriodora*), prepared for putting into the ground.

Cuttings may be struck in the open ground, and in the common soil, without any covering; but these cuttings are only of those plants which strike readily. When struck in pots, it is customary to fill the pots half, or entirely full of silver sand, to prevent the stalk of the cutting from having too much moisture round it. Those cuttings which are most liable to be injured by moisture, such as heaths, &c., are struck in pots filled entirely with sand; but as there is no



Cuttings of the COMMON HORSESHOE, and LARGE WHITE FLOWERED GERANIUMS (*Pelargonium zonale* and *P. macranthum*) prepared for putting into the ground.

nourishment to be derived from sand, most cuttings do best with their lower end in earth, and with only sand about an inch, or two inches deep, at the top of the pot, to keep the stem dry, and to prevent it from rotting. The cutting, when prepared, should be buried to about the second joint, and two or three joints with leaves should be left above the soil. A few leaves to elaborate the sap in the case of herbaceous plants, or evergreen trees and shrubs, are essential; for I have known very promising cuttings of petunias, which had been some weeks in the ground, and which had thrown out abundance of roots, entirely destroyed by some snails having eaten all the leaves; and I am told that the case is by no means an uncommon one. Cuttings of delicate plants are generally covered with a bulb-glass pressed closely on the earth, to keep a regular degree of moisture round the plants, and to prevent too rapid an evaporation; but I have found cuttings thus treated very apt to damp off, and have never succeeded in striking them, unless I took off the glass to wipe it, every day. Cuttings of greenhouse plants, I have been

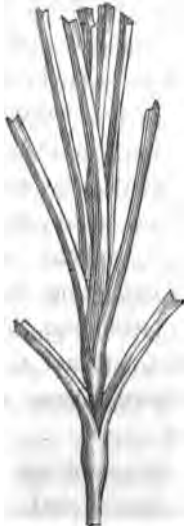


A cutting of the CHINA ROSE (*Rosa indica*) prepared for putting into the ground.

told by practical gardeners, strike best when put into the pots as thickly as possible; and as they are generally well watered when first put in the ground, if covered with a close glass, they will frequently not require any watering afterwards. As long as they continue looking fresh, they are doing well; and as soon as they begin to grow they should be transplanted into small thumb pots, and supplied moderately, but regularly, with water; changing the pots for larger ones as the plants increase in size, and according to their nature. Sometimes the pots are sunk into a hot-bed, to induce the cuttings to take root, and this is called applying bottom heat; and sometimes one flower-pot is placed within another a size or two larger, and the outer one filled with water. All these expedients are more or less efficacious; and the great object with all of them, is to excite and stimulate the plant.

Slips.—When cuttings are made of the shoots from the root or collar of the plant, or of little branches stripped off with a small portion of the root or stem attached, they are called slips; and they require no other

preparation than cutting off the portion of bark smooth and close to the shoot. Slips are generally taken off in March, but they will also succeed if made in autumn. Cuttings of succulent plants, such as of the different kinds of cacti, require to be dried for some time after they are made, by placing them on a shelf in the sun. This is done to prevent a waste of the returning sap; which, in plants of this kind, is very abundant, and in a very liquid state.



A piping of a Carnation.

Pipings are cuttings of pinks and carnations, and indeed are applicable to all plants having jointed tubular stems. They are prepared by taking a shoot that has nearly done growing, and holding the root end of it in one hand, below a pair of leaves, and with the other pulling the top part above the pair of leaves, so as to separate it from the root-part of the stem at the socket formed

by the axils of the leaves, leaving the part of the stem pulled off with a tubular or pipe-like termination. Hence the name of pipings; and when thus separated, they are inserted in finely sifted earth or sand, and a hand-glass is fixed firmly over them. Most florists cut off the tips of the leaves of pipings, but others plant them entire; and the pipings grow apparently equally well under both modes of treatment.

The principal points to be attended to in making cuttings are, to cut off the shoot at a joint, without bruising the stem; to make the cutting at a time when the sap is in motion; to fix the end which is to send out roots, firmly in the soil; to keep it in an equal temperature both as regards heat and moisture; to cut off part of the leaves, and to shade the whole, so as to prevent too much evaporation, without excluding the light, which is wanted to stimulate the plant; to keep the soil moist, but not too damp; and to pot off the young plants as soon as they begin to grow.

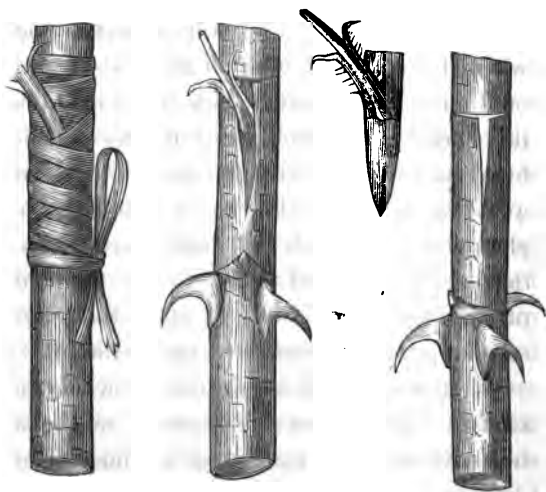
Budding has been compared to sowing a seed; but it may rather be considered as

making a cutting with a single eye, and inserting it in another tree, called the stock, instead of in the ground. A young shoot of the current year's wood is cut off in the latter end of July or August, or perhaps, if the season should be very moist, the first week in September; and incisions are made longitudinally and across, on each side, above and below a bud, so that the bud may be cut out, attached to an oblong piece of wood and bark, pointed at the lower end. The leaf is then taken off, but the footstalk is left on.

The next thing is to separate the bark with the bud attached from the wood; and on the nicety of this operation much depends, as if any wood be left in the bark the bud will not take; generally, however, if the sap is in a proper state of movement, the wood comes out easily, without leaving the smallest particle behind. The bud must be then examined below, that is, on the side that was next the wood; and if it appears fresh and firm it is likely to take, but if it looks shrunk and withered it had better be thrown away, as it will never grow. Slits

longitudinal and across are then made in a shoot of the stock, generally near the fork of a branch; and the bark is gently raised by the handle of the budding knife, which is purposely made thin and flat, while the piece of bark to which the bud is attached is slipped into the opening, and the bark of the stock closed over it. This is an operation that requires the greatest nicety and exactness; as unless the inner bark of the bud fits quite closely to the soft wood of the stock, it is in vain to hope that it will take. The operation is then completed by binding the two parts together with a strand or strip of bast mat, which in the case of rose trees is quite sufficient; but buds on apple and pear trees are sometimes wrapped round with wet moss, which is tied on by shreds of bast matting. In all cases, the strips of bast should be left long enough to be tied with bows and ends, that the ligature may be loosened and tied again without deranging the position of the bud as soon as it begins to grow. The first sign of the bud having taken, as it is called, is when the petiole of the leaf (that was left on when the leaf itself

was cut off,) drops, on being very slightly touched with the finger; but the ligature should not be loosened till the bud begins to throw out leaves; and then it should be retied only a little slacker than before, until the bud is firmly united with the stock.



Mode of budding a Rose-tree.

Budding, though sometimes used for apples and pears, when the spring grafts have failed, is most commonly applied to roses: it is, however, occasionally used for inserting

eyes in the tubers of the dahlia. It sometimes happens that a large portion of a dahlia-root is found to be entirely devoid of buds, or as the gardeners call them, eyes; and when this is the case, in whatever soil the root may be planted, it will never send up a stem. Other dahlia tubers, on the contrary, may be found full of buds; and when this is the case, one of them is scooped out, and a corresponding hole being made in the barren tuber to receive it, the bud is fitted in, and the point of junction covered with grafting wax. The tuber must then be planted in a pot with the budded part above the soil; and the pot plunged into a hot-bed till the bud begins to push, when the tuber may be planted out into the open ground.

What is called flute-grafting, is in fact, a kind of budding; as it consists in taking a ring of bark, on which there is a bud, off a shoot; and then supplying its place with a ring of bark, with a bud attached, from another tree: placing the suppositious bud as nearly as possible in the position of the true bud. Sometimes, however, this is not thought necessary; and the ring of bark is

taken from any part of the stock; though it is always replaced by a ring of bark containing a bud from the scion. There are many other kinds of budding, but as the principles are the same in all, it is not necessary to detail them here. The blade of the budding knife should curve outwards, to lessen the danger of wounding the wood when making the incisions.

The principal points to be attended to in budding, are; to choose a fresh healthy bud; to separate the bark to which it is attached without wounding it, quite cleanly from the wood; to make a clear incision through the bark of the stock, and to raise it without wounding it from the wood; to press the bark containing the bud, closely to the wood of the stock so that no air can remain between them; and to perform the operation in moist weather, not earlier than the last week in July, nor later than the first week



in September. Of these points the most important are the joining closely the bark of the bud to the wood of the stock, and the performing the operation in moist, or at least in cloudy weather; and if these are attended to there is little doubt of success. When the young shoot begins to grow, it is usual to shorten the branches of the stock, so as to throw the whole vigour of the tree into the bud. It is singular to observe that even when the operation is most successful, no intimate union takes place between the bud and the stock: they grow firmly together, but they do not incorporate, and the point of union may always be distinctly traced.

It must always be remembered that a plant can only be budded on another plant of the same nature as itself; thus a peach may be budded on a plum, as they are both stone fruits, and both belong to the same section of the natural order *Rosaceæ*; but a peach can neither be budded on a walnut, which belongs to another natural order, nor even on an apple or a pear, both of which, though belonging to the order *Rosaceæ*, arekerneled fruits, and are included in another section.

Grafting differs from budding in its being the transfer of a shoot with several buds on it, from one tree to another, instead of only a single bud; and as budding has been compared to sowing seeds, so has grafting to making cuttings. The art of grafting consists in bringing two portions of growing shoots together, so that the liber, or soft wood of two may unite and grow together; and the same general principles apply to it as to budding. There are above fifty modes of grafting described in books, but only three or four are in common use.

In all kinds of grafting the shoot to be transferred is called the scion, and the tree that is to receive it is called the stock; and it is always desirable, not only that the kinds to be united should be of the same genus, or at least of the same natural family, but that they should agree as closely as possible in their time of leafing, in the duration of their leaves, and in their habits of growth. This is conformable to common sense; as it is quite obvious that unless the root send up a supply of sap at the time the leaves want it, and only then, the graft must suffer either

from famine or repletion. For this reason, a deciduous plant cannot be grafted on an evergreen, and the reverse. The necessity of a conformity in the habit of growth, is strikingly displayed in Mr. Loudon's *Arboretum Britannicum*, in a flowering ash grafted on a common ash; by which it is shown, that an architectural column with its plinth and capital may be formed in a living tree, where there is a decided difference in the growth of the stock and the scion.

These examples show that no intimate union takes place between the scion and the stock; and the fact is, that though they grow together and draw their nourishment from the same root, they are in every other respect perfectly distinct. The stock will bear its own leaves, flowers, and fruit, on the part below the graft; while the scion is bearing its leaves, flowers, and fruit which are widely different, on the part above the graft. Nay, five or six grafts of different species on the same tree, will each bear a different kind of fruit at the same time. This want of amalgamation between the scion and the stock is particularly visible in cases of

severe frost, when the former is more tender than the latter; as the graft is frequently killed without the stock being injured. It is also necessary when grafted trees are for any reason cut down, to leave a portion above the graft for the new shoots to spring from; as otherwise the proprietor will find his trees changed as if by magic, and instead of choice kinds only the common sorts left. A rather droll instance of this happened some years ago, in the neighbourhood of London; an ignorant gardener having a conservatory full of very choice Camellias, and wishing to reduce the plants to a more compact shape; cut them down for that purpose; when in due time he found, to his great confusion and dismay, that the choice Camellias had all vanished, and that he had nothing left but a number of plants of the common single red on which they had been grafted.

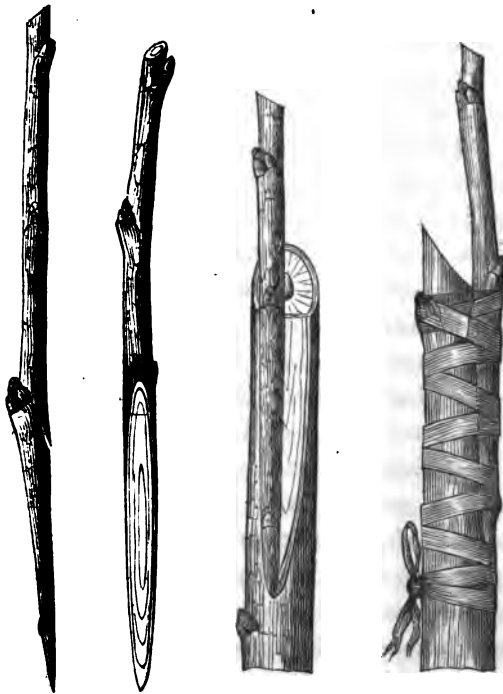
The proper season for grafting is in spring, generally in March and April; in order that the union between the scion and the stock may be effected when the sap is in full vigour. At this season a stock is chosen of nearly the same diameter as the scion,

whether that stock be a young tree, or merely a branch; and they are both cut so as to fit each other. One piece is then fitted on the other as exactly as possible; and if practicable, it is contrived that the different parts, such as the bark, soft wood, and hard wood of the one, may rest on the corresponding parts of the other; and on the exactness with which this is done, the neatness of appearance in the graft depends. It is not, however, essential to the success of the operation that all the parts of the scion should fit exactly on the corresponding parts of the stock, or even that the two trees should be of the same diameter, for if the bark and the soft wood correspond in any one point so as to unite, it is sufficient to make the graft take. As soon as the scion and the stock are properly fitted to each other, the parts are neatly bound together with a strand of bast mat steeped in water to make it flexible; and the bast is covered with a composition called grafting clay, which is put on to keep the absorbent vessels of the wounded parts moist, and capable of the alternate contractions and dilations

which will be necessary during the passage of the ascending and returning sap between the stock and the graft. These directions apply alike to all kinds of grafting; and the difference between the sorts refers principally to the manner in which the corresponding parts are cut to fit each other.

Whip or Tongue Grafting is where both the stock and the scion are cut in a slanting direction so as to fit each other, and a little slit is made in the stock into which a tongue or projecting part cut in the scion fits. The head of the scion is then cut off in a slanting direction, slanting upwards from the part cut to receive the scion, and the two are bound closely together with a strand of bast mat, or wrapped in moss, and then covered with grafting clay. The part left on the stock in a slanting direction above the graft withers, and is cut off when the graft has taken. This is the kind of grafting generally practised in nurseries, and it is the most useful, as it does not require the scion and the stock to be of the same size.

Peg Grafting is an old method seldom practised now; according to it, the bark at



The common mode of Whip or Tongue Grafting.

the extremity of the scion is cut through, and the central wood shaped like a peg; a hole is then bored in the stock to receive the scion, and when the one is inserted in the other, the bark of the two is brought together, so as to make but a very slight scar.

Cleft Grafting is where the scion is shaped at the extremity like a wedge, and a cleft is made in the stock to receive it. When this kind of grafting is practised with trees and shrubs, the head of the stock is cut off; but a modification of it is practised with succulent plants, in which the end of the graft having been cut into the shape of a wedge, is inserted into a cleft made in the side of the stock to receive it, and the line of junction is covered with grafting wax. The tubers of strong common dahlias may be grafted in the cleft manner with choice sorts, as may the tubers of the herbaceous pæonies with scions of the tree-pæony. This last is very useful, as cuttings of the *Pæonia Moutan* remain weak for several years, while roots grafted in July or August will flower the following spring.

Crown Grafting resembles the last kind in

requiring the head of the stock to be cut off, but the scion is shaped at the extremity like a wedge flattened on one side, and it is pushed in between the bark and wood of the stock, with its flat side next the wood, till it is stopped by a shoulder with which it is provided to prevent it going in too far. In *Saddle Grafting* the head of the stock is cut off, and the extremity of the trunk is shaped like a long wedge; a long slit is then made in the scion, and the divided parts are made to stand astride on the stock. The bark is then pared off at the extremity, so that the two parts may fit quite close; and a firm ligature is applied.

Herbaceous Grafting is very badly named, as it gives the idea of its being a kind of grafting applied to herbaceous plants; whereas, in fact, it only means grafting with the brittle wood of the current year, in opposition to common grafting, which is always performed with firm wood, frequently of several years' growth. Herbaceous grafting is now generally used for trees of the pine and fir tribe, which, only a few years ago, it was thought impossible to graft at all.

The proper time for this kind of grafting is when the young pine-shoots have made about three parts of their growth, and are still so herbaceous as to break readily between the fingers, like a shoot of asparagus. The shoot of the stock is then broken off about two inches below the point, and all the leaves stripped off for nearly two inches more, except two sheaths of leaves, which are left, one on each side, close to the top. The shoot is then split with a very thin knife between the sheaths of leaves left on, and the scion, having had its lower extremity prepared by stripping off the leaves, and cutting it into the shape of a wedge, is inserted as in cleft grafting, and the parts are bound together with list, or with a strip of thin woollen cloth. A cone of paper is then put over the whole to protect it from the sun and rain, and the graft is very seldom found to fail. Sometimes this kind of grafting is applied to annual plants. The period chosen should be when the plant is in its greatest vigour, and is just going into flower. The flower stem is then cut off close to a leaf, and a slit is made in the stem

downwards. The scion is then taken off near the root of the plant, and the end being cut into a wedge-shape, is inserted in the slit. The wound is then bound up with strips of cloth spread with grafting wax, and the leaf taken great care of. When the graft begins to grow, this leaf and all the shoots below it are removed. In this manner artichokes have been grafted on cardoons, and cauliflowers on cabbages with great success. Tomatoes have also been grafted on potatoes in this manner, the potatoes perfecting their tubers, and the tomatoes their fruit, at the same time; and it is said that the ripening of the latter was much accelerated. This mode of grafting was invented by the Baron Tschoudy, a gentleman residing at Metz, and the principal point in it which requires attention, is the preserving a leaf, or two leaves, at the extremity of the stock, to serve as nurses to the graft.

Inarching, or Grafting by Approach. — Though I have left this till last, it is in fact the most simple of all ways of grafting, and it is certainly the only one practised by

nature. In a natural forest, two branches rub against each other in windy weather, till the bark of both becomes wounded; a calm ensues, and, while it lasts, the wounded branches lying across each other adhere and grow together. Of this, which is called inos-



Stock and Scion prepared for Inarching.

culation, examples in the beech, the hornbeam, and the oak, are given in Mr. Loudon's *Arb. Brit.*; and it is probable that mankind derived the first idea of grafting from observing instances of this kind. Inarching, as practised in nurseries, closely resembles layering. A branch is bent and partly cut through, and the heel thus formed is slipped into a



Mode of inarching the Camellia.

slit made downwards in the stock to receive it. The parts are then made to meet as exactly as possible, and are bound together with bast mat, and covered with grafting clay, as in common grafting. In five or six months the union will be complete; and the inarched plant will be ready to be separated from the parent, which is done with a very sharp knife, so as to leave a clean cut, and not a bruised one. The head of the stock, if it was left on when the plant was inarched, is then cut away, and the plant is ready for removal. It is, however, customary to keep on the grafting clay and ligature for a few weeks, till the plant is firmly established. This mode of propagation is very commonly practised with Camellias and Magnolias; and it is usual in nurseries to see a fine new kind of Camellia surrounded by a sort of frame, on which are several pots of stocks of the single red, placed at different heights for the convenience of attaching to them different branches of the choice kind, to undergo the process of inarching. In most of these cases the head of the stock is retained, and the scion introduced at the side; but as soon as

the graft has taken, and has thrown out a sufficient number of leaves to carry on the elaboration of the sap, all the branches of the original plant above the graft are cut away to strengthen the inarched one.

Grafting clay and grafting wax have been so frequently mentioned in the various operations of grafting and budding, that it seems necessary to say a few words on their composition. Common grafting clay is made with any kind of stiff clay mixed with a fourth part of fresh horse-dung free from litter, and a portion of cut hay; a little water is sprinkled on the mass, and the whole is beaten several times a day for a week together, till the ingredients are thoroughly amalgamated. The common French grafting clay, or *Onguent de Ste Fiacre*, is composed of equal parts of stiff clay and cow-dung; but a superior kind, recommended by M. De Candolle, is composed of one pound of cow-dung, half a pound of pitch, and half a pound of yellow wax. Grafting wax is generally made of equal parts of turpentine, bees'-wax, and resin, with a little tallow, melted together, and

thoroughly incorporated. This is thinly spread on cotton cloth, and used in strips like cerecloth. In grafting trees with soft and delicate bark, fine moss and cotton wool, tied on with ligatures of bast mat, are better than anything else, and they are quite sufficient for every purpose for which grafting clay can be required for ladies. A new composition has been lately invented, made with caoutchouc, which is said to be very efficacious, but I have never seen it tried.

The essential points to be attended to in grafting are choosing a stock and a scion that correspond in nature and in habits of growth; cutting the parts to be united so as to fit exactly and leave no vacuity between; taking care that the soft wood of the scion shall always rest on the soft wood of the stock, as it is between these parts that the union is to be effected; binding the parts closely together, and covering them so as to prevent them from becoming so dry as to shrink apart, in which case the vessels would wither and become incapable of uniting.

Uses of Grafting and Budding. The obvious use of grafting is to propagate varieties

that cannot so easily be continued by seed, and that will not strike by cuttings. There is, however, another use nearly as important; and this is to make plants flower and fruit sooner than they would otherwise do. There are many plants that only flower at the extremity of their shoots; and these plants, when tender, would require enormous plant-houses before they would be thrown into flower or fruit. To remedy this inconvenience, a method has been devised of cutting off the tips of the shoots and grafting them; and then, after they have grown for some time, cutting off the tips again and regrafting them, by means of which flowers are at length produced on plants of quite a small size. The same method is applied in Paris to rare fruit-trees to throw them into fruit; and it has been tried with success with the rose-apple (*Eugenia Jambos*), the mango, &c. In common nurseries, the fruit of new seedling apples is obtained much sooner by grafting than by leaving the plant to nature; and this plan is also practised at Brussels by Prof. Van Mons, to test his seedling-pears.

CHAPTER V.

PRUNING, TRAINING, PROTECTING FROM FROST,
AND DESTROYING INSECTS.

Pruning appears, at first sight, a most laborious and unfeminine occupation; and yet perhaps there is no operation of gardening which a lady may more easily accomplish. With the aid of a small, and almost elegant pair of pruning shears, which I procured from Mr. Forrest, of Kensington Nursery, I have myself (though few women have less strength of wrist) divided branches that a strong man could scarcely cut through with a knife. The only thing to be attended to is to choose a pair of pruning shears with a sliding joint, so as to make what is called a draw-cut; in order that the

branch may be divided by a clean cut, and not bruised on the side next the plant, and also to leave a somewhat sloping section. When a branch is pruned, it should also be cut as near to a bud as can be done without injuring the bud itself; or, to speak more definitely, not more in length than the branch is thick should be left beyond the bud. The cut should slope downwards from the bud to prevent the water lodging in the angle; and also that the sun and air may have their full influence in exciting the bark to cover the wound. When a long piece of branch, or what gardeners call a snag, is left beyond the bud, it withers, from there being no leaves beyond it to carry on the circulation of the sap; and it thus not only becomes a deformity, but very often seriously injures the tree by rotting, and infecting the fruit-bearing branch to which it is attached.

According to the usual method of pruning with a knife, the gardener holds the branch in his left hand, below the part that is to be removed; and then, holding the knife firmly with the thumb at the back of the blade, he



makes a strong cut upwards, and from him, so as to remove the branch with a single stroke, and to leave a slanting section. This operation, however, requiring strength as well as skill, it will generally be safer for a lady to keep to her pruning shears, a pair of which may be bought for *7s. 6d.*, and which will be sufficient to cut through the largest branch that a lady would be able to remove; or to use a pair of garden scissors fixed to a pole which may be lengthened or taken to pieces like a fishing-rod. The scissors are strong and sharp, and are made to act by means of a long cord, which passes through rings down the side of the pole. The principal use of these scissors is to remove dead roses, &c., but they will also cut off a branch of dead wood, &c. When a gardener wishes to remove a large branch, he first cuts a notch out

of it on each side, and then with his pruning knife, or a small saw, he divides the diminished space. In all cases, the great art of pruning consists in making a clean sharp cut, so as to leave the bark in a healthy state to make an effort to cover over the wound, and in pruning sufficiently near a bud not to leave any dead wood.

The time for pruning is either early in spring, after all danger is over from frost, but before the sap has begun to move; or in winter, after the movement of the sap for the summer has ceased. Summer pruning is also necessary with some trees; but, generally speaking, it should be confined to rubbing off all buds which would produce unnecessary shoots, as soon as they appear. This operation is called disbudding, and it is highly efficacious in sparing the strength of the tree. The points of those shoots which appear to be running too much to wood, should also be pinched off; or every leaf may be taken off them as it appears, which will exhaust the superfluous strength of the tree; and the shoots which will produce no buds for want of leaves, may be removed in

the winter pruning. The vine is very apt to bleed when pruning has been delayed too late; and in very strong vigorous plants, the ascending sap sometimes drops from the branches like rain. The French very poetically call these drops the tears of the vine.

The uses to which pruning is applied are various; but most commonly it is intended either to improve the form of the tree, or to make it bear more flowers and fruit than it otherwise would do: it is also used for removing diseased or broken branches; and, in cases of transplanting, for proportioning the head to the roots.

Pruning to improve the form of a tree in pleasure-grounds, is only required in those cases where trees have grown under unfavourable circumstances, and where they have been too much drawn up, or distorted in any manner: but in useful plantations it is necessary to prepare trees for the purposes for which they are intended. Thus, for example, a tree intended for timber, should have its side-branches taken off while they are quite young, in order that the wounds may soon heal over, and not leave loose knots to

weaken or disfigure the wood; while a tree intended for a screen should be allowed ample space for its branches to spread from the ground upwards, and then they should only be shortened at their extremities, to make them throw out short branches near the tree. In pleasure-grounds the principal object is generally either to preserve the shape of the tree or shrub, so that it may form an agreeable object on a lawn; or to let it combine in a group with others, either for ornament, or to serve as a screen or shelter. In the first case, it is obvious that no pruning is requisite, but to remove dead, diseased, or unsightly branches; and in the second, the pruning must depend upon the shape the tree is required to take to group well with the others planted near it.

Pruning to produce flowers or fruit has in view two objects: first, to cut off all superfluous wood, so as to throw the strength of the tree into the fruit-bearing branches; and secondly, to admit the sun and air into the interior of the tree to ripen and strengthen the wood. In both cases the attention of the pruner must be directed to thinning out

weak and crowded shoots; and to keeping both the sides of the tree well balanced, in order that the circulation of the sap may be equal throughout. This will preserve the general health of the tree, at the same time that it throws the sap into the proper channels; and the fruit will be produced in as much abundance as can be done without injuring the tree. It should never be forgotten, that to effect permanent improvements, nature should be aided, not overstrained; and that all extraordinary exertions are succeeded by a period of feebleness and languor; or, if the exertion be continued too long, by death. Thus, all cases of pruning and training to produce fruit, should never be pushed too far: as though, by occasioning an extraordinary deposit of the returning sap in some particular part, that part may be forced into fruit, the unnatural deposit cannot fail in the end to engender disease.

Sometimes a tree, from being supplied with more food than it can digest, or from some other cause, has a tendency to produce what the English gardeners call water-shoots, and which the French call gourmands.

These are strong, vigorous-growing branches, which are sent up from the main trunk of the tree, but which do not produce either flowers or fruit; and which, consequently, if the tree be full of wood, should be removed as soon as their true character is discovered. If, however, the tree have too little wood in the centre, or if it appear exhausted by too much bearing, these branches should be spared, as they will serve admirably both to fill up any blanks that may have been left in the training, and to strengthen the trunks and roots by the quantity of rich returning sap, which they will send down from their numerous leaves. A certain quantity of leaves and barren branches are essential to the health of every tree; and the fruit-grower who consults his own interest, should cherish them instead of grudging the sap required for their support. Whenever there is not a sufficient quantity of leaves to elaborate the sap, the fruit that ought to have been nourished by its rich juices, becomes flaccid and insipid; its skin grows tough instead of crisp; and if the deprivation of leaves has been carried to excess, the fruit

never ripens, but withers prematurely, and falls off. Pruning, at the best, is a violent remedy; and, like all other violent remedies, if carried further than is absolutely necessary, it generally ends by destroying.

Training is intimately connected with pruning, and like it should always be used with caution. A trained tree is a most unnatural object; and whatever care may be taken of it, there can be no doubt that training shortens its life by many years. The principal object of training is to produce from a certain number of branches a greater quantity of fruit or flowers than would grow on them if the plant were left in a natural state; and this is effected by spreading and bending the branches, so as to form numerous depositions of the returning sap, aided, where the plant is trained against the wall, by the shelter and reflected heat which the wall affords. Thus the points to be attended to by the gardener in training are the covering of the wall, so that no part of it may be lost; the bending of the branches backwards and forwards, so that they may form numerous deposits of the returning sap; and the full

exposure of the fruit-bearing branches to the sun and air. For these purposes the gardener shortens the long shoots, to make them throw out side-branches, with which he covers his walls, never suffering them to cross each other, but letting each be as much exposed to the influence of the air and light as is consistent with a necessary quantity of leaves; and he bends them in different directions to throw them into fruit. These general principles are common to all fruit-trees, but of course they must be modified to suit the habits of the different kinds. Thus, for example, some trees, such as the fig and the pomegranate, only bear on the extremities of their shoots; and, consequently, if their shoots were continually shortened, these trees would never bear at all; other trees, such as the apple and the pear, bear their fruit on short projecting branches, called spurs; and others at intervals on nearly all the branches, and close to the wall. All these habits should be known to the gardener, and the modes of training adopted which will be suitable to each. Training flowers should also be regulated by a knowledge of the habits of the

plants; but it consists principally in checking their over-luxuriance of growth, and tying them to stakes or wooden frames. In all kinds of training, neatness is essentially requisite, and any departure from it is exceedingly offensive. Where the hand of art is so evident as it is in training, we require excessive neatness to make us amends for the loss of the graceful luxuriance of nature.

The operation of training against a wall is performed by the aid of nails and shreds; the shreds being narrow oblong pieces of list or cloth, put round the branches, and attached to the wall by nails driven in with a hammer. Care should be taken that the pieces of list are long enough to allow of the free passage of the sap, and yet not so long as to permit the branch to be so agitated by the wind as to bruise itself against the wall. The nails should also never be driven in so as to wound or corrode the bark; and when driving in the nails, the gardener should be very careful not to bruise the branch with his hammer. The shreds should be broad enough not to cut the bark, and yet not so broad as to cover the buds; and they should, as much

as possible, be of some uniform and dark colour. As few shreds should be used as are sufficient to attain the end in view; but these should be very firmly attached, as nothing gives a more gloomy picture of misery and desolation in a garden, than trees that once were trained, having become detached, and hanging drooping from the wall. Sometimes wires are fastened to walls, to which the plants are tied with strands of bast mat; the strand, after it is put round the branch, and the wire being gently twisted between the finger and thumb, in order that it may make a firm knot without tearing or weakening the ligament. Climbing shrubs are tied to the pillars of a verandah, or to trellis work, in the same manner; as are also flowers to sticks, or slight wooden or wire frames, with the exception that, in their case, the bast does not require twisting.

Protecting from frost is an essential part of culture to a lady gardener, particularly in so uncertain a climate as that of England. Not only the blossoms of peaches and nectarines, and those of other early flowering fruit-trees, are liable to be injured by the spring frosts;

but those of the tree pæony, and other beautiful shrubs, are frequently destroyed by them; and, unfortunately, many of the modes of protection, by knocking off and bruising the blossoms, are almost as injurious as the frosts that they are intended to guard against. Twisting a straw-rope round the trunk of the tree, and putting its ends into a bucket of water, is certainly a simple method, and it has been recommended as a very efficacious one. When a mat is used to protect wall trees, it does perhaps least injury to the blossoms, when curtain rings are sewed to its upper end, and it is hung by these on hold-fasts, or large hooks, driven into the upper part of the wall. To make it more secure, particularly in windy weather, it may be tied on the sides with bast to nails driven into the wall; and a broad moveable wooden coping should rest on the hold-fasts, and cover the space between the mat and the wall, to prevent injury from what are called perpendicular frosts. Camellias and many half-hardy shrubs may be protected by laying straw or litter round the roots; as the severest frosts seldom penetrate more than a few inches into

the ground. Even in the severe winter of 1837-8, the ground was not frozen at the depth of ten inches. Tree pæonies, and other tender shrubs, that are in a growing state, very early in the spring, may be protected by coverings of basket work, which are sufficiently large and light to be lifted off in fine days. Hand and bell glasses, sea-kale pots, and wooden frames covered with oiled paper are all useful for protecting small plants.

Insects, and Snails and Slugs are the terror of all gardeners; and the destruction they effect in some seasons in small gardens is almost beyond the bounds of credibility. Birds do comparatively little injury, and indeed all the soft-billed kinds (which fortunately include most of the sweetest songsters) do good. The willow and common wrens, the blackcap, the nightingale, the redstart, all the warblers and fly-catchers, the swallows and martins, the wagtails, the wryneck, the tomtit, the fern owl or night jar, and many others, live almost entirely on insects, and destroy great numbers every year: while the blackbird and the thrush, the robin and the sparrows, though they devour a portion

of the fruit, destroy insects also. All birds may indeed be safely encouraged in small gardens near towns, as they will do much more good than injury; and a few cherries and currants are a cheap price to pay for their delightful songs.

As it is the larvæ only of insects, with very few exceptions, that do injury to vegetation, many persons never think of destroying them in any other state; forgetting that every butterfly that we see fluttering about may lay thousands of eggs, and that if we wait till these eggs have become caterpillars, irreparable mischief will be done to our plants before they can possibly be destroyed. Whenever a butterfly is seen quietly sitting on the branch of a tree, in the daytime, it will generally be found to be a female, that either just has laid, or what is more probable, is just about to lay her eggs. As soon as the eggs are laid, the butterfly generally dies; and where dead butterflies are found, search should always be made for their eggs. In summer, a little oblong chrysalis, the colour of which is yellow, with black bands, will frequently be found hanging from the

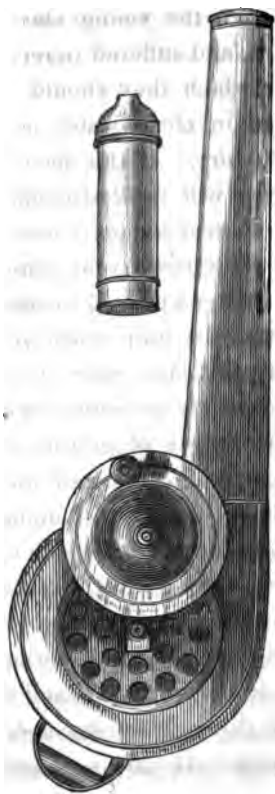
gooseberry-bushes; and whenever it is seen it should be destroyed. This chrysalis is the pupa of the magpie moth, the caterpillar of which frequently strips the gooseberry-bushes of all their leaves in spring, and thus renders their fruit worthless in summer. The lackey caterpillar is another very destructive insect. These creatures, which are curiously striped, like the tags on a footman's shoulder, (whence their name,) assemble together in great numbers, and covering themselves with a web, completely devour the epidermis and parenchyma of the leaf on which they have fixed themselves; they then draw another leaf to them, which they also devour, and then another, till the greater part of the leaves of the tree they have attacked, present a fine lace-like appearance, as though they had been macerated. Did all these insects live to become moths, they would completely destroy not only our gardens, but our forests, as they feed on almost every different kind of tree; but with that beautiful arrangement by which all the works of our Great Creator are balanced equally with each other, and none allowed to predominate,

these insects are such favourite food for birds, that not a hundredth part of them are suffered to reach maturity. The eggs of the lackey moth are often found fixed on a naked twig, in winter, looking like a bracelet of hard beads, and adhering so firmly together, that the whole bracelet may be slipped off entire.

The cabbage butterflies are also very destructive in the larva state. The caterpillars are soft, of a pale whitish green, and very active, leaping about in the hand when taken; and the chrysalis, which is also green, looks as if it were swathed up like a mummy. The caterpillar of the beautiful little ermine moth is a gregarious feeder, like the lackey caterpillar, and is nearly as destructive; and it is the more necessary to mention this, because the moth itself is so small, so delicate, and so quiet, that no one unacquainted with its habits would think of killing it as an injurious insect.

The leaf-rollers, the saw-flies, and the gnats which occasion the oak-galls, are all very destructive. The leaves of the rose-tree are often found marked, in summer,

with pale-brown zigzag lines, with a narrow black line running down the middle of each. These lines are the work of a very small orange-coloured caterpillar, not more than two lines long, that lives on the parenchyma of the leaf; and the pale-brown mark is occasioned by the epidermis drying where the pulp beneath it has been removed. The moth is called the red-headed pigmy, and it is so small as not to measure more than two lines and a half broad, when its wings are fully expanded. The "worm i' th' bud" of the rose, is the maggot or grub of one of the kinds of saw-fly; a beautiful transparent-winged little creature that no one would suspect of springing from such a frightful-looking maggot. But of all the insects that infest the rose, the most destructive are the aphides. These little green flies cover the tender leaves and buds of the young shoots in myriads, and are extremely difficult to destroy, without spoiling the appearance of the shoots that have been attacked by them. Tobacco-water is an excellent remedy, if not too strong. It should be made by steeping half-a-pound of the best tobacco in a gallon



Patent Blower and Fumigator.

of hot water; and as soon as the infusion has become cold, the young shoots should be dipped in it, and suffered to remain a few seconds, after which they should be immediately washed in clean water before they are suffered to dry. If this be done carefully, the insects will be destroyed, and yet the shoots will remain uninjured. Lime-water may also be tried, if no more lime be used than the water will hold in solution; as unless the water be quite clear in appearance when applied, the plant will be very much disfigured with the white stains of the lime. Another means of getting rid of all noxious insects, is to fumigate them with tobacco; and the best way of doing this is by a small brass fumigator, which costs four shillings, applied to one of Clark's patent blowers. The fumigator is filled with loose tobacco, which is lighted, and the brass tube is then screwed on the blower, and the fume gently spread through the green-house, or among the plants. By putting a little of the moxa or Spanish tinder among the tobacco, or using it alone, caterpillars, butterflies, snails, &c., may be stupified, when they will

fall from the branches, and may be gathered up and destroyed. An excellent preventive remedy is to wash the stems and branches of deciduous rose-trees, in winter, with water heated to 200°, or with a mixture of strong tobacco-water and soft-soap; cleaning the branches well at the same time with a soft brush. The American blight which infests apple-trees is another species of aphid, and may be destroyed in the same manner.

Besides the insects already enumerated, there are several kinds of beetles, which devour plants both in the larva and perfect state. Of these, the cockchafer remains in the larva state four years, and is one of the most destructive insects known; the rose beetle, or rose chaffer (*Cetonia aurata*) is extremely beautiful, from its splendid wing cases of burnished green and gold. These beetles, notwithstanding their shape, which looks too heavy and clumsy for flying, may frequently, in hot summer weather, be seen upon the wing, making a loud buzzing noise. When taken up in the hand, they draw up their feet, and appear to be dead; but, after having been handled, and even tossed about

for some time, they will, if a favourable opportunity appears to offer, suddenly spread out their wings and buzz away, leaving their captor too much astonished to be able to make any effort to retain them. Several of these insects may often be found in one rose; but they are supposed to be only engaged in sucking the honey from the flower, and not injuring it. They undergo their transformations under ground, and the grubs are supposed to live entirely on little bits of rotten wood. Besides the insects already mentioned, the various kinds of weevils, the wire-worm, the thrips, the red spider, or rather mite (*Acarus telarius*), various kinds of tipula, or Gaffer long-legs, wood lice, and earth-worms, are all found on plants, and are all more or less injurious to them. In the general destruction of insects, the Lady-bird should always be spared, as, both in its larva and its perfect state, it lives on the larvæ of the green fly, or aphid.

Snails and Slugs are more destructive to vegetation than any kind of insect; and they are still more difficult to get rid of. There is a very small gray slug, that is

peculiarly injurious to plants in pots; the large grey is also very destructive, and the common garden snail. The beautifully banded snail (*Helix nemoralis*) is, however, supposed to live partly on earth-worms, and the shell slug (*Testacella scutella*) lives entirely on them. The usual modes of entrapping snails, slugs, and wood-lice, are laying down slices of raw potatoes or cabbage-leaves at night, and examining them before the dew is off the plants in the morning. As, however, this requires very early rising, a more convenient method is to lay a few flower pots upon their sides, where the snails have committed their ravages; and the snails, which can neither move nor feed unless the ground be wet with dew or rain, will generally be found to take refuge in the flower pots from the heat of the sun. They are likewise often found in the middle of the day, sticking against walls, under ivy, or box edgings. In gardens very much infested with snails, search should be made in winter among all the ivy and box in the garden; and all the snails found in a torpid state should be destroyed. This, though some

may escape, will effectually prevent them from becoming numerous; and, as the eggs are not laid till April or May, care should be taken, before that season, to destroy all the snails that can be found. The eggs are round, almost transparent, and of a bluish white; and they are always found in small clusters, buried in the ground.

CHAPTER VI.

THE KITCHEN-GARDEN — THE MANAGEMENT OF CULINARY VEGETABLES.

In almost all gardens, it is customary to set apart a portion of the ground for the culture of culinary vegetables; and, in villas and country seats, this portion is quite detached from the pleasure-ground, and is called the kitchen-garden. When this is the case, it usually consists of a square or oblong piece of ground, varying from one to five acres in extent, according to the size of the establishment, and enclosed by a wall ten or twelve feet high. If a greater extent of ground than two or three acres be required, it is generally laid out in two or more gardens, communicating with each other, so

as to afford an extent of wall proportionate to that of the ground. In front of the wall is a border for the roots of the fruit trees, ten or twelve feet wide, and beyond that a walk usually four feet wide, leaving a plot of ground in the centre for the culture of culinary vegetables and espalier fruit-trees. The central plat is usually divided by a main walk up the centre, five or six feet wide, and two or four side-walks, three or four feet wide; the smaller plots enclosed between these walks being again divided into oblong compartments, or beds.

The general form and arrangement of all large kitchen-gardens being alike, it is obvious that they must have been determined by some general principle; and this principle appears to be utility. The walks are made straight, that the heavy loads wheeled along them may not be in danger of overturning, which they would if the walks took a serpentine direction; while the compartments are divided into oblong beds, for the convenience of digging and cropping; it being found most convenient to sow vegetables in straight lines, to allow of weeding and hoeing be-

tween them, earthing up, &c. For these reasons, all pieces of ground in small gardens appropriated to the culture of kitchen vegetables should be made to approximate, as closely as possible, in form and general arrangement, to regular kitchen gardens; and, where there is any portion of the ground that cannot be brought into a rectangular shape, it should be set aside for tart-rhubarb, artichokes, or some other permanent crop; and a square or oblong plot in the centre be reserved for peas and beans, and other annual vegetables.

The best soil for a kitchen garden is a sandy loam, and the surface soil should be from two feet to three feet deep. If it is on a clayey sub-soil, every part of the garden should be well drained; as from the quantity of manure required for cultivating culinary vegetables, if any water should be suffered to remain in a stagnant state in the soil, it would be particularly injurious. The ground, if possible, should slope to the south or south-east; and it should, at any rate, be sheltered from the prevailing winds of the locality.

When there is only one detached kitchen

garden; it is usual to surround it entirely, or on three sides, with a piece of ground called a slip, consisting of a fruit-tree border, and a walk with perhaps a narrow bed beyond it, bounded by a low hedge. This is done in order that fruit-trees may be grown on both sides of the wall. The vinery and forcing houses are generally placed facing the main walk of the garden; and what is called the melon-ground, which forms a small walled garden, is often placed behind them. This, however, is not essential; but the melon-ground should always be as near as possible to the stable-offices, for the convenience of carting manure; and both it and the kitchen garden should be near the house, and have a convenient road to it concealed from the pleasure-ground. In small suburban gardens there should always be a convenient, and, if possible, partially concealed, road for servants to bring in vegetables; and there should be a little plot of ground for thyme, mint, sage, parsley, &c., very near the kitchen door.

Walks.—The obvious use of walks in a garden constructed on a general principle of utility, is to enable the gardener and others

to reach every part of the garden as speedily as possible, without treading on the beds; and for this reason, though the walks are made to intersect each other at right angles, it is customary in many gardens to round the central beds adjoining them at the corners. Paths two feet wide are also made between the beds into which the compartments are divided; and the beds themselves are never wider than a man can conveniently reach across to the middle to rake or hoe. These paths, however, as they vary according to the nature of the crop, are never made of any permanent materials; and the whole compartment is generally dug over when necessary, without paying any regard to them, and re-divided into fresh beds every season.

The walks, on the contrary, being intended to be permanent, are of a very different nature; and, in addition to their obvious uses, it is essentially requisite that they should be hard and firm. This is necessary, as the manure, &c. wanted in a kitchen garden, is generally distributed through the garden in a wheelbarrow; and the weight in the act of

wheeling is principally thrown upon a very narrow wheel, which, on soft walks, literally ploughs its way through the gravel, leaving an uneven furrow, extremely offensive to the eye. To avoid this inconvenience, the walks in kitchen gardens, where expense is not an object, are frequently made of cement or asphalt, or laid with bricks or flag-stones; but as all these materials give the idea of a court-yard, rather than a garden, most persons prefer gravel walks. Where gravel is to be employed, the intended walks are marked out with two garden lines; the space between is then dug out, generally in the form of an inverted arch, from one foot to two feet deep in the centre, according to the nature of the soil, and the expense it may be thought advisable to incur; and the excavation is filled to within six inches of the top with brick-bats, stones, or any other hard rubbish that can be procured. If the excavation be made in the shape of an inverted arch, in filling it up the extreme point of the arch should be left hollow to serve as a drain; and if it be made rectangular, a drain is generally left on each side. In filling in the rubbish

the largest pieces are thrown in first; their smaller ones, and lastly pieces broken very small, which are rammed down, or rolled, so as to form a smooth surface immediately under the gravel. This is done both to give solidity to the walk, and to prevent the gravel from being wasted by trickling down between the interstices of the stones. As walks can never be firm unless they are kept quite dry, in all cases there should be at least one drain to each walk. The gravel before laying down should be sifted, and all stones, larger than a moderate-sized gooseberry, should be thrown out or broken; and as soon as it is laid down and evenly spread, it should be well rolled, previously to which, if it should be very dry, it ought to be sprinkled with water. If the gravel be at all loose, it should be mixed with equal parts of brick-dust and Roman cement before laying it down; or the gravel should be mixed with burnt clay powdered, in the proportion of one wheelbarrow full of clay, to a two-horse cart-load of gravel; or if the gravel be already laid, and it is wished to render the walk more firm, powdered burnt clay may be

strewn over it, and raked in. In all these cases, the walks must be immediately well watered, and afterwards heavily rolled. Sometimes the clay is mixed with water before applying it to the gravel. Tolerably firm walks may be made of sea gravel, or powdered sandstone, where good gravel cannot be procured, or even of sand by this treatment. The clay may be burnt by making it into a heap, intermixed and surrounded with faggot wood; or, as a substitute for burning, it may be dried by spreading it on the top of the furnace or boiler employed to heat the hothouses. Gravel walks are generally slightly raised in the middle, to throw off the water to the sides; and they are very frequently supplied with gratings, to prevent large stones, or any kind of rubbish, from being washed down by the rain into the drains so as to choke them up. When the walks in a kitchen garden are formed of flag stones, artificial stone, or brick, the material used is laid on brick arches or piers; and when grass walks are employed, they require no other preparation than marking them out on the ground, consolidating it by pressure;

and then laying them with turf. Grass walks were formerly common in kitchen-gardens, but they are manifestly unsuitable, being more injured than any others by the wheelbarrow, and unfit to walk on in wet weather.

When gravel walks want renovating, the gravel should be loosened with a pick, turned over, raked, and firmly rolled, adding a coating of fresh gravel wherever it may be found necessary. Weeds may be prevented from growing on gravel walks by watering the walks with salt and water. The salt will also kill the weeds already there, and, if these are large, they should, of course, be hoed up and raked off.

Box edgings are better than any others for gravel walks. They are generally planted in March or April. A garden line being first drawn tightly along the earth bordering the walk; a shallow trench is then opened close to the gravel, and the earth from it thrown on the bed. The box is pulled into separate plants, and the branches and roots of each trimmed till all the plants are very nearly of the same size. The plants are

then: put into the trench, with no earth between them and the gravel; and the trench is filled up by drawing the earth into it, and pressing it close to the roots, so as to make the plants quite firm. Nothing else is requisite but a few waterings, till the box begins to grow; and the only difficulty is to keep the plants in a straight line, with the points of their shoots at an equal distance above the soil. When box edgings are pruned, they should always be cut in with a knife, and never clipped with shears. They should also never be suffered to grow too high without pruning; and they should be occasionally taken up and replanted wider apart, when their stems appear to be becoming naked below.

Cropping.—The crops grown in the open air in a kitchen-garden are of two kinds,—those produced by the fruit trees, and those of the herbaceous vegetables; and the latter are again divided into the permanent crops, and the temporary ones. The permanent crops are those which remain for a number of years in one place, producing a crop, year after year, from the same roots; such as

asparagus, artichokes, rhubarb, &c. : while the temporary crops are those that require sowing or fresh planting every year, and these should never be sown for two years in succession on the same ground.

PERMANENT CROPS.—In regular kitchen gardens, it is of very little consequence where the permanent crops are placed, as every part of the ground is generally alike accessible from the walks, and alike suitable for cultivation. But in small gardens the case is different; and there are generally some awkward corners, which are best set apart for the lasting crops. The part to be sown annually should be always divided into compartments, in order to manage properly the rotation of crops.

Asparagus Beds.—Of all the permanent crops grown in a garden, the one which requires most preparation is asparagus. It is not perhaps generally known that this plant is a native of Britain; but the fact is, that it grows wild in several places both in England and Scotland. The cultivated plant is, however, of course, very different from the wild one; for, while the latter is

meagre, insipid, and very tough, the former is not only succulent and finely flavoured, but grows to an enormous size. There are three sorts of asparagus grown for the London market: the Battersea, which has a thick whitish stalk, only just tipped with a pinkish head; the Gravesend, which is much more slender, and has both the stalk and head green; and the Giant, which is an enormous variety of the first. Asparagus is always raised from seed; but, as the stalks are not fit to cut till the roots are two or three years old, persons wishing to plant an asparagus bed generally purchase one-year or two-years' old plants from a nurseryman.

Asparagus plants require a light, rich, sandy loam, and the ground in which they are to be planted is always first trenched from three to four feet deep, or even more, and plenty of stable dung is buried at the bottom of the trench; the beds are then marked out four feet wide, with paths two feet wide left between, and the plants are planted in rows about six inches deep (the crown of the root being left about two inches below the surface), and nine inches apart.

The beds are generally covered during winter with rotten manure, which is forked in, and the beds raked in spring; and this treatment should be repeated every year, or every two or three years at farthest, the beds being slightly covered, in the intermediate years, with litter, leaves, &c., which may be raked off in spring. The stalks should not be cut till the third year after planting; but, after that, the roots will continue to produce freely for twelve or fourteen years. Asparagus is cut generally a little below the surface, with a sharp knife, slanting upwards; and the market-gardeners cut all the shoots produced for two months,—say from April till Midsummer,—but suffer all the shoots that push up after that period to expand their leaves, in order that they may elaborate their sap, and thus strengthen the roots. Whole fields of this plant are cultivated by the market-gardeners near London; to the extent, as it is said, of from eighty to a hundred acres, chiefly near Mortlake, Battersea, and Deptford. During the last four or five years, these fields, and many private gardens near London, have been infested

with a most beautiful little beetle, striped with red, black, and blue, which eats through the shoots close to the ground almost as soon as they appear. Asparagus is generally forced by covering the beds with manure, and by deepening the alleys between the beds, and filling them with manure also.

Sea-Kale.—About seventy years ago, Dr. Lettsom, a celebrated physician and botanist of that day, happened to be travelling near Southampton, when he observed some plants pushing their way up through the sea-sand. Finding the shoots of these plants quite succulent, he enquired of some person in the neighbourhood if they were ever eaten, and was answered, that the country people had been in the habit of boiling these shoots and eating them as a vegetable from time immemorial. The doctor tasted them, and found them so good, that he took some seed to his friend Mr. Curtis, the originator of the "Botanical Magazine," who had then a nursery in Lambeth Marsh. Mr. Curtis wrote a book about the plant which brought it into notice, and he sold the seed in small packets at a high price: and thus, this long

neglected British plant, which for so many years was only eaten by the poorest fishermen, became our highly prized and much esteemed sea-kale, which is now so great a favourite at the tables of the rich.

Sea-kale is raised either from seeds or cuttings of the roots. In either case, when the plants are a year old, they are put into a bed thoroughly prepared as if for asparagus, and planted in the same manner. The first year the plants will require little care, except cutting down the flower-stems wherever they appear; but the second year they will be ready for forcing. This is performed by covering the plants first with river-sand; then turning what are called sea-kale pots over them, and lastly, covering the pots to the depth of fifteen or twenty inches with fresh stable dung, the heat from which will draw the shoots up, and make them succulent and fit to eat.

Artichokes are another kind of permanent crop, but they are not suitable for growing in a small garden. The artichoke is a native of Italy, said to have been introduced in the reign of Henry VIII. It is propa-

gated by division, and requires a light, rich, and rather moist soil. Manure should be laid between the rows every autumn, and the plants covered with straw in severe weather in winter. Artichoke-plants do not continue to produce good heads longer than six or seven years; but young plants come into bearing the second year after transplanting.

Strawberries.—Though strawberries should be properly included in the list of fruits, they are generally classed by gardeners among the permanent herbaceous crops in a kitchen-garden. There are a great variety of named sorts grown in gardens; but they are mostly varieties or sub-varieties of three species, viz. : the Pine (*Fragaria grandiflora*), which is supposed to be originally from Surinam; the Chili (*F. Chilensis*), and the Scarlet (*F. Virginiana*). Of these the pine-strawberries are large, pale in colour, but with scarlet flesh, and of a very fine and delicate flavour. The best strawberries are Keen's seedling, and the old pine; the Chili strawberries (one of which is Wilmot's Superb) have very large fruit, with white flesh, but pos-

sess very little flavour; and the scarlet-strawberries have small, bright-red, slightly acid fruit, which is principally used for ice-creams and preserving. To these may be added the Hautbois (*F. elatior*), which, though so often mentioned by the street vendors, is in reality very seldom grown, from the fruit, which is small and blackish, being rarely produced in any quantity; the Green strawberries (*F. collina* and *F. virides*); the Alpine strawberries (*F. semperflorens*); and the common wild Wood strawberry (*F. vesca*).

Strawberries should be grown on rich loamy soil, and they are generally planted in beds three feet wide, three rows in a bed. Every year, the strongest of the runners should be taken off, and planted to form a succession crop, as the beds seldom remain good more than three or four years. When the old beds are suffered to remain, they should be covered with manure in winter to be forked in in spring. When strawberries are wanted for forcing, pots are placed near the beds, and the runners are placed over them, and kept down with a stone, or hooked down with pegs to root.

Tart Rhubarb.—The part of the rhubarb used for making pies and puddings is the footstalk of the leaf; and the kinds usually grown in gardens for this purpose are *Rheum Rhaponticum*, a native of Asia introduced in 1573, and *Rheum Undulatum*, a native of China introduced in 1734. *Rheum Palmatum*, the leaves of which are very deeply cut with pointed segments, is generally supposed to be the kind, the root of which is used in medicine, under the name of Turkey Rhubarb. Buck's Elford, or Scarlet Rhubarb, has slender stalks, but is valuable for its beautiful colour; and the Tobolsk, the Giant, and the Victoria Rhubarb, are remarkable for the enormous size of their stalks. *Rheum Australe*, which is by some said to be the medicinal kind, and which is only lately introduced, has also enormous leaves, and very long thick stalks, the skin of which is rough, while the pulp tastes like that of apples.

Rhubarb is either raised from seed, or propagated by offsets, or dividing the crown of the root. The seed is sown in April, in light rich soil, and the plants are pricked out in autumn into a bed of rich sandy loam

which has been dug over, or trenched to the depth of eighteen inches or two feet. The plants require no other care than an occasional autumn or spring coating of manure to be slightly forked in, this dressing to be only applied, when, from the leaves and stalks produced being smaller than usual, the roots appear to want nourishment; and if they seem crowded, they may be occasionally taken up and replanted further apart. Rhubarb may be forced by covering it with pots and manure, like sea-kale; or the roots may be planted in a box, and kept in the house on a stove, or near the fire in the kitchen, covering the box with a bast mat to keep the plant in darkness and free from the dust, and watering it frequently.

Horse radish grows best in rich alluvial soil; and it is propagated by cuttings of the crowns of the roots, each about two inches long. The ground is then prepared by trenching at least two feet deep, and the cuttings or sets are planted in a kind of furrow about fifteen inches deep, with their crowns upwards. The second year the roots may be taken up, and the crowns cut off and

replanted. As the sets are planted in March, and the leaves seldom begin to appear till the following June or July, it is customary to sow a light crop, of lettuce for example, or spinach, on the surface of the ground over the horse radish sets; which crop is cleared off in time to make way for the leaves of the true crop. When the sticks of horse-radish are taken up, they may be kept in sand in a cellar or out-house till wanted for use.

TEMPORARY CROPS, AND THEIR ROTATION.

—It has been already observed, that temporary crops should never be grown two years in succession on the same ground; and the reason for this has been already alluded to under the head of transplanting. It is, that the roots of plants every year throw out a quantity of excrementitious matter that they either will not reimburse, or that is injurious to them; and that thus, the ground in which they have been grown one year, becomes unfit for them to grow in the next. This danger is obviated in the case of perennial plants, and trees and shrubs, by the constant elongation of the roots, which spread farther and farther every year, beyond the influence

of the unwholesome soil. This, however, is not the case with annuals, as the roots of the plants of one year are no longer than those were of the plants of the preceding year; and consequently as every year's plants occupy exactly the same ground, when annuals are sown for several years in the same soil they must degenerate; or, in other words, become weak and small, from not having enough of wholesome food, or from being forced to take food unwholesome for them. Now it has been found, that excrementitious matter, though poisonous to the plant that exudes it, is extremely nourishing to other plants, completely differing from the first in nature; and what is meant by the rotation of crops, is the art of making plants of opposite natures succeed each other, till the ground shall be so completely cleared of the excrementitious matter exuded by the first crop, as to be ready to receive it again. It is true that the same ground may occasionally be made to bear the same crops for several successive years, by copious manuring, or by trenching; but in both cases the evil is overcome by supplying the plant with abundance of nour-

ishment, and thus preventing it from being driven to the necessity of taking unwholesome food. In fixing the rotation of crops, plants differing as much as possible in their habits should be chosen to succeed each other; as, for example, onions may be succeeded by lettuces; carrots by peas; potatoes by cabbage; turnips by spinach, &c.

The Cabbage Tribe.—Few persons unacquainted with botany will be able to believe that brocoli, cauliflowers, cabbages, Scotch or German Greens, Brussels sprouts and savoys, not only all belong to one genus, but are actually varieties of one species of a genus, viz. *Brassica oleracea*; and that the turnip, the Swedish turnip, and the rape (the seed of which is used for oil), belong to other species of the same genus. The cabbage, in its wild state, is a biennial which grows naturally on the sea-coast in different parts of England, and is a tall straggling plant with loose leaves, and a rather pretty yellow cruciferous flower. The borecole or kale is the first improvement effected by cultivation; and the cauliflower the last. Indeed it is impossible to imagine a greater difference

between any species and variety, than exists between the cauliflower and the original wild cabbage plant. All the varieties of the cabbage tribe require a soil which has been enriched with abundance of animal manure; and when decaying, they have all a peculiarly offensive smell like that of putrid meat, from the large quantity of azote that they contain.

The Cabbage.—The word “cabbage,” in its original signification, means a firm head or ball of leaves folded closely over each other; and thus, there is a cabbage lettuce, and a cabbage rose. The cabbages grown in gardens are usually sown at three different times; for the spring, summer, and autumn crop. The spring cabbages are sown in summer generally about the first week in August, in an open airy situation, and in light soil. When they come up, they are thinned; and in October or November they are ready for planting out in rows, twelve or eighteen inches apart, into the beds where they are to cabbage. In small gardens, cabbages are seldom raised from seed; but the plants are purchased when ready for planting out. The summer crop is sown in February,

and planted out in rows eighteen inches or two feet apart; and the autumn crop is sown in May, and planted out in July, generally eighteen inches apart every way. All cabbages require a rich soil, and frequent hoeing up; and in dry weather they should be watered to make them succulent. The stalks of the spring cabbages are generally pulled up and carried to the refuse heap as soon as the cabbages are cut; but the stalks of the summer and autumn kinds are left standing, that they may throw out what are called sprouts. The culture of the red cabbage is exactly the same; except that there is no spring crop, and the stalks are never left standing for sprouts. Some gardeners sow only one crop of green cabbages, and leave the stalks standing to produce sprouts all the rest of the year. When the cabbage stalk is left for sprouts, it is customary, after cutting the cabbage, to give the stalk two cuts across, so as to divide the top into four; as when this is done, it is thought to produce sprouts with more certainty.

Coleworts are young cabbages gathered before they form a head; and they are gene-

rally sown in June or July for an autumn, winter, or early spring crop. As they are always eaten young, they need not be planted more than ten or twelve inches apart every way; and when they are gathered the stalks are always pulled up and thrown away.

Savoys and Brussels sprouts.—Savoys are large cabbages with wrinkled leaves, the seed of which is sown about the end of March, in order that the crop may be ready for the table in November. The culture is the same as that of cabbages, except that as the savoys are large, they should be planted out in the bed where they are to cabbage, two feet apart every way. Brussels sprouts are a variety of the savoy cabbage; the plants first produce a small savoy on an elongated stalk, and when this is cut off, the long stalk throws out a number of little cabbages from its sides, which are the Brussels sprouts. The culture is the same as for the Savoys, except that the plants, as they do not spread, need not be more than a foot or eighteen inches apart every way; and that the seed is generally procured from Brussels; as that ripened in England is said to produce

inferior plants. Both savoys and Brussels sprouts are much better if not cut till there has been some frost upon them; and they are consequently of great value as winter vegetables.

Brocoli and Cauliflower.—The cauliflower (the name of which is supposed to be derived from *caulis*, a stalk, and *florens*, flowering,) is a native of Cyprus, introduced in 1694; and no one unacquainted with the details of its culture, and who has seen the immense quantities brought to the London market, could credit the extraordinary care bestowed on each plant to bring it to perfection. Cauliflowers take nearly a year from their first sowing to bring them into a state fit for the table; and as the plants are too tender to bear an English winter without protection, they require to be grown in frames, or sheltered by hand glasses during frosty weather. The seed is sown in August, in a bed of rich light earth, and the ground is occasionally watered till the plants appear. They are then shaded with mats during the heat of the day, and thinned out, so as to leave the plants a little distance apart. In September they

are pricked out into beds of rich earth, and watered and shaded; and about the end of October, or beginning of November, they are transplanted into frames, or into beds, richly manured with rotten dung, spread over the ground three or four inches thick, and trenched in, a spade deep; after which, they are watered and covered with hand-glasses. During the whole winter they require constant attention, slightly watering them, and raising the glasses to give them air in fine weather; and covering up the glasses closely with mats or straw in severe frosts, and during the continuance of sharp winds. They must also be frequently looked at, to pick off decayed leaves, &c., which might rot the stem; and the ground in which they grow must be strewed with a mixture of lime and soot, to protect them from the attacks of caterpillars and slugs. Care must also be taken by giving air, &c., to prevent them from being drawn up, or running to flower too soon. At length spring arrives, and the plants which have safely survived the winter must be looked over, and thinned out so that only one or two may be left to

each glass; the earth is then loosened, the plants regularly watered, and the glasses taken off in the middle of the day, but carefully replaced at night. At last, towards the end of April, the glasses are removed altogether, and in May some of the plants will begin to make heads; but even then the care bestowed on them must not cease. The plants must be examined daily, and some of the leaves turned down over the flowers, to preserve them from the rays of the sun, which would turn them brown, and from the rain which would rot them. At length, about the end of May, or in June and July, the cauliflowers are ready for the market; and little do the purchasers of them think of the labour and unremitting attention which, for so many months, have been required to rear them. A second crop, sown in February and planted out in April, will be ready in August; and a third crop, sown in May and planted out in July, will be in perfection about Michaelmas or October, and may be preserved in mild weather till near Christmas.

Brocoli is generally supposed to be a variety of the cauliflower; but it differs

essentially, both in being much hardier, and in being very apt to vary. Thus, while only two kinds of cauliflower are known, the early and the late, and even these can hardly be distinguished from each other, — there are ten or twelve distinct sorts of brocoli, and more are being raised every day. All these kinds, however, appear to have sprung from two, the purple and the green, which are said to have been brought from Italy. Brocoli is grown for the table in autumn, winter, and early spring; but there is no summer crop. The principal seasons for sowing are February and April for the autumn and winter crops, and June for the spring crop; and the plants succeed best in fresh loamy soil, or, if this cannot be procured, in ground that has been deeply trenched and well manured. The culture is like that of cabbages, except that, in very severe winters, the plants require a little protection.

The Borecole is generally known in England by the name of Scotch kale, and in Scotland by that of German greens. There are many different sub-varieties, fourteen

of which are enumerated in the *Ency. of Gard.*; but all the kinds agree in being generally sown in April, and transplanted in June. They require no other culture, except hoeing and earthing up; and, as they are exceedingly hardy, they are very valuable vegetables for winter use.

The Leguminous tribe.—Vegetables belonging to this tribe generally occupy the ground but a few months in the summer, and are thus very suitable, in the rotation of crops, to precede or follow those of the cabbage tribe, which occupy the ground the greater part of a year.

Peas.—The list of peas is almost interminable, and it is continually changing; so that what may be considered the fashionable peas of one season are generally superseded the next by some others, to which every possible merit is attributed. There are, however, some very distinct kinds, the principal of which are—the dwarf early kinds, which are dry and mealy when full-grown, and become whitish when they are old; the Prussian and marrow-fat peas, which are soft and juicy, with a rich marrowy flavour,

and which remain green even when quite ripe; and the sugar peas, which are boiled, like kidney beans, in their pods. The soil for peas should be a light, dry, sandy loam, tolerably rich, but not freshly-manured; and, for this reason, they are particularly well adapted to succeed any of the cabbage-tribe, for which a great deal of manure is required. They should generally have an open sunny situation; and the early crops should be sheltered from the prevailing winds of the district. If peas are sown in freshly-manured, very moist, or clayey soil, they will run to haulm, that is, they will produce more leaves and stalks than peas: and, if grown in calcareous soil, they will boil hard and tough, even when young, and when old will never become floury.

The early peas are small, and few in each pod, and with so little flavour, that we never have them sown in our little garden, but have the green Prussians sown early for a first crop, and again, a little later, for a second. The early dwarf peas are, indeed, of little use, except for forcing. They are, however, frequently sown in November and

December, to stand the winter in the open border, in order that they may produce a crop the following May or June. When forced, they are sown in pots plunged in a hotbed, and transplanted into the open border in March; turning them out of the pots into holes made to receive them, without breaking the balls of earth round the roots. In some cases, they are fruited in pots placed in a greenhouse, or even stove; by which means, when it is thought worth while to incur the expense, fresh green peas may be had at Christmas. The main crop of early peas is, however, sown in February. A pint of small early peas will sow twenty yards of drills; each drill being one inch and a half deep, and the drills two or three feet asunder. The drills are marked out by stretching a garden-line lengthways along the bed, and then making a drill or furrow along it with a dibber; the earth is pressed firm at the bottom of the drill by the very act of making it, and the peas are then distributed along it, two or three to every inch, or wider apart, according to their size, and covered with soil, which is generally

trodden down or rolled. When attacks are apprehended from mice, dried furze is generally strewed over the peas as soon as they are put into the ground, and before they are covered with earth; and this is efficacious, not only in protecting the peas from their enemies, but in keeping enough air about them to allow them to vegetate. They should then be well watered, and will require no farther care till they come up. When they are two or three inches high, they should be hoed; that is, the weeds which may have sprung up between the rows should be hoed up, and the earth drawn up to the roots of the peas. When about six inches high, they should be staked, with two rows of sticks to each row of peas; the sticks being about a foot higher than the average height of the peas, and care being taken never to let them cross at top.

Late peas only differ in their culture from the early crops in having their drills farther apart, and in being placed farther apart in the drills. A pint of these peas is calculated to sow thirty-three yards of rows, and the peas of the larger kinds should be from one

inch to two inches, or even more apart in the drills. Dwarf Marrowfats and Blue Prussians are, however, frequently sown about three in two inches. The time of sowing usually varies from April to July; but where no early peas are grown, even the late kinds may be sown as early as February or March. The tall-growing kinds should, however, never be suffered to stand the winter; and they should not be sown before March, unless the weather appear likely to be open, on account of the greater difficulties attending tall-growing plants. It may indeed be here observed, though the fact is obvious, that all dwarf-growing plants are much better adapted for forcing, than the tall-growing kinds; from their being much more easily sheltered and protected. Peas should always be eaten when freshly gathered, as they are perhaps more injured by keeping than any other vegetable. The pea is a native of the south of Europe, and it is supposed to have been introduced in the reign of Henry VIII.

Beans, though belonging to the same natural order as peas, and generally classed

with them by persons speaking of garden products, yet differ in several very important particulars: for instance, they will grow in much stronger soil; they do not require sticks; and they are generally topped, that is, the leading shoot of each plant is cut off, an operation that would be fatal to peas. There are many different kinds of beans, though not so many as of peas; and the different varieties may be divided into the early and the late. The early beans may be sown in drills in November or December, to stand the winter; but the main crop is generally sown in January or February. The late beans are sown in March and April, and some even so late as June; and instead of drills, a hole is made for each bean separately with a dibber. Both sorts are covered with earth, which is pressed down and then watered; and they require no further care till the beans are three or four inches high, when they should be hoed and earthed up. As soon as the plants come into blossom, the tops are cut off; and this is said not only to increase the crop, but to prevent the plants from being attacked with the insect

called the black blight. The crop should be gathered when the beans are about half ripe. The bean is said to be a native of Egypt; and it is supposed to have been brought to England by the Romans.

Kidney-Beans differ from the other leguminous vegetables, in their pods being eaten. There are two distinct kinds, the Dwarf Kidney-Beans, and the Scarlet-Runners; and these are again divided into numerous subdivisions. The soil for the dwarf kinds should be similar to that for peas: viz., rich, light, and dry, but not newly manured; and it should have been well pulverized to the depth of a foot or eighteen inches. The drills are generally made about two inches deep; and two feet or two feet and a half apart. The seeds are sown the first or second week in May. As the plants grow, they may be earthed up; and if the plants are very vigorous, and appear disposed to run to haulm, a few of the leading shoots may have their tops pinched off; but this should be done carefully, and the operation confined to a few of the strongest growing plants. The scarlet-runners require nearly the same

culture, except that the seeds should be sown two or three inches asunder, and only lightly covered; and that the rows should be at least three feet apart. The seeds are covered lightly, as abundance of both air and moisture are required to make seeds enveloped in so thick a skin germinate; and the rows must be wide apart on account of their height, as otherwise the crop would not get enough sun and air. The scarlet-runner is properly a perennial, and if the plants are cut down to the ground after producing their crop, and their roots are covered with dry litter, they will produce an early and abundant crop the following summer. Kidney-beans are very frequently forced nearly in the same manner as peas; viz., by sowing them in pots plunged in a hot-bed, and then removing them to a hot-house or green-house (according to the season) to fruit. Sometimes they are sown in the earth of the hot-bed, and fruited there like cucumbers. The dwarf kidney-bean is a native of India, and was introduced before the time of Gerard; but the scarlet-runner is a native of South America, and was not introduced

till 1633, when it was at first only cultivated in the flower-garden as an ornamental plant, and it is treated as such by all the early writers on flowers.

The Potatoe is a native of South America, but it was first brought to England by Sir Walter Raleigh, from Virginia. It was hence called the Potatoe of Virginia; and it was at its first introduction thought very inferior to the *Convolvulus Batatus*, which was called the Spanish Potatoe, and to the Jerusalem Artichoke, which was called the Potatoe of Canada, from its having been first taken from South America to Canada, before it was brought to England. About twenty or thirty sorts of the common potatoe are now cultivated for the table; but so large a quantity is wanted in almost every family, that few persons attempt to grow their main crop in a garden. A few early potatoes are, however, grown frequently; and the best of these is decidedly the ash-leaved kidney. The soil for potatoes should be a light, fresh, unmanured loam, and when manure is applied, it should be mellow dung, or well-rotted leaves. Potatoes are generally planted

by dividing the root into what are called sets, with an eye in each; but sometimes the tubers are planted whole. Seeds are never used, except where it is wished to raise new sorts. Potatoes are seldom good forced; but an early crop may be raised by planting the sets in October. The principal early crop is, however, planted early in March; and the principal late crop in May or June. When the potatoes are to be planted, the ground should be first well pulverized, and then, the garden-line being stretched across the beds, holes should be made along it with the dibber from two to four or five inches deep, and about a foot apart. The sets should then be put one in each hole, with the eye upwards, and the earth pressed firmly down on each. When the potatoes come up, they should be hoed, and again in about a fortnight or three weeks; and when the plants are eight or ten inches high, they should be carefully earthed up. As soon as the plants go into blossom, some cultivators cut off the tops, to prevent the roots from being exhausted by the formation of the potatoe apples, or fruit. When the

tubers are ripe, the stalks begin to wither, and may be taken up; but most persons have not patience to wait so long, and they begin to take up their early potatoes before the tubers are half-grown.

The Jerusalem Artichoke is a tuberous-rooted sun-flower, a native of Brazil; the epithet Jerusalem being a corruption of the Italian word 'girasole,' signifying to turn to the sun, from the supposed habit of the flower. The Jerusalem artichoke is planted in February or March, by sets, like the potatoe; and the tubers will be ready for use in September or October. It was introduced in 1716.

The Turnip succeeds best in a dry, sandy, or gravelly soil, which has been well manured, and dug to a considerable depth. The beds should be four or five feet wide, and the seeds having been strewed very thinly over them, the surface should be raked smooth, and then slightly beaten with the back of the spade. The first sowing is generally made in March, or the first week in April; and as soon as the young plants shew their rough leaves, they should be hoed up separately.

They will then seldom want any other culture till the end of May, when, if the weather has been favourable, they will be ready for use. A second sowing is generally made about the middle of May; and a third, for the main crop, towards the end of June. Besides the turnips usually sold in seed shops, the Teltow, or small yellow German turnip, the French long white, and the Scotch yellow, are well deserving of cultivation for their excellence. The common turnip, the carrot, and the parsnip, are natives of England.

Carrots are of two kinds—the long carrots, the root of which tapers gradually from the crown to the point, and the horn carrots, the root of which continues of nearly the same thickness for three-fourths of its length, and then abruptly diminishes to a very slender tap root. There are numerous sub-varieties of both kinds. The goodness of the carrot depending entirely on the ease with which the root can penetrate the soil, it is obvious that the soil, in which these roots are grown, must not be of a very adhesive nature; and thus the best carrots are grown in pure sand,

or peat. When soils of this nature cannot be procured, the ground should be trenched two spades deep, and a very little thoroughly rotten dung, or vegetable mould, should be well mixed with the earth in digging the lower spadeful. If manure, in a fresh state, be laid on a carrot-bed, or if the soil be not thoroughly pulverized, the roots will become forked, fibrous, and worm-eaten. The seeds of the carrot being each furnished with a pappus, or feathery wing, are apt to become entangled with each other, and can only be separated by rubbing them between the hands, and mixing them with sand. They are then to be sown very thinly, the ground slightly raked over to cover them, and then beaten flat with the back of the spade. When the young plants are up, the ground should be occasionally loosened, from time to time, with a small hoe, round each. When the leaves begin to change colour, the roots should be taken up, dry weather being chosen for that purpose; and the tops being cut off, the carrots should be carried into a cellar, or outhouse, and there buried in sand. Early carrots are

generally sown in February, and the principal crop about the middle of March.

The Parsnip requires the same culture as the carrot, except that there is no early crop. The seed is sown in February or March, and the roots are ready for use about the latter end of September, or beginning of October.

The Red Beet is a native of the sea-coast on the south of Europe, and was introduced in 1656. The seed should not be sown till the last week in March, or the beginning of April. The ground should previously be dug to the depth of a foot or eighteen inches, and mixed with a little sea or river sand, and vegetable mould, or rotten dung. The roots will be ready for the table in September or October. In taking them up, and boiling them, great care must be taken not to wound the outer skin; as, if they are scraped or broken, all the colouring liquid will escape, and the root will become of a dull, dingy, whitish pink, instead of its usual brilliant red.

The Skirret, the Scorzonera, and the Salsify, are all tap-rooted plants, which require the same culture as the carrot.

The Radish is a native of China, and was introduced into England before 1584. There are numerous varieties; but they may be all divided into three or four kinds:—the spring radishes, which are sub-divided into the spindle-rooted, and the turnip-rooted; the autumn kinds, which are frequently oval, or turnip-rooted; and the winter kinds, which are oblong and dark-coloured. The seed may be sown at any season when the ground is open; but the very early spring kinds are generally sown in October or November to stand the winter, and be ready to draw in February and March.

Spinach. — The round-leaved variety is generally sown for a summer crop, on rich moist soil, in January or February, if the ground be open; and the triangular-leaved kinds, of which the Flanders is the best, are sown for the winter crops in August. The summer crop, when gathered, may be pulled up by the root; but the winter crop should only have the outer leaves gathered, and it will thus continue producing fresh leaves for many months.

Sorrel is generally propagated by offsets

in spring or autumn; or, if by seed, it is sown in March. It is, however, seldom grown in English gardens.

The Onion tribe.—Very few onions, except for salads, are generally grown in small gardens. Where they are grown the soil should be a rich loam, well manured with very rotten dung; and though the beds need not be dug more than a spade deep, the soil to that depth should be well pulverized. The seed is sown broad-cast in March, on beds about four feet wide, and after it is raked in, the surface of the bed is rolled or beaten flat with the spade. In about three weeks the beds should be hoed, and thinned, as the young onions will be then ready for salads; and the beds should be again hoed and thinned out, from time to time, as the onions may be wanted. When the onions are from three to six inches apart, they are generally left to swell for the main crop, and they will be ready to draw in August or September. Many persons, about a month or six weeks before the onions are ready to take up, bend the stalks down flat on the bed, to throw all the strength of the plant into the bulb, and

to prevent its thickening at the neck. Onions for pickling are generally sown in April; and onions for salads may be sown at intervals all the year. When onions are wanted of a very large size, they are sown in drills, and regularly earthed up; and the Portugal onions are generally transplanted. In Portugal it is said that the alleys between the beds are filled with manure, which is kept constantly watered, and the water directed over the beds. Onions of enormous size have been grown in England by raising them on a slight hotbed in November or December, and transplanting them in April or May. When they are transplanted it is into very rich soil, three-fourths of which is rotten manure, and only the fibrous roots are buried in the soil, the bulb being left above ground. The plants are placed from nine inches to a foot apart every way, and regularly watered. Onions thus grown are not only of enormous size, but of very delicate flavour. Neither the native country of the common onion, nor the date of its introduction into England, is known.

Leeks may be treated like onions, and may

be grown to an enormous size by transplanting into a hole about twice their own diameter, at the bottom of which their fibrous roots are spread out and covered with soil, while the bulb is left untouched by the soil, standing in a kind of hollow cup. The plant is then well supplied with water, and will soon swell to fill the cavity. The leek is a native of Switzerland, and it was introduced before the time of Elizabeth.

The Chive is a perennial plant, a native of Britain, and it is propagated by dividing the roots in spring or autumn.

Garlic is propagated by dividing the bulb into what are called cloves, and planting them in February or March. They are generally planted in drills, and earthed up as they begin to grow. When the leaves turn yellow, which they will do about August, the bulbs should be taken up, and what may not be wanted for use, should be reserved for planting the following spring. Garlic is a native of the south of Europe, and was introduced before the time of Henry VIII. *The shallot* is a native of Palestine, and it has been in cultivation in British gardens at least as long as

the garlic. It is very difficult to grow, as it is apt to be attacked by a kind of maggot; but it has been found to succeed planted in cup-shaped hollows like the leek.

All the onion tribe require a light, rich, well-drained soil; and they always succeed best where there is a gravelly subsoil.

Salad plants.—These are very numerous, and include lettuces, endive, small salads, celery, &c. It is somewhat remarkable that nearly all these were known to our ancestors, and were in common use at British tables dressed much as we dress them now, while the potatoe was yet unknown, or only eaten as a sweetmeat stewed with sack and sugar.

The lettuce is said to have been introduced in 1562, but from what country is unknown. There are numerous varieties, but they may be all referred to two kinds; the cabbage lettuces which grow flat and spreading, and the cos lettuces which grow compact and upright. Lettuces are generally sown broadcast, like turnips or spinach, on beds of rich mellow soil, at any season from January to October; and the cabbage kinds require no after care, but weeding and thinning out. The cos lettuces are, however, generally

blanched by bending down the tips of the leaves over the heart, and tying them together with bast mat. Lettuces are also sown by the French to cut for salads when quite young, as we grow mustard and cress.

Endive is a native of China and Japan, introduced before 1548. It is generally sown in large gardens at three seasons, viz., April, June, and August; but in small gardens one sowing is generally thought sufficient, and that is made in May. The seeds are sown very thinly in beds of rich mellow earth; and when they are from four to six inches high, they are transplanted into beds of rich light earth, where they are planted in drills about a foot apart in the line; and as they grow, are occasionally earthed up. When the plants are about three parts grown, the outer leaves are tied over the hearts to blanch them, with strands of bast mat, or osier twigs; a dry day being chosen for the operation. Only a few plants should be tied up at a time; and they should be seldom allowed to stand more than a fortnight or three weeks after the operation; as, if they remain longer, particularly if the weather be wet,

they begin to rot. In wet or cold seasons endive is best blanched by turning a sea-kale pot over each root, instead of tying down the outer leaves. There are two distinct kinds: the broad leaved or Batavia endive, and the curled leaved, which is the most common, and to which the French give the name of *chicorée*.

The true Chicory or Succory is sometimes called wild endive; but the French name for it is *barbe de capucin*. It is common in calcareous and sandy soils in different parts of England, where it is conspicuous from its bright blue flowers. Its culture is the same as that of endive; but it may also be treated as a winter salad, by being taken up in October or November, and stacked in cellars in alternate layers of sand, so that the crowns of the plants may just appear along the ridge. Here, if the frost be excluded, the roots will soon send out a profusion of tender succulent leaves; which, if kept from the light, will also be quite blanched.

Mustard and Cress.—Mustard is the native white mustard eaten in its seed leaves; and cress is an annual cruciferous plant, intro-

duced before 1548, but from what country is unknown. They are both of the easiest culture, and will not only grow in any soil or situation, but may even be raised for the table by spreading the seed in a saucer on wet flannel. The flour of mustard is made from the ground seeds of the black mustard, which is cultivated extensively in some parts of England for that purpose.

Corn Salad or Lamb Lettuce, Winter Cress, Burnet, Tansey, and many other plants are occasionally used in salads, particularly on the Continent, but they are seldom grown for that purpose in England.

Celery is frequently used in salads; and it is interesting, as being so greatly improved by cultivation as scarcely to be recognized; for in its wild state it is a British plant called smallage, which grows in ditches, and is scarcely eatable. In gardens, celery requires more manure than any other vegetable, except the cabbage tribe. The seed for the principal crop of celery is generally sown in March or April, and the seed-bed should be formed of equal parts of fresh dark loamy soil, and old rotten dung. When the plants

are about two or three inches high, they are pricked out into another bed made of very rich soil, six or seven inches deep, on a hard bottom; and when they are about a foot high, they are transplanted into trenches for blanching. The trenches are made four feet apart, eighteen inches wide, and twelve deep; and they are filled nine inches high with a rich compost of strong fresh soil and rotten dung. The plants are taken up with as much earth as will adhere to the roots, and the side-shoots or offsets are removed from the central stems; they are then set by the hand, nine or ten inches apart, in the centre of each trench, and well watered. As the plants in the trenches grow, the earth is gradually drawn up to them, a little at a time, taking care never to let the earth rise above the heart of the plant; and this earthing up is repeated five or six times, at intervals of about ten days or a fortnight, till the plants are ready for use. Thus treated, a single plant of celery of the solid kind has been known to weigh nine pounds, and to measure four feet in length.

Water cress is generally gathered wild, but

it may be cultivated in gardens where there is a clear running stream, on a sandy or gravelly bottom. The plants are disposed in rows parallel with the stream, about eighteen inches apart, in shallow water; but four or five feet apart if the water be very deep, as if nearer together they will check the stream. Thus treated, the plants may be cut at least once a week during the whole summer. The beds must, however, be cleared out and replanted twice a-year; and when this is done, all the plants are taken up, divided and planted again in the gravelly bed of the stream, a stone being laid on each to keep it in its place.

Pot Herbs.—Of these *parsley* is a hardy biennial, a native of Sardinia, introduced before 1548. It is generally sown in a drill in February or March, and this will supply leaves all the summer. The plants do not seed till they are two years old. The curled variety is preferred for garnishing. *Tarragon* is a strong-smelling perennial from Siberia, introduced before 1548. It is principally used for making Tarragon vinegar. *Fennel* is a perennial, which, when once introduced,

spreads every where, and can scarcely be eradicated. *Chervil* is an annual used for garnishing, and sometimes in salads, and the common *Marigold* is an annual, a native of the South of Europe, introduced before 1573, but now seldom grown except in cottage gardens.

Sweet Herbs.—These plants, though called in gardening-books sweet herbs, are mostly aromatic shrubs; such as thyme, sage, &c.

Thyme.—There are two kinds of this delicate little shrub cultivated in gardens; the common and the lemon: both are natives of the south of Europe, and were introduced before 1548. Young plants are generally raised by division of the root, or from offsets slipped off the branching roots in spring or autumn; they grow best in poor dry soil, or lime rubbish.

Sage is a much taller-growing shrub than thyme. It is a native of the south of Europe, and was introduced before 1597. It is propagated by slips, or by cuttings of the young shoots taken off in May or June; but as the plant is very long-lived it seldom

wants renewing. It requires the same kind of soil as thyme.

Mint.—There are three kinds grown in gardens: the common, or spear mint, which is the kind boiled with peas, and used for mint-sauce, &c.; the peppermint, comparatively little cultivated, and only used for distilling; and the penny-royal. They are all British perennials, and are propagated by dividing the root, making cuttings, or taking off offsets. All require rather a moist and strong soil.

Marjoram.—There are four kinds in cultivation: the pot marjoram, which is a low shrub, a native of Sicily, introduced in 1759; and propagated by slips; the sweet, or knotted marjoram, a hardy biennial, a native of Portugal, introduced in 1573, and sown every year from seed generally ripened in France; the winter marjoram, a hardy perennial, a native of Greece, introduced before 1640, and propagated by cuttings or slips; and the common marjoram, a perennial, and a native of Britain. The first three kinds require a light dry soil, and

the last a calcareous soil, and sheltered situation.

Savoury and Basil.—Winter savoury is a hardy under-shrub, and summer savoury an annual—both natives of the south of Europe, and cultivated in England since about 1650. Basil is an annual, a native of the East Indies, introduced about 1548. All these aromatic herbs may be purchased, admirably dried, in small cases, at Mrs. Johnson's, in Covent Garden market.

Cucumbers require a hotbed to grow them to perfection; but the smaller kinds for pickling are sometimes planted in the open ground. The seed should be from two to four years old, and it should be sown in pots plunged in a hotbed, not below 58° at night, nor above 65° in the day. When the plants come up, they should be pricked out into pots, three in each pot, and watered, the earth in the pots and the water being both previously kept under the glass for some time, that they may be both of the same heat as the plants. When the plants are about five weeks old, they are generally removed to a larger hotbed, with a two

or three-light frame. In this bed, a little ridge of earth is made under each light; and, in each of these, the contents of a pot is planted, without breaking the ball of earth round the roots of the plants. The heat of this bed is generally a little higher than that of the seed-bed. Water should be given every day, warmed to the heat of the bed. If the plants are wanted to fruit early, the ends of the shoots may be pinched off as soon as the plants have made two rough leaves, and this is called stopping the runners at the first joint; this stopping is repeated wherever the runners show a disposition to extend themselves without producing fruit. As plants raised under glass have not the benefit either of currents of air or insects, to convey the pollen of the barren plants to the stigma of the fertile ones, the latter must either be dusted with pollen by the gardener, or the plants should be exposed as much to the air as possible, in the middle of the day, when it is warm enough, during the time that they are in flower. Seeds for the first crop of cucumbers are generally sown in December or January; but, as extra

heat and care are required at this early season, the crop for a small garden may be sown about March. The great art is to grow the cucumbers long and straight, and to keep them green, with a beautiful bloom. For the first purpose, many cultivators place a brick under the young fruit; and for the latter they leave on the plant abundance of leaves, and keep the ground moist, as the plant appears to thrive best when it has abundance of heat and moisture, and is kept in the shade. A dry heat, and especially exposure to the burning rays of the sun, will make cucumbers flaccid and yellow.

Pickling Cucumbers are generally sown in patches of ten or twelve seeds in each, in the open air; and when they come up, they are thinned out to four or five in each patch. They are sown in rich ground, and well watered; and as they grow, they are occasionally earthed up.

Melons. — The culture of the melon is the same as that of the cucumber, except that the lowest heat of the seed-bed should not be less than 65°, and that of the fruiting

bed 75°. To grow the finer kinds of melons well, however, requires the attention of a regular gardener; and as this is the case also with pine-apples (the plants of which are too expensive to be trifled with), no directions are here given respecting them.

Gourds.—The two kinds of vegetable-marrow—the American butter-squash, and the mammoth-gourd, are excellent for the table, either in soup, or boiled, or fried. The plants of all these kinds should be raised in a hotbed, the seeds being sown in March or April, three in a pot, and covered nearly an inch deep. In May, the young plants should be removed to the open ground, where they should be planted in rich soil, and sheltered for a night or two, till they have become inured to the change. They should be frequently watered in dry weather, as the fruit will not swell without abundance of moisture.

Tomatoes.—The tomato or love-apple is a tender annual, a native of South America, introduced before 1596. The seeds should be sown in a hot-bed in March, and as soon as they come up pricked out into pots; they

should be transplanted into a warm border in front of a south wall in May; where they should be trained against the wall, or pegged down over a warm bank of earth sloping to the sun. They require abundance of water while the fruit is swelling; and as much heat as possible while it is ripening.

Mushrooms.—The spawn is generally procured from a nurseryman; and the beds are made of fresh horse-dung thrown together in a heap under cover, and turned over many times in the course of a fortnight or three weeks, till every part has thoroughly fermented. When the dung is thought to be in a proper state, a trench is marked out twelve or fourteen feet long and five broad, and about six inches deep; the mould taken out in forming it being laid on one side till wanted. In the bottom of the trench there should be a layer of long fresh stable manure about four inches thick; and on this, successive layers of the prepared dung, each beaten flat with the fork, till the bed is about five feet high, and narrow at the top like the ridge of a house. In this state it may remain about a fortnight; and then if the bed be

found, on trying it by plunging a stick in, to be not too hot, the bricks of spawn should be broken into pieces about an inch and a half or two inches square, and strewed regularly over the bed, each piece of spawn being buried by raising up a little of the dung and inserting it. After this the surface of the bed is beaten flat with a spade, and the whole is covered with mould, that of a loamy nature being preferred. The whole is then beaten quite smooth, and covered about a foot thick with oat straw, on which are laid mats. In about a month or six weeks the mushrooms will be ready for the table; and when gathered they should be gently twisted up by the roots, and not cut off, as the root, if left in the ground, will decay, and be injurious to the young plants.

CHAPTER VII.

THE KITCHEN-GARDEN CONTINUED—THE
MANAGEMENT OF FRUIT TREES.

THE fruit trees in a kitchen garden are of three kinds: the wall trees, the espaliers, and the standards. To these may be added the fruit shrubs, and the vines; which last are generally grown under glass.

The Wall-Fruit Trees.—There are two things on which the welfare of wall-fruit trees materially depends, viz. the construction of the wall, and that of the border. The walls of kitchen gardens are very generally made too high: a serious fault in many respects, but particularly in impeding the free passage of the sun and air to the fruit. It has indeed been found, by experience, that walls about

eight feet high, will produce better fruit than walls of ten feet or twelve feet, which is the general height; and besides they have the advantage of not throwing so deep a shadow over the garden. Of whatever height the walls may be, they should always be in straight lines; as the various expedients which have been from time to time adopted, of curved or zigzag lines, have been found not to answer in practice, but to produce eddies and currents of wind exceedingly injurious to the fruit. The garden wall should have a slight stone coping; and where the trees are likely to want protection, strong hooks, or holdfasts, projecting from the wall, should be built in at regular distances for the convenience of suspending the mats or bunting that may be employed; or supporting a deep wooden coping. Hot or flued walls are not desirable, as they are very expensive and troublesome, and of very little use.

The walls should be built on good, sound, and deep foundations, but on no account on arches; as it is of importance to the gardener to confine the roots to the border in front of the wall, which is under his control,

instead of suffering them to spread through the arches to the other sides, where they are entirely removed from him.

The essential point to be attended to in the construction of a fruit border is that the soil shall not be more than eighteen inches deep on a hard bottom. If the subsoil be hard gravel or rock, covered with mould to the depth mentioned, nothing more can be desired; but if the subsoil be wet clay, or sand over gravel, or in short anything that will allow of roots penetrating into it, artificial means should be resorted to, to keep the roots near the surface of the ground. The most common method of forming a border is to excavate the ground to the depth required, and to pave the bottom of the excavation with large stones or pebbles; but bricks, cement, asphalt, or in short any other substance may be employed which appears likely to attain the end in view—taking care, however, to provide effectual drainage, as otherwise the chamber, as it is called, would become a reservoir of stagnant water, exceedingly injurious to the plants. The chamber having been formed, it should be covered

with good rich garden mould to the requisite depth, varying in some instances according to the kind of tree to be grown in it; but in all cases thoroughly pulverized, so as to offer no obstruction to the passage of the roots.

When the trees are planted care should be taken to raise each on a little hillock, at the point of junction between the trunk and the root, to allow for the sinking of the ground. The collar of a ligneous plant should never be buried; as any moisture collected round this tender and indeed vital part, brings on canker, and innumerable other diseases. All fruit-trees thus treated produce cankered and deformed fruit, and die in a few years of premature old age.

It can never be repeated too often that the essential point in growing fruit-trees is to keep their roots as near to the surface as possible, and never to suffer them to descend so deep as to be out of the influence of the sun and air. Many persons unacquainted with vegetable physiology, have an idea that when a fruit-tree, which has been productive, suddenly ceases to bear, it is because its roots have reached the gravel, or in other

words, the subsoil. This is, however, false reasoning on true premises. It is quite true that the tree has ceased to bear in consequence of the descent of its roots; but the reason this descent is injurious is, that the ground far below the surface is cold, and frequently impregnated with stagnant water; and either that the roots thus become swollen and unable to perform their proper functions, in which case the leaves turn yellow, and the tree appears to wither, or that they supply the tree with an abundance of poor thin watery sap quite unsuitable for the production of fruit. On the contrary, when the roots are kept near the surface, though they have no air-vessels except in the spongioles, these spongioles imbibe air and carbonic acid gas from the atmosphere with all the moisture they take up; and thus the vessels are not only kept in a healthy state by not being overcharged with water without air, but the sap is so thickened and enriched with the carbonic acid gas, that it is brought into a proper state for forming those deposits which lead to the production of fruit.

... *The use of walls* is to afford tender plants

the heat necessary to mature their fruit, by reflecting the sun's rays back upon it; and by giving out to the fruit during the night the heat they have absorbed during the day. They are also useful in sheltering the plant from cold winds; and in preventing the branches from bruising each other in violent storms. This being the use of walls, it is evident that only those trees should be trained against them that require protection; and the south and south-east walls being warmer than the others, it is equally evident that only those trees should be trained against these walls, that require a great deal of heat to mature their fruits. There are some fruits, such as the apple, which too much heat renders mealy and insipid; and these would obviously be injured instead of improved by a south, or south-east wall; while other fruits, such as the peach, could not produce good fruit in our climate without one. Before planting trees against the walls of a garden, it will thus be necessary to select the trees proper for each wall; and as some of the finer kinds will be several years before they attain a sufficient size to

fill up the places assigned to them, trees of inferior kinds may be planted between them, so that no part of the wall may be lost, the inferior trees being cut in as the others grow, and being finally removed. This is accomplished by planting alternately dwarf trees of the kind which is to remain, and trees grafted standard high, which are called riders, of the kinds which are to be removed. The distance at which the permanent trees ought to be planted depends upon the nature of the tree.

There is, however, one objection to a south or south-east wall for tender plants which should be carefully guarded against. This is the danger from spring frosts, to which the blossoms are exposed during the night, from being brought prematurely forward during the day. To guard against this, the south wall should have a deep wooden coping, supported by holdfasts, projecting about a foot from the wall; and under this coping there should be a row of hooks, on which should be hung a kind of curtain of bunting, which should be kept on day and night in frosty weather, while the blossoms

are expanded. This is not only to protect the blossoms from the frost, but to save them from the withering effect of the sun, which is as injurious to them after a frosty night as the frost itself. In fact, when tender trees are covered with hoar-frost, they may sometimes be saved if shaded till they have thawed; but they are always killed if exposed, while the frost is on them, to the sun. Bunting is preferable to matting or canvass; because it is thinner and does not entirely exclude the light and air, because it is more easily put up and taken down, and takes up less room when stowed away, and because it is cheaper, four square yards costing only two shillings at Edgington's, the marquee-maker.

... *Kinds of Wall-Fruit Trees, &c.*—The principal fruits grown against a wall in England are those containing stones; and of these the most valuable are the peach, the nectarine, and the apricot. The other stone fruits, such as the plum and the cherry, are frequently grown against a wall, but they are grown also as standards: as are the kernel fruits, such as the apple and pear; the apple

being very rarely grown against a wall in England. In the neighbourhood of London, figs and grapes are grown against walls in the open ground, and in some parts of Devonshire the orange tribe.

Stone Fruits.—All kinds of stone fruits are more or less delicate at the time of forming their stones, or “stoning” as it is called; and the fruit requires thinning at that period to prevent the greater part of it being dropped. They all blossom early, and are delicate while their flowers are expanded. For these reasons their crops are more uncertain in a variable climate like that of England, than crops of the kernel fruits, and require more care and attention to bring them to perfection.

Peaches and Nectarines.—The peach and the nectarine are only varieties of one species of almond; and instances have been known of peaches and nectarines growing on the same tree without grafting. Both peaches and nectarines are divided into two kinds; the free stones, the flesh of which parts readily from the stone—and the cling stones, the flesh of which adheres to the stone. Some of the

best peaches for a small garden are the *Grosse mignonne*, *Bellegardé*, and *Barrington*. The earliest peach is the red nutmeg, which ripens in July; and one of the latest, the *Catherine*, which does not ripen till October. The best nectarines are the *Elruge* and the *Violette hative*, with the new white nectarine, for a variety in colour. Both peaches and nectarines are budded on plum stocks, or on seedling peaches, or almonds, the latter being greatly preferred by the French nurserymen. The best soil for peaches is about three parts of fresh clayey loam, taken from some field, and one part of drift sand. This soil should be moderately enriched with vegetable mould composed of decayed leaves, and it should be laid on the prepared chamber to the depth of about eighteen inches, rather less than more. Peaches require rather an adhesive soil, not too rich; as in a rich loose soil they will produce wood rather than fruit. Peach trees are seldom planted against the wall where they are to remain, till they have been two, three, or four years trained; and they are generally removed at the latter end of October, or beginning of November, just as

the leaf begins to fall. They are best trained in the fan manner; and as they always bear their fruit on shoots of a year old, these shoots must always be left on in pruning, and the old wood cut out. Pruning should be performed at two seasons, viz. winter and summer: the winter pruning is performed at the fall of the leaf, or in the beginning of February, and consists of cutting out or shortening the old wood or barren branches; and summer pruning, which consists chiefly of what is called disbudding, (that is, rubbing off the buds as soon as they appear,) should be applied to the removal of all shoots growing right out from the wall, (and which, consequently, could not be well trained,) or which appear otherwise to be improperly placed. Experienced gardeners also look over the blossom buds, as soon as they show themselves, and thin them out, without allowing the tree to waste its strength in forming fruit which it can never ripen, and which is of no use in its green state. The disbudding is easily performed; and watching the trees to find when it will be necessary, affords a constant source of interest. Thin-

ning the blossoms is rather more difficult; but, with a little practice, a lady could do it much better than a gardener, as it is an operation that depends principally on delicacy of touch. When a peach tree is trained in the fan manner, the first year the little side shoots are left for producing the fruit, and none of these should be more than a year old. The next year these shoots must be cut out, (as the same shoot never bears two years in succession,) and others which have been produced while they were bearing, must be trained in their stead. The borders should never be cropped on account of not disturbing the roots, which should be encouraged to rise up to the surface of the ground by what is called mulching, that is, covering the ground with straw, dead leaves, or litter; and when this is objected to on account of its untidy appearance, the borders should be left bare, and only raked occasionally to prevent the surface from caking over, and becoming impervious to air and moisture. No stable dung should be given to peaches, and when the trees seem exhausted they should be taken up and replanted in fresh soil; or

they should be removed, and trees of quite a different kind, such as pears for example, planted instead of them in the same soil. When the borders cannot be spared to be left entirely bare, a light crop, such as of spinach, lettuces, mustard and cress, or parsley, should be sown on them, and the remains of this crop, when done with, should be raked off; but fruit borders should never on any account be touched with a spade, and even a fork should be used very seldom and very sparingly; never, indeed, unless the ground has become too hard and compact to admit the rain, the sun, and the air. It must never be forgotten, that unless the spongioles of the roots are permitted to imbibe the carbonic acid gas always floating in the atmosphere, with the moisture they take up, the sap of the tree will never be rich enough to produce fruit. The fruit and seeds of every plant are in fact concentrations of carbon, precipitated by the action of light; and where any plant is deficient in carbon, or deprived of light, it cannot produce much fruit. The culture of the nectarine is exactly the same as that of the peach. In both, when the season is cold

and wet, with but little sun, some cultivators remove a few of the leaves to admit more air and light to the fruit; but this should be done very sparingly, as unless a sufficient quantity of leaves are left to carry on the proper circulation of the sap, the skin of the fruit will become tough and withered, and the flesh insipid. When the fruit is ripe, it is customary, in large gardens, to suspend a net under the branches to catch any fruit that may fall, and thus to save it from being bruised. The peach is supposed to be a native of Persia, and to have been introduced into England about the middle of the sixteenth century. Peaches and nectarines on a wall ten or twelve feet high, should be planted about twenty feet apart; with riders of some kind of plum, or peach, till the permanent trees spread.

The Apricot is a native of Armenia, introduced about 1562. The culture is the same as that of the peach, excepting that it is not trained quite so much in the fan manner, but somewhat horizontally. It also bears, not only on the side-shoots of the last year, but on close spurs formed on the two-years'

old wood. The whole of the fruit is also generally suffered to form, and is thinned out while it is green, in May or the beginning of June, as green apricots are generally thought delicious in tarts. The best apricots are the Moorpark for the table, and the Breda for preserving. This last is frequently grown as a standard. Large branches, or rather arms of apricot-trees, particularly of the Moorpark, are very apt to die off without any apparent cause. The finest apricots I ever saw were grown on a tree trained against a cottage, the owner of which was an old woman, who took in washing, and who was in the habit, nearly every day, of pouring down about the roots of the tree a quantity of soap-suds. Apricot-trees should be twenty-five feet apart, as the tree spreads rapidly, and does not bear cutting in.

The Plum.—No plum-tree, except perhaps the green-gage, should be planted on a south wall; and, as a north wall is too cold for the finer kinds, they do best planted against a wall facing to the east or west. Any common garden soil will suit plum-trees; and when the soil appears exhausted, it may be-

renovated by a little rotten dung laid on the surface, and frequently watered to wash its juices into the soil, without disturbing the roots. Plum-trees bear on what are called spurs, which are short rugged-looking little branches, jutting out from the shoots of two or three years' growth. The same spurs bear more than once, and often continue fruitful several years. Plum-trees are generally trained horizontally. The kinds are very numerous, but the Green-gage and Orleans are, perhaps, the most popular. Plum-trees should be twenty feet apart, if all dwarfs; but dwarfs and riders alternately may be only fifteen feet apart.

The Cherry.— Only the finer kinds of cherries are grown against walls; and the tree, in its native localities, delights in a dry sandy soil, and elevated airy situation. When cultivated, it will thrive in any common garden soil which is tolerably open; and it is not injured by manure applied moderately, and in a perfectly rotten state. The cherry is trained horizontally, and bears on spurs springing from both the old and the new wood. As the branches are con-

tinually throwing out fresh spurs from their extremities, it is a maxim with gardeners never to shorten the bearing branches of a cherry-tree. The morello is, however, an exception to this rule, as its mode of bearing resembles that of the peach; and it is always pruned and trained like that tree. The cherry-trees grown against walls are the different varieties of May Duke, Circassian, the large black Tartarian, the Morello, and the Bigarreau. Cherries need not be more than fifteen feet apart for the common kinds, and twenty feet for the morello.

Fig-trees grow and bear quite well in the neighbourhood of London, and they even thrive and bear in many street-gardens in the City. The fig requires less care in training and pruning than any other tree; it should indeed rarely be touched with the knife, and only the ill placed shoots removed by dis-budding. The fruit is produced on the young wood at the extremity of the branches, but it does not ripen till the wood on which it grows is a year old. The best soil for figs is a light fresh loam not above a foot or fifteen inches deep, on a hard, well-drained

bottom. This is essential; as the fig will not grow with any stagnant water about its roots, though it requires to be constantly and abundantly supplied with moisture. Many country persons throw soap-suds on the roots of their fig-trees with very great success. The tree may be trained in any shape; and the long branches should be bent backwards and forwards, not only to make them throw out side-shoots, but to cover the wall. The best figs for general bearing are the black and brown Ischias and the large blue or purple fig. A tree of the last kind, which is trained against our house at Bayswater, under the glass veranda, has never failed, during the last ten years, to produce a good crop every summer. Fig-trees should be thirty feet apart if the branches are trained horizontally; but they may be placed rather nearer, if the branches are bent backwards and forwards to cover the wall.

ESPALIERS.—Espaliers, though they are nearly as troublesome to train as wall-trees, have none of their advantages. They are indeed only superior to standards in taking up less room, in having a neater appearance,

in their fruit being more easily gathered, and in their roots being more under the control of the gardener. The latter is an important advantage, and one of which every gardener should avail himself. It has been already observed, when speaking of the laying out of a kitchen garden, that beyond the fruit-border there is generally a walk, enclosing the compartments devoted to culinary vegetables in the centre. Now where espaliers are grown, there should be a second chambered border, exactly like the fruit border under the wall, which should be shut out from the culinary compartments by a low wall under ground, or flat stones placed edgeways, or boards, or, in fact, any thing to prevent the roots of the espaliers from spreading into the ground devoted to the culinary crops. When due precautions have been taken, the espaliers should be planted near the boundary, and their roots carefully spread out over the chambered border, those parts being cut off which cannot be brought to lie flat in the proper direction. The ground is then pressed firmly upon the roots, and espalier rails, either of iron or

wood, are fixed near the trees to tie them to. Espalier trees are seldom suffered to grow higher than five feet or six feet, on account of the trouble of training them when they are of a greater height; but to make amends for this loss of space, their branches are allowed to spread as widely as possible, according to the nature of the trees. Thus apples should be planted thirty feet apart, and cherries about the same distance; pears thirty-five feet, and plums twenty-five feet. The finer kinds of fruits are seldom planted as espaliers; and apples and pears are more commonly thus treated than cherries and plums. The continual cutting necessary to keep the trees in a proper shape for training, and the unnatural position of the roots, are indeed very unsuitable to trees so apt to gum and canker as the cherry and the plum. The width of the border destined for the roots of the espaliers is generally five feet; and it should only be cropped with a few herbaceous or annual flowers, that will not require the ground to be deeper stirred than can be done with a rake. Some persons suffer the roots of their espalier trees to

extend under the gravel walks, which are purposely left hollow; but this defeats the purpose for which they are to be attracted to the surface, for the spongioles will be as effectually excluded from the air under a compact coating of gravel, as if they were buried many feet deep in the soil. If an underground wall is built along the inner side of the espalier border to confine the roots of the trees, stones should be fixed in it at intervals, with holes made in them for the reception of the espalier rails, which should be run in with pitch. These rails should be about nine inches asunder, and they may be kept together at the top with a transverse rail, to which they should be nailed. The inconveniences of espaliers are the very great trouble of training them and keeping them within bounds; the rough and untidy appearance which their spurs assume when the trees begin to get old; and the numerous diseases to which the trees are liable, from their unnatural position and constant cutting in, and which always render espalier trees short-lived.

STANDARD FRUIT-TREES.—Tall standard

trees should never, on any account, be planted in a kitchen-garden; as from their drip and shade it is impossible to grow good culinary vegetables under them; while, on the other hand, the constant digging and trenching necessary to cultivate culinary vegetables, force the roots of the trees to descend so far that it is impossible for them to produce good fruit. Dwarf standards are, however, by many preferred to espaliers; as they are susceptible of all the advantages, without any of the disadvantages attendant on that mode of training. A chambered border may be prepared for the dwarf standards in the same manner as for the espaliers; and they may be placed in the centre of it, instead of on one side. The dwarf standards are generally grafted very near the collar of the plant, and are trained to form bushes rather than trees, but in various manners. Some are trained round a hoop placed inside, and others have their branches trained upwards for a few feet, and then bent downwards like an umbrella; some are trained *en quenouille*, with a single stem; others *en pyramide*; and others have their branches spread out hori-

zontally, and supported by stakes placed at a regular distance in a circle round the tree. In short, there are no limits to fancy in this respect. The trees generally grown in gardens as dwarf standards are apples, pears, and morello cherries. The other kinds of cherries may also be grown in this manner; but they are generally grown as tall standards in a detached orchard near the kitchen-garden, or adjoining the pleasure-grounds. The common kinds of plums and damsons are also grown as tall trees in the same manner, as are the kitchen and keeping apples. Mulberry-trees are generally planted on the lawn, as well for the picturesque form of the tree, as for the convenience of the fruit, which drops as soon as it is ripe, and is spoiled if it falls on dry earth or gravel. Sweet chesnuts are grown in the park or pleasure-grounds among other trees; and walnuts in similar situations, or in a back-court, or stable-yard, for the convenience of their shade. Filberts and hazels are generally planted on each side of a walk in the garden or pleasure-ground, which they are trained over; and barberries and elderberries

in the shrubberies; the last four being the only kinds of trees which should ever be planted as standards in the slips to the kitchen-garden.

KERNEL FRUITS.—The principal of these are apples and pears, but the division also includes the medlar, the quince, and the true service.

The apple is universally allowed to be the most useful of all fruits; and it is certain that there is no fruit more extensively cultivated. The list of apples is as numerous as that of peas; and it is almost as difficult to make a selection from. Apples are, however, generally divided into three kinds; the dessert or eating apples, the kitchen or baking apples, and the cider apples. The last are good for nothing but to make cider, and can never be mistaken; the line of demarcation between the first two is, however, not so strongly marked, as many of the kinds will serve both purposes. Many dessert apples, for example, possess the chief merit of a good kitchen apple, viz. that of falling well, or in plainer terms, of becoming quite soft when baked or boiled; and many of the

baking apples are very good to eat raw. The Ribstone pippen, one of the best of all apples, but rather a shy bearer, and the hawthorn dean, a most abundant bearer, but an apple that does not keep well, are both alike excellent for the kitchen and the dessert. The best keeping apple is the French crab, of which some specimens have been preserved quite fresh and plump for more than three years.

The most common way of propagating apple-trees' is by grafting the best kinds on crab-stocks, either standard high, that is, on stocks suffered to grow to the height of about six feet; or as dwarfs, that is, about six inches or eight inches from the collar of the stock. Sometimes trees intended to be grown as dwarf standards in a kitchen-garden are grafted what is called half standard high; that is, about two or three feet from the collar. When apple-trees are planted in the kitchen-garden where they are to remain, each tree should always be placed on a little hillock; as no tree is more liable to become cankered from having its collar buried. The tree succeeds best in a

deep strong loam, provided it be well drained, and rich rather than poor; and when the soil appears exhausted, it may be renovated by laying on it what the farmers call a top-dressing of manure, taking care not to bury or even to touch the collar of the tree. Apple-trees will, however, flourish in any soil except sand or gravel. They are very apt to become cankered, and to be attacked by the woolly aphis, sometimes called the American blight. Canker is generally caused by some defect in the drainage or the soil, and of course no remedy can be efficacious till the cause of the disease is removed; when, however, the soil has been renovated or drained, the effects of the disease may be obviated by heading down the tree, when it will produce new and healthy branches; or cutting out the cankered part, if they should be so low as to make it inconvenient to cut off the trunk of the tree below them. The American blight is best cured by brushing the parts affected all over with soft soap and water; and repeating the operation whenever any fresh insects appear.

The Pear.—The culture of the pear as a

standard differs very little from that of the apple; and though it is naturally rather a deeper-rooted plant, it requires its fibrous roots to be kept near the surface. There is a general complaint in gardens against pear-trees as bad bearers, and very healthy-looking trees have been known to exist twenty years in a garden without ever even showing any blossoms. Various causes have a tendency to produce this effect. The pear being naturally inclined to send down its roots, will do so, unless effectually prevented by a chambered border, or a hard rocky sub-soil; and if the spongioles of the roots are allowed to descend out of the reach of the air, the stagnant moisture of the sub-soil will produce the same effect on them as on those of the apple. Planting pear-trees in a very rich stiff soil has a similar effect. Injudicious pruning, particularly in summer, is another cause; as cutting in young shoots, while the sap is in motion, has a tendency to make the tree throw out two new shoots in the room of every one removed, and thus to exhaust itself in producing branches. Summer shoots should either be checked by disbudding as

soon as they appear, or suffered to remain till winter, when they may be cut in, without exciting the tree to fresh efforts to replace them. Much of the fertility of pear-trees also depends on the habit of the stock being similar to that of the graft; and much also on a judicious manner of training. As a wall-tree, the pear is always trained horizontally, and spurs are left on all the branches for producing fruit. These spurs used formerly to be left large, and standing out a foot or eighteen inches from the wall; but they are now found to bear best when kept short. According to this plan, every spur is allowed to bear only once, viz.—in its third year; and after this, it is cut out to give place to another spur, which has been trained to succeed it. By this mode of treatment, a constant succession of young spurs is kept up, and fruit is produced all over the tree; whereas, by the old method of pruning and training, in the course of a few years, the projecting spurs became barren, and fruit was produced only at the extremity of the branches. Pears are frequently grafted standard high, when intended for training

against a wall, in order that they may be used as riders between dwarf plums or peaches. Pear-trees generally bear better as espaliers, or dwarf standards than against a wall, and this has been attributed to rather a curious reason. The stamens of the pear have naturally very little farina; and where the blossoms are exposed to great heat, and have little air circulating round them, as is the case with wall-trees, the pollen is very apt to dry up without fertilizing the stigma. The blossoms of espaliers and dwarf standards are exposed to less heat and more air than those of wall-trees; and thus their pollen is more likely to perform its natural functions. The truth of this observation has been proved by shading the blossoms of a wall pear-tree during the whole period of their expansion, and fanning them with an artificial current of air by means of bellows, when it was found that more than twice the usual quantity of fruit was produced. Espalier pear-trees have generally a very rough appearance, from their rugged projecting spurs; but dwarf standards both look and bear well. It has, however, been as-

serted by some gardeners, that riders on the walls, and tall standards in the orchard, come into bearing earlier than dwarf standards, unless the branches of the dwarfs are suffered to grow very long, and are curiously bent and twisted to produce depositions of sap. Probably, however, the true cause of the dwarf standards not bearing is, that, in some cases, they have been planted in the deep rich soil of the kitchen-garden, intended for culinary vegetables; while the trees in the orchard, compared with them, were in poor light soil, and those against the wall in a prepared border.

There is perhaps no fruit that has been so much improved by cultivation as the pear; and this extraordinary improvement has been principally effected by the exertions of Professor Van Mons of Louvain, near Brussels. This gentleman, towards the latter end of the last century, having turned his attention to the culture of fruit-trees, conceived the idea that new varieties of pears might be raised scientifically; and the result of his first experiment was that he obtained four pears very superior to the

kinds previously known : these kinds were the *Passe Colmar*, the *Beurré Spence*, the *Beurré de Ranz* (commonly called the *Beurré Rance*), and the *Beurré d'hiver*. Encouraged by this success, the Baron Van Mons repeated his experiments every year, and thus raised above a hundred thousand new kinds of pears ; and though by far the greater part of these proved in the end not worth growing, many very valuable pears have been obtained. Van Mons's theory is to sow the most perfect seed of the best pear of any given sort that he can procure ; then to force the seedling as soon as possible into fruit, and to sow the best seed it produces, and thus to proceed till the fifth or sixth, or tenth or twelfth generation. In this manner coarse but highly-flavoured fruits were softened down, and produced some of exquisite flavour ; and among others, the well-known *Marie Louise* is said to have been the descendant, in the fifteenth generation, of a very coarse and harsh-flavoured parent. The *Glout morceau*, one of the very best of the Flemish pears, if kept till it is quite ripe, is another variety, said to be similarly

descended; and the Duchesse d'Angoulême a third.

The goodness of all these pears, however, depends a great deal on the stocks upon which they are grafted; and thus the fruit produced does not always answer the expectations of its growers. Another point to be attended to is the thinning out of the fruit, that more may not set than the tree seems able to ripen, as, if the tree is suffered to bear too large a crop, the fruit will be small, hard, and without flavour.

The Quince is a low tree which thrives best near water. It is always grown as a standard; and the fruit, which is very ornamental when ripe, is never eaten raw. It requires no particular care, except that of planting it in a moist soft soil; and, if possible, where its roots can have access to water. There are four or five kinds grown in nurseries, but they differ very little from each other.

MISCELLANEOUS FRUIT TREES. — Under this head I shall include all those trees usually grown as standards in pleasure grounds or orchards; but which, as their fruit is eaten,

appear properly to belong to the department of the kitchen-garden.

The Medlar.—There are three or four kinds of medlars, one of which is much larger than the others. The medlar will thrive in any soil or situation not too dry; but, like the quince, does best within the reach of water. The fruit, which is never eaten till it is in a state of decay, is not of much value, but the flowers are very large and rather handsome.

The Mulberry.—There are three distinct species of mulberry, besides innumerable varieties. The distinct species are the white, only used for feeding silk-worms with its leaves; the black, which is generally grown in gardens for its fruit; and the red, or American mulberry. Many persons are not aware of the difference between the black and the white mulberries, and they think that if they have a mulberry tree in their garden, they cannot do better than feed their silk-worms with its leaves; though the fact is that the white mulberry is scarcely ever grown in England, and the leaves of the black mulberry are positively injurious to

the worms. Lettuce leaves are indeed better than any other food for silk-worms reared in England. The fruit of the red mulberry is eatable, but not very good; and its leaves are injurious to silkworms.

The black mulberry is said to be a native of Persia; but if so it must have been brought to Europe at a very early period, as it was common in Italy when ancient Rome was at her zenith. It appears to have been introduced into England long before 1573, as some old trees, still in existence, are said to have been of considerable size in that year. The mulberry has several peculiarities in its habits, which distinguish it from most other trees. The most striking of these is that it may be propagated by truncheons: that is, if a large limb of a tree, as thick as a man's arm or thicker, be cut off, and stuck into the ground, it will grow without any further trouble being taken with it; and probably the next year, or the year after, it will bear abundance of fruit. This I believe is the case with no other tree except the olive. The mulberry also is later than any other tree in coming into leaf; but when it does

begin to open its buds, its leaves are expanded, and its young fruit formed, in an incredibly short time. Another peculiarity is that old trees frequently split into five or six different parts, each of which in time becomes surrounded with bark, so that a very old and thick trunk appears changed into five or six slender new ones: the branches also, if they lie along the ground, take root and become trees; and if an old mulberry tree be blown down, every branch sends down roots into the ground, and in a very short time becomes a tree. When apparently dead, a mulberry may in most cases be resuscitated by cutting it down to just above the collar, when it will send up a number of young stems, which will very soon be covered with fruit. The mulberry, in other respects, needs very little care from the gardener; it requires no pruning; and even the fruit does not require gathering, as it drops as soon as it is ripe.

The Elder is rather a shrub than a tree; and from its very disagreeable smell, and straggling habit of growth, it is rarely planted except in cottage gardens. There are seven-

ral kinds, one with white berries, another with green, and a third, which is very ornamental, with scarlet berries. There is also a very handsome kind with cut leaves: a ptisan made of the flowers is reckoned excellent in France for producing perspiration in cases of colds and fevers; and the fruit of the black-berryed kind is used for making wine, and also a kind of jam.

The Pomegranate.—If the elder be considered a plebeian fruit, the pomegranate may be called an aristocratic one, as it is rarely seen in England except in the gardens of persons of rank and wealth. Notwithstanding this, it requires but little care from the gardener, and it is only necessary for him to spare the knife; since it is on the points of the shoots, and on short slender twigs projecting from the branches, which are exactly what a gardener, whose only care was to make his tree look neat, would think it advisable to cut off, that flowers are produced. Pomegranates require very rich and well pulverised soil, and to be trained against a wall with a south, or south-east aspect. When it is wished to throw them into fruit, their

blossoms should be shaded during the whole time of their expansion.

Nut Trees.—The principal kinds of nut trees cultivated in British gardens are, the walnut, the sweet chestnut, and the filbert. The American hickories and the black walnut are sometimes grown, though but rarely; as are the Colurna and other nuts. The almond also, as it is grown only for the kernel of its stones, may be classed among the nuts, though it is, properly speaking, a kind of peach.

The Walnut can hardly be mentioned without bringing with it a host of classical recollections. The Greeks dedicated this tree to Diana, and held fêtes under its shade; and the Romans called its fruit the nut of Jove. In modern times its wood has obtained rather an unpleasent kind of celebrity, as being generally used for making the stocks of muskets. In villages and country places, however, the walnut recalls more agreeable associations; as its noble leaves and spreading branches render it a delightful tree for shade; and formerly it used to be frequently found at the doors of cottages and farm houses.

There are several kinds of walnut-trees cultivated for their fruit; all varieties of one species, and differing principally in the hardness or comparative softness of their shells. Walnut-trees are generally propagated by sowing the nuts; and if the young trees are planted in a light, sandy, and well-drained soil, they will grow rapidly, and bear at an early age.

The custom which prevails among the country people in some parts of England and France, of beating a barren walnut-tree to make it bear, is efficacious, as the beating breaks off the points of the too luxuriant shoots, and makes them send out those short spurs which alone produce fruit; though the end would be attained with more certainty by pruning. A decoction of walnut-leaves and husks is said to be very efficacious in protecting plants against insects, if sprinkled on the leaves.

The nut of the black walnut (*Juglans nigra*) is so hard as to be of little use for the table; and only two or three of those of the hickories can be considered as fruit. The best of these is the peccane nut (*Carya olivæ*

formis), of which Washington is said to have been so fond that he was rarely without some in his pocket, which he used to be continually eating during his campaigns. The white hiccory (*Carya sulcata*), the outer rind of which is very thick, is also good to eat.

The sweet chestnut is frequently called the Spanish chestnut, because the best sweet chestnuts were formerly brought to the London markets from Spain. The tree can, indeed, scarcely be considered as an English fruit-tree; though some of the chestnuts sold for the table are grown in Devonshire. In France, chestnut-trees are more common; and they are divided there into two kinds: the chataigniers and the marroniers; the former bearing about the same relation to the latter as the crab does to the apple. The best chestnuts in France are those called les marrons de Lyons. The sweet chestnut is a native of Asia; but it has also been found in the north of Africa and North America. It is always propagated by seeds, and thrives best in a deep sandy loam; it will grow in even the poorest gravel, but it never does

well in either a calcareous soil, or a stiff clay.

There are several celebrated chestnut-trees of enormous size and great age; the most remarkable of which are the Castagna di Cento Cavalli on Mount Etna, and the Tortworth chestnut in England. Till within the last eight or ten years it was believed that the wood of the chestnut was good timber; but it has lately been discovered that it is absolutely worthless, except while quite young: the wood that was supposed to be chestnut, having been proved to be that of the English chestnut oak (*Quercus sessiliflora*). The wood of the chestnut, when the tree attains a large size, becomes what the English timber-merchants call shaky, and what the French call dialled; that is, instead of forming a solid log of timber, the trunk when cut down is found to fly off in splinters, or to divide into a number of angular pieces, as if shivered by a blow from the centre.

The filbert is only a variety of the common hazel; and it is supposed to derive its name from the words "full beard," in allusion to the length of its husk. The varieties of the

hazel are indeed divided into two classes: those with long husks which are called the filberts; and those with short husks which are called the nuts. All the varieties grow best in calcareous soils, like those of Kent; in which county the best nuts grown in England are raised. When either filberts or nuts are grown in gardens they are generally planted in rows from five feet to ten feet apart from each other in the row, according as they are wanted to grow high, or to spread. Filberts are generally propagated by sowing the seeds, and nuts by suckers, which the trees throw up in abundance. "The principal art in the culture of the filbert as a fruit-tree," says Mr. Loudon in his *Arboretum Britannicum*, "consists in training and pruning it properly, as the blossom is produced upon the sides and extremities of the upper young branches, and from small young shoots which proceed from the bases of side branches, cut off the preceding year. The tree requires to be kept remarkably open, in order that the main branches may produce young wood throughout the whole of their length. In the

filbert orchards about Maidstone, the trees are trained with short stems like gooseberry-bushes, and are formed into the shape of a punch-bowl, exceedingly thin of wood." When the trees are pruned, care is taken to eradicate all the suckers. Filberts are always kept in their husks, and if they lose their colour and appear black or mouldy, their appearance is renovated by the dealers, by putting them into iron trays pierced with holes, and gently shaking them over a chafing-dish full of charcoal, on which a little powdered sulphur has been thrown while the charcoal was red-hot.

The Constantinople nut, or *Columna hazel*, is a large handsome tree, and the American hazels are shrubs grown occasionally in plantations, but not cultivated in England for their fruit.

The almond is in fact a peach-tree, with a fruit having a leathery pericardium instead of a fleshy one; and what are called almonds are the kernels of the stones of this fruit. The bitter and sweet almonds are varieties of the same species; and there are several other varieties differing principally in the

degree of hardness of the stone. The other part of the fruit is in all the varieties quite worthless; except for the prussic acid it contains. The prussic acid used in medicine is, however, made principally from the kernel of the bitter almond, though it does not exist in that of the sweet variety. Almond-trees are propagated by grafting either on almond or plum-stocks; they are frequently planted for the beauty of their flowers, which appear before the leaves, but they are seldom grown in England for their fruit; most of the almonds sold in London being imported from Italy or Spain. The Jordan almonds, which are considered the best, are brought from Malaga. The almond requires a dry soil, either sandy or calcareous; and the situation should be sheltered, as the branches are brittle and apt to be broken off by high winds. When the stones are sown, care should be taken to press the sharp ends downwards. The young plants will not bear transplanting, as they will send down tap-roots two feet long the first season.

FRUIT-SHRUBS.—The principal fruit-shrubs grown in gardens are gooseberries, currants,

and raspberries; to which may be added barberries and cranberries.

The gooseberry.—The number of varieties of this useful fruit almost exceeds belief, and fresh kinds are originated every year. The principal reason of the great number of gooseberries thus raised may be traced to the gooseberry shows now so prevalent in different parts of the kingdom. At these shows the largest and heaviest berries gain the prize; and it thus becomes an object with the exhibitors to grow berries that shall be as large and as heavy as possible. For this purpose they raise a great many new kinds; and when they have obtained one likely to suit their purpose, they plant it in very rich soil, water it well, and picking off all the berries except three or four, they nourish these by putting saucers filled with water under each. By these cares gooseberries have been produced weighing above an ounce and a half each; and one weighing very nearly two ounces; though gooseberries generally, even of large size, seldom weigh above half an ounce.

Gooseberries may be propagated either by

seeds or cuttings; and they will thrive in any good garden soil, if it be well drained, well manured, and not under the drip of trees. When gooseberries are wanted large, the ground between the rows should have a coating of rotten manure laid on it every third year. Gooseberry-bushes are generally planted in rows, the rows eight or ten feet apart, and the bushes six feet from each other in the rows. They are pruned twice a-year: in winter to remove the branches not likely to produce fruit; and in summer to clear away the cross shoots which shade the fruit from the sun, and prevent the access of air to every part of the tree. It is a very good plan to thin the fruit; which is easily done when gathering green gooseberries for pies and puddings, by taking a few from every branch and never gathering from the same tree twice. The gooseberry bush produces fruit both on the old and young wood; but in the summer pruning all the long slender shoots which the tree sends out beyond the part which produces fruit should be cut off, to prevent the plant from wasting its strength. The best red gooseberries for general use are perhaps

the following: the Warrington, which is a great bearer, and retains its fruit a long time on the tree; the Champagne, an early gooseberry of very fine flavour; the early Rough-Red, small, but remarkable for its sweetness; the Boaring-Lion, the largest gooseberry grown, a good bearer, the berries of which are oblong, and have a smooth skin; the Ironmonger, the fruit of which is almost black; the Crown-Bob, a very large gooseberry, equally good for using green or ripe; and the Top-Sawyer, a large, round and rough gooseberry, with a very thin skin, and agreeable flavour. The best white gooseberries, are the White Dutch, the Whitesmith, Wellington's Glory, and the Cheshire Lass, the last two being of very large size; the best yellow are Rumbullion, and Rockwood, the first of which is reckoned the best of all gooseberries for preserving; and the best green are Ocean, a large early gooseberry, and the Pitnaston Greengage, a late variety, remarkable for its extraordinary sweetness, and for its hanging on the tree till killed by frost.

Currants are very seldom raised from

seed; as there is no particular desire for the production of new sorts. The usual mode of propagation is by cuttings, which are taken off the strongest shoots in autumn or early in spring, and planted in rich soil. The cuttings are generally about a foot long; and all the buds are taken off except five or six at the top: the cutting is then firmly inserted in the soil about six inches deep. No other care is required but pruning the young trees every year. The currant bears on spurs of the old and new wood; and as currant-trees, when pruned, are generally cut into these spurs, a currant-bush after its winter pruning looks like a worthless stump, fit only for the fire. The currant is very hardy, and will grow in any soil or situation, even under the drip of trees. In open situations and rich soils, currants have been grown to a very large size; but not proportionately large to gooseberries. The red, white, and striped currants are varieties of the same species; but the black is another species. All belong to the same genus as the gooseberry.

Raspberries are, what is called, travelling

plants; that is to say, if left to themselves, they would, by the old plants dying off, and being succeeded by suckers every year, soon travel over a considerable extent of ground. The raspberry thrives best in a light, free loam, moderately rich; and in an open situation. It always bears on the young shoots, so that the principal art required in pruning it consists in cutting out the old wood, and shortening the young. The height at which the bearing shoots should be left is three feet, or four feet. The best raspberries are the red and yellow Antwerp. Raspberries are propagated by suckers, which are produced in great abundance every year. The raspberry belongs to the same genus as the bramble, or blackberry.

Barberries. — No fruit-tree or shrub requires less care in its culture than the barberry, or, as it is more properly called, the berberry. The sorts usually grown for their fruit are all varieties of the common sort: they are the common red, the stoneless, and the sweet. Several varieties of the Mahonia or Ash berberry bear excellent fruit, but the trees are at present too rare, and of too

high a price, to be cultivated for that purpose. The berry will grow in any soil and situation, and it does not require any pruning.

The Cranberry will only grow in moist soil, or peat earth. It succeeds very well on the muddy margin of a pond; particularly if a row of stakes be driven into the water two or three feet from the edge, and lined with stones, on which is laid a quantity of bog earth. In this earth the cranberries are planted, and they will require no after-care except the occasional trimming into shape of their long runners. The common cranberry is a native of England, Scotland, and indeed of all the north of Europe; but its fruit is much smaller than that of the American cranberry, which has also a more delicate flavour.

CHAPTER VIII.

THE FLOWER-GARDEN, AND THE CULTURE
OF FLOWERS.

WHATEVER doubts may be entertained as to the practicability of a lady attending to the culture of culinary vegetables and fruit-trees, none can exist respecting her management of the flower-garden, as that is pre-eminently a woman's department. The culture of flowers implies the lightest possible kind of garden labour; only, indeed, enough to give an interest in its effects. This light labour is, in fact, one of the reasons that the culture of flowers is so generally a favourite occupation; as, though it is one of the conditions of our nature that we shall never enjoy what is too easily obtained, it is equally

true that we cannot associate the ideas of pleasure with anything that gives us very much trouble. The culture of flowers is exactly in the happy medium between what is too hard and what is too easy. There are difficulties in it, but they are such as may be readily surmounted; and the result at once gratifies our own sense of what is beautiful, and our pride at being the means of presenting, so much that is worthy to be admired, to others.

Laying out a Flower-Garden.—Very little need be said of the aspect of the flower-garden, as, in most cases, it depends on circumstances quite beyond the control of the cultivator of flowers: when, however, a situation can be chosen, the best is one open to the south or south-east, and sheltered on the north. It must be observed, however, in all situations, that flowers never do well under the shade of trees. Where no ground can be spared for a flower-garden but a spot surrounded by tall trees, it is better to give up at once the idea of growing flowers in it in beds, and to ornament it with rock-work, fountains, vases, statues, &c., interspersed

with a few flowering trees and shrubs, so arranged, that though their flowers, if produced, would augment the beauty of the scene, the want of them may not destroy it, if they should fail. Flower-gardens are of two kinds,—those that are called natural, and which are planted without any regard to regularity, and those that are called geometrical, and which consist of beds forming some definite figure.

The natural, or English style, as it is called abroad, however beautiful it may be in pleasure-grounds, is very ill adapted to a flower-garden, which is essentially artificial. The principal beauty of a flower-garden consists, indeed, in the elegance with which it has been arranged, and the neatness with which it is kept; or, in other words, in the evidence it affords of the art that has been employed in forming it. This being the case, it is quite clear that an artificial mode of arrangement is more suitable to it than any other, as it is best adapted for keeping up the harmony of the whole. In all cases, therefore, where the garden is large enough to show a formal figure to advantage, the

artificial mode of arrangement should be adopted; and wherever it is adopted, the beds should be planted so as to form masses of different-coloured flowers. Where, however, the garden is very small, and no part of it can be set entirely apart for flowers, no attempt should be made to produce masses of colour in regular forms; but the plants should be arranged along the borders singly, or in patches, as may be best adapted to display the individual beauties of each. In some cases, flowers may be planted in borders, so as to form a miniature representation of the natural system: as, for instance, first there may be planted anemones and ranunculuses, interspersed with patches of *Flos Adonis*, larkspurs, &c. to come into flower when the anemones and ranunculuses have done flowering; next should be some poppies and fumitories; and next, stocks and wall-flowers. In this manner, the beds might be arranged, by mixing perennials and annuals, so as to form an ornamental botanic garden during the whole of the flowering season; and the flower-garden would thus become not merely a source of elegant

amusement, but also actually of scientific knowledge, without any appearance of formal arrangement.

When the flower-garden is to be a geometrical one, the best way of designing it is to draw a figure on paper consisting of angular, circular, or serpentine forms, to represent beds, and arranging them so as to form a whole. This may appear easy at first, but to do it well, requires a great deal of both taste and ingenuity; as each form should not only harmonize well with the others, but be handsome in itself. Where the space to be laid out is small, the figure may be more complex, and the separate beds more grotesque in their shapes, than where the garden is large: but where a large space is devoted to flowers, only simply formed beds should be adopted. The reason for this is, that where the beds are of bizarre shapes, they require to be seen at one *coup-d'œil* to have a good effect; whereas simple and uniform shapes may be seen either together or alone, without producing any disagreeable impression on the mind. Thus, in large flower-gardens, a succession of circles or

ovals at regular distances, so as to form continually changing vistas to the spectator who walks through them, will have a much better effect than any geometric figure, the parts composing which appear ridiculous when disjointed. Whatever figures may be adopted, as soon as they have been sketched on paper, each bed should be coloured; to try what arrangement of colours will be best suited to the form of the beds, &c. The colours, of course, should be those usually found in flowers: for example, yellow, scarlet, blue, pink, orange, and purple; and they should be arranged, not only with a view to effect, but with regard to the practicability of filling the beds with suitable flowers. The colours above mentioned may, however, generally be procured, and a bed of white flowers may be added at pleasure wherever it may appear necessary.

The forms of the beds having been decided on, the next step is to mark them on the ground, and this is done in several different ways. One is by covering the figure with squares, and then forming much larger squares with pack-thread over the

ground; that part of the outline of the figure contained in each of the small squares is then to be transferred to the corresponding large square, by tracing it on the ground with the point of a stick. When the pattern is regular, it is sometimes marked on the ground by stretching a garden-line from one point to another by means of pegs. When this line is so arranged as to form the proper figure, it is chalked, and made to thrill between the pegs, so as to transfer the chalk in the proper lines to the ground. When circles are to be traced, it is done by first fixing a stake in the centre, and then forming a loop at the end of a cord, and putting it over the stake. One end of the cord being thus fastened to the stake, the other end should be stretched out to the extremity of the radius or half-diameter of the circle, and a short pointed stick should be tied to it, with which, the circle may be traced all round. An oval is made by tracing two circles, the outer edge of one of which just touches the centre of the other; a short line is then drawn at the top, and another at the bottom, and this, when the central lines are oblite-

rated, forms the oval. Many other ways will suggest themselves, and may be adopted: the essential points in all being to have the ground first dug, and made perfectly smooth and level; and then to have the figure clearly and accurately traced out and tested by measurement, before any of the beds are formed, or the turf or gravel laid down.

Planting the beds and forming the walks require nearly as much care as tracing out the figure. Many persons, however, are not aware of this: they think, if the figure be good and accurately traced on the ground, that nothing more will be required; or, if any thing more be necessary, it is only to indicate the proper colours of the beds to the gardener.

This, however, is not enough; low plants producing abundance of flowers must be chosen, and these must be carefully trained, or pegged down, so as to cover the beds entirely, or the effect will be destroyed. If, for example, a bed of scarlet be wanted, a lady would probably think that her gardener would have no trouble in finding abundance

of scarlet flowers; and having told him the colour, she would give herself no further trouble. Now the kind of scarlet flower to be used, depends entirely on the position of the bed, and the kinds of flowers used in the other beds. If these flowers have been dwarfs, and trained so as entirely to cover the ground, the scarlet flower used, should be the *verbena melindres*, (or *chamdrifolia* as it is now called,) or some of its varieties, and each stem should be pegged down close to the ground. Thus treated, and supplied with abundance of water, being grown in rich light soil, on a porous subsoil or well drained, the *verbena* will soon become a splendid mass of scarlet, almost too dazzling for the eye to bear, unless it be relieved by grass walks between the beds. If, on the contrary, the bed in question had been planted with one of the scarlet *lobelias*, or even scarlet *geraniums*, the effect would have been quite different, from the taller growth of the plants, and the greater proportion of leaves to their flowers. Where *geraniums* are grown to produce an effect in beds, the plants should be kept bushy while in the

green-house or frame, by continually shifting them into larger pots, or frequently taking off the points of their shoots; and when planted out, they should be at least a foot or eighteen inches asunder, increasing the distance, if the plants are very large. The kind should be the Frogmore or Dropmore varieties; and the plants should be well watered, and frequently pruned wherever they throw up long shoots. Other plants should be treated in a similar manner; and great care should be taken to keep all the plants in the beds which are to combine to form a figure, of the same height, and equally covered with flowers. The centre bed alone may have taller plants. Where the walks are of gravel, a greater proportion of leaves may be allowed to the flowers; but a geometrical flower-garden never looks half so well on gravel as on grass.

The walks of a geometrical flower-garden, if of grass, may be laid down with turf, or sown with grass seeds; and in either case they should never be pared (as that would enlarge the beds, and destroy their proportion to the walks), unless some part should

accidentally project into the bed, when it should be removed, and the turf pressed down so as to form the same gradual slope from the bed to the walk as in the other part. Where the walks are of gravel, the beds should have a neat edging of box, or any other plant that may be preferred, kept quite low and narrow, by frequent pruning, but which should never be clipped.

The Culture of Flowers.—The ornamental flowers grown in gardens may be all arranged under the heads of annuals, biennials, perennials, bulbs, tubers, corms, flowering dwarf shrubs, climbers, twiners, trailers, and rock plants; and as the culture of the plants in each division is nearly the same, I shall say a few words on each, particularizing those plants which require a different treatment from the ordinary routine of their kind.

Annuals.—Most of the hardy annual flowers should be sown in March, April, or May, in the open border where they are intended to remain. The usual method of sowing in the borders, is, first to loosen the ground with a fork, and to break it very fine; after which it should be made perfectly level, and raked.

A circle is then made by pressing the bottom of a flower-pot saucer; three or four inches in diameter, on the ground; and six or eight seeds are spread over the level surface thus formed: a little soil is then sprinkled over them, and the surface slightly pressed again with the saucer. If the weather, or the soil be dry, a slight watering should be given to the seeds after sowing, with a watering-pot having a very fine rose; but this must be done carefully, as too much water would wash the seeds out of their place. It is usual, after sowing, to stick a flat stick into the ground in the centre of the patch with the name of the flower upon it; and it is better to write these names very plainly, with a rather soft black-lead pencil than with ink, as the ink is very apt to run, and to render the words indistinct. Very neat little tallies, called monogrammes, made of very smooth wood, and prepared for writing on, are sold at the principal seed shops. It is customary with many gardeners, after sowing flower seeds, to turn a flower-pot over them; and this practice is useful in keeping the seeds moist by preventing evaporation, while the

hole in the bottom of the pot admits enough light and air for germination. The flower-pot should, however, be removed as soon as the young plants appear above ground; as if kept on longer, the plants would be drawn up, and their stems would become so elongated, and consequently so weak, that they would never recover their strength or beauty. Flowering plants should always be kept dwarf and compact; not only on account of the superior neatness of their appearance, but because tall, ill-grown plants never produce fine flowers. For this reason, as soon as annuals attain their second pair of leaves they should be thinned out; and again, when about a foot high, if necessary. As the plants grow they should be watered occasionally; and when of a proper height, staked and tied up, if of a kind to require support. As soon as the flowers fade they should be cut off; unless, as is sometimes the case, the plant has very ornamental seed pods, in which case they may be left on. It is seldom worth while for any lady to save her own seed; but when she does so, the plants for that purpose should be grown in a back

garden or reserve-ground, as they greatly disfigure a flower-garden. All annuals, indeed, should be taken up, and carried to the refuse heap as soon as they cease to be ornamental; as in their withered state, they only call up unpleasant images in the mind.

Tender annuals are raised on a hot-bed, and though generally sown in February, are not planted in the open ground till May. When they have been raised in pots, the contents of each pot should be carefully turned out, and put into a hole made to receive them without breaking the ball of earth that has formed round the roots of the plants. As some plants, as for example stocks, and all the cruciferæ, require a rich soil, a hole may be dug in the border a foot or eighteen inches in diameter, and about the same depth, and filled with a rich compost of equal parts of garden mould, decayed leaves, and well rotted manure, or what is much better, with either the remains of the trenches in which celery was grown the preceding summer, or the earth used in covering, or that laid round, manure while fermenting for

a hot-bed. The hole should be filled with this compost, so as to raise it about six inches higher than the rest of the border, to allow for the new earth sinking, and the annuals should be planted in the centre, and carefully shaded for a few days by a flower-pot being turned over them. The mode of making and managing a hot-bed has been already given in the second chapter of this work; but the readiest way for the inhabitants of a suburban villa to obtain half-hardy annuals, is to purchase them from some nurseryman when ready for transplanting. The usual price is from two-pence to four-pence for a dozen plants; and thus, for a couple of shillings, a sufficient number of plants may be procured to make a splendid display for a whole summer. No one should, indeed, attempt to manage a hot-bed, who has not some person to pay constant attention to it; as one day's neglect respecting giving air, watering, &c. will often destroy the hopes of a whole season.

The Californian annuals require peculiar treatment. These plants are very hardy, and though many of them are of short dura-

tion in flower, they may, by proper management, be contrived to produce a brilliant effect during the whole summer. For this purpose a well-trodden path, or a piece of very hard ground, should be covered about an inch thick with very light rich soil; and the seeds of any of the Californian annuals should be sown in it. These will stand the winter, and in February or March, when the flower-beds have been dug over, and made quite smooth, the annuals should be taken up with the spade in patches and laid on the bed; the spaces between the patches being filled up with soil, and the whole made quite firm and compact, by beating each patch down with the back of the spade. As soon as the patches have been removed, fresh earth should be spread on the hard ground, and fresh seeds sown in it, the plants springing from which will be ready to transfer to the beds as soon as the first series have done flowering; and in this way a succession of flowers may be kept up nearly all the year, observing to dig over the bed in the flower-garden to which the flowers are to be transplanted, and to rake it smooth

every time the old flowers are removed, in order to prepare it for the new ones.

Biennials are plants which do not flower till the second year. They are generally sown in March, April, or May, and are transplanted in September, to the situations where they are to flower the following year. The best known of these flowers are the different kinds of hollyhock, snapdragon, Canterbury bells, wallflowers, sweet-williams, *Enotheras*, and Brompton stocks; but there are many others extremely beautiful and equally well deserving of cultivation. Most of the biennials may be propagated by layers or cuttings, and thus treated, they will last four or five years.

Perennial herbaceous plants are so numerous, that few general directions can be given for their culture, and it will be necessary to treat of the principal families separately. Perennial flowers are generally propagated by layers, cuttings, offsets, suckers, and division of the root; for when raised from seed, many of the kinds do not blossom for several years. When propagated by layers, the earth which is pressed over the

pegged-down shoot, should not be kept too moist; as layers of herbaceous plants, particularly where the stem has been partly slit through, are very apt to rot. The same remark holds good as to cuttings; and they should generally have fewer leaves left on, than cuttings of trees and shrubs. Many plants produce offsets, such as the potentilla, the wild geranium, &c., and these only require separating from the parent, and planting in spring; all the flower-buds should, however, be pinched off the first year, to strengthen the plant, and to encourage it to send down roots. Suckers are treated in exactly the same manner as offsets. Division of the roots is, however, the most common way of propagating perennials. To do this the plant is generally taken up, and the roots pulled asunder if dry, or cut into pieces if fleshy, and replanted; care being taken to cut off any part of the fibrous roots that may have been wounded, or broken, by the removal. The plant itself is also generally pruned or cut in, and some of its leaves are taken off before replanting, and carefully shaded and watered till it has recovered

from the effects of its removal. All perennial plants should be occasionally taken up, thinned, and replanted with the same precautions: and the ground dug over, and renovated, before they are replaced.

The most remarkable kinds of herbaceous plants are those called florists' flowers. This name indicates plants grown principally for the purpose of exhibiting at some show to gain a prize, and on the culture of which an extraordinary degree of care has been bestowed. Most of these are either bulbs or tubers, but some few come under the present head; and of these the most remarkable are the auricula, the polyanthus, the carnation, the pink, the heartsease, and the chrysanthemum.

Auriculas are well-known and favourite flowers; the wild plant is a native of Switzerland, but it is almost as different from the cultivated kinds, as the wild cabbage is from brocoli or cauliflower. The garden auriculas have almost innumerable names, but they are all divided into four kinds, very distinct from each other. These kinds are the green-edged, the grey-edged, the white-edged, and

the selfs. The beauty of the flowers depends upon their size, the clearness of their colours, and their roundness and flatness; these last qualities being often assisted by art: the anthers of the stamens should also rise above the pistil; as when the pistil is seen above the anthers, the flower is called pin-eyed, and is esteemed of little value by florists. The culture of the auricula, when it is to be grown as a prize-flower, demands a degree of care and attention that no one but a professed florist would think it worth his while to bestow. The great points appear to be to make the soil as rich as possible, only, however, using the cold manures, such as cow-dung, &c.; to let the pots be very well drained, by placing about an inch and a half deep of broken pot-shreds in each pot; and to keep the plants well and regularly watered. When the flowers expand, they are generally shaded with square pieces of board, tin, or paste-board, supported by a stick just over the flower, so as to shelter it from the direct influence of the sun, but to admit a free current of air, and sufficient light. This precaution is said to improve the clearness

and intensity of the colours, which otherwise are apt to become dull and clouded. Those persons who grow auriculas for sale, generally show them on what is called a blooming-stage, and shade them with an awning like that used for a tulip-bed. The plants are propagated by offsets, or dividing the root; and new varieties are continually being raised from seed. Auriculas are occasionally double or semi-double, but these varieties are considered by florists very far inferior to the single kinds.

The Polyanthus is of the same genus as the auricula, and of the same species as the primrose. It is, however, a very distinct variety of the last; and it is said to take its name of polyanthus, which signifies many-flowered, from its producing its flowers in trusses like the auricula, while the flowers of the primrose are produced singly, each on a separate stalk rising from the root. The qualities of the polyanthus resemble those of the auricula as to form and shape, but there is not the same variety as to colour, as the polyanthus is always of a very dark brownish red and golden yellow. The best flowers

have generally a narrow edging of a bright golden colour, and as clear and distinct as possible, round the margin of each petal; and no flower is at all esteemed that has what is called a pin-eye; that is, as before mentioned with regard to the auricula, when the pistil projects beyond the anthers of the stamens. The polyanthus is propagated by slips, and division of the root, and new varieties are raised from seed.

The Primrose differs essentially from the polyanthus and the auricula, in being only esteemed when double, while they are not considered to rank as florists' flowers unless they are single. The primrose, indeed, is not a florist's flower; and its pretty double pale yellow, dark scarlet, lilac, and white varieties are only grown as common border flowers. They like a rich loamy soil, rather moist than otherwise, and a shady situation; and they are propagated by division of the roots.

The Carnation has long been a favourite florists' flower; and, as it is not quite so difficult to grow to a considerable degree of perfection as the auricula, it is also a fa-

avourite border flower. The florists' carnations are of three kinds, viz.—the flakes, which are striped with broad bands of two colours; the bizarres, which are striped or streaked with three colours; and the picotees, which are much the hardiest, and are only bordered with a narrow margin of some dark colour, or dotted with very small and almost imperceptible spots. The carnation, in its wild state, is a native of England, and is generally found on the walls of some old castle, or other ruin, or growing in very poor, gravelly, or calcareous soil. The cultivated plant, of course, requires different treatment; and the following directions have been kindly given to us by one of the first growers of carnations in France, M. Triquet de Blanc, Rue de la Madelaine, Paris:—

“ The compost should be a fresh mellow loam, mixed with an equal quantity of what the French call *terre de taupinière*, and we, casts from mole-hills; to this mixture should be added a fifth of well-rotten cow-dung, so thoroughly decayed as to have become quite black. The soil thus prepared should be pressed firmly into the pots, more so,

indeed, than for any other plant: thus there should be twice as much earth as usual in pots for carnations. The pots are placed in the sun till the 15th or 20th of November, and watered a little at a time, but often. After the 20th of November, at latest, the plants should be kept entirely in the shade, so that they may not be exposed to the sun at any time during the day; and it is also absolutely necessary that they should be kept under a roof where they may be sheltered from the rain and snow; but they must not be put in a hot-house, as a cold situation suits them much better. During frosty weather, they should be very little watered, in order that the soil in which they grow may not freeze very hard. They are thus left in the shade till the end of April, when, there being no longer white hoar frosts to fear, they may be exposed to the east, so that the sun may shine upon them from its rising to the middle of the day, but no longer. Thus treated, they will grow luxuriantly, and produce a magnificent show of flowers."

The best places for carnations in London,

are, Groom's, Walworth; and Hogg's, Paddington Green.

Carnations are propagated by layers and cuttings which, as we have before mentioned, are called pipings. The layers are made when the flowers are in full blossom, and several are made at once, as the operation frequently kills the old plant, and consequently cannot be practised with advantage unless a great many plants are ready to take its place. The layers are cut half through as usual; and covered half an inch deep with mould. As the stalks are very brittle, when they are wet and succulent, it is customary to place the plant in the sun for about half an hour, or an hour, to render it flaccid before the layers are made. The layers will generally be well rooted in a month or six weeks, and will then be ready to be separated from the parent plant. The mode of treating pipings has been already described. When the buds begin to form they are frequently tied round with a strand of bast mat, to prevent them from bursting; and just as they are opening, a bit of paste-board curiously cut is slipped under the flower to

keep the petals in their proper place. Each flower is also furnished with a paper or tin cap to shade it from the sun, and a stake to tie it to, in order to keep the stalk erect. Clove-carnations bear the same relation to florists' carnations, as unbroken tulips, or self-coloured auriculas do to the finer flowers. The tree-carnation is a half-shrubby variety of the same species, and the mule pink is a hybrid between the carnation (*Dianthus caryophyllus*) and the sweet-william (*Dianthus barbatus*.) All these may be treated as common perennial border flowers.

The Pink.—It is remarkable that though the pink is a commoner and hardier flower than the carnation, it is not known in a wild state, and it does not appear to have been much cultivated till the latter half of the last century, though it is said to have been introduced in 1629. Its origin is indeed very uncertain; some botanists considering it as a variety of the carnation, and others making it a distinct species, under the name of *Dianthus plumarius*. There are now many named sorts, and the best laced pinks rank as florists' flowers; their culture being

the same as that of the carnation. The other kinds are considered inferior, and are grown like common herbaceous plants in the open borders.

The Heartsease has only within the last few years ranked as a florist's flower. It had long been a favourite in gardens as its innumerable popular names may testify; but it was reserved for a young lady, aided by an industrious and intelligent gardener, to show the world the extraordinary variations of which the flower is susceptible. About the year 1810 or 1812, the present lady Monck; then Lady Mary Bennet, had a small flower-garden entirely planted with heartseases in the garden of her father, the late Earl of Tankerville, at Walton-upon-Thames. The young lady naturally wished to get as many different sorts into her garden as possible; and at her desire, the gardener, Mr. Richardson, raised as many new kinds as he could from seed. From this small beginning the present passion for heartseases took its rise. Mr. Richardson, astonished at the great variety and beauty of his seedlings, showed them to Mr. Lee, of the Hammersmith Nursery.

Mr. Lee instantly saw the advantages to be derived from the culture of the plant; other nurserymen followed his example, and in a few years the heartsease took its place as a florists' flower. The heartsease mania was at its height from 1835 to 1838; but during the last year, it has appeared somewhat on the decline. The most splendid flowers grown for exhibition are generally hybrids, which possess, in a great degree, the qualities of both parents. Thus, though almost every heartsease has sprung partly from the wild kind, (*Viola tricolor*,) its other parent may be traced by its general appearance. The very large dark purple and yellow flowers are descended from *Viola grandiflora*, a species with large yellowish flowers; other large flowers, with dark purple upper petals, and the lower ones of a bluish tinge, are descended from *V. amœna*; and the offspring of *V. lutea* are nearly all yellow, strongly marked with very dark branched lines. The hybrids raised partly from *V. altaica* are of a very pale yellow, and the petals have an undulated margin; those from *V. Rothomogensis*, or *V. hispida*, are of a pale blue;

and those from *V. bicolor* are white, slightly veined with purple, and tinged with yellow at the base. All these vary exceedingly by continual crossings, but some of the characteristics of the parents always remain.

The culture of the heartsease requires much attention. It is the habit of the plant to ripen a succession of seed during the whole of its flowering season: thus it bears flowers and ripe seeds at the same time during the whole summer. The seeds should be sown in a bed of rich garden mould, at least eighteen inches deep, and highly manured, and the young plants should be suffered to remain till they have flowered, when all the plants should be taken up, the best replanted eighteen inches apart if in a bed, or in pots or boxes, and the inferior ones thrown away. The best soil for replanting the heartsease, particularly if they are in pots or boxes, is rich loam, mixed with one-sixth of sand and one-sixth of vegetable mould; and in large towns, all these soils may be purchased in small quantities from the nurserymen. The pots and boxes should also be well drained; for it must be remembered, that though the

heartsease is very liable to be scorched by the excessive heat of the sun, and will require constant watering in hot weather; it is also very liable to be damped off by cold and wet in winter. The best varieties are propagated by cuttings, taken off in spring, which grow rapidly so as to flower the same summer or autumn. These cuttings should be taken from the points of the shoots, cutting them off immediately below a joint; and they should be struck in pure white sand, as when the cutting is put into earth it is very apt to damp off. The cuttings when made should not be watered, but should be covered with a bell glass, and shaded for several days, on account of the succulent nature of the stems, and great evaporation from the leaves. Heartseases are sometimes propagated by layers, in which case the branch should be only pegged down at a joint, and not slit, on account of its tendency to damp off.

Chrysanthemums are principally winter flowers, and they are valuable for affording a brilliant show at a season when there are few other flowers to be seen. In November and December, when no other flowers are in

blossom, these flowers are in full beauty; and Mr. Loudon tells me that he has seen the walls of two small street-gardens, one belonging to Mr. Ingpen at Chelsea, and the other to Mr. Allen, Chapel Street, Edgware-Road, so completely covered with them as to present a most brilliant and dazzling appearance. Chrysanthemums may therefore be safely recommended as most valuable flowers for both town and country; and their great number and beauty make them particularly interesting. There are, indeed, numerous varieties of every possible shade of yellow, brown, orange, buff, pink, reddish-purple, lilac, and white, but not blue. All the different varieties of chrysanthemums, and there are nearly a hundred named sorts, may be referred to six distinct tribes; and these are the following: 1. Ranunculus-flowered; 2. Incurved; 3. China-aster, or Daisy-flowered; 4. Marigold-flowered; 5. Tassel-flowered, or Quilled; and 6. Half-double Tassel-flowered. The ranunculus-flowered have generally small flowers, in clusters, like little roses; but the rest have large, handsome flowers, particularly the

tasselled kinds, the quilled petals of which are very long, and hang down like tassels. The culture of the chrysanthemum differs according to the use which it is proposed to make of it. When it is to be flowered in pots, cuttings are taken from the tops of the shoots in April; and as soon as they have taken root they are transplanted into very small pots, where they are planted in a compost formed of equal parts of sand, loam, and peat. As soon as they begin to grow, and send out plenty of roots, they are removed into other, rather larger, pots; and this shifting is repeated eight or nine, and sometimes ten or twelve times. This constant shifting will keep the plants bushy, without the cultivator being under the necessity of pinching off the ends of the shoots; a practice which, though it answers the desired end of keeping the plants of a compact habit of growth, has yet the inconvenience of making them throw out so many shoots and leaves as to weaken the flowers. When the chrysanthemums are to be planted in the open border against a wall, their roots should be parted in autumn or early spring,

and planted in very rich and highly manured, but light soil, at the foot of a south or west wall, against which they should be trained like a peach-tree, and all the superfluous shoots cut off. When planted, they should be carefully watered, not only at their roots, but all over their leaves, with a fine-rosed watering-pot, or garden-engine. They should afterwards be watered three times a-day, and occasionally with soap-suds, or manured water, that is, water in which manure has been steeped. Thus treated, the plants will grow six or eight feet high, and their flowers will not only be produced in great abundance, but they will be of enormous size, and very brilliant in their colours. The best chrysanthemums in London are at Chandler's nursery, Vauxhall.

Bulbs and Tubers. — The most interesting bulbs in a flower-garden are the tulip, the hyacinth, and the crocus; and the most interesting tubers are the ranunculus, the anemone, and the dahlia. There are, however, many other flowers of both kinds highly deserving of cultivation. The culture of all the bulbs is nearly the same; but

that of the tuberous-rooted flowers differs in different plants.

Bulbs are generally planted in autumn to flower in spring; and are taken up when their leaves begin to wither, to be kept out of the ground a month or two in complete repose before they are replanted. They are generally propagated by offsets, which are produced by the side of the old bulb; or rather, by the side of the new bulb, which is formed every year to supply the place of the old one, which wastes away. The new bulb sometimes forms beside the old one; and sometimes below it or above it; and this is one of the principal reasons why bulbs should be taken up and replanted every year; as, when this is not attended to, those bulbs that form every year below the old bulb, sink so low in the course of a few years, that they become too far removed from the air to vegetate; while those that form above the old bulb are pushed so high out of the ground that they are often killed by frost or drought. In this way, valuable plants often disappear from gardens, without their owners having the slightest suspicion of the cause. It is,

however, rarely worth while to take up the common garden bulbs: such as the snow-drop, the crown-imperial, &c., every year; particularly as they generally form their new bulbs at the side of the old bulb: but even these kinds should be taken up every two or three years. When raised from seed, bulbs are generally from three to five years before they produce flowers; and they are never propagated by layers or cuttings.

Tulips.—Experienced florists raise tulips from seed to obtain new varieties; but as the young bulbs are frequently from five to seven years before they flower, this mode of propagating tulips does not suit amateurs. Even when seedling tulips do flower, they produce only self-coloured flowers, for the first two or three years, and in this state they are called breeders. To make them break, that is, produce the brilliant and distinct colours which constitute the beauty of a florist's tulip, they are subjected to the most sudden and violent changes of soil, climate, and management. At one time, they are grown in poor soil, and only allowed enough water to keep them living; and then they are

suddenly transported to the richest soil, abounding with food and moisture. Sometimes, to change the climate effectually, florists send their tulips to be grown for a year or two twenty miles or more from the place where they were raised; and then they are brought back to their native air. This laborious and unscientific mode of proceeding is, however, now rapidly giving place to a proper method of hybridizing; after which the young bulbs are brought forward by means of bottom-heat, water, and frequent shiftings, so as to flower and break the second or third season. Florists' tulips are generally divided into four tribes, viz.—1. Bizarres, which have yellow grounds shaded with dark red or purple, and which are sub-divided into flamed, in which the red or purple is in a broad stripe or band, rising from the bottom of the petal,—and feathered, in which the dark colour forms a marginal edging to the petals, descending into them in various little delicate feathery veins. 2. Bybloemens, having white grounds shaded with violet or dark purple, and also sub-divided into flamed and feathered. 3.

Roses, having white grounds shaded with rose-colour or cherry-red, and divided into flamed and feathered; and, 4. Selfs, being either a pure white or yellow. In addition to these, the French have Baguettes, very tall-stemmed tulips, the flowers of which are white, striped with dark brownish red; Baguettes Rigants, which resemble the former, but have shorter stems and longer flowers; and Flamands, which are the same as Byblœmens. The Dutch have also a kind they call Incomparable Verport, a very finely-shaped flower, white, and feathered with bright shining brown. All these kinds are said to be varieties of one species, *Tulipa Gesneriana*, a native of Italy; and they all ought to have round, cup-shaped flowers, clean at the base, and with all the marks and different colours quite clear and distinct. Besides these florists' tulips, several other species are occasionally grown in gardens: the most common of which are the little Van Thol tulips, which were named after the Duke Van Thol, and which are scarlet, edged with yellow; the wild French tulip, which is a pure yellow, and very fragrant;

and the Parrot tulip, which appears to be a variety of the last, and the petals of which are yellow, irregularly striped or spotted with green, scarlet, and blue, and fringed at the margin.

The culture of the tulip, as a florist's flower, requires unremitting attention and care; but for common garden purposes, the tulip will be found hardier, and less liable to injury from insects, &c., than most other flowers. Where tulips are grown in a regular bed, the ground should be dug out to the depth of twenty inches, or two feet. A stratum of fresh earth is laid at the bottom of the pit thus formed, on that a stratum of rotten cow-dung, and on this a stratum of loam mixed with sand. The bed should be three or four feet wide, and its surface should be slightly raised in the middle. A fresh bed should be made every year, or rather the same bed should be filled with fresh soil every season; as the exudations from the tulips will soon poison the ground for plants of the same kind, though it will be very suitable for the growth of other bulbs, and tubers. The proper distance at which

the tulips should be planted in the bed is seven inches apart, every way; and their colours and kinds may be arranged according to the fancy of the planter. It is customary, where the tulips differ a good deal in height, to place the tallest in the middle, and the lower ones on the sides; and when this is the case, the centre of the surface of the bed need not be raised. The bed is protected by hoops and mats, which are contrived to open to admit light, air, and rain at pleasure. When the plants are near flowering, a path is made round the bed; and over the whole is stretched a canvass covering, supported on a wooden frame, and so contrived as to open at the sides or the top, as may be required. The bulbs are planted about two or three inches deep, and are never watered, except occasionally by admitting a gentle rain, till they are in flower. When they have done flowering, the leaves are suffered to remain till they begin to turn brown, when the bulbs are taken up, and laid with the lower part upwards on shelves to dry. When this is the case, the dry leaves and the fibrous roots are pulled or rubbed off;

and the bulbs are put into drawers or boxes, divided into compartments so as to keep the named sorts apart, till the season arrives for replanting, which is the last week of October or the first of November.

Mr. Groom, of Walworth, is the principal tulip-grower in the neighbourhood of London, and he has an exhibition of them of extraordinary brilliancy and beauty every May.

Hyacinths are perhaps the most beautiful of all flowers, and when grown in a bed like tulips, they are almost equally brilliant in effect. Mr. Corsten, a Dutch florist, residing at a place he has called Hyacinth Villa, at Shepherd's Bush, has an exhibition of this kind every April, and I have seldom seen any thing more striking. Under a tent nearly two hundred feet long, and thirty feet wide, are two beds each about one hundred and fifty feet long, divided by a walk covered with matting in the centre, and surrounded by a similar walk, with seats at each end of the tent. In these beds are above three thousand hyacinths, the colours arranged so as to form diagonal lines, and the whole presenting

a perfect blaze of beauty. Hyacinths are as numerous in their named varieties as tulips, but they are not divided into any distinct tribes, except as regards their colours. The principal distinctions are the white, the pink, and the blue; but these admit of various modifications, and there are some of a pale yellow, or rather lemon colour, and some of so dark a purple as to be almost black.

The culture of the hyacinth somewhat resembles that of the tulip; but it is more difficult, from the great length to which the roots of the hyacinth descend perpendicularly, and the necessity which consequently exists for preparing the ground for them to a very great depth. There is also another peculiarity in hyacinth culture which is rather difficult of attainment; namely, that the roots require a great deal of moisture, though the bulbs should be kept quite dry. The roots also require the soil to be very rich, but that the manure used should be of the kind called cold. It will easily be seen from this enumeration of the essentials for hyacinth culture, why Holland is so pre-eminently the country for hyacinths. The

dry sandy soil, raised on the numerous dykes and embankments, by means of which Holland has been rescued from the sea, affords at once a proper bed for the bulbs, and a soil easily penetrable by the roots; while the constant evaporation rising from the water which is every where found below the dykes, is just what is required for the roots. Even the manure most easily obtained in Holland is precisely that best adapted for hyacinths, as it is cow-dung unmixed with straw; and which thus contains nothing to induce fermentation and consequent heat.

It is impossible in England to obtain the advantages so easily attainable by the Dutch, without incurring a very considerable expence. Our soil is generally so adhesive that it requires to be pulverized to a very great depth to admit of the descent of the roots; and even when the soil is sandy it is very different from the beautiful silvery sea-sand, called *Dünensande* by the Dutch. The only way in which we can imitate this sand is by mixing nearly in equal parts what we call silver-sand and peat, or by growing the plants in silver-sand, with a very slight ad-

mixture of fine vegetable mould. Whatever the soil may be, it can hardly be too light, as the Dutch say that the hyacinth will never thrive unless in sand so fine as to be blown away in separate particles by a high wind. When hyacinths are to be grown to the greatest perfection in England, a bed, or rather pit, should be dug three feet or four feet wide, and six feet deep, the length depending on the situation, and on the quantity of flowers to be grown. A layer of stale cow-dung, without any mixture of straw or litter, should be laid at the bottom of this pit at least a foot deep, and the pit should then be filled up to within three inches of the top, with equal parts of peat and silver-sand, or with a mixture of three parts of silver-sand to one of light vegetable mould perfectly fine and without any stones. About three inches from the top should be spread a layer of pure sand in which the bulbs are placed at regular distances, and each with the pointed end, which the Dutch call the nose, upwards; and the bed is then filled up with the same mixture as the lower part, and a layer about three inches deep of

pure peat is laid over the whole, to form a relief to the flowers. Dry weather should always be chosen for the planting; and when planted, the bulbs should be entirely covered with the sand, and should be about six inches below the surface of the bed, which should be raised at least three inches higher than the surrounding garden, to allow for its sinking. The layer of pure peat on the surface is only to afford a dark background to the flowers when they expand, and may be omitted if thought unnecessary for this purpose. The bulbs are planted the last week in October, or the first or second week in November, and they are placed about four inches apart every way. After they are planted, a mixture of cow-dung and water is generally thrown with a scoop over the bed, so as to form a thin coating over the soil, but not to penetrate into it. When the weather becomes frosty, a covering of dry litter, reeds, or tan is put over the beds; or hoops may be fixed over them on which bast mats are stretched. In March the covering is removed and the beds are cleared of weeds, and covered with a fresh coating

of cow-dung and water. In April, an awning of thin canvass, is erected over each bed, under which the plants are to flower; and by the middle of this month they will be in all their beauty. As soon as the flowers begin to fade the flower-stalks should be cut off and instantly removed. They should never be suffered to lie on the bed, and should not even be put where by any chance they can mix with the earth intended for a hyacinth bed in another year, as the exudations proceeding from them in their decay would cause the bulbs to rot. This is not only because the exudations from the hyacinths are of course poisonous to other bulbs of the same genus; but because the flower-stalks appear to contain a kind of corrosive juice, as the labourers employed in Holland to cut them off the bulbs, frequently find their hands and bodies become red and inflamed, and sometimes so painful as to prevent them from sleeping.

When the leaves turn brown at the points, which is generally about the middle of June, the bulbs should be taken up. When this is to be done the leaves are first pulled off,

or if they will not come off readily by pulling, they are cut off close to the bulb. The bulbs are then taken out of the ground, and laid on the footpath in rows, so as to keep the different kinds distinct. The bed is afterwards raked smooth all over, and a strip about a foot and a half broad is made flat and firm, in the middle of the bed, by being pressed with a plank, or beaten with the back of the spade, and on this the hyacinth-roots are laid, still in distinct rows: earth is then drawn over them two or three inches thick, and they are left for two or three weeks. This the Dutch call lying in the Käuil, and the time of remaining in it varies according to the size of the bulb and the weather, the largest bulbs being removed soonest. When taken from the Käuil, the bulbs are placed on shelves or wooden trays to dry, with the root end of the bulb inclining towards the south.

Where it is not thought advisable to sink the bed so deep as six feet, it may be made four feet deep, and the layer of cow-dung at the bottom mixed with soil a foot deep, leaving only about three feet to be filled with

a mixture of peat and river sand, with about the proportion of a third to the whole of vegetable mould. The other treatment is the same as that detailed above. In all cases the soil should be very light and fine, and only cow-dung should be used as a manure. The roots should also always be watered very sparingly, and with a mixture of cow dung and water, though not so thick as that used for coating the bed. When the bulbs are planted, and again when they are taken up, they should be carefully examined, and all that are at all specked or mouldy, should be laid on one side, as they would infect the others. When the infected part is large, the bulb should be thrown away, or burnt with the stalks; but where the speck is small it should be cut out with a sharp knife, and the bulb planted, in not more than four-and-twenty hours after the piece has been cut out. Hyacinths are propagated by offsets, by dividing the bulb, and by seed, in which last case they are five years before they flower. When planted in pots or boxes, the pot or box should be half filled with broken potsherds, or some other mate-

rial to ensure perfect drainage, and the bulbs should be planted in a compost of peat, sand, and very rotten cow-dung. The bulbs should only be about half covered with soil; and if in boxes they should be kept, if practicable, in a greenhouse, till they are ready to flower. If in pots, they should be plunged into a hot-bed, or into a tan-stove; or where this cannot be done they should be buried in the garden, so that the point of the bulb should be at least four inches below the surface. Here they should remain till about six weeks before flowering, when the pots should be taken out, and placed where they are to flower; the sides of the pots being kept warm with moss, and the flowers brought forward by daily waterings. All hyacinths grown in pots and boxes will require abundance of water to make amends for the unnatural situation in which their roots are placed. After hyacinths have flowered in pots or boxes, or in water glasses, the bulbs are generally planted in the open ground, and being covered with about an inch of soil they are left to take their chance. Thus treated, the finer kinds generally perish, but

the hardier ones will live and flower for many years, if allowed every autumn to retain their leaves, till their new bulbs are matured. Hyacinths that have been flowered in glasses, or pots, seldom however flower so well afterwards, at least not for several years, as they scarcely ever quite recover the shock they have sustained from the unnatural position of their roots; whereas the Dutch florists, by allowing the roots of their hyacinths plenty of room to descend perpendicularly, and taking up the bulbs every autumn, have been known to keep bulbs of their finest flowers twelve or even twenty years, and to have them produce splendid flowers every year.

It must be observed that the exudations of hyacinths are very abundant, and very injurious to other plants of their own genus. For this reason, the Dutch never grow their hyacinths in the same bed two years consecutively. The usual rotation is, first year, hyacinths; second, tulips; third, polyanthus-narcissus; fourth, crocuses; and fifth, hyacinths again. The Guernsey lily, the bulbs of which are generally thrown away in Eng-

land as soon as they have flowered, will live many years if treated like the hyacinth.

Crocuses may be grown in the open ground, and they do not require taking up every year like hyacinths or tulips. If they are taken up and replanted every third or fourth year, it will be sufficient. There are above a hundred named varieties, and they will produce a very good effect if planted so as to form figures with their various colours. When this is the case, however, the corms should be taken up and replanted every year; to prevent the figure from becoming confused by the spreading of the offsets. *Crocuses* may be grown in glasses, or in pots or boxes, with very little injury, if planted in the open ground as soon as they have done flowering, and suffered to mature their leaves. In all cases the leaves of the crocus should be suffered to remain till they wither, and not cut off; though many gardeners, from a mistaken desire for neatness, cut the leaves off as soon as the flowers have faded, and thus seriously injure the corms. All the kinds of gladiolus or corn flag, the *Irises*, the *Ixias*, and, in short all the Cape bulbs, are corms, and require

the same treatment as the crocus. Charlwood's, Covent-garden, and Carter's, Holborn, are the best places in London for procuring all kinds of bulbs and corms.

The Ranunculus. — M. Triquet de Blanc, who had the kindness to send me directions for the culture of the carnation, has given me the following directions for the culture of the ranunculus:—"In November spread well-rotten cow-dung, or thoroughly-decayed leaves, four or five inches thick over the beds which are to be devoted to the ranunculus, and dig it into the ground about four inches deep, digging the bed over several times, so as to mix it well with the soil. The surface of the bed is then raked smooth, and lines, or rather drills, an inch and a half deep, are traced on it so as to form squares, four inches on the side every way. The ground is then left till the beginning of February, when the ranunculuses are planted four inches apart, just at the point of intersection of the lines, and they are covered about an inch and a half deep (rather less than more) with the compost described above, or with fine garden mould. The

advantages gained by digging the earth in November, though the roots are not planted till February, are—that the ranunculuses are thus planted on a hard bottom, which suits them particularly; and that the gardener is not obliged to dig the earth to mix the cow-dung with it in February, when the ground is generally sloppy, and in a very unfit state for being worked.”—When the plants are about to flower, an awning may be erected over the bed to protect them from the effects of the sun, which is apt to destroy the brilliancy of their colours. In frosty weather, they should be protected by a mat, day and night, as the sun will do them a serious injury, if they have been at all affected by the frost. The plants may be watered with a weak solution of cow-dung in water, and they should be constantly watered in dry weather. The tubers should be taken up as soon as the leaves begin to turn brown, which will generally be in July. Groom, of Walworth, is considered to keep the best ranunculuses.

The Anemones of florists are of two kinds: those descended from the garden or star anemone (*A. hortense*), and those descended

from the poppy anemone (*A. coronaria*). The poppy anemones, which are generally single, are planted in September or October, and under shelter are frequently in flower all winter: the splendid Dutch anemones, and all the varieties of *A. coronaria*, on the contrary, are not planted till February or March; the latter month, or even the beginning of April, being preferred for the Dutch anemones, which are apt to rot if planted too early. Anemones should be planted three inches deep, and five inches apart every way, in a fresh, sound, yellow loam, without any manure. Care should be taken to keep the frost from them; but they will not need any other attention till the leaves turn brown, when the tubers should be taken up, and treated like those of the *ranunculus* and tulip. Old varieties are propagated by offsets, and new kinds are raised from seed.

Dahlias are either raised from seed, or propagated by slips or cuttings, or dividing the tubers. The seed is sown in pots in a slight hotbed in February, and the young plants are transplanted into the open air in June, where they are suffered to remain till they flower. In October, those

which are thought worth preserving are marked, and the others taken up and thrown away. When the stalks are killed by frost, the tubers are taken up, and kept in some dry place till the season of planting the following year. The slips are taken from the collar of the root in spring, and the cuttings from the tops of the young shoots early in summer. Both are planted in very small pots, in light, rich, sandy loam, and placed in a hotbed frame, and shaded. In a fortnight they will have struck root; but they should be shifted into larger pots, and placed for a short time in a greenhouse, before they are turned out into the open ground. Dahlias have large tuberous roots, but stems will only spring from the eyes or buds in the crown of the root. If these eyes should have been destroyed, or be wanting, the root is said to be blind; and though it will live for several years in the ground, it will not send up a single stem. For this reason, before dividing the root, it should be planted in a gentle hotbed to develope or start the buds or eyes; and when it is divided, care should be taken that each piece includes a portion

of the crown, which has an eye in it. Sometimes eyes are grafted in the herbaceous manner on blind tubers.

The best soil for dahlias is a sandy loam, not too rich, as, in rich or moist soils, the plant will produce more stalks and leaves than flowers. Where the soil of the garden in which dahlias are to be planted is rich, or heavy, a quantity of sand or gravel should be mixed with it. Striped or variegated flowers will soon lose their markings if grown in rich soil. The tubers of the early kinds are planted in April, to flower in June; but those of the finer kinds are not planted till May and June. When they begin to grow, the side-shoots are removed from one foot to three feet from the ground; the principal stem is then either tied to a stake driven deeply and firmly into the ground, or the whole plant is drawn through a set of dahlia rings. Dwarf plants are frequently suffered to trail on the ground, and are pegged down, so as to cover the whole of the bed, with which treatment they look extremely well. In dry weather, the plants should be regularly watered, but not

too abundantly. When the leaves and stalks are killed by the frost, they should be directly cut down; but the tubers may be left in the ground a little longer, as, if taken up too soon, they will shrivel, and often become rotten. When taken up, they should be kept in a dry place, and covered with a mat to exclude the frost.

All the dahlias now in our gardens, numerous as they are, have sprung from two kinds, both natives of Mexico, viz.—*D. pinnata*, or *variabilis*, all the varieties of which are purple, crimson, rose-coloured, lilac, or white; and *D. coccinea*, the varieties of which are scarlet, orange, or yellow.

It is remarkable, that notwithstanding the numerous varieties that have been raised of these two species, there have never been any hybrids raised between them. Many attempts have been made, but all the plants raised have partaken exclusively of the qualities of one or the other of the parents, and none have partaken equally of both, as is the case with true hybrids. There are many other kinds mentioned in books, the most remarkable of which is the tree dahlia, *D.*

excelsa, a specimen of which, in the Liverpool Botanic Garden, is now above twenty feet high. All the varieties grown in British gardens as florists' flowers, may be divided into four kinds, viz. — Dwarfs, Anemone-flowered, Ranunculus-flowered, and Globe-flowered. The dahlia was first discovered in Mexico by Baron Humboldt, in 1789, and it was sent by him to Cavanilles, at Madrid, who named it in honour of Professor Dahl, a Swedish botanist. This name was afterwards changed to Georgina, in honour of a German botanist named Georgi, who resided many years in St. Petersburg, in consequence of the genus *Dalea* having been previously established by Thunberg. As, however, this name is neither spelt nor pronounced the same as *Dahlia*; and as the name of *Dahlia* was given long before that of *Georgina*, the plant is now restored to its original appellation. The dahlia was introduced into England in 1804, but it did not become a florists' flower till about 1815.

CHAPTER IX.

MANAGEMENT OF THE LAWN, PLEASURE-
GROUNDS, AND SHRUBBERY, OF A SMALL
VILLA.

THE word Lawn may probably conjure up ideas of too large an extent of ground to be managed by a lady; but when I use the term, I do not mean an extensive park-like surface of level turf, but one of those beautiful verdant glades that produce so delightful an effect even in the smallest gardens. In places where the whole extent of garden-ground does not perhaps exceed an acre, every one must have felt the relief afforded to the eye by a broad strip of lawn, bordered by trees and shrubs, not in a formal line on each side, but running into numerous pro-

jections and recesses, and resting their lower branches, frequently covered with flowers, on a rich smooth velvet-looking carpet of grass.

Every one possessing a lawn of this description must be aware that its chief beauty consists in its smoothness, and in the firmness and closeness of its grasses. I say grasses, because strange as it may sound to unbotanical ears, from twenty to thirty different kinds of grasses sometimes enter into the composition of a square foot of fine turf. Some of these grasses are coarse and grow high, and widely apart; and others are very fine and slender, and grow closely together. This being the case, it is obvious that when a fine smooth turf is required, the finer kinds of grasses should be chosen, and the coarser ones not only rejected among the grass-seeds sown, but, if possible, destroyed whenever they appear, if they should chance to come up accidentally.

Botanists have distinguished and arranged nearly fifteen hundred different species of grasses; and of these probably more than three hundred kinds are now cultivated in

England. Of these, some are, of course, better adapted to certain soils than others; and to ascertain which grass was best suited to each soil, the late Duke of Bedford, whose loss the horticultural and agricultural world has recently had to deplore, instituted a series of experiments at Woburn under the superintendence of his gardener, the late Mr. Sinclair, who was a very intelligent man, and the result of which was published in the *Hortus Gramineus Woburnensis*. From these experiments, it was found that what are called hungry sandy soils, were the worst, and rich alluvial soils the best for the production of grasses; but that sandy loams produced the most equal and most permanent crops. To apply this to practice in the production of proper lawn grasses, it is evident that as a sandy loam appears to be the best for them, a sandy soil would be improved by the addition of clay, and a clayey one by the addition of sand, both these mixtures constituting what is called a sandy loam: and it may be added, that where the soil is calcareous, it may generally be left without any alteration, when it is to be covered with

grass. The next thing to be considered is the kind of grasses most suitable for sowing on a lawn; and to ascertain this, it must be remembered that the proprietor of a lawn does not want a crop of hay, but a fine smooth level turf, the grass in which shall entirely conceal the earth. For this purpose, it is evident that slow growing grasses, the roots of which will retain permanent possession of the soil, and which are sufficiently succulent not to be burnt up when closely mown in hot weather, are preferable to those which grow rapidly and produce an abundant crop of herbage, particularly as the roots of the last kind are generally easily withered up in dry weather. Very fast-growing grasses are indeed exceedingly annoying to the possessor of a small lawn, as they require constant mowing and are thus a constant source of expence.

Some philosophers assert that the chief thing that hinders the attainment of our desires, is that very few of us know exactly what we want; and it is to save my readers from being in this unpleasant predicament with regard to lawns, that I have been thus

particular in describing what qualities are requisite in grasses to make them suitable for producing soft turf. The next thing is to tell them as well as I can, what kind of grasses appear most likely to answer the end in view. Of all these, one of the most permanent appears to be the fox-tail meadow-grass (*Alopecurus pratensis*); it is one of the principal grasses in rich natural pastures, and it should always form one-fourth part of the seeds used for laying down a lawn. The sweet-scented spring grass (*Anthoxanthum odoratum*) grows best in deep moist soil; but it is worth sowing in every situation for its fineness, its dwarf growth, and for its habit of continuing to vegetate, and to throw up fresh stalks nearly all the year. It is this grass which gives so delightful a fragrance to new hay. The common meadow-grass (*Poa pratensis*) is also suitable for lawns; as, though of slow growth, it has creeping permanent roots: and the short blue meadow-grass (*Poa cærulea*) may be added, for its deep blue tint, which gives a richness to the general colour of the grass, and because it sustains no injury from dry weather. The

crested dog's-tail grass (*Cynosurus cristatus*) is, however, the best for sustaining drought and heat, as its roots penetrate so deeply into the ground, as to keep its blades green, while all the grasses around it are quite brown from being burnt up. The hard fescue grass (*Festuca duriuscula*) is another kind which will stand the effects of dry weather; it is also a very fine dwarf grass, and springs early. Many other grasses might be named, but these will suffice. The proportion in which they ought to be mixed, is another, and an essential point; but at the same time it is one rather difficult to ascertain, as the seeds of the finer kinds of grasses are very often abortive, and do not germinate; and thus a larger quantity must be sown of them, than of those kinds, all the seeds of which are generally good. The seed of the meadow fox-tail grass (*Alopecurus pratensis*) is very often so bad, that not above one seed in three will germinate, consequently a much larger proportion of seed of this grass must be sown than of any of the others. This seed is very light, and consequently a pound of it, if bought by weight,

will appear a great deal more than a pound of the crested dog's-tail grass (*Cynosurus cristatus*), the seed of which is very heavy; and yet as the latter seed is generally all good, it will cover more ground with grass than the other. The best way is to write down the botanic names of the grasses, and to send them to a respectable seedsman, with directions to return enough of the seed of each, to produce an equal quantity of grass of each respective species on the lawn. The whole quantity required of the mixed grasses is generally not more than four bushels and a half per acre; but if an immediate effect be wanted, about a bushel and a half of the common white clover may be added. This quantity of seed will be sufficient to sow the ground very thickly, as when ground has been dug over and rendered perfectly smooth the seeds will go further, and cover it more completely than when the surface is uneven; and if the seeds are sown in dry weather, then rolled in and afterwards watered, the ground will be as green and covered with as fine a sward the first season, as though it had been laid down with turf.

The plants will, however, probably be too thick; and as, when this is the case many of them die, the ground may require a partial re-sowing the following spring. It is therefore safer under ordinary circumstances not to sow more than four bushels and a half an acre, as if that quantity be equally distributed, the plants will not be too thick.

When the ground which is to form the lawn has been marked out, the soil, if it wants amelioration, should be spread over with the earth required to make it approach as near as possible to the great desideratum, a sandy loam, and it should be then dug about a foot deep. Care should be taken to do this in dry weather; as the two soils to be mixed, should be both in a state of dryness. No manure should be dug in unless the soil happen to be very poor indeed; as manure will tend to produce a larger and taller growing crop of grass, which, of course, will increase the trouble and expence of mowing, without being of any use. The ground being dug, and raked to remove all the large stones, the surface should be rolled, and then the seeds sown; after which it should be rolled again

and watered by a garden-engine having a very fine rose. This watering may be repeated occasionally if the weather should be very dry; and if any mole-hills or worm-casts appear, they should be levelled, and the rolling repeated.

When the ground is to be covered with turf, instead of being sown with grass seeds, the turf should, if possible, be procured from some meadow or downs where sheep have been fed; as these animals bite close to the roots, and this kills the coarser grasses which have generally weak fibrous roots, while the finer grasses, which have deep roots, remain uninjured. The turf is then cut with a turf spade, and rolled up for removal. When it is to be laid down, and the ground is ready to receive it, it is spread out, and the different rolls carefully joined to each other: little bits being cut off or pushed in where the pieces do not exactly fit. It is then watered and rolled, and will require no other care. With regard to after management, a lawn can never be kept neat without frequent mowing, and this is an operation which a lady cannot very well perform for herself: unless, indeed,

she have strength enough to use one of Budding's mowing machines. In whatever way, however, the operation may be performed, it should be repeated very frequently. In large establishments, the lawn is always mown every week during summer; and even in the smallest gardens the grass should never be suffered to remain more than a fortnight during summer without mowing. The roots will thus become weakened, and will not be able to send up any but dwarf and fine blades of grass, which will form in a few years that beautifully smooth and soft velvet-like turf, which it is the principal beauty of a lawn to possess. "It is a great mistake," says Mr. Loudon, in his *Suburban Gardener*, "to suppose that anything is gained in the way of economy by suffering the grass of lawns to grow long before mowing, in order to save the expense of once or twice mowing during the season; for, in proportion as the grass is allowed to grow long before mowing, in the same proportion are the roots strengthened and enabled to send up still longer leaves and stems; whereas if a lawn were kept short by frequent mowing for two or three

years in succession, the plants of grass would at last become so weak that not one-half the mowing usually required for even slovenly-kept lawns would be necessary, and the turf would be much finer, and neater in appearance." The best manure for a lawn is soot.

I have dwelt longer than I otherwise should have done on the management of lawns, not only because I am a great admirer of a smooth green turf, but because I believe it is a subject not generally understood. Most persons imagine that if they lay down turf, or sow grass seeds, they have done all that is requisite; and my object is simply to impress upon the minds of my readers, that this is not enough: for as there are different kinds of turf and grasses, it is as necessary to choose which to take, as to select flowers for the flower-garden. I have only to add that the brownish hue sometimes observed on the brows of hills in pleasure grounds is produced by *holcus lanatus*, a kind of couch-grass, that wastes all its strength on its fleshy roots, and produces only a thin and wiry herbage. This species, the different kinds of *agrostis* or bent-grass, the brome grasses, particularly

Bromus arvensis, and the cock's-foot grass, *Dactylus glomerata*, should never be sown in lawns.

Grass seeds should be sown either in spring or autumn; and May, and August or September are considered the best months. In very old lawns, moss is apt to predominate, and when it is wished to destroy this, the surface of the lawn is dressed, as it is called, in May with lime. Dressing with lime will also destroy the worms which are often very troublesome in lawns (particularly where the ground has been manured with dung), in throwing up casts, which make the ground uneven, and very difficult to mow.

The Walks in pleasure-grounds should be hard and dry; and they should also be sufficiently wide to admit of three persons to walk abreast occasionally; as nothing can be more disagreeable than the situation of the third person, whom the narrowness of the walk obliges to walk before or behind his companions; and who is obliged either to remain silent or to carry on a most uncomfortable and disjointed kind of conversation. The minor evils of clothes being caught by

branches, and leaves discharging on the pedestrians the remains of a recent shower, would likewise be avoided by broader walks.

The laying out of pleasure grounds embraces a wide field; and when they are extensive they require the eye of a painter, as well as the taste and skill of a landscape gardener. Even in small places, so much depends on situation (particularly as regards the house, and whether there may or may not be any distant prospects); on the taste of the occupier; and on the expense to be incurred, not only in laying out and planting, but in after keeping, that few directions can be given that would be generally applicable. It may, however, be observed that in all places whether large or small, the walks should be so contrived, that no person passing along one, should see the persons walking on another. Indeed, if more than one walk be ever seen at a time, it gives an idea of want of space and confinement; and this idea is one which the landscape gardener always endeavours as much as possible to avoid. For the same reason the boundary fence should never be seen, if it can possibly be

disguised. Even in a small street-garden, with three low walls on three of the sides, and the house on the fourth, a very pleasing effect may be produced by effectually concealing the boundary walls with ivy; and thus permitting the imagination to fix the boundary where it will.

Another general rule in laying out pleasure-grounds is to avoid monotony or sameness as much as possible. Nothing is more wearying to the eye than a place, every part of which is alike, and which leaves nothing to the imagination. A place regularly dotted over with trees at equal distances is quite featureless; has nothing to attract the eye, and nothing to interest the mind. But if the same trees are planted on the same ground in masses, with a broad expanse of lawn between; the trees sometimes projecting, and sometimes showing a smooth glade of grass, running in among them, the end of which the eye cannot reach, the imagination becomes excited, and a degree of interest is instantly created. Where the lawn is large, a few single trees may be introduced; but few things in landscape gardening require

more taste. Indeed, in laying out pleasure-grounds, however small they may be, it is generally the best, and indeed the most economical way, to have the advice of a professional landscape gardener at first; instead of groping on in the dark, from a mistaken idea of economy, till at last it is discovered that all is wrong, and must be done over again. Thus in the end, the work is generally found to have cost twice as much as would have been expended if it had been begun properly at first; besides the loss of time, and the annoyance always occasioned by having anything to undo.

The Trees and Shrubs.—In all places sufficiently small to be managed by a lady, without the aid of a regular gardener, the trees and shrubs should be of the choicest kinds. It is quite the fashion of the present day to plant arboretums; and though a place of the kind I mention would not admit of a complete one, a lady might take some genus, or some small natural order to illustrate, (as for example the genus *Ribes*, or the order *Berberideæ*.) and fill up the rest of her grounds with hollies or other evergreens, so

as to form a back ground to the ornamental trees. The genera *Magnolia* and *Liriodendron* form the hardy trees of another small order, which it would be easy to cultivate, taking care to plant *M. conspicua*, and any other that produces its flowers before it does its leaves, with a rich background of evergreens. The almond, which flowers in the same manner, should be placed in a similar situation; and standard roses may also be so placed as to have the unsightliness of their long naked stems greatly lessened by a mass of evergreens behind.

Another very interesting mode of arrangement, where the ground will admit of it, is to plant particular situations with certain trees which are not to be found in any other part of the grounds; and thus to form what the landscape gardeners call scenes. Thus, for instance, there might be an American ground, formed in some shaded hollow, and planted with rhododendrons, azaleas, and kalmias. All these plants require a light peaty soil, and a shady and somewhat moist situation. In another part of the pleasure-grounds there might be some alpine scenery,

with pines and firs, and particularly larches, interspersed with a few birch-trees, planted in dry sandy soil on hilly ground. The deciduous cypress and weeping willow should be near water, as should the common willow, nearly all the poplars, and the alders. In another place might be a thicket of the different varieties of hawthorn, with a few of the fine large-fruited foreign thorns planted in striking situations. In short there are no limits to the numerous and beautiful scenes that might be laid out by a woman of cultivated mind, who possessed fancy and taste, combined with a very slight knowledge of trees; and I think I may safely add, that I do not know a more delightful occupation than this kind of landscape gardening. It is landscape painting, but on the noblest and boldest scale: and it is a source of constant enjoyment, from the daily improvement that it displays. What a difference it makes in the pleasure we have in returning home, if we have something to visit, that we know has been improving in our absence. We regard the trees and shrubs we have planted, and the scenes we have laid out with almost a

parental fondness; and a new and daily increasing interest is given to life. I would, therefore, most earnestly entreat my readers to study trees and shrubs; and I do assure them that they will find themselves amply repaid, not only by the pleasure they will have in landscape gardening, but in the additional enjoyment their accession of knowledge will give to every country walk and ride that they take.

There is, however, one great drawback to the pleasure that may be anticipated from planting an arboretum, or even an illustration of any particular order or genus; and this is the very great difficulty that exists in procuring plants true to their names. Nurserymen put down a great many more names in their catalogues, than they have different kinds of plants; and thus the same plants, like the actors in a country theatre, are often made to perform under a great many different names in the same piece. I have heard of instances where twelve or fourteen species were named in a catalogue, though the nurseryman only possessed three or four, which, when wanted, were made to do duty under

all these different names. Almost all nurserymen are alike in this respect, and the only real cure will be an increased knowledge of trees and shrubs on the part of the purchasers, which will render it impossible to impose false kinds upon them. In the mean time I may mention that Mr. Loudon has found the trees and shrubs in the nursery of Messrs. Whitley and Osborn, at Fulham, more correctly named than in most others.

In planting masses of trees and shrubs, great care should be taken to hide the dug ground around them, which always forms a scar in the landscape. The best way of doing this is to cover all the space between the shrubs with grass, and to tie down the branches of the trees to pegs or stakes fixed in the earth, so as to make the trees feather down to the ground. Where this cannot be accomplished, on account of the expense of clipping the grass, for it cannot be mown among the trees, ivy may be pegged down over the dug ground, or evergreen trailing roses, of which there are many kinds especially adapted for this purpose. There is one general rule relating to the planting of trees and

shrubs, which can never be too often repeated, or too strongly enforced, — it is, never to suffer them to be planted too thickly. This may appear a very simple rule, but it is one which it is very difficult to put in practice, as all the persons employed in planting are generally opposed to it. The nurseryman of course wishes to dispose of his plants, and the gardener to produce a good effect as soon as possible, nay, even the proprietor cannot help feeling the bare and desolate appearance of a new plantation where the shrubs are placed at proper distances. There are but two remedies for this: either planting so as to produce an effect at first, and then thinning out half the plants, beginning the second or third year; or planting the shrubs at the proper distances, and covering the ground between them with some trailing plant pegged down.

Nothing can look worse than a row of tall trees which were evidently planted for a screen; but which, so far from answering the intended purpose, admit the light between their slender naked stems, which afford no more concealment than the open rails of a pal-

ing. Mr. Loudon observes, in one of the numbers of the *Gardener's Magazine*, that the quickest way of thickening a plantation in this state is, if the trees are deciduous, to cut every alternate tree down, in order that the stools of the fallen trees may send up young shoots; but if any of them have branches within six or eight feet of the ground, by taking off the tops of the trees, and tying down these branches, the plantation may be thickened, without cutting any trees down.

A weeping ash is a very ornamental tree on a lawn, but unless it is well trained it loses its effect. When trained to a wooden frame, the hoops and rods of which it is composed are seldom strong enough to sustain the weight of snow which falls on the summit of the tree in severe winters, and if they give way in any place, the boughs are frequently broken. In the arboretum which Joseph Strutt, Esq., is now having laid out at Derby, and which, when finished, he is most liberally about to present to that town as a public promenade, there is a very fine weeping ash, for which Mr. Strutt has had an iron frame-work made. The iron rods are light

and elegant, and yet so strong that they are in no danger of giving way under any weight of snow that is ever likely to fall on the tree. The iron frame work has been coated over with gas tar to preserve it from rust, and it now looks exceedingly well.

Roses. — These beautiful shrubs are so generally admired, and they are grown so universally in all gardens, that I think I ought to give some especial directions for their culture. In the first place, roses are said to require removing every third year; as their roots exude a great deal of matter unfit for them to reabsorb, and as their fibrous roots are few, small, and not widely extended from the bole of the plant. It is not perhaps necessary to take this rule strictly *au pied de la lettre*, but it is as well to keep it in view, and to remember that when rose trees look sickly, or fail to produce a due proportion of flowers, removing them to a fresh soil will generally restore their vigour.

It is not perhaps generally known that there are nearly two thousand species and varieties of roses. Among such a chaos it would be almost impossible to choose, had

not florists arranged them in about twenty general divisions. One of the principal of these contains the cabbage-roses and their beautiful descendants, the moss-roses, of which last there are more than twenty kinds, some of which are very striking, and particularly the dark crimson moss-rose, generally called the Rouge de Luxembourg, and the white moss, though the latter is rather too delicate for a town garden. The crested moss is also a curious variety, and it is said to have been found growing out of an old wall in Switzerland. All the kinds of moss-roses should be planted in warm dry situations, and in March a little manure should be laid on the surface of the soil round their roots. Should the season prove dry, the plants should be frequently watered, and the result will be a brilliant display of flowers. There are twenty-five or thirty other kinds of cabbage or Provence roses, all of which are very fragrant, and indeed they are the kinds used for making rose-water, &c.; they are all quite hardy, and require no particular culture.

The autumn-flowering or perpetual roses

are also remarkable both for their beauty and their fragrance. There are more than fifty sorts; one of the most beautiful of which is Lee's perpetual, the Rose du Roi of the French. The Pæstum roses, mentioned by Pliny, are supposed to belong to this family; as does also the well known Rose des Quatre Saisons. All these roses should be pruned twice a-year, in November and in June; and after pruning, the ground about their roots should be loosened with a fork, and then covered two or three inches deep with manure, the manure being covered over with some fresh green moss, to prevent it from having an unpleasant appearance. The roses of all the perpetual kinds frequently fade without losing their petals; and when this is the case the faded flowers should be instantly removed. They are all propagated by grafting on the common dog-rose, as they do not readily take root from layering. These roses are particularly valuable, as with a little management they may be kept in flower eight months in every year.

The French, or Provins Roses, are gene-

rally widely opened flowers like the rose in architecture. The striped and marbled roses belong to this division. These roses have scarcely any fragrance; but they have generally showy flowers, and they are very hardy. The druggists use them for making conserve of roses; and for this purpose they are grown in great quantities near the little town of Provins in France, whence their name, which is often confounded with that of the Provence Roses from the south of France. The white roses are hardy, and bloom abundantly with very little care. The Scotch roses are also remarkable for their hardiness, for their blooming generally a fortnight earlier than any others, and for their ripening abundance of seed, from which new varieties may continually be raised. The yellow Scotch rose is very beautiful. Williams's double yellow sweetbriar, and the Austrian yellow or copper-coloured rose are also well worth cultivating. The latter is yellow on the outside of the petal and red within. This rose will not succeed well in a smoky atmosphere, but it flowers beautifully in Mrs. Marryatt's flower-garden at Wimbledon, and in that of

R. H. Jenkinson, Esq., at Norbiton House, near Kingston. The common double yellow Rose, which seldom flowers well, should be grown in a rich soil and warm situation, and it requires abundance of air.

Of the climbing roses, the Ayrshire roses, particularly the beautiful white flower called the Queen of the Belgians, and *Rosa ruga*, a very handsome and fragrant variety, are perhaps the best for training upon frames to form what are called pillars and pyramids of roses, as they are quite hardy. For sheltered situations *Rosa multiflora*, and its near ally the Seven Sisters' rose may be chosen; as they grow very fast and very high, and produce myriads of flowers, though they are easily killed by frost. The most valuable climbing roses are, however, the descendants of *Rosa sempervirens*, the evergreen roses; and these are the only kinds that should be used for pegging down over the dug ground of a shrubbery. They are of the easiest culture, as they will grow under the drip of trees, and they ought never to be pruned. Before planting them the ground should be dug, and well cleared from the roots of weeds, &c.

It should then be manured with part of an old hot-bed, and the roses should be planted about five feet apart. The following autumn a good coating of manure should be laid on the surface of the ground; and the plants will require no after culture but pegging down the shoots to prevent them from leaving any part of the ground bare. The Triomphe de Bollwiller is one of the best of roses for this purpose. The Boursault division, one of the best of which is the Rose de Lisle, may be treated in the same manner. The noisette roses are known by the great clusters of flowers which they bear at the extremities of their shoots. Their branches should not be shortened, but the dead flowers should be removed as soon as they fade.

The Banksia roses, the tea-scented kinds, the Macartney and musk roses, are too tender for any situation but a south wall. The best roses in the neighbourhood of London are to be found at Lee's, Hammersmith, and Loddige's, Hackney. There are also very fine collections at Rivers's, Sawbridgeworth; at Wood's, Maresfield, and Hooker's, Brenchley, both near Tunbridge Wells; and more

especially at Lane's, Berkhamstead,—the latter nurseryman contriving, by means of forcing, to have roses beautifully in flower from the latter end of January to the middle of November every year.

Roses are generally propagated by grafting or budding, and also by making layers and cuttings. In the latter case, the point of the shoot should be taken off, and the greater part of the leaves, to prevent an access of evaporation. (For Illustration, see p. 84.)

CHAPTER X.

ROCK-WORK, MOSS-HOUSES, RUSTIC BASKETS,
AND FOUNTAINS.

Rock-work, though composed of somewhat ponderous materials, is very frequently arranged according to female taste; and one of the most remarkable examples in England (that at the Hoole, near Chester,) was designed by a lady, and executed entirely under her direction. There are many kinds of rock-work; but they may be all described as collections of fragments of rocks, stones, flints, vitrified bricks, scorixæ, and similar materials, so arranged as to afford a striking object in the landscape; and, at the same time, so as to form a number of little nests or crevices for the reception of alpine plants.

The mode of arranging these materials depends entirely upon taste; and of course varies widely. The most natural kind of rockwork, is like that at Redleaf, near Tunbridge Wells; where Mr. Wells, the proprietor, taking, what Mr. Loudon calls the key-note, from the natural scenery of the neighbourhood, has made his rocks appear "to crop out" of the soil, as though naturally, in such situations as to give the best effect to the scenery. The plants deposited in the hollows of these rocks, are so admirably placed, and the art with which they are cultivated, is so skilfully concealed, that no illusion can be more complete; and we may fancy ourselves in a scene of nature, but of nature in her greatest beauty and highest luxuriance.

Very different is the rock-garden of the late Duke of Marlborough, in his private gardens at Blenheim. It is perhaps more beautiful than the rocks at Redleaf; but no one could possibly mistake it for anything but a work of art, and it owes its chief beauty to the plants grown in it. It is formed on a scar in the natural rock, which is hewn into zigzag paths; on one side of each of

which are numerous niches to receive the plants. These plants are planted and kept with great care; and they grow so luxuriously, as almost to hide the paths, and to make the rock look at a little distance like a bank of flowers. Mosses of different colours are interspersed, and the whole has a peculiarly rich and sparkling effect.

The rock-work at Syon has been compared to the scenery of a highland glen; but I must confess there does not appear to me the slightest resemblance. In fact, the Syon rock-work is so overpowered by the magnificent conservatory in front, with its splendid terrace, and the geometric flower-garden at its base, with its myriads of beautiful flowers, &c. that it becomes quite a secondary object, and its real beauties are very apt to pass unnoticed. It consists of masses of granite, intermixed with broken capitals of columns, &c. thrown together in a natural manner, and planted with ornamental flowering plants, principally exotic. The rock-work at Norbiton Hall, is disposed in the same manner as that at Syon; but it is on a smaller scale; and its principal use is to keep moisture

round the roots of the plants, which are planted among it.

Many other specimens of rock-work might be mentioned, particularly that of the Rev. J. Clowes at Lower Boughton Hall, near Manchester, that of Mrs. Lawrence at Drayton, that of the late Duke of Bedford at Woburn, and that of Thomas Millie, Esq. at St. Clair Town, in Perthshire; but the most remarkable of all is that of Lady Boughton, at the Hoole, near Chester, which, indeed, stands quite alone, the only one of its kind. The design for this rock-work was taken from a small model, representing the mountains of Savoy, with the valley of Chamouni; and the rocks are made sufficiently large to give a person walking among them, an idea of their reality. The labour of forming this rock-work was very great; not only from the large size of the stones to be removed, but from the difficulty of getting them of the proper colours and shapes. Besides this, it was very difficult to make it stand against the weather. "Rain washed away the soil, and frost swelled the stones: and several times the main wall failed from the weight

put upon it. The walls and foundations are built of the red sandstone of the country; and the other materials have been collected from various quarters, chiefly from Wales." The part that represents the outer circle of rocks, is principally composed of the red sandstone of the neighbourhood, in which little niches have been made for plants, and filled with exactly the kind of soil in which alpine plants grow naturally; viz., broken fragments of stones, clean-washed river gravel, and the debris of decaying moss, and other plants, crumbling rocks, &c. The plants are all strictly alpine—the only liberty taken, being the mingling of the alpine plants of hot and cold countries, or rather of different elevations, together; and this is contrived very ingeniously, by placing fragments of dark-stone to absorb the heat, round those that require most warmth, and fragments of white stone to reflect the heat, round those that require to be kept cool. In all the trees and shrubs planted among the rocks, the same care is taken to keep up the illusion: they are all alpine plants; and dwarf species, or those of very slow growth, are generally

chosen, to prevent them from becoming too large for the rocks. The part which represents the "Mer de Glace," is "worked with grey limestone, quartz, and spar. It has no cells for plants; but the spaces are filled up with broken fragments of white marble, to look like snow; and the spar is to imitate the glaciers." I have already mentioned that Lady Boughton was her own artist; and, I may add, that the rock-work was six or eight years in progress, before it was completed.

Whatever kind of rock-work may be erected, the first thing to be done is to make a secure foundation; as, unless this is effected, the stones will gradually sink into the earth by their own weight; and thus, in a few years, the mass will either have become half buried, or tottering and insecure. It is therefore most prudent, unless the rock-work be actually erected on a solid rock, to prepare a foundation for it of brick-work; not suffering, however, any of the wall to appear above the surface of the ground. To prevent the possibility of this foundation wall being seen, it will be best not to carry it higher than to within six or eight inches of the sur-

face. All being prepared, the stones may be arranged, the largest at the base ; and the upper ones diversified according to the taste of the designer.

The following general rules will apply to all the different kinds of rock-work :—never to let the stones rest against any kind of building ; as, when so disposed, they give ideas of disorder and insecurity. Never to mix up decaying materials, such as roots of trees, &c. with durable materials, such as rocks and stones ; or things evidently natural, with those evidently formed by art. Never to let the rock-work rise abruptly out of the turf, like a great mass of stones discharged from a cart ; but gradually to prepare the way for it, by sinking some fragments of stone half-way in the ground, and letting them become larger and more numerous, till the spectator at last arrives at the principal mass. Never to begin to work without having some fixed design, whether avowedly artificial or apparently natural ; and where the design is to make what may be called a natural rock-garden, like that of the Duke of Marlborough at Blenheim, always to take

care that the stones are very large, and piled upon one another, so as to imitate the stratification of a rocky country.

“In general,” says Mr. Loudon, in his *Suburban Gardener*, “rock-work, to be truly natural, can only show the rock on one side, or at most on two sides; as scars, cliffs, and precipices are seen in rocky districts.” This abrupt side or face of the rock should be represented as projecting into ledges or shelves, to imitate the terminations of the different strata; and the flowering plants should be introduced, in what may be supposed to be the clefts and fissures of the natural rock. The summit of the rock and the sloping side should be covered with turf, and may be planted with trees, some of which may hang over the rock; or the line of junction between the stones and the turf may be concealed, by the luxuriance of the alpine plants, planted in the fissures, and suffered to climb over the top. It must be observed, however, that in granite or basalt rocks, the lines of stratification are generally vertical; and consequently very ill adapted for forming ledges for plants. The best ma-

terials for a natural rock-garden in ledges are therefore sandstone and limestone, the lines of stratification in which are chiefly horizontal, with occasional dips.

It will be evident, from what has been said, that to make good rock-work, requires the eye of an artist; and it may be added, that rock-work should never be attempted without first making a coloured drawing of it on paper, or a small model, with a child's box of bricks, or some similar materials, to try the effect.

Mass-houses are interesting as garden buildings, because they afford great scope to the exercise of the fancy; not only in the design for the entire building, but for the arrangement of the moss in different patterns. The first thing to be considered in carrying the design into execution, is the foundation; and this, if the soil be damp, should be dug out two feet deep, and nearly filled with concrete. In this must be fixed the rustic pillars which are to support the roof; and these are generally composed of the trunks of young larches or spruce-firs with their bark on, which should be chosen as nearly as

possible of the same size. The number of pillars and the manner in which they are to be arranged depends, of course, on the design; but the general number is from eight to twelve. Great care must be taken to drive the posts firmly into the ground, and all to the same depth. The rafters for the roof are then fixed on, and narrow laths, or hazel rods, nailed between them, and also between the uprights. Between these laths or rods the moss is pushed with a wedge-shaped piece of wood; the pattern having been first rudely traced with chalk on the outside of the rods. The moss to be used should be first collected and sorted, all of the same kind being put together; and when it is used the root end should always be the part pushed in between the rods. The principal mosses fit for this purpose are the reindeer moss, *Cenomyce rangifera*, and its allies, many of which are found in abundance on Bagshot Heath, and other commons near London, and nearly all of which are white: the different kinds of *Bryum*, all of which are very neat and compact growing mosses, sending up long stalks bearing their seed-

Pods; of these, *Bryum roseum* is pink, *B. hornum* yellowish green, and *B. cuspidatum* light green: *Dicranum glaucum* nearly yellow, and *D. scoparium* a very dark green: *Sphagnum*, one kind pink, and another nearly white; and *Hypnum*, several species, varying in different shades of green. All these are abundant in the commons about London. Farther north, more brilliant colours are found, some very dark brown, some of a rich brownish purple, some of a very bluish green, and some so white as to look like snow. Wherever there is a common or very old turf, it will be an amusement to explore it in search of the different kinds of mosses; and when the prevailing mosses of the district have been discovered, the pattern and colours for the moss-house can be arranged accordingly. A very rich, and at the same time original effect, might be produced in a moss-house, by arranging the moss in an arabesque pattern, with different colours combined something like those of a Turkey carpet; and instead of paving the floor it might be formed in the same manner as the walls. Or, the walls might be of some plain colour with

only the crest of the family, or the initials of the designer's name in white or colours, and the ceiling and floor in arabesque.

In all cases the outside of the roof is thatched or covered with shingles; and the outside of the walls is either boarded or covered with a thick coating of moss. Where the house is large, or if there are glass windows, it is best to have the frame-work made by a regular carpenter; but where the moss-house is small, and open in front, it may be put up by the gardener, or any intelligent servant. In many cases, the roof is finished with a circle of pine-cones fixed round it as a cornice; and the floor is either laid with other pine-cones, or with small pebbles, some of which are white and are arranged in a kind of pattern; the windows are frequently of coloured glass; and a curious effect might be produced by having those in the back of the building purple, which would make the ground and every object seen through them look as if covered with snow; and those in front of the building filled with yellow glass, which gives every object the rich glow of summer.

The seats in a garden or pleasure-ground are generally purchased ready made; but an agreeable variety may be occasionally produced, by having the stump of an old tree formed into a seat, and twining ivy, and creeping flowering shrubs, round it. Where it is an object to save trouble, a plant of the Virginian creeper may be planted with one of the giant ivy; and if both are left to nature, the effect will be very good, as the brilliant deep red of the Virginian creeper in autumn will be relieved by the dark green of the ivy. A few moveable seats—one to wheel about from one part of the garden to another, and another of the new folding kind, imported from Norway by Charlwood, and sold at 3s. 6d. each, are very convenient. Where there is a terrace, a seat may be erected at each end of wood, but of a somewhat massive design, and painted white, being strewed while the paint is wet with very fine sand, which will make it a good imitation of stone. Seats may also be decorated by nailing on a wooden frame-work hazel rods with the bark on, which have been stained of different colours, and then varnished. These rods are

arranged in a pattern, and I have seen the effect of a landscape produced; but it appears a kind of decoration that is in very doubtful taste, or at least one that it requires great judgment to manage properly.



1. RUSTIC BOX.

Rustic Baskets.—There are perhaps few things over which the alchemy of taste has more power than the apparently worthless materials of which these elegant ornaments are constructed. An old cask, a few pinecones, and a few pieces of rope, combined by

skilful hands, will produce an almost magical effect. The baskets at Dropmore were all constructed in this manner from designs by Lady Grenville. As an example of what may be done with the commonest materials in this way, Fig. 1. is an old Chinese tea-chest, with part of a tree sawn through as a pedestal, and some pieces of rope nailed on as decorations. Fig. 2. is an old basket



2. MOSS BASKET.

with all its interstices stuffed with moss. Many other articles might be devised, which any person of taste and invention would find it an agreeable occupation to design, and to superintend the execution of. In addition to these rustic baskets, a few wire-

work frames might be designed of much more elegant forms than those commonly sold, which an intelligent gardener might be easily instructed to make at his leisure hours; and indeed a lady with two pair of small pincers would find no great difficulty in twisting the wire herself. The great point is to exercise our own skill and ingenuity; for we all feel so much more interested in what we do ourselves than in what is done for us, that no lady is likely to become fond of gardening, who does not do a great deal with her own hands.

Fountains.—Though fountains are more suitable to a hot country than to a weeping climate like that of England, yet it must be confessed they are generally a great improvement to garden scenery. The first thing to be considered before erecting one, is where to make the reservoir; as on the elevation which that is above the garden, depends the height to which the water of the fountain will ascend. The length of time which the fountain will play depends on the quantity of water contained in the reservoir, but this has nothing to do with the height to

which the water will rise. If a cistern be formed on the top of a summer-house, ten feet and a half high, and a pipe from that be carried down a sufficient depth into the ground to secure it from frost, and thence horizontally to the orifice which is to form the fountain, that orifice, if it be only half an inch in diameter, will throw up a jet of water ten feet high, and will continue playing till all the water in the cistern is exhausted. The conducting pipe for such a fountain should be two inches and a quarter in diameter, and it should be furnished with a valve or stop-cock, which may be turned at pleasure, and by which the water may be either suffered to ascend through the orifice, or retained in the conducting pipe. The reservoir cistern must be kept full by a forcing pump, or hydraulic ram; or, in the neighbourhood of London, by high service from the water company which supplies the dwelling. Any cistern, sufficiently high above the garden, will do. Where a cistern in the roof is supplied with a high service pipe, a fountain with a jet thirty or forty feet high, according to the height of the

house, might be had in the garden at no other expence than that of fixing descending, and horizontal conducting pipes.

The water in a fountain may be thrown up in various designs, which are formed by little tubes of brass, called adjutages, which are screwed on the orifice of the conducting pipe. Some of these designs imitate a convolulus, some a wheat-sheaf, some a basket, and some a globe. In short, they are very numerous, and after exhausting the fancy of the English plumbers, a variety of different and very elegant designs may be obtained from Paris.

CHAPTER XL

WINDOW GARDENING, AND THE MANAGEMENT OF PLANTS IN POTS IN SMALL GREENHOUSES.

The management of plants in rooms is extremely difficult, from the want of proper light and pure air: though this latter want may, in some measure, be obviated, by opening the window in front of which the plants stand, whenever circumstances will permit. It should never be forgotten that fresh air is almost as essential to plants as water; and that they are seriously injured by being forced to inspire air at their breathing pores that is in an unfit state for them. I have often observed the healthy appearance of plants belonging to cottagers; and I believe it

arises principally from the habit that most poor people have, of setting their plants out in the rain whenever there is a shower. This not only clears the leaves of dust, and opens the stomata or breathing pores, but gives the plant abundance of fresh air. Without a sufficiency of air and light, plants will soon become weak and sickly, and their leaves will turn yellow; but if a little fresh air be given to them every day when the temperature is not too cold, they will grow quite as well in a room as in a green-house.

Another reason why plants kept in rooms are generally unhealthy, is, that they are watered in a very irregular manner. Sometimes they are suffered to become so dry that the mould in which they grow will crumble under the pressure of the finger, and the spongioles of the roots are quite withered; and then a profusion of water is given to them, quite cold from the pump, though they have probably been standing in a temperature of from 60° to 70°. As a climax, part of this water is suffered to remain in the saucer for a day or two, till even the healthy part of the roots is thoroughly

chilled, and the plant, if of a delicate nature, is destroyed. The reverse of all this should be the case. The plant should never be suffered to become so dry as to have the mould in a crumbling state; but if such a circumstance has been suffered to occur, it should be well watered with warm water of at least the temperature of the room, and better if rather warmer. Enough of this water should be given to fill the saucer; in order that every part of the mould and of the roots may imbibe some benefit from the moisture; but as soon as this has been done, the pot should be lifted out of the saucer, and the water thrown away, as nothing can be more injurious to the roots of most plants, than to have the pot they grow in, kept standing in water. There are, however, some exceptions to this rule, such as all the kinds of *Mimulus*, the *Hydrangea*, *Calla ethiopica*, and some kinds of *Calceolaria*. All these, and all marsh plants, require abundance of water, and will not flower well unless the saucer be kept half full, though the water should be changed every day.

It is also a common fault to put plants kept in rooms, into too large pots; or, as the gardeners express it, to over-pot them. This has always a bad effect. If the soil be good, and not over-watered, the plants will indeed grow rapidly; but it will be to produce leaves and branches instead of flowers: and if the soil be over-watered, the mass of soddened soil round the roots has the same effect upon them as stagnant water in the saucer. The soil should always be in such a state as to admit air with the water to the roots; and this it cannot do when it becomes a blackened paste by being saturated with water. At the same time frequent repotting is often absolutely necessary to keep the plants in a dwarf compact habit of growth, and to prevent them from being drawn up. The way in which gardeners ascertain when repotting is necessary, is by turning the plant out of its pot with the ball of earth attached; and if they find the roots look white round the outside of the mould, then the plant should be transferred to a larger pot; but only one size larger: afterwards it may be repotted again if necessary, but always to a pot only

a little larger than the one it was taken from. By persevering in this mode of treatment for some time, and never advancing more than one size at a time, a plant may be grown to a large size, and made to produce abundance of flowers; while by the contrary treatment, that is, suffering it to remain in a very small pot, or shifting it suddenly into a very large one, the stem will become weakened and elongated, and the flowers will be few and very poor. In short, on the skilful management of repotting, or shifting, as the gardeners call it, a great deal of the art of growing plants in pots depends.

The best soil for plants in pots is generally peat mixed with vegetable mould and sand; and the pots should be filled nearly a quarter of their depth with little bits of broken pots, called potshreds, so as to ensure complete drainage. When plants are shifted, they are turned out of their old pots with their balls of earth entire; the roots are then examined, and if any are wounded or decayed they should be cut off. The new pot has then a layer of potshreds placed at the bottom with a little earth, and the plant is placed in the centre,

so that the bole or collar may be just above the level of the rim. The new earth is then put in, and the pot shaken to make it settle. The plant is then slightly watered, and set aside in the shade for the rest of the day. Plants should never be repotted when in flower; the best time is indeed when they are growing, till their flower buds begin to swell, when they should be allowed to remain undisturbed till the flowering season is completely over. Sometimes the soil in a pot looks black, and covered with moss. When this is the case, the plant should be turned out of the pot, and the black sodden earth partly shaken off the roots, which should be pruned, and should have all their decayed parts cut off. The plant should then be repotted in another pot of the same, or nearly the same, size as the one it was taken from, which should be well drained, and filled up with a compost of vegetable mould, sand, and peat. Thus treated, and only moderately but regularly watered with warm water, which should never be allowed to stand in the saucer, the plant will soon recover; and if judiciously pruned in, if it

has become elongated, it will become handsome, and what gardeners call well grown.

Another objection to growing plants in rooms is the great difficulty that exists in keeping them clear of insects; particularly the Aphis or green fly, and the kind of mite, (*Acarus tellarius*) commonly called the red spider. These are generally destroyed by fumigation; and the best mode of fumigating them is by Clark's Patent Blower, with the fumigator attached, which has been already described. Washing with a syringe and abundance of water is, however, probably a better mode; as it has been often observed that neither the green fly nor the red spider will ever infest a plant, that is frequently syringed.

The management of plants in a small greenhouse differs very little from that of plants in rooms. Whenever the weather will permit, air should be given if only for half an hour in the middle of the day. The house should be kept clean, and free from dead leaves; and the plants should not be too much crowded. Nothing can look worse than pale sickly green-house plants, drawn up

to an unnatural length, and so weak that their stems will not stand upright without the aid of a stick. When green-houses are crowded with plants, some of which are too far from the light, this must be the case; and when it is, it is quite hopeless to expect either healthy plants or fine flowers. Though it is advisable to have saucers to the pots of plants kept in rooms, for the sake of cleanliness, it is much better for those kept in the green-house to be without them. As different green-house plants require a somewhat different treatment, the following directions for the management of a few of the most popular may be useful to my readers.

Camellias.—The *Camellia* is a plant which requires abundance of water, and is yet soon killed by suffering stagnant moisture to remain about the roots. When grown in pots there should be abundant drainage; that is, the pots should be more than a quarter filled with potshreds. The soil should be peat earth, mixed earth, and sand; and the plants should be potted high, so as to let the collar of the plant be quite above the rim of the pot. The pots should not have saucers,

or if they have for the sake of cleanliness, the water should be carefully poured out of them immediately after the plants have been watered. The plants should be watered abundantly every day while their flower-buds are swelling, as if this be neglected, the buds are very apt to drop off. When the flowers begin to expand, the watering is not of so much consequence, though it should be continued in moderate quantities; and abundance should be again given when the plants are making their young shoots. After they have done growing, watering once or twice a week will be sufficient till the flower-buds again begin to swell. During the growing season the plants should be set out and syringed all over the leaves once or twice a week; but care should be taken not to do this when the sun shines, or at any rate not to set the plants in the sun while they are wet, as the heat of the sun acting on the water, will scald the leaves, and make them appear blotched, and partially withered. The roots of Camellias are seldom very strong, and they are very easily injured. Great care should, therefore, be taken when

the plants are repotted not to bruise the roots, or to cut off all that are at all injured. If on turning out the plants previous to repotting, the ball of earth has no white roots appearing on the outside, the earth and decayed roots should be shaken or cleared away, till good roots are seen; and these should be carefully examined, and all the bad parts cut away. The plants should then be repotted in a pot not more than an inch in diameter more than the diameter of the ball of earth left round the sound roots; and it should be well drained at the bottom with very small potshreds, or clean gravel. Small Camellias should not be shifted oftener than once in two years; and large ones, that is, those above five feet high, not oftener than once in three or four years; but if the earth in the pot appears to have sunk, a little vegetable mould may be laid on the surface. The usual time for shifting Camellias is just when they have done flowering, before they are beginning to send out their young shoots. When planted in the free ground in a conservatory, they will require no other care than regular watering, and syringing the

leaves once or twice a week. When planted in the open air, the roots should be carefully protected by straw during frosty weather. There are some Camellias in the Vauxhall Nursery, (Messrs. Chandler's,) which have been treated in this manner, and have stood out for several years. The hardiest kinds and the most suitable for planting in the open air, are the single red, the double red, and the double white. The magnificent *Camellia reticulata* is also said to be tolerably hardy. The tenderest of the common kinds are the beautiful apple-flowered variety of *C. Sasanqua*, and the single variety of this species, the flower of which resembles that of the tea-plant. These plants are both of low growth, and ought always to be kept in pots.

Geraniums or Pelargoniums. — The beautiful green-house shrubs which we are accustomed to call Geraniums, have, in fact, been long separated from that genus, and formed into a new one called Pelargonium. The difference is in the shape of the seed vessel; that of the Pelargonium being like a stork's bill, and that of the Geranium like a crane's bill. Both are nearly allied to the Touch-

me-not; and when the seed is ripe, the valves of the seed pod burst asunder and curl up. There are almost innumerable species, hybrids, and varieties of *Pelargoniums* grown in our green-houses, so mixed up together by hybridizing, that it is very difficult even to class them. One of the hardiest kinds, which has numerous descendants, is the Horse-shoe Geranium, *Pelargonium zonale*; and another, *P. inquinans*, is the common scarlet. The rose-scented Geranium, *P. graveolens*, and oak-leaved, *P. quercifolium*, with their numerous descendants, the flowers of which are all crimson, striped with brown so very dark that it looks almost black, are also tolerably hardy. All the shrubby kinds which are generally kept in green-houses, require a rich loamy soil, that is, about half very rotten dung, and half sandy loam, to make them produce fine flowers. When the flowering season is over, the plants are cut down, and cuttings made from them. (See page 82.) When these have struck, they are potted in a compost of vegetable mould and sand, and continue in this soil till February or March,

when they are repotted in rich soil for flowering. Some gardeners throw away the old plants as soon as they have made the cuttings; but others take the old plants out of their pots, and shaking the earth from them, prune the roots, and repot the plants in smaller pots. Pelargoniums require a great deal of air; and when about to flower they should have a great deal of water, but at other seasons very little. They are killed with the slightest frost; and are very liable to damp off, if watered too much, and not allowed sufficient air in winter. Air is, indeed, quite essential to them.

Heaths.—The kinds grown in green-houses are all natives of the Cape of Good Hope, and they are very numerous; but they may be classed under six heads, which are named from the shape of their flowers. These divisions are tubular-shaped, ventricose, spreading or salver shaped, with an inflated calyx, globular, and ovate. They all require to be potted high, and to be grown in three parts of peat earth to one of fine white sand, or in what is emphatically called heath mould. The fine hair-like roots of

heaths cannot penetrate a stiff loamy soil, and manure would be too gross for their spongioles to take up. The collar of the plant should always be above the soil, as it is very easily rotted by moisture. Heaths require good drainage, and frequent waterings; and though the water should never be allowed to stand in the saucer, the roots should also never be allowed to become quite dry, as when once withered, they are not easily recovered. Heaths also require abundance of free air, and no plants are more injured by being kept in rooms. They should not be shifted oftener than once in three or four years. They are propagated by cuttings taken from the tips of the shoots, and then struck in pure white sand. The pots containing the cuttings should be plunged up to the rim in a hot-bed, and each should be covered with a bell glass. Heaths are easily killed by frost, which acts upon them by splitting, or rather shivering their stems.

Verbenas.—No family of plants better rewards the care of the cultivator, and none can be more beautiful than the *Verbenas*. The old scarlet *Verbena melindres*, or, as it

is frequently called, *V. chamædrifolia*, is the most brilliant of all the kinds, though it is one of the most tender: it is a prostrate plant, and when pegged down, it is well adapted for covering a bed in a geometric flower garden; or it may be planted in a vase, or rustic flower-basket to hang down over the sides. *Verbena Tweediana* is an upright growing plant, and though the flowers, which are crimson, are not half so brilliant as those of *V. melindres*, the plant has the great advantage of being one of the hardiest of all the kinds. *V. melindres latifolia*, and *V. mel. splendens* are both hardier than their parent, and they unite its brilliant colour, with the upright habit of *Tweediana*. *V. incisa* has pale pink flowers, and an upright habit of growth. It is tolerably hardy, and grows freely, but its flowers have a faded look. *V. Arraniana* has an upright habit of growth, and purple flowers, with very dark bluish-green leaves. It is very tender, and very apt to be attacked by a kind of aphis, and other insects. *V. Aubletia*, *V. Lambertii*, and *V. Sabinii* are prostrate tufted half herbaceous kinds, all hardy. *V.*

Neillii has lilac flowers, and rather an upright habit of growth; and *V. teucroides* is a coarse-growing plant, with a long spike of white flowers, which turn pink in dying off, which has been much more praised than it deserves. There is also a yellowish kind, *V. sulphurea*; *V. venosa*, a very strong-growing species, with purple flowers, and many other species, hybrids, and varieties. All the *Verbenas* require to be grown in sand and peat, or heath-mould, and to be kept moderately watered: they all strike readily from cuttings or layers; and, indeed, when pegged down without any slitting or twisting, most of the shrubby kinds will throw out roots at every joint. When worm casts are observed on the surface of the pot, as will very often be the case, the plant, with its ball of earth entire, may be turned out of the pot, and the worms, which will always be found on the outside of the ball may be picked off. Worms do considerable injury to plants, especially such as are in pots, by rupturing the fibres and impeding the free percolation of the water, besides giving the surface of the earth in the pot, a very unpleasant appearance. The

flowers of the Verbenas should always be cut off as soon as they wither. The Lemon plant, *Verbena triphylla*, now called *Aloysia citriodora*, is remarkable for the sweetness of the odour of its leaves. It is tolerably hardy; but requires great care in watering; as the leaves will soon curl up and wither if it has too little, and they will drop off if it has too much. The flower has no beauty; and the only recommendation of the plant is the delightful fragrance of its leaves.

Petunias may be raised, either from seed or cuttings, as they seed freely, and strike readily. The first kind introduced was the white-flowered kind, *Petunia nyctaginiflora*, which is an abundant flowerer, and very fragrant. *Petunia phœnicea*, or *violacea*, is another original species, and from these nearly all the myriads of hybrids and varieties have arisen. These *Petunias* hybridize freely with each other, and most of the kinds produce abundance of seed. *P. bicolor* is a different species, and does not either mix well with the others, or seed freely. *Petunias* may be treated as annuals, and raised on a slight hot-bed every year from seed; and

thus treated, they will do very well in the open ground. In warm dry situations, they may even be suffered to sow themselves in the open ground, and will come up and flower abundantly. Treated as green-house plants, they are, however, all shrubby, and will last several years. When intended to be kept in pots, the seed should be sown on a slight hot-bed in February, and the young plants pricked out into very small thumb pots, as they are called, while in the seed leaf. In these pots they should remain either in the frame of the hot-bed, or in a room, or green-house, for about a week or ten days, and they should be then shifted into somewhat larger pots. These shiftings, always into somewhat larger pots, should be repeated six, eight, or ten times, if the plants are wanted to be bushy; and not more than four, if the plants are wished to grow tall. The bushy plants will flower abundantly, without any support; but the tall-growing plants, which are suffered to flower in comparatively small pots, must be trained to some kind of frame. When the tall plants appear growing too straggling, the extremities of

the shoots should be taken off and made into cuttings. Petunias may be grown in any good garden soil ; and require no particular attention as to watering, &c. In fact, they are, perhaps, the best of all plants for a lady to cultivate ; as they will afford a great deal of interest and amusement, with the least possible amount of trouble.

Fuchsias are another family of plants that may be cultivated with very little trouble. *Fuchsia globosa* is at once the hardiest and the handsomest kind. *F. virgata* is also tolerably hardy. All the *Fuchsias* require a light, rich soil, or a mixture of rich sandy loam and peat ; and regular watering, as when the outer roots are once withered, either by want of moisture, or by exposure of the pot to the direct rays of the sun, the plant generally dies. For this reason the *Fuchsia* is not so well adapted for a window plant, as many others. *Fuchsia fulgens* differs considerably from the other species, and will not flower well unless in the open ground, and with a sunny exposure. It is also tuberous rooted, though woody in its stem. It is easily propagated ; and even a leaf taken off

without injuring the part of the petiole which was attached to the stem, has been known to grow and form a plant. Several handsome hybrids have been produced, by applying the pollen of *F. fulgens* to the stigma of *F. globosa*, *F. conica*, and *F. gracilis*. It may here be mentioned, that whenever hybrids are to be raised, by fertilizing one plant with the pollen of another, the anthers of the flower that is to produce the seed, should be removed with a pair of scissors, before they burst. The pollen from the other flower which is to form the hybrid, should be afterwards applied with a camel-hair pencil to the stigma of the flower, which is to produce the seed; and a bit of thread should be tied round the flower-stalk, in order that the seed-pod may be saved, and set apart. All hybrids may be made in the same manner; but it must always be remembered that flowers will not hybridize properly, unless they are naturally nearly allied.

Calceolarias.—Perhaps no plants have ever been hybridized more extensively than these. The principal parents of the numerous and splendid plants that we are continually seeing

produced, are *C. corymbosa*, and *C. arachnoidea*, the one a yellow, and the other a purple flower; but there are many other species that have been crossed and re-crossed with these, so as to form a very great variety. *C. bicolor* has a very large pale yellow-and-white flower; and it has been the parent of some very fine hybrids and varieties. All the calceolarias require rather a rich soil; and the usual compost is two parts of thoroughly rotten dung, one part of leaf mould, or old turf, and one part of white sand. The ingredients of this compost should be well mixed together, and broken fine, but not sifted. All the Calceolarias require plenty of water, and abundance of light and air; and they will all flower best when planted in the open ground. They are, however, very subject to be attacked by a kind of aphid; and when kept in pots, they should be frequently syringed.

Myrtles should be grown in a soil composed of peat and loam, in which the former predominates; they should be regularly watered, and frequently syringed. Some persons nip off the tips of the young shoots, to make

the plants grow bushy; and though it has this effect, it is a bad practice with the flowering kinds, as it prevents them from flowering. A better plan is to make cuttings, and first to plant them in very small pots, gradually changing them into larger ones, till the plants have acquired a bushy habit of growth.

Mimulus.—Some of the kinds of plants of this genus are very handsome, particularly the hybrids raised by the nurserymen from *M. cardinalis*, *M. roseus*, *M. luteus*, and *M. guttatus*. These species are all herbaceous, and all natives of South America, Mexico, and California. They are all nearly hardy, and though generally grown in a green-house, they will stand quite well in the open air, dying down to the ground in winter, but sending up fresh and very vigorous shoots in spring. When these plants are grown in the open ground it should be in a shady moist situation; and when they are kept in pots, they should always stand in saucers half full of water. This water should, however, be changed every day, and when given to the plants it should always be as nearly as possi-

ble, of the same temperature as themselves. The little musk plant, *Mimulus moschata*, requires the same treatment as its more showy brethren. As all the species of *Mimulus* have been found in their native habitats growing in coarse sand or gravel on the brink of a river, this kind of soil should be chosen for them in pots; and the soil in which they are grown can hardly be too poor, provided they have abundance of water. In Chili, the inhabitants eat the leaves as a kind of vegetable. The shrubby kinds of *Mimulus*; viz., the common monkey plant, *M. luteus*, and the scarlet-flowered species, *M. puniceus*, are now considered to belong to a new genus called *Diplacus*. They are both natives of California; and in their treatment they should be considered as greenhouse plants, and have rather a better soil, and less water than the true kinds of *Mimulus*.

Hydrangea Hortensia is another plant, that when grown in a pot, requires to have the saucer kept half full of water. There are several species, most of which are hardy shrubs, but *Hydrangea Hortensia*, the kind

usually called the *Hydrangea*, is a native of China, and only half hardy, though it will live in the open air in sheltered situations, or with a very slight protection. This plant was named *Hortensia* by the botanist Commerson in compliment to Madame Hortense Lapeaute, the wife of a French watch-maker. The *Hydrangea*, when the colour of its flower is to be pink, should be grown in a rich loamy soil; but when the colour of the flower is wished to be blue it should be grown in peat. In both cases the plant should be pruned every year, and the old wood cut out; so that the wood which is to produce the flowering shoots should never be more than two or at most three years old. Cuttings strike readily at any season when the plant is in a growing state; if put into a rich soil and kept moist they will root in a fortnight, and flower in a month.

Succulent plants.—There are very few things in gardening respecting which gardeners appear more to disagree than in the treatment of succulent plants. Nearly all these plants are natives of the sandy plains in the neighbourhood of the Cape of Good Hope, where

they are subjected to alternate seasons of extreme wet and extreme dryness. Cultivators attempting to imitate this, have grown their plants in poor sandy soil, and kept them entirely without water at one season, while they have been inundated with it at another. The fact is, that when we attempt to imitate nature, we should remember that the attempt is useless unless we can do so in every particular; and also that the plants we have to cultivate, have been nursed up into so very artificial a state, that if they were transplanted to their native plains they would probably perish, like a poor Canary bird, which a mistake of philanthropy has turned out of the cage in which it has long lived. For this reason, we must adopt the mode of treating succulents, which the best gardeners find most successful, without troubling ourselves to discover why it is so different from the natural habit of the plants. This mode of treatment is, then, to grow the plants in a rich loamy soil, kept open, as it is called, by the addition of lime rubbish; and to give the plants water all the year, but more moderately when they are in a dormant, than when

they are in a growing state. They should also have as much air and light as possible. The water should never be suffered to stand in the saucer of any succulent plant; but it should be given regularly, diminishing the quantity a little every day as the season for rest approaches. If the water be suddenly stopped the leaves of the plants will shrink and become flaccid, and when this is the case, the plant generally dies. A deficiency of air on the other hand will cause the plant to damp off. All succulent plants are very soon affected by frost.

The Australian plants, of which so many beautiful kinds have been introduced within the last few years, should nearly all be grown in a mixture of sand and peat; and they should have their pots filled one-third with potshreds. They all require abundance of water, but they will all perish if water is retained about their roots. Most of the Australian plants are very tenacious of life, and if cut down when they appear dead, they will generally spring up again from the collar or the roots.

The principal climbing plants grown in pots

are the Maurandyas, the Lophospermums, the Passion-flowers, the Rhodochiton, the Eccremocarpus, the Ipomæas, and the Cobæa. There are, however, several others, all of which are very handsome. The greater part of these require a rich light soil to make them grow rapidly, and to be kept in small pots to throw them into flower. The Bignonias or Tecomas should be grown in equal parts of loam and peat; and this compost will suit the Polygalas, and other showy climbers. The Sollyas and Billiardieras should be grown in peat, and frequently syringed to keep off the green fly. The Thunbergias are very liable to be attacked by the red spider. Many of the shrubby climbers may be treated as annuals, and raised from seed every year in January, and planted out in June; but they do still better treated as biennials, and sown one year to flower the next.

CHAPTER XII.

CALENDAR OF OPERATIONS.

January.

JANUARY may be called the digging month, as almost the only gardening operation that can be performed in it is digging, or rather trenching the ground; and even this cannot be done unless the weather be open and the ground free from frost. Nothing can be imagined more desolate than the appearance of the flower-garden in this month. Perhaps the Christmas rose may be in flower, and a few lingering blossoms may remain on the *Pyrus* or *Cydonia japonica*; but this is generally all, except a few red berries that the birds may have left on the holly or the *pyracantha*. January, however, is an excellent month for the destruction of snails and

insects. The snails will be found in their winter quarters, sticking to the trunk of some ivy-clad tree, or hidden beneath the coping of some wall. They are quite in a torpid state and appear dead, but might soon be revived by bringing them into a warm room, and sprinkling them with water. Of course, however, if they are to be destroyed, it should be without rousing them from their stupor. The eggs of insects should also be sought for and destroyed. Those of the lackey moth will be found on twigs, fixed firmly round them like bracelets of small beads. These should be burnt, as they are too hard to be crushed. The eggs of the vapourer moth will be found on the outside of the cocoon, looking like a bag of spider's eggs. A very small scale-like insect will also sometimes be found on the branches of the rose-trees, which should be carefully removed. Indeed, as a precautionary measure, it is well to brush the branches of all the rose-trees in this month with soft soap and water, to destroy any eggs that may be adhering to them. Sometimes trees and shrubs are planted in January if the weather

be favourable, but this it very seldom is, as if not frosty it is generally very wet.

In the kitchen-garden the fruit-trees and shrubs, particularly the gooseberries, should be carefully examined for eggs of insects; and the trunk and branches of all suspected trees and shrubs should be brushed with soft soap and hot water.

February.

In this month, if the weather be favourable, the gardeners "dress" their beds; that is, they dig and rake them, manuring them if necessary. In the flower-garden the Californian annuals that had stood the winter in some waste part of the garden are now brought forward by spadefuls, and laid over the beds intended for them. The early bulbs, such as the snow-drop and the Scotch crocus begin to appear, and here and there a splendid cloth of gold glitters among them in its rich yellow and brown. The winter aconite and the beautiful hepaticus are now in full glory; and in short all nature appears awakening from the sleep of winter. This is pre-eminently the season for spring plant-

ing; and all the trees and shrubs, and even herbaceous plants that are to be removed are put into the ground. The garden rose-trees and other hardy flowering shrubs are pruned, care being taken always to cut them in a slanting direction, and to a bud. When the rose-bushes have sent up long untidy shoots, every alternate shoot may be cut down to within a few inches of the ground. Thus treated, the shoots that are left will flower, and those that were cut down will send up strong and vigorous shoots for flowering the succeeding year, when the present flowering stems may be cut in. The bushes will thus be kept of moderate size, and of a compact habit of growth, without the flowering being materially checked. In February the ranunculus roots are planted that are to flower in the following May, and a hot-bed is made for the tender annuals. In short, the business of the gardener's year has commenced.

In the kitchen-garden, if the weather be open, the gooseberries and currants should be pruned, and also such of the fruit-trees as have been left for spring pruning. If the winter has been very hard, the gooseberries

and currants are left as long as possible unpruned, because the birds, when driven to distress for want of food, very often pick off the buds, and should the number of buds have been previously diminished by pruning, the hopes of the season for a good crop of fruit are generally destroyed. Radishes and lettuce should be sown in February, and spinage; also the first crop of peas and beans. The strawberry-beds are pruned and dressed, and the raspberry shoots shortened and cut in.

March.

This is the sowing month. In the flower-garden the seeds of hardy annuals are sown in the open border. Turf is laid down where wanted, and grass-seeds are sown. Rose-trees are sometimes planted in this month, and the climbing kinds are pruned and trained. The best sorts for training as pyramids of roses are the Noisette and Bour-sault kinds, and some of the hybrid China. The box edgings are taken up and replanted, and the gravel walks are raked or turned over, and new gravel added if requisite.

This is in fact the first month that displays the cheerfulness and brilliancy of spring, for the flower-garden is gay with crocuses, and the bees are buzzing about them, while the birds are singing on every tree. The weather is often very fine and warm in March; but there are frequently frosty nights, during which the tree-peonies and other half-hardy early-flowering shrubs should be protected by a kind of beehive-like covering, made sufficiently large to put on and take off without injuring the plants. In the country, these coverings may be made of platted rushes sewed together, and the gathering and platting them will afford employment to poor old women and children in winter. Biennials, such as hollyhocks, Brompton stocks, &c., are generally transplanted in this month.

In the kitchen-garden the principal crops of all the culinary vegetables are sown, and potatoe sets are planted. The spring pruning and planting are also finished. Forest-trees are planted in the parks and pleasure-grounds, and trees are cut down. In short, in large places March and April probably

form the most laborious period of the gardener's year.

April.

In the first week of this month many gardeners transplant their biennials, instead of putting them into the ground in March. The hollyhocks should have a hole dug for each plant two feet deep, at the bottom of which should be thrown three or four spadefuls of strong stable manure. Many gardeners also plant their dahlia-roots in this month, though others delay this operation till May, or even June. However this may be, the tubers of the dwarf kinds should be planted at about three feet apart, but the larger sorts should be four feet or five feet from each other every way. The soil should be in a sandy loam, not too rich, lest the plants should produce more leaves than flowers, and not too poor, lest the flowers should be poor also. In planting the tubers, care should be taken to arrange them in such a manner that the colours of the flowers they produce shall have a harmonious effect. In this month the auriculases generally begin

to come into flower in pots, and the polyanthuses and primroses in the open ground. Tuberoses, the different kinds of gladiolus, the Guernsey lily, and other shewy autumn-flowering bulbs may be planted towards the end of April, or the first week in May. A bed should be prepared for their reception, by digging the ground about a foot deep, and taking out about half the soil, which is to be replaced by equal parts of vegetable-mould and well-rotted dung. When this is well dug over and mixed, drills should be drawn in it, about three or four inches deep and eighteen inches apart, in which the bulbs (after first taking off their offsets) are to be placed about nine inches apart. The bulbs should be made quite firm in the soil, and then covered with mould an inch or an inch and a half deep. They will not require any water till a week or ten days after planting, when the roots have begun to grow, but after that they should be watered regularly. Heartseases for autumn flowering may be sown this month, or cuttings may be made of favourite kinds. The heartsease requires a shady situation, and a rich loamy

soil, plentifully supplied with water. The box edgings may be pruned in this month, but they should never be clipped. A garden-line should be stretched along the edging, at the proper height, generally about four inches from the ground, above which the highest point of the box should not reach; and the box should be cut down to this line, every shoot being cut in a slanting direction to a bud, and only every alternate shoot suffered to reach the line. Hardy annuals also may be sown in this month, if the sowing of them was neglected in March. The ornamental kinds of *Ribes* and *Berberis* will begin to come into flower with *Magnolia conspicua*, and the common almond.

In the kitchen-garden, April may be called the grafting month, though many gardeners begin to perform that operation in March. In the culinary department, those vegetables that require transplanting, such as celery, sea-kale, cauliflower, &c., are generally planted out in April. The peas and beans are hoed up, as are the potatoes; the asparagus and artichoke beds are dressed; and the onions, turnips, &c., are thinned.

If potatoes for the main crop were not planted in March, they should be now. The peas should be staked when they are hoed up; and this is the best season for dividing roots of thyme and other aromatic herbs.

May.

In the flower-garden, this is the month for planting out the tender annuals which have been raised on a hotbed. The seeds of hardy annuals may still be sown, and also those of biennials for planting out the following spring. In this month, ornamental perennial plants may be propagated by slips and cuttings; and if any were made in April for striking in a hotbed, they may be transplanted. The leaves of the rose-trees should be examined for a little brown grub, which infests them at this season, and which should be picked off and destroyed. The flower-garden will now be in all its splendour. The hyacinths will be in full bloom, as will also the different kinds of Ribes, Berberis, and Mahonia, among the shrubs; and several kinds of Magnolia, the

Judas tree, *Edwardsia*, &c., among the trees. The *Pæonia Moutan* will likewise expand its magnificent blossoms; and the spring heartsease will be coming into flower, as will the *Nemophilla insignis*, and several of the other Californian annuals.

In the kitchen-garden, the operations continue nearly the same as the last month. Peas and beans may be sown for the late crops, and spinach, &c. This is the proper season for sowing kidney-beans. If the first crop of peas has not been staked, it should now be done, and the tops should be taken off the common beans; both may also be hoed up. The blossoms of the fruit-trees should be examined, and those attacked by insects should be instantly removed, and the insects they contain destroyed. All leaves that are found rolled up should be taken off, and destroyed. In the park and pleasure-grounds, oak-trees are generally felled in May, because the movement of the sap at this season makes the bark separate more easily from the wood.

June.

In the flower-garden, this is the month for piping and layering pinks and carnations, and for making cuttings of the tenderer kinds of roses. The hardy roses will be probably much infested with the green fly, or aphid, which should be destroyed with tobacco-water. Great care should, however, be taken in using it, or the tobacco-water will disfigure the plants more than even the aphid itself. Half-a-pound of the best shag tobacco should be put into a gallon of hot water, and the decoction suffered to stand till it is quite cold. The infested shoots should then be dipped in the tobacco-water, and suffered to remain in it about a minute, and then immediately washed in clean water. Two persons should perform this operation, one carrying a saucer with the tobacco-water, and the other a jug of clean water and a saucer, to wash the shoots immediately.

In the kitchen-garden, there is very little to do, except to sow what are called succession crops of culinary vegetables, and to continue the operations of the last month

where necessary. June is, indeed, rather a month of enjoyment in a garden, than one of labour. The fruit-trees, however, may be pruned or disbudded of their summer shoots; and towards the end of the month, budding commences.

July.

The bulbs of hyacinths and tulips are generally taken up in this month, and put in to a proper place to dry; as are the tubers of ranunculuses and anemones. The stalks of those herbaceous plants that have done flowering should be cut down, that they may send up fresh shoots, and produce a second set of flowers. The dead roses, &c., should be cut away as soon as they fade, as nothing more completely destroys the beauty of a flower-garden than a number of dead flowers mingled with the newly-expanded ones. Cuttings of verbenas, and other greenhouse, or window plants may be made this month; and those that were made early in spring, may be planted in the beds to supply the place of the bulbs, and other plants that have quite done flowering. Roses, pinks, and carna-

tions are in their greatest splendour in June and July. Roses are generally budded in this month; though, if the weather be moist, any time will do from June to September. The essential point is to have the weather sufficiently moist and warm to stimulate the dormant action of the bud.

In the kitchen-garden the shallots should be taken up; but in other respects there is nothing particular to do—except the routine culture of keeping the garden neat, and sowing the seeds of culinary vegetables for succession.

August.

The box edgings are again pruned in this month as they were in spring. The pinks and carnations having now done flowering, should have the layers which were made in June cut away if they have rooted; and some German stocks, and other plants which have been purposely raised in pots, should be planted amongst the carnations, to prevent the beds from looking bare of flowers.

The seeds of most of the annual flowers are now ripe, and should be gathered. The

evergreens and other plants in the shrubberies should be pruned, and their summer shoots cut in, if they have been too luxuriant. The bulbs of crown imperials, lilies, and all the scaly kinds, which generally remain several years in the ground without taking them up, should be planted in this month. They will grow under the shade of trees, and in any situation not too dry. If too much exposed to the sun, the flowers will fade almost as soon as they expand. Scaly bulbs that have been long planted, may also be taken up, their offsets taken off, and the bulb removed to a new situation; but no scaly bulb should be kept long out of the ground.

In the kitchen-garden this is the gathering month, as most of the fruits and vegetables are now ripe.

September.

The dahlias are now the principal ornament of the flower garden; and they should be kept neatly tied up, and all the dead flowers removed as soon as they fade. The autumn flowering bulbs are now in full blossom; and all the greenhouse and frame plants

that were turned out are also in flower. The beds for hyacinths and other spring bulbs should be dug over and manured.

In the kitchen-garden, spinach may be sown for use in spring; and the potatoes and other roots should be taken up. This is considered the best month for planting strawberries. The wall-fruit will require protection from birds, wasps, and flies. Some worsted twined backwards and forwards from projecting nails, is said to be the best protection from birds; and bottles of sugar and water hung from the twigs will attract the wasps and flies from the fruit. After the fruit of the wall-trees is gathered, the borders are usually lightly forked over, and what is called a top-dressing of fresh compost is spread over them.

October.

In the flower-garden the tender greenhouse plants should be taken up. Seeds of the hardy annuals that will stand the winter should be sown, particularly those of the heartsease, rocket-larkspur, coreopsis, Eschscholtzia, and all the californian annuals.

The best way of managing these is to choose a portion of hard ground on which a little light earth, six or eight inches deep, has been laid; in this the seeds should be sown, and the young plants will be ready to remove by spadefuls to the beds prepared for them in spring.

This is the best season for planting hyacinths, tulips, crocuses, and other bulbs and corms, and the different varieties of *Anemone hortensis*; taking care when planting the latter to keep the eye of the tuber uppermost. All the kinds of *Pæonies*, as well the *Pæonia Moutan* as the herbaceous species, should be planted in this month. The leaves that fall in great abundance in October and November should be regularly swept up, and carried to a rotting heap, that they may decay, and make the earth so valuable to florists, which is generally called vegetable mould.

In the kitchen-garden the remaining fruit should be gathered. Towards the end of the month some fruit-trees may be planted if their leaves have dropped; and the autumnal pruning may begin, unless the trees should be still in a growing state.

November.

In the beginning of this month the appearance of the flower-garden is extremely desolate. The dahlias have generally been seriously injured by the frost, but not quite so much so as to warrant their removal; and a few lingering flowers of other kinds recal melancholy ideas of what has been, but is passed. A mild November is indeed the old age of the floral year; and a sharp frost that kills all the remaining flowers is felt positively as a relief. The tubers of the dahlias should be taken up as soon as the frost has changed their flowers. The names should be attached to the roots by string, or the Chester metallic wire; and they should be laid on dry boards in a cellar, and covered with sand, or in some dry place, not too warm, in a greenhouse. The temperature at which they should be kept, should be between 35° and 45°. The autumn-flowering bulbs should be taken up in the same manner, and kept in dry sand or moss. All the plants that require protection, should be carefully covered or matted up.

In the kitchen-garden the beds should be cleared of all haulm, &c., and dug over and dressed; and the trees which were not before planted should be put into the ground.

December.

This month is a perfect blank both for the flower and the fruit garden; except for collecting soils, making composts, preparing labels for names or numbers, sticks or stakes for tying up plants, nails and list for fastening them; and in mild weather, for pruning the larger and more hardy deciduous trees and shrubs, &c.

INDEX.

A

- ACACIA** seeds, way to make them vegetate, 69
- Acarus telarius**, or the red spider, 353
- Adjutages** for fountains, 346
- Almond trees**, kinds and culture, 236
- Aloysia citriodora**, culture of, 363
- American blight**, mode of removing, 220
- Anemones**, culture of, 296
 - different kinds of, 295
- Annual flowers**, culture of, 254
- Aphis**, or green fly, mode of destroying, 353
 - season for destroying, 385
- Apples**, kinds and culture of, 218
- Apricots**, best kinds and culture, 208
- April**, operations in, 380
- Arboretums**, 315
- Artichokes**, 149
- Asparagus beds**, 144
 - different kinds of, 145
 - insects on, 147
 - soil for, 145
- August**, operations in, 387
- Auriculas**, 262
- Australian plants**, 372
- Ayrshire roses**, 326

B

- Barberries**, 242
- Baulk in dug ground**, what it is, 16
- Beans**, kinds and culture of, 167
- Bed for bulbs**, mode of preparing, 381

- Beet, red, 176**
Biennial flowers, culture of, 260
 time for transplanting, 379
Birds, those which do most injury to gardens, 123
Black earth, cause of its infertility, 25
 remedy for, 28
Blenheim, rock work at, 330
Blotches on leaves, cause of, 355
Boiling seeds, 69
Borecole, 162
Box edgings, mode of clipping, 382
 to plant, 142
 season for planting, 378
 summer pruning of, 387
Brocoli, 161
Brussels' sprouts, 158
Budding knife, 92
Budding, mode of performing, 88
 points to be attended to, 92
 time for performing on rose-trees, 387
Bulbs, 277
 analogy between them and seeds, 48
 different kinds of, 49
 mode of planting, 47, 49
 time for taking up, 386
 tunicated, bed for, 50
Burying manure, 17

C

- Cabbage tribe, 155**
Cacti, cuttings of, 86
Calcareous loam, 33
Calceolarias, culture of, 367
 kinds of, 367
Californian annuals, kinds of, 258
 treatment of, 376, 390
Camellias, choice, changed to single red, 96
 culture of, 354
 hardest kinds of, 357
Canker in apple-trees, cause of, 219, 220
Carnations, cultivation of, 265
Carrots, kinds and culture of, 174
Cauliflower, culture of, 159
Celery, culture of, 184
Chalk, its defects and merits as a soil, 32

- Cherries, 210
 - Chestnuts, 233
 - Chicory, 183
 - Chives, 180
 - Chrysanthemums, 273
 - Clay, its nature, and mode of improving, 32
 - Cleft grafting, 100
 - Climbing plants, 373
 - roses, 326
 - Cold manures, 38
 - Coleworts, 157
 - Collar, or collet of a plant, 23
 - Colurna hazel, 236
 - Compost for carnations, 266
 - Constantinople nut, 236
 - Corns, what they are, and mode of treating, 293
 - Cranberries, 243
 - Crocuses, culture of, 293
 - when they first appear, 376
 - Cropping, 143
 - Crops, permanent, 144
 - temporary, rotation of, 153
 - Crown grafting, 100
 - Crown imperial, time for planting, 388
 - Crown of a plant, 23
 - Cucumbers, culture of, 189
 - for pickling, 191
 - Cutting down plants below the graft, 96
 - Cuttings, mode of making, 79
 - principal points to be attended to in making, 87
 - Currants, 240
 - season for pruning, 377
- D
- Dahlias, culture of, 296
 - different kinds of, 299
 - mode of budding, 91
 - modes of training, 298
 - soil for, 298
 - tubers of, to keep, 391
 - when to plant, 380
 - Dead flowers, to be removed, 386
 - leaves, use of, 390
 - December, operations in, 392
 - Deciduous trees, time for transplanting, 53

- Delicate plants, cuttings of, to strike, 83
- Derby arboretum, 321
- Digging beds, mode of performing, 14
 - mode of performing by a gardener, 7, 12
 - by a lady, 9, 12
 - purposes used for, 13
 - season for, 13, 374
 - uses of, 1, 6
- Disbudding, 113
 - season for, 386
- Dug ground in shrubberies, to conceal, 319
- Dwarf fruit-trees, 201

E

- Earthing up, in what cases it may be applied, 23
- Earths, the three primitive, 28
- Eggs of insects, when to destroy, 375
- Elder, 229
- Endive, 182
- Espaliers, training of, 212
- Evenness of surface, necessity of attending to in digging, 16
- Evergreen roses, 326
- Excrementitious matter, 153

F

- February, operations in, 376
- Felling trees, season for, 384
- Fibrous roots, 51
- Fig-trees, 211
- Filbert, 234
- Fixing by water, 59
- Florists' flowers, 262
- Flower garden, 244
- Flowers, culture of, 254
- Flute grafting, 91
- Forking, uses of, 20
- Fountains, mode of constructing, 344
- French, or Provins roses, 325
- Fruit border, construction of, 197
- Fruit shrubs, 237
- Fruit-trees, mode of planting, 198
- Fuchsias, culture of, 365
 - hardiest kinds, 365

Fumigator, 128
 Furrows formed in digging, 16

G

Garden walls, mode of forming, 196
 use of, 199
 Garlic, mode of growing, 180
 Gathering month, 388
 Gauntlet for a lady to save her hands, 10
 Geraniums, or pelargoniums, cuttings of, 82
 kinds of, 357
 Gooseberries, 238
 season for pruning, 377
 Gourds, 192
 Grafting clay and grafting wax, 107
 Grafting month, 382
 Grafting, modes of performing, 97
 nature of, 94
 points to be attended to in performing, 108
 season for, 96
 uses of, 109
 Grasses, different kinds of, 302
 kinds to be avoided in sowing lawns, 311
 quantity necessary per acre for sowing a lawn, 307
 soil for, 303
 suitable for lawns, 304
 Grass seeds, time for sowing, 312
 Gravel walks, to make, 139
 when to renovate, 378
 Green fly, 353
 mode of destroying, 385
 Greenhouse, management of plants in, 353
 Grubs on rose-trees, when to look for, 383
 Guernsey lily, treatment of, 292
 when to plant, 381

H

Heartseases, 270
 for autumn flowering, 381
 Heath mould, imitation of, 359
 nature of, 31
 Heaths, culture of, 360
 cuttings of, 360
 different kinds of, 359

- Heaths, mode of potting, 360
 - shifting, when necessary, 360
- Heat, average degree of, for different kinds of hotbeds, 41
- Herbaceous grafting, 101
- Hiccories, different kinds of, 233
- Hoing, different kinds of, 21
 - uses of, 21
- Hollyhocks, treatment of, 380
- Hoole near Chester, rockwork at, 329, 332
- Horse-radish, 152
- Hotbeds for tender annuals, when to make, 377
 - of stable dung, mode of making, 39, 40
 - of tan or decayed leaves, 41
 - to make look neat, 42
- Hot manures, 38
- Hot water for plants, 69
- Humboldt's method of obtaining layers, 78
- Hyacinths, culture of, 284
 - Dutch mode of treating, 289
 - exhibition of, at Shepherd's Bush, 283
 - forming a bed for, 50
 - growing in glasses, 50
 - manure for, 291
 - planting in pots and boxes, 291
 - propagation of, 290
 - rotation of, with other bulbs, 292
 - time for taking up the bulbs, 386
- Hybridizing, mode of performing, 366
- Hydrangea, culture of, 369
 - origin of the specific name, 370

I

- Implements for digging, 10
- Inarching, or grafting by approach, 103
- Insects, eggs of, when to search for, 375
 - larva of, 124
 - on plants in pots, 353
- Ivy, training over the ground, 319

J

- January, operations in, 374
- Jerusalem artichoke, 173
- June, operations in, 385

July, operations in, 386

K

Kale, 162

Kernel fruits, 218

Kidney beans, culture of, 169
time for sowing, 384

Kitchen garden, form and arrangement of, 135
soil for, 136
walks in, 137

L

Lady's gauntlet, 10

spade, 9

mode of keeping in a proper state for use, 13

Lady's wheelbarrow, 11

Landscape scenes in pleasure grounds, 316

Lawns, management of, 301

manure for, 311

mowing of, 310

Layers, Chinese, 76

modes of making, 73

time for separating from the parent plant, 387

Laying out a flower garden, 245

pleasure grounds, 313

Laying plants in by the heels, 61

Leaves, dead, use of sweeping up, 390

Leeks, mode of growing, 179

Leguminous tribe, 163

Lemon scented verbena, 363

Lettuces, 181

Light, effect of, on plants, 47

Lime, how changed into chalk, 32

Lime water, 129

Liquid manure, 38

Loug litter, what it consists of, 39

M

Marjoram, 188

Manures, different kinds of, 33,37

mode of preparing for use, 33

modes of applying, 34

suitable to different soils, 35

March, operations in, 378

May, operations in, 383

- Medlar, 227
 Melons, 191
 Mimulus, culture of, 369
 different kinds of, 368
 Mint, 188
 Moss houses, mode of constructing, 337
 mosses suitable for, 338
 Moss-roses, culture of, 323
 Moss, to destroy on lawns, 312
 Mowing of lawns, 310
 Mulberry, 227
 Mushrooms, 193
 Mustard and cress, 183
 Myrtles, cultivation of, 367

N

- Nailing against a wall, 120
 Neck of a plant, 23
 Nectarines, best kinds and culture, 203
 Norbiton Hall, rock work, 331
 November, operations in, 391

O

- October, operations in, 389
 Offsets, plants that produce them, 71, 72
 Onguent de Ste. Fiacre, 107
 Onions, 178

P

- Pæonia Moutan, the tree Pæony, time for planting, 390
 Parsnips, 176
 Peaches, best kinds, and culture, 203
 Pear trees, 220
 cause of their not bearing, 221
 mode of pruning, 223
 Peas, kinds and culture of, 163
 time for sowing, 378, 384
 Peat-bog or moss, difference between it and a quagmire,
 and between it and heath mould, 30
 Peat earth, its nature, and how formed, 30
 soils, mode of improving, 36

- Peccane nut, 232**
Pelargoniums, cuttings of, 82
 different kinds of, 358
Perennial flowers, mode of propagating, 260
Permanent cropping, 144
Perpetual roses, culture of, 324
Petunias, culture of, 364
 kinds of, 363
Pillars of roses, 326
Pinks, 269
Pipings of pinks and carnations, 86
 seasons for making, 385
Pits for choice plants, mode of preparing, 19
Plantations, mode of thickening, 324
Planting bulbs and tubers, 48
 fruit trees, 198
 in pleasure grounds, 314
 shrubs too thickly, evils of, 320
Plants that are unfit for transplanting, 55
 that will bear earthing up, 22
 which can be budded on each other, 93
Plants in pots, management of, 347
 soil for, 351
 watering of, 348
Pleasure grounds, to lay out, 313
Plums, 209
Pointing, or shallow digging, uses of, 17
Polyanthus, 264
Pomegranates, mode of throwing them into fruit, 230
Potatoes, 171
 when to plant, 379
Pot herbs, 186
Pots, double for cuttings, 85
 when too large, injurious, 350
Potshreds, what they are, and use of, 351
Potting plants, mode of performing, 351
Primrose, 265
Propagating plants, modes of, 70
Protecting, 201
 from frost, 121
Protection, coverings for, mode of making, 379
Pruning, best mode of performing the operation, 111
 gooseberries and currants, 377
 season for generally, 113
 to improve the form of a tree, 114

- Sorrel, 177
 Sowing month, 378
 seeds, principal points to be attended to respect-
 ing, 43
 Spade, kind of, suitable for a lady, 9
 Spinach, 177
 Spitful, meaning of the term, 7
 Spongioles, 4, 52
 Spring planting, 377
 pruning, 377
 Standard fruit trees, 215
 Stirring the soil, uses of, 2, 6
 Stone fruits, 203
 Stools, 75
 Strawberries, kinds of, 149
 soil for, 150
 time for planting, 389
 Street gardens, mode of improving, 25
 Subsoil, what composed of, 28
 Succory, 183
 Succulent plants, 370
 Suckers, plants that produce them, 71
 Summer pruning, 113, 386
 Surface soil, nature of, 28
 Sweet herbs, 187
 William, 269
 Syon, rock work at, 331

T

- Tap-rooted plants, mode of treating, when transplanted, 55
 Tart rhubarb, 151
 Tears of the vine, 114
 Temporary crops, 153
 Tender annuals, 257
 time for planting out, 383
 Tender roses, 327
 Thyme, 187
 when to divide the roots, 383
 Tobacco water, how to make, and mode of applying, 385
 Tomatoes, 192
 grafted on potatoes, 103
 Training, 118
 Transplanting, principal points to be attended to, 51

- Transplanting, what plants will bear it, 54
 - uses of, 57
- Trees, ornamental, 315
 - removing large ones, 62
- Trenching too labourious for ladies, 18
- Trowel, when useful, 23
- Tuberoses, when to plant, 381
- Tubers, mode of planting, 47, 49
 - time for taking up, 386, 391
- Tulips, culture of, 281
 - kinds of, 279
- Turf, mode of laying down, 309
 - when to lay down, 378
- Turnips, kinds and culture of, 173

U

- Uses of transplanting, 56

V

- Van Mons, theory of, as regards pear-trees, 225
- Vegetable mould, 37, 390
- Verbena, lemon scented, cuttings of, 80
 - scarlet, layers of, 74
 - triphylla, 363
- Verbenas, culture of, 362
 - kinds of, 361
 - time for making cuttings, 387

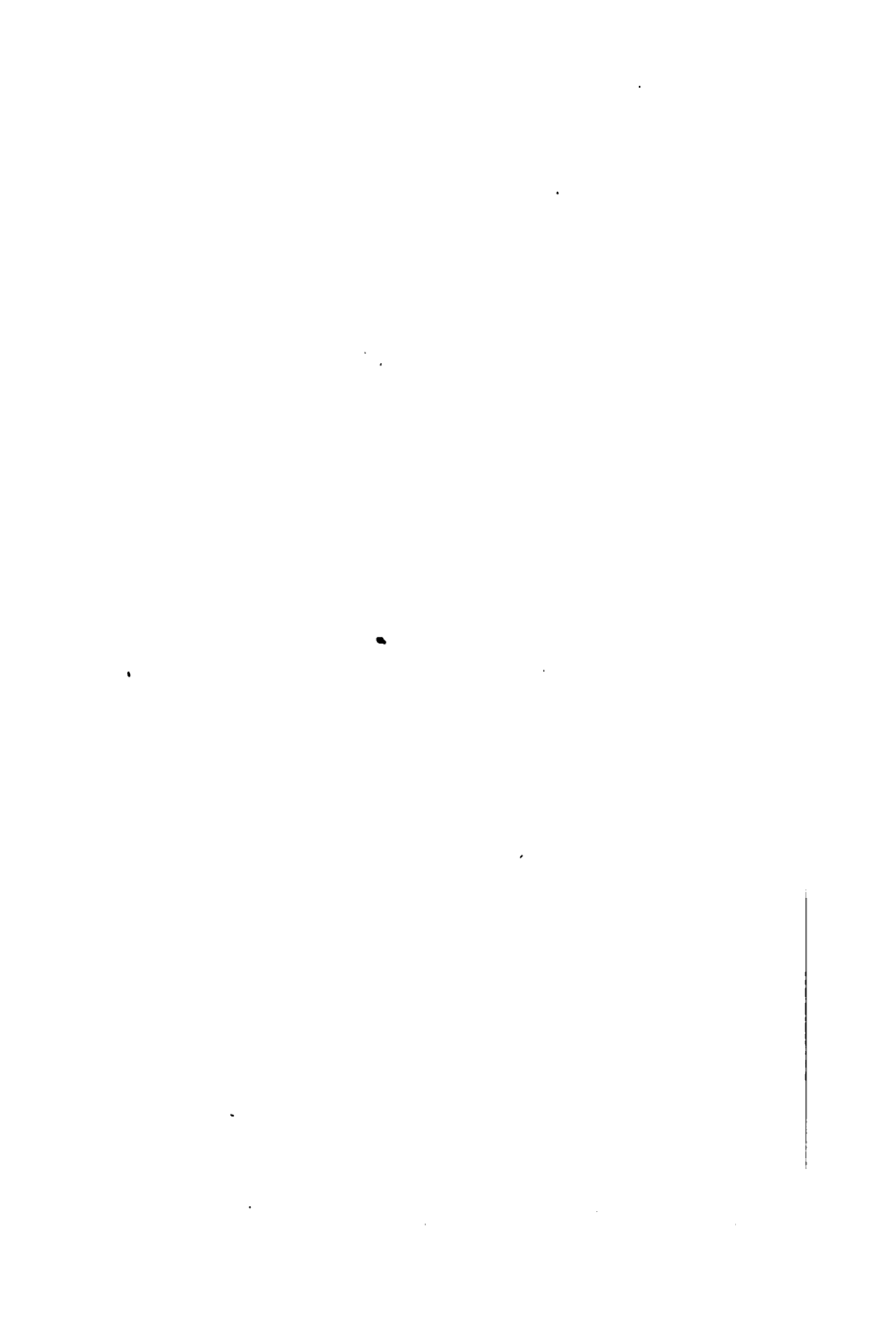
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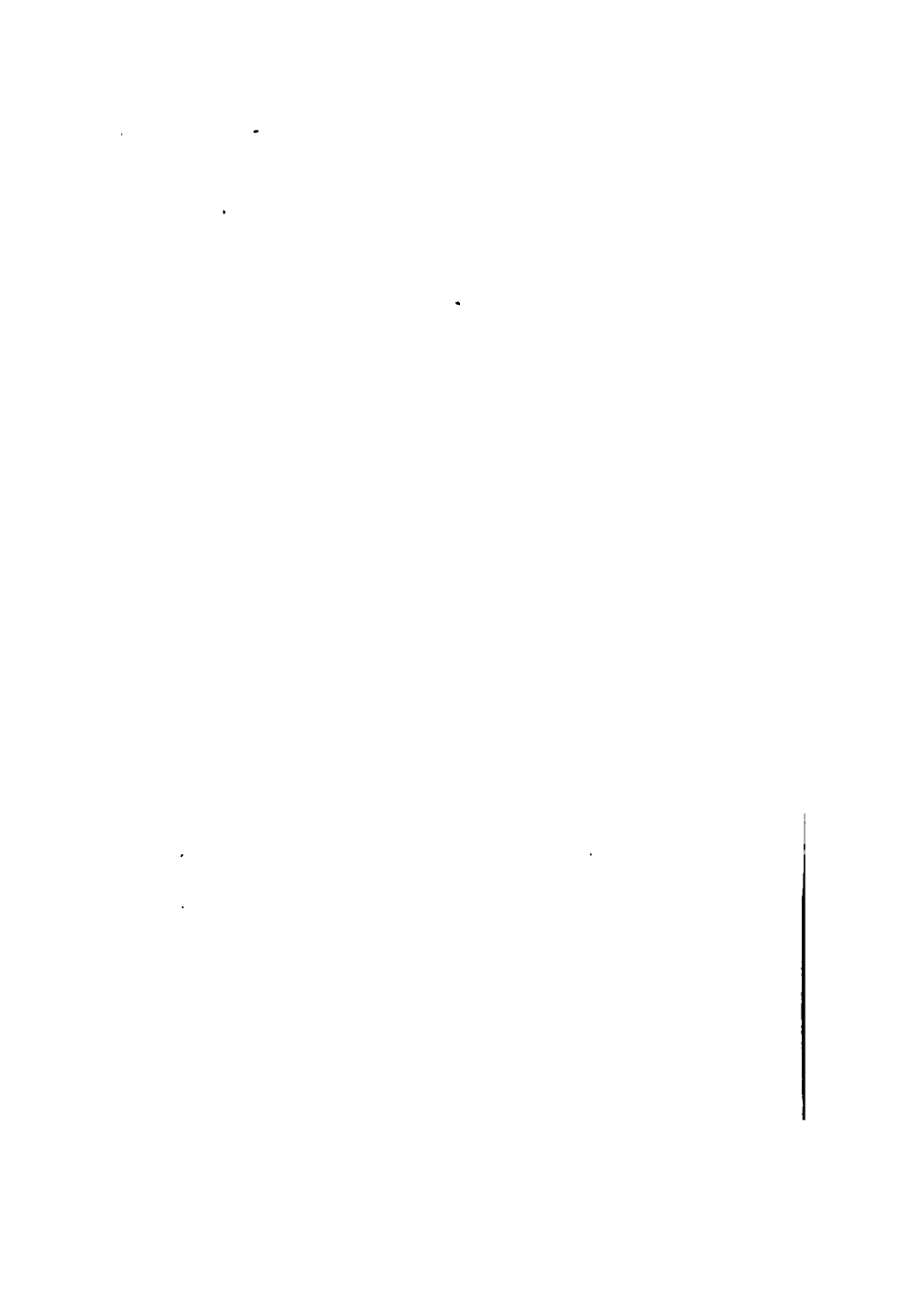
- Walks in pleasure grounds, 312
 - to make, 139
 - to renovate, 142
- Wall fruit trees, 198
 - kinds of, 202
 - modes of protecting, 201, 389
- Walls, construction of, 195
 - use of in gardens, 169
- Walnut, 231
- Water cress, mode of cultivating, 185
- Watering plants when the sun shines, effect of, 67
 - manner of applying to different plants, 64
 - quantity to be given at different times, 66

- Watering plants, time for, 67
 - use of, 63
 - use of after transplanting, 54
- Water, the best kind of for plants, 68
- Weeds, destroying by hoeing, 22
- Weeping ash, mode of training, 321
- Wheelbarrow for a lady, 11
- Whip grafting, 99
- Window gardening, 347
- Wire frames, 344
- Worm casts, bad effects of, 362
- Worms, to destroy, on lawns, 312

Y

- Yellow rose, culture of, 326





1000



