ABERCROMBIE'S
PRACTICAL GARDENER,

AND

Improved System of Modern Horticulture,

ALPHABETICALLY ARRANGED;

ADAPTED TO SMALL OR LARGE GARDENS,

AND DESIGNED FOR

GENTLEMEN WHO MANAGE THEIR OWN GARDENS,

AND AS

A MANUAL FOR PROFESSIONAL HORTICULTURISTS:

CONTAINING

THE CULTURE, CONSTRUCTION, AND MANAGEMENT OF THE

KITCHEN GARDEN,	PLEASURE GROUND,	CONSERVATORY,
FRUIT GARDEN,	NURSERY,	HOT HOUSE,
FLOWER GARDEN,	TIMBER PLANTATION,	FORCING GARDEN,
SHRUBBERY,	GREEN HOUSE,	PINERY,

A LIST OF PLANTS TO EACH DEPARTMENT,

EXHIBITING THE

BOTANICAL NAME, TIME OF FLOWERING, COMPARATIVE SIZE.
COLOUR, SOIL, AND SITUATION.

With a Copious Index.

BY JOHN ABERCROMBIE.

FOURTH EDITION:

WITH AN INTRODUCTORY

TREATISE ON VEGETABLE PHYSIOLOGY,

WITH PLATES:

BY WILLIAM SALISBURY,

AUTHOR OF THE BOTANIST'S AND COTTAGER'S COMPANION.

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ADVERTISEMENT.

PRACTICE is the foundation of our work;—and in its pages are combined the Latest Experience of Horticulturists, the theories and doctrines of Agricultural Chemists, and the most recent Discoveries in VEGETABLE PHYSIOLOGY. This Department of Gardening, in the present erudite state of all classes in this country, will be consulted to good effect; and therefore it is made the principal type and rationale for reference, in all the arts and manipulations described.

Each Department is systematically and separately arranged; containing preliminary instructions relative to General Management, and detailing all that relates to the Culture of each particular Plant.

The *Alphabetic* Order has been followed in most instances; but, by means of a GENERAL INDEX, a direct reference is obtained to each article, both under its English and Generic name;—thus presenting a Manual of Instruction for the treatment of Plants, both Indigenous and Exotic; the principles of which may be applicable in all Climates, and become invaluably useful to persons resident at Foreign Stations.

Our Treatises on the Pleasure Ground, Nursery, and Tree Plantation, will be found to merit the particular attention of Landscape Gardeners, Rural Improvers,

and the Managers of Noblemen's and Gentlemen's Plantations; not only as respects Design and Ornamental Improvement, but by scientific instructions relative to the rearing and management of Copses, Woods, and Forests.

We thus flatter ourselves in having done full justice to our title of "The Practical Gardener," and in presenting to the Public an improved edition of a work no less calculated to afford *individual* than *National* advantages. And by according with the sentiments of Scientific Horticulturists, we trust our labour will continue to receive the sanction of those who are most competent to appreciate its value.

ARRANGEMENT OF THE WORK.

KITCHEN GARDEN.

VEGETABLE PHYSIOLOGY,

FRUIT GARDEN, AND ORCHARD.

FLOWER GARDEN, SHRUBBERY, AND PLEASURE GROUND.

SHRUBBERY, 298—

PLEASURE GROUND.

NURSERY, AND GENERAL TREE-PLANTATION.

GREEN-HOUSE.

HOT-HOUSE, AND FORCING-GARDEN.

PINERY.

DRY STOVE, 472.

FORCING DEPARTMENT.

APPENDIX.

GENERAL INDEX.

TABLES OF PLANTS.

INTRODUCTION

TO

THE KITCHEN GARDEN.

HARDY esculent vegetables contribute so materially to the subsistence of society, that the business of cultivating them is the most important branch of Gardening.

CHOICE AND IMPROVEMENT OF THE GROUND.

(1.) A competent portion of the best land, consulting both the aspect and soil, should be assigned for the Kitchen Garden. It should be situate conveniently for access from the house. If the ground has a gentle declination to the south, it lies in the best way that can be desired: on the east and west there should be no plantations or buildings near enough to obstruct the rising and setting sun.

An open aspect to the east is itself a point of capital importance in laying out a garden or orchard, on account of the early sun. When the sun can reach the garden at its rising, and continue a regular influence, increasing as the day advances, it has a *gradual* and most beneficial effect, in dissolving the HOAR-FROST which the past night may have scattered over young buds, leaves, and blossoms or setting fruit. On the contrary, when the sun is excluded from the garden till about ten in the morning, and then suddenly darts upon it with all the force derived from considerable elevation, the situation is bad, particularly for fruit-bearing plants in the spring months: the powerful rays of heat at once melt the icy particles, and, immediately acting on the moisture thus created, *scald* the tender blossom, which drops as if nipped by a malignant blight: hence it happens, that many a healthy tree with a promising show of blossoms fails to produce fruit, the blossoms sometimes falling together in the course of a morning. The covering of the hoar-frost, or congealed dew, is otherwise, of itself, a remarkable preservative of the vegetable creation from frosty winds.—When plants, from want of the necessary protection in green-houses or frames &c., become frost-bitten, the best mode of preventing the injury from that effect is to wash them with a syringe in cold water; and thus thawing them gradually, the mischief is in a great degree prevented.

The garden should not be so elevated as to be exposed to boisterous and cutting winds; nor should a very low situation be taken, if circumstances afford any choice.

If the soil be not naturally good to the depth of thirty inches, and thence to three feet, proper earths and composts should be incorporated with it, to make it so, where the tenure does not render the expense unadvisable. It should be done where it is intended to found a complete Kitchen Garden: not indeed because many esculent plants require more than eighteen inches' depth of good earth in order to flourish in perfection; nor that even fruit-trees, generally, will not thrive for a considerable course of time in a suitable soil full two feet in depth, although three feet on their account is better; but in order that the gardener may have it in his power to give rest to alternate portions of the soil, without keeping the surface out of crop—by trenching, in successive years, to different depths, so as to bring any given layer, measuring a spit in thickness, by turns to the bottom, the middle, and the surface. Where something positively intractable must be taken away, as in the case of a very stony bed, let the ground be trenched, and the larger stones screened or raked out. To give heart to excessively light, sandy, and unstable ground, incorporate with it clayey loam and well-rotted dung. To correct a cold stubborn clay, add drift-sand, shell-marl, sea-weed, warm light earth, and well-rotted dung. When soot is used, mix a thirty-sixth part with a heap of compost.

If the soil has been rendered wet by the lodgement of water, it is requisite to have the ground effectually drained.*

LAYING OUT THE AREA.

(2.) *Compartments.*—Where wall-trees are to stand, a liberal width of border is necessary, to allow the roots to spread without impediment. Next to the border, leave space for a walk entirely round the garden, from four to six feet wide. Some choose to have a border on the inward side of the walk, for the cultivation of espaliers, and esculents of dwarf growth: others divide the central parts at once into main quarters or divisions. Where the ground is extensive, the centre should be traversed by a walk with parallel borders; from which cross-walks may branch, if necessary.

As the beds are marked out, trench them two spits deep, if good soil reach so low.

Walks.—Gravel is the neatest and most lasting material with

* See *Practical Essays on Manures*, and *Salisbury's Cottager's Agricultural Companion*.

which a walk can be laid. See *Pleasure Ground*, "Ground-work." In default of gravel, chalk or road-drift may be substituted. If these be unattainable, coal-ashes may be resorted to in the last place: binding, when trodden close, they make a sound firm walk, generally dry, and easily kept in good order; but the black colour is unsightly. Lay good mould under the walks, particularly where espaliers or wall-trees are within ten feet.

Border Edgings.—After the garden is planned, and laid out into compartments, the borders should have their outer edges, in contact with the walks, made up firm and even. Where the design, or intimate communication with the house, requires edgings, box is superior to every thing else. See *Shrubbery* and *Pleasure Ground.* In extensive Kitchen Gardens, edgings of vegetables, particularly of box, are dispensed with. At the same time, the margins of the beds and main walks should be kept even and well defined: for this purpose, nothing is more neat and lasting, or better fitted to save trouble, than narrow edgings of brick, a single course wide. In the interior quarters, parsley may be sown for an edging; or thyme, winter-savory, hyssop, or other aromatic herbs, may be planted: as long as such herbs flourish, or remain ungathered, they form a verdant edging, in character with the Kitchen Garden.

In the *Jardin des Plantes* at Paris, in 1821, the Editor saw two sloping beds laid out in small square compartments of garden herbs, on a plan both neat and economical: the slopes were about eight feet in width, with a two-foot grass walk at the bottom: the whole presenting the figure of an ancient *Stadium.*

LOCAL MIXTURE OF DEPARTMENTS.

(3.) In gardens on a large scale, the Pleasure Ground may be contiguous, but should be kept quite distinct. But where the field is more circumscribed, the Flower Garden and the Kitchen Garden are often blended together: in this case, a piece under the windows of the residence is generally laid down as grass-plat. See *Flower Garden* and *Pleasure Ground.*

Fruit Trees.—Fruit-bearing bushes and trees are found in the most regular culinary garden: thus the fullest advantage is taken of the walls and general area. One of the first things to be done, on the foundation of a Kitchen Garden, is, at the proper season, to bring in the sorts, and number, of fruit-trees intended to be distributed over the ground; for the plants will require several years' growth to arrive at full bearing. Cover the walls with trees, according to the aspect. Espaliers may

be planted in some of the borders, in a row along the inner edge, fifteen or twenty feet apart; and when planted on each side of a walk, they may be allowed to run up, so as to form, in a few years, a graceful archway. There should also be a competent supply of gooseberry, currant, and raspberry bushes, in plantations by themselves. See Introduction to the *Fruit Garden*, and the separate articles under that department.

Frames, Hand-Glasses, Matting.—Where early crops of favourite esculents are to be provided, the Kitchen Garden should be furnished with a suitable quantity of garden-frames and brick-cased pits. See p. 10; also *Hot-house*, Introduction, and "Frames and Pits without fire-heat." The moveable frames should comprehend one-light, two-light, and three-light frames; the smaller chiefly for raising seedlings or hot-beds; the full-sized for the general purposes of frame-forcing; and both to serve occasionally as winter conservatories for tender plants. As a branch of the same department, let there be also a set of hand-glasses, squares or bells, for the above purpose, on a smaller scale; for instance, to protect young plants of the cauliflower and lettuce in winter, and to be employed in hot-bed ridges that are without frames, in spring and the early part of summer. In proportion to the number of lights and glasses, a quantity of bass-matting should be provided, to cover the glasses at night, when the weather is any thing short of confirmed summer; and during part of the day, in the extreme rigour of winter. Mats also serve for shading in summer.

These lower branches of the forcing department are *locally* within the Kitchen Garden; it is therefore necessary to have, in some sunny opening, lying convenient for communication with the garden, prepared composts of rich earth, light mellow loam, and rotten dung, perfectly incorporated, ready for earthing the hot-beds. In large establishments, the space set apart for ranges of frames is technically called the *Melon Ground*.

GARDEN TOOLS.

(4.) It will be necessary to have spades, rakes, and hoes, of different sizes; one or more thinning hoes; also a set of dibbles, with garden line and reel; scooped trowels; forks for pointing ground where it is improper to dig; asparagus and potatoe forks; a common garden-knife, grafting and pruning knives, a small hatchet, a thin broad chisel, handbill, and saw; a proper wall-tree nailing hammer, and light wall-ladder; watering-pots of different sizes; a garden-engine; sieve for

earth; baskets; one or more wheelbarrows; dung-fork, and pitch-fork.

CULTURE OF THE SOIL.

(5.) Divisions of the garden to which annuals are assigned should be dug over, and trenched once a year. The principal time for this is winter and spring; but it may be partially done at other times, in preparing for a fresh crop. Occasional manure will also be necessary: if the original soil be poor, it may require aid from dung every year: but, in general, the quarters in which annuals and biennials are cultivated will want to be thus recruited, at least once in two years, when the last autumn crops are off the ground. Beds occupied by perennials cannot sometimes receive any material accession of new earth or compost for a number of years; and therefore, when the stocks are worn out, the repairs of the soil should, in proportion, be substantial, and go deep. Dung is fit to manure beds for receiving many sorts of plants, when it has lain in a heap from three to six months, and is beginning to be well rotted. But for particular purposes, which will be stated in different divisions of the work, it should lie from one to two years. Apply it for annuals, two or three inches thick; for perennials that are to stand long, six or eight inches thick; spreading it equally, till the bed into which it is to be dug is covered: then trench it in, a moderate spade deep, that it may be within easy reach of the roots of the plants. In preparing ground for perennials, a portion of the dung should be deposited six inches deeper.

In every case where it is intended that the ground shall lie fallow for a time, it is adviseable, in digging, to turn up the earth roughly in ridges; and to repeat this process during winter, for the purpose of exposing a new surface to the action of frost.

Trench-digging may be performed from one to three spades deep. Observe, in beginning the work, to dig out and form a proper open trench, to admit the earth of that immediately adjoining; carrying the earth of the first trench to that side of the compartment which you intend to dig last. A trench two spades deep should be two spades in width. Proceeding to dig a second trench, turn the earth into the first; and thus continue till the whole is dug over, filling up the last trench with the earth of the first. Give every top spit a clean turn off the spade, that all surface weeds and litter may be buried at the bottom. Indeed, where the face of the ground is foul, it is proper to pare the top, with all the weeds upon it, into

the bottom of the adjoining open trench, before the digging of each line is commenced.

DRESSINGS FOR BORDERS.

(6.) 1. Vegetable mould may be mentioned in the first place, though it is too choice to be applied for raising common plants. 2. Fresh mould may be brought to recruit exhausted borders. 3. Scrapings of roads, not clayey: those from high roads are enriched in far the greatest degree by the droppings of cattle. It should be observed, that the gravel, or slate, or stone, which is ground into earth on the surface of a road, is necessarily *virgin-earth*, having never been in a state to support vegetation. 4. Decayed tan-bark, which has been used in a forcing-pit, and reduced to an earthy state. 5. Dung, which has been employed in hot-beds, or by any means rotted without bearing a crop. 6. Drift-sand. 7. Coal-ashes. 8. Soot.—The last three will be proper only for soils that require to be made lighter, or to have the faults of coldness or wetness corrected.

VEGETABLE PHYSIOLOGY,
AND THE PRACTICES OF GARDENING THEREBY ILLUSTRATED.

(7.) The necessary objects for forming a garden being thus obtained, it will considerably aid the practical gardener in his progress if the natural conformation of a plant, and the principles on which the soil is to be made comparatively more fertile, be rendered plain; which will be effected by a brief and familiar outline of Vegetable Physiology; as *the art of gardening is merely a direct way of assisting natural operations.*

Every plant is composed of a root, stem, branches, and leaves, and, as it advances towards maturity, flowers and fruit: these are intended by Providence to contain the reproductive principle, and also to give sustenance to animal life.

(8.) As the most direct and natural mode of cultivation is by causing seeds to grow, it will assist the operator if the formation of a seed be described; which will be done by the dissection of a bean. If, therefore, the outer skin be removed, two substances, called cotyledones, appear, enclosing another small substance that is called the corculum or little heart: this latter is composed of two parts; one having the appearance of a feather, called the plumula, which, in progress, forms the stem and branches of the plants; another the radicle, from which the roots are produced.

The component part of the cotyledon is of a highly interesting nature, from which the most wholesome articles and nutritious substances are derived.

The outward appearance of a bean exhibits a small black

mark, called the eye (*hilum*), near to which is observed a small hole (*foramen*) through which the internal parts extract moisture, whenever it is placed in the earth. This moisture causing the cotyledones to swell, imparts a vegetating power to the corculum; the consequence of which is, that the radicle is elongated and soon protrudes through the outer skin, and the plumula is seen to make its appearance in an opposite direction. If a due portion of moisture be afforded, the radicle will be found to have a downward tendency; while the plumula will rise upwards, and make its appearance above ground; in which state the young plant is said by gardeners to be in the seed-leaf.

(9.) It would be foreign to our work to describe all the curious phænomena that attend this natural process; but it is necessary to the purpose in view to observe, that as soon as vegetation is excited, a change is observed in the nature of the substance composing the cotyledones. What, before the process took place, if reduced to meal, would exhibit the substance known as flour, is now changed into a rich saccharine mucilage: and were my illustration of this part of Nature's process made by the vegetation of a grain of barley, the result would be the change of the cotyledones into malt.

(10.) It will therefore be readily seen, that the substance of the cotyledones is by nature intended to supply the corculum with nourishment during the first developement of the young plant, till the radicle puts forth fibres. Thus, as the extension of the young plant takes place, the cotyledones become effete and tasteless, as the saccharine juice has been previously exhausted in sustaining the plant.

(11.) It is now of interest to observe the continual increase of bulk, as it effects all parts of the plant, and at once excites consideration to what it is that constitutes the

FOOD OF PLANTS.

(12.) To satisfy inquirers on this head, we must begin by observing, that during the first processes of vegetation a violent fermentation takes place, and a considerable quantity of carbonic acid gas is produced from the change of substance in the cotyledones. This is imparted to the embryo plant, which, as it makes its appearance above ground and receives the influence of light, imbibes the oxygen of the atmosphere and becomes of a green colour. The whole process of vegetation is a change of atmospheric fluid; as the plant continually imbibes carbonic acid gas, and gives out oxygen gas: thus, when the substance of vegetables is decomposed, either by fire or other means, the result is CHARCOAL, or CARBON: *and to*

afford this substance in the most congenial way to vegetables while in a growing state, is the most explicit mode of comprehending the fertilizing effect of manures.

Carbonic acid gas is a component part of water and air, formed by the decomposition of vegetable and animal matter, and becomes perceptible by flying off in abundance during fermentation, thus mixing with the atmospheric fluid. Hence soils are sterile or fertile, according as they contain substances that attract this gas to the earth. These considerations will greatly assist the gardener in manuring, for the production of particular plants. To understand how such substance is imbibed by, and assimilated to, the vegetable, it is necessary that we examine the construction of a plant, as it appears on dissection.

(13.) As vegetation goes on, the young plant increases in size; stems, branches, and leaves are formed; and on splitting the stem, we at once perceive it to be composed of a central light substance called the pith or *medulla;* next to which is the wood called *alburnum:* these are surrounded by the bark, composed of two distinct layers; the inner portion called the *liber*, and the outer the *epidermis.* The alburnum, on examination, is found to be composed of very minute vessels, through which the moisture ascends.

(14.) The bark is also composed of a number of tubular vessels, surrounded by a mucilaginous substance. While the plant is young, these are delicate and tender, but more robust and strong as the plant acquires age. These vessels commence with the fibres of the roots, and extend to the points of the leaves, in which we observe them in the shape of nerves; where they are found, with those of the alburnum, like the arteries and veins in the animal body. The mechanical construction of the root induces the consideration that the extreme ends of the fibres are peculiarly calculated to imbibe moisture; and these members of the plant are technically termed the *spongioles:* hence the ascending fluid is termed COMMON SAP; and when it has passed the leaves and returns down the bark, it is termed the BLOOD OF THE PLANT.

(15.) The food of the plant, then, being dissolved in water, is taken up from the soil by the extremity of the alburnous vessels in the roots, and propelled upwards through the stem and branches into the leaves, where it is operated on by the sun-beams, when that portion fitting for the sustenance of the plant is carried down the descending vessels in the bark; depositing, on its return, a mucilaginous substance called CAMBIUM, which is, in due course, changed into alburnum, and

produces the addition to the bulk of the plant. The cambium is the essence of the blood of the plant: it forms wine if collected from the birch-tree, sugar from the cane, and gum from the peach, the plum or the cherry, if the bark be wounded. These are, then, the regular principles of vegetation; affording much serious contemplation to the naturalist, and to the gardener a direct clue to the most ready mode of facilitating the growth of plants. And here we learn the means of discovering how many years a timber-tree has been growing, by counting the number of rings, *i.e.* layers of wood, that have been annually formed, which are readily observed when the trunk is sawed across: we may also hereby account for any irregularities in the growth. The acting principle on which the common sap is propelled up the stem has been the subject of much philosophical inquiry; but, for the purpose of our first consideration, it will be enough to know that it is as uniform in its ascent as it is for smoke to rise above all atmospheric fluids; and if a luxuriant branch of a plant be allowed to take lead and get the ascendency, it will keep it, by the food reaching the upper parts, which continue to extend, while the inferior branches are left weak and comparatively less supported.

FIRST NATURAL PROCESS OF VEGETATION IN THE SEEDS.

(16.) The great attraction of the cotyledones for moisture is evinced by an immediate enlargement of the parts, on being deposited in the ground; which is greatly facilitated by the addition of any portion of the manuring principle being brought into contact therewith. Hence, if an equal bulk of pigeon, rabbit, sheep's dung, or other substances containing a more than usual portion of carbon, be mixed with any seeds intended to be sown, and placed in a large vessel with sufficient water to cover the whole, a fermentation will take place, and in a few hours the work of vegetation will be greatly hastened; insomuch so, that if the seeds be rubbed dry in wood ashes, the advantage of their growth may be perceived for many weeks, and, in some cases, till the full time of maturity.

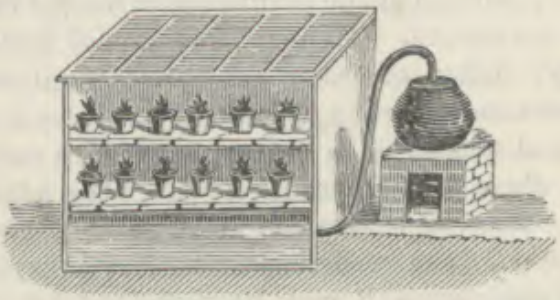
(17.) Some seeds have two cotyledones, as pulse, &c.; others only one, as corn; others many: some have also the property of coming up with the cotyledones forming seed-leaves above ground, as is instanced in turnips, carrots, lettuces, &c.; others, as beans, pease, &c. come up with the second leaves. Hence it is necessary to consider this circumstance, as those of the former description cannot grow well if deposited too deeply in the earth; while those of Indian-corn, wheat, barley, and rye,

having but one cotyledon, vegetate and thrust up the plumula from any moderate depth.

SOWING SEEDS.

(18.) Few seeds require to be deposited in the ground more than two inches deep: small seeds of lettuce will grow if covered only half that depth. It is usual to scatter the seeds on the ground after it is fresh dug or stirred up as evenly as possible, and cover them by raking the ground: this is called broadcast sowing. It is impossible to raise a number of our most useful and ornamental plants, so as to have them in proper season, without the assistance of artificial heat: this used to be accomplished by hot-beds made of fermented stable-dung, and kept up by linings with much labour and expense. The improvements of the present age, however, admit of a more economic method, which is here described:—Dig out a pit the full size of any common garden-frame, and line it completely with four-inch brick work: if sunk three feet under ground, and the frame placed three feet above, it will be convenient for use. Let the lower two feet be plastered with Parker's cement, so as to hold and be filled with water: over this place some oak timbers or iron bars, at a distance apart, to support large stones; on which let some of a size less be placed, and on these still smaller; so that the bed would, if one of the walls were taken away, have this appearance;—and which it is intended to call

THE ECONOMIC FORCING-FRAME.



Now, if a small steam boiler be set in any convenient place, with an iron pipe to convey steam from it, when heated by any convenience at hand, so that the water in the pit may be made hot, this will be found a most useful forcing-pit for all purposes, and sustained at a small expense. In this pit may be placed such seed-pots as will afford all that can be required in the forcing department of gardening, at any season of the year.

Very few directions will be necessary. Sow the seeds in pots or shallow pans: prick out the plants in others; and, as

they advance to maturity, let them be disposed of according to future directions;—observing, that all the modes used to facilitate vegetation applies to this, as is recommended for usual practice. The gardener will find that a heat of 60° or upwards, kept up during the night, will enable him, by giving proper air in the day-time, and shading when necessary, to propagate any vegetable that may be the object of his care: and if branches of grape-vines be brought into it, from a wall, early fruit may be thus produced. This will also be found the most useful and simple mode of erecting and heating, any kind of horticultural building.

(19.) Drilling is the most eligible mode for sowing all kinds of seeds, in consequence of the facility it affords of thinning out, or clearing the crop from weeds. Drills are usually made with a hoe, at any distance that the size or growth of the crop requires: this mode affords the gardener the means of applying stimulating manures to the crop, by sowing it in with the seeds and covering all up together. In this way, powdered oil-cake, malt-dust, &c. &c. is frequently applied to great advantage.

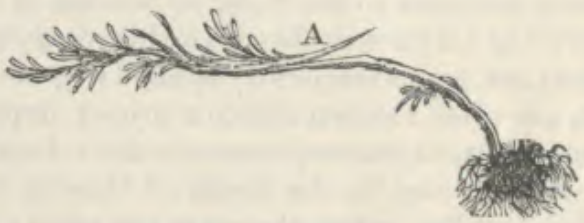
(20.) Beds are often thrown out to a proper depth for sowing with large seeds, as acorns, chesnuts, &c.: for this purpose the ground is excavated to the depth of three or four inches, and the bottom levelled, when the seeds are sown at about two inches apart: the mould is then thrown in over them. This is a most eligible mode of raising seeds that are enclosed in hard shells, and require a continued moisture in the first state of vegetation; for if the mould be thrown out sufficiently deep, and not all replaced in covering the seeds, a basin is formed, whereby the beds may be watered to advantage.

When seeds are sown during dry weather, it is often prudent to lay either old mats or other covering over the beds or drills; and in small gardens, or where it can be accomplished with convenience, the advantage in facilitating the growth, as well as in saving the crop, will well repay the extra trouble.

(21.) It must not be forgotten, that water is one of the principal mediums by which sustenance is conveyed to the plant; and that under all circumstances this is highly necessary. Seeds, when sown in the early spring months, will generally be sufficiently moistened from the humidity of the soil; but in summer, it frequently happens that the ground is so dry that the cotyledones will absolutely shrink. Gentle waterings in dry weather, given in the evening, so that the moisture remain longer without being exhaled, is, to use a common expression, "the life and soul" of horticulture. (See § 12. p. 7.)

PROPAGATION BY ARTIFICIAL MEANS.

(22.) *Layering.*—If it be required to increase any kind of tree in the most certain mode, it should be planted in a convenient place where a sufficient space can be spared, according to the length of the growth of the one-year's shoots, allowing room all round to rather more than their full length. As soon as the tree so planted is become of vigorous growth, it must be cut down close to the ground, and young shoots will be produced; and if in less number than are required, if those be also cut down again before the midsummer shoot (see 28. 29.), a more numerous set will be obtained; and as soon as of proper length, these may be converted into plants;—the mode of doing which is, to introduce a sharp knife through the bark, and half-way through the alburnum or wood; thus,



Now it is evident, that the sap having ascended up the alburnum, will furnish the descending blood-vessels, but which cannot descend below the tongue-point, as at (A); and it will become surcharged with the fluid. The ends of the blood-vessels will be found to form knobs, *i. e.* spongioles, which will inevitably increase; and wherever there is a stoppage of that sort, a set of roots is the regular consequence; and sooner or later, according to the growth of the tree, this layer will become rooted, and form a perfect plant.

In many of the common trees, as Dogwood, Lilac, &c. &c. it is only necessary to give the young shoots a gentle twist, and peg them into the ground, to the depth of about four inches. Almost every plant cultivated for use or ornament may be best and easiest propagated by this method. When plants are small, and growing in borders, &c., and probably among other plants, this may be done with convenience and success: in such case it is always proper to take away some of the mould to a few inches depth, and replace it with such as is comparatively fresh or more congenial to the growth of the plant; observing also the note on watering (§ 21).

PROPAGATION BY GRAFTS.

(23.) At the season of the year when the sap begins to flow up the alburnous vessels, any young tree or shrub about the size of a goose-quill may be grafted with a scion taken from another of the same natural order. The stock being headed down to any height above ground, is to be cut slantways upwards, and a piece shaved off the bark and alburnum: and the scion must be shaved in the same way at the bottom, to match the piece taken off the stock.

The necessity of splicing the two parts, so that the sap and blood-vessels may come into contact, will be evident, without further remark. (*a*, is the heel of the stock; and it is evident the scion cannot be completely tied up to the top, if this portion of the stock be not left.) It is only necessary to tie this union tight with bass-matting, and to cover the whole over with clay beaten up with horse-dung, or to brush it with melted rosin and tallow, and it will certainly grow.

(24.) Old trees may be also grafted by sawing off the top, and cutting out a notch in shape of a wedge, with the scion to correspond; and tie round as above, observing the same rule as to placing the sap-vessels in contact. This is a common method of changing the kinds of fruit, on trees of large size, in cider countries.

It must be observed, that scions of two or three years' growth may be placed on such trees with great effect. (See § 38.)

INARCHING.

(25.) It frequently happens, that when a person is in possession of a fine tree growing in a pot or otherwise, and may have another of inferior value, as the single and double Camellia Japonica, and would wish to graft at more certainty and make a larger tree in shorter time, it is then he will find advantage in this method; to perform which, place the two plants together, bring a branch of the double kind in contact with the single, pare away half the stem of each, placing the scion on to the best advantage, and tie and clay as above: the sap will flow through each; and as soon as a union is formed, gradually cut off the top of the single one,

by taking part off first; and let it be till a fine tree of the double is grown on the single, and then sever it off from the parent plant.

BUDDING.

(26.) If, at any period after the separation of the true sap, a bud be selected from a healthy branch and taken carefully off the alburnum, and a corresponding piece of bark be lifted up from the stock in any convenient place, and the bud slipped in and tied, a union will at once take place by the returning sap-vessels, and the bud will shoot and form a tree. This is performed in autumn, as late as August. After the formation of the true sap (see § 28.), the reason hereof is important to all cultivators, *i. e.* the union is so instantaneous, that it may be ascertained if the bud is alive the following day after insertion. No wounds being left open that may induce gangrene and secretions of gums (see § 15.), this becomes the best mode of propagating peaches, nectarines, and other tender varieties of stone-fruit. When the union is formed, the bud is left till the spring; at which time the head of the stock must be taken off. If the bud be properly attended to, as far as relates to its being trained in an upright direction, and care taken that all the shoots of the stock are prevented from growing, the bud of a peach placed into a plum-stock will grow six feet high the first season. The smaller growing roses are also budded with good effect on the high stems of the apple-bearing and other kinds of wild briers as are now usually trained up for this purpose.

PROPAGATION.

(27.) In order to illustrate the part of my subject treated on hitherto, I have to refer my readers to the simple natural phenomena that attend the first stages of vegetation. But I have now to go further on in my subject; and to shew, that branches taken from a tree fully and wholly may be, with care, made to grow; that single buds slipped off from the bark of a tree may also be so fostered as to become objects of the greatest importance in the supply of Nature's wants to man, *i. e.* the improved supply of animal food.

(28.) For this purpose, I must endeavour to shew, that after the first stage of vegetation (as is described above) is completed, a disposition is evinced in the plant to produce flowers. At this state, then, is to be observed that extraordinary circumstance in the growth of plants called Midsummer-shoot by the older gardeners, but which is noted by the skilful physiologist as the period when the TRUE SAP is formed.

(29.) To explain this, then, it must be noticed, that when a plant is in bloom it has three different kinds of fluid circulating within it—the common sap, the blood, and the true sap.

(30.) Perhaps this will be best illustrated by inspecting the growth of a lettuce: the same process of vegetation described above takes place till the lettuce is formed and fit for the table, at which time it is composed of the blood of the plant; but as the season advances, it grows up and forms a stem of greater height: and if it be examined, the blood that was sweet and nutritious will be found to be changed into a white substance, resembling milk in appearance; on tasting which, an acrid and otherwise disagreeable flavour will be discovered: in fact, the former wholesome and well-flavoured juice is become a most powerful and dangerous narcotic, known in medicine as morphine. Now, although every plant undergoes the same change in its constituted fluids, yet it may not in all be apparent. In fruit-trees, this period is marked by buds being formed that are replete with the embryo flower of the succeeding year. In the plants of hemp and flax the returning blood-vessels, that heretofore are extremely tender and brittle, put on that fibrous and strong texture which characterizes those plants for the purpose of yielding the substance of which linen and cordage are made.

While we contemplate these circumstances, we must observe that this substance, the true sap, is what is formed for substantiating those curious organs of the seed: hence that extraordinary substance, the cotyledones, before termed nutritious, has been dispersed through the plant; and at the termination of its growth we again find it in a similar state.

(31.) Buds, bulbs, or tubers, are all one and the same, each containing a portion of vital fluid, whereby the powers of vegetation are retained; and are not very dissimilar to the seeds: as in the buds &c. are laid up the elements of the future shoots of the plant. Those however differ; some produce wood, others bloom; and are to be distinguished by observation. These, when fully considered, will serve as useful and important guides to the practical gardener.

This circumstance leaves the amateur gardener much to reflect on. In annual and biennial plants, the vital fluid is wholly absorbed by the seeds; the substance of the plants becomes effete, decomposition takes place, and all is dispersed from our sight. In perennials, it is partly distributed in the seeds, and partly in the buds formed on the roots; and the same remarks hold good in fruit-trees. Perennial plants

forming extensive roots, with buds in proportion for the future keeping up of the species, in many cases do not ripen seeds. Nature has thus economized her store; and having laid up so abundantly in one way, has deprived the flowers of their otherwise usual supply. Early potatoes do not even go to bloom.—With this view of vegetable physiology, let us, in illustration, attend to the following experiment.

(32.) If the early frame-potatoe be, during its growth, deprived of its tubers by amputating them with scissars, the plant, not being able to deposit its true sap there, will go to flower and produce seeds. If a potatoe-plant, thus treated, be forced into bloom, and the bloom also taken off, potatoes will be produced on the stem.

The reader will do well to reflect on the foregoing facts; whereby he will trace out an interesting view of what has before not been practically explained in books on this subject.

The common sap we find to be conveyed by the alburnous vessels into the leaves, and to return by the blood-vessels. As the leaves are deciduous, one of these vessels terminates in the buds that uniformly exist at the base of the other. If we consult the remarks made at § 15, we find a deposit of the blood to end in the formation of spongioles: this is merely a change in the alburnous vessels: this change takes place with uniform certainty in well-prepared layers (see § 22). Now we shall perceive that nothing more is necessary to making every individual bud a perfect plant, than to prepare a piece of the wood of sufficient length to be placed in the earth so as to leave any one bud above; and when a due state of moisture is supplied, the alburnous vessels will imbibe sufficient to preserve life; and in process of time, spongioles will be formed, and roots consequently protruded. This is effected by placing the cuttings in sandy soil, either in pots or otherwise, covered closely with a bell-glass, whereby the moisture is preserved, and, consequently, the carbonic acid is prevented from escaping. Under this fostering care of the experienced gardener, cuttings are caused to grow: or a single bud taken from any tree in autumn, if inserted into a suitable stock, makes a tree on the same principle as the grafts.

(33.) Propagation by cuttings is best accomplished by taking a piece of the last year's wood, and having shortened it to the length of six or eight buds or about six or eight inches long, and made it smooth, cut close to a bud at the lower end; then plant it in a loose sandy soil; and if small and fine, as is the young wood of our heaths, use the protection

of the bell-glass above specified; as otherwise the cuttings would be dried up before the vital functions could operate.

(34.) Cuttings of hardy plants, as laurels and other evergreens and deciduous shrubs, will grow if planted after the midsummer-shoot has past and the young wood is become hard, if merely planted in any shady situation where the heat of the sun is prevented from scorching up the vital parts.

This is, then, the principle on which cuttings of plants are caused to grow. The difficulty of growing cuttings of slow-growing plants, and those producing hard wood, is only to be overcome by modes similar to what is here described: by the practice of layering and engrafting, however, the amateur or professional gardener has the direct means of propagating plants to any extent that may be desired.

PRICKING OUT.

(35.) This term signifies the planting out any kind of plants from the beds where they may have been raised from seeds or otherwise propagated, so as to have room to acquire strength and make better plants than when left too thickly together. This is performed with a dibble: it should be done in straight rows, for the ease of passing a hoe between them. Cabbage-plants and cauliflowers are thus set at about four inches distant. Seedling-trees in nurseries are also thus treated; and it is usual to have it so accomplished, that every other row may be removed, and leave greater room for those left to grow.

DABBING THE ROOTS.

In the pricking out or planting all small plants in dry weather, it will be prudent to mix up in a small hole mud made of the common earth, and dab the roots therein, sufficient to cover them; taking care that they be not bent or injured. This will save the plants from injury by drought, and ensure their striking roots much more readily.

PLANTING.

(36.) This portion of the gardener's practice embraces a great number of operations, according to the nature of the vegetables. Hence, in planting at the various seasons hereafter referred to, the following plain rule should be observed—that the roots of every plant should be placed in the ground in a free state, neither crowded together nor by any means bent. Little can be said further on this head. Fruit-trees should not be planted deeper than is necessary to cover the roots: in fact, shallow planting is always preferable to putting plants too deep into the ground.

From what has been said above, it will be seen, in transplanting trees, how necessary it is to preserve the fibres as entire as circumstances will admit; and when roots are broken, to observe that the part be cut very smooth. A sharp knife is indispensable to a working gardener.

OBSERVATIONS ON DRYING HERBS.

(37.) To those who are acquainted with vegetable physiology, it will appear, that all herbs should be cut just at the time of their full blooming state, always gathered at midday, and left to dry by being turned if necessary, then carefully tied up in small bunches and hung in the shade.

Herbs grown for distilling may either be dried previously or not; for if cut at a proper season, the essential oils will be equally good as if distilled green.

ARTIFICIAL CHANGES THAT MAY BE EFFECTED IN THE NATURE OF PLANTS.

(38.) If a branch of any plant or tree be taken for propagation at the period of growth after the true sap is formed, such plant will both flower and produce fruit comparatively early. This is thus instanced: If a scion be taken from a young vigorous growing tree, and grafted on a free stock, it will not yield fruit for many years; but if taken from a tree that is in a fruit-bearing state, such will produce fruit the second or third year after grafting.

In like manner, if apple-trees are so raised by layers, they will produce fruit in a similarly young state; or if the wild apple common in Sussex and Kent, called the Bitter-sweet, be grown from cuttings made from fruiting branches, and those grafted with scions taken as above, apples in full bearing may be grown in small pots. These are the modes in which those dwarf apple-trees are raised that are now brought from France.

(39.) The uninformed amateur should know, that in grafting one kind of fruit or flower on another, no other change is effected in the nature of the scion further than as is thus found in the luxuriance of growth. The quince-tree is much smaller than the pear, and consequently the small portion of blood that, in comparison, is elaborated in a pear-tree, if grafted thereon, causes it to be dwarf. The pear does not otherwise partake of the quince; nor would the colour of a flower be altered from similar changes, in the choice of the stock.

In like manner, cherry-trees are made dwarf by grafting on the common laurel. The change in the nature of plants that is thus effected, affords the amateur gardener great subjects for his practice. The small *Cytisus purpureus* makes a

curiously beautiful plant, when grafted high on the Laburnum; and the great variety of roses that are by similar means made standard-trees give also numerous instances of great delight, and hold out to view many other improvements for speculation.

(40.) If portions of many plants that are annuals in this climate are propagated by cuttings or layers at a period *after the true sap is formed,* the plants so raised will continue to grow, and form shrubs. Trees of the interesting Mignionette are thus formed at Bristol, and sold in the markets in pots. The finest flowering varieties of the *Chrysanthemum coronarium,* that are but seldom seen from plants grown from seeds, may thus be propagated. The lovely new annual *Schizanthus pinnatus,* I have seen, when grown this way, in pots, make plants six and eight feet high, forming singular ornaments, in the months of March and April. Lateral shoots are sometimes produced near the bottoms of the culms of our annual grasses, as well as on those of wheat and other kinds of grain. These, if planted as cuttings, will grow, and form perfect plants. Cucumber-plants raised from cuttings will become shrubby, and bear all winter, if judiciously trained in the dry part of a hothouse. In like manner, potatoes, and many other herbaceous plants, may be made to grow, by cuttings being taken from off the haulm.

EARLY RIPENING OF FRUIT BY DECORTICATION.

(41.) If, in the month of May, as soon as the young fruit is formed, a portion of the bark be removed, in the shape of a ring, completely round the branch (*c*), the blood of the plant is kept

from descending, and the true sap becomes the more effectually secreted during the early season: the consequence is, a more robust growth of the part of the branch above the place where the ring of bark is taken off, the ripening of the crop is hastened several weeks, and the fruit made finer and more abundant.

If the bark above (*a*) be watched, it will be found to descend in the course of one season; and if, on its approaching the part below (*b*), the cicatrice on each be removed, a union takes place, the circulation goes on as usual, and no difference will be observed in the branch thus operated on.

If the Philohorticulturist has paid attention to these first principles of physiology, he will find a happy rationale, whereby to illustrate many objects hitherto inexplicable. But I must now request him to observe a few of Nature's laws, which could not be traced till he has attended to the foregoing observations, and been enabled practically to apply them. Hence it is, that every plant, sooner or later, becomes imbued with this grand principle of life and reproduction, the TRUE SAP; that it is secreted from the blood of the plant; that over-luxuriance of vegetation is inimical to that secretion; that, although Nature is fully liberal in this as in other productions, there is never a superabundance; therefore it is the business of the gardener to husband this, with the most convenience according to circumstances.

He will see from these considerations, that to foster the growth of his crops by enriching the land, will have the effect of causing luxuriance of growth: over luxuriance must be checked; and he will see this cannot be accomplished by pruning; as the more luxuriant a tree is, if deprived of its branches, the more its growth is increased.

In pruning the peach, nectarine, apricots, &c., he knows that in every tree there is a greater quantity of fruiting-buds formed than can be supplied with proper sap, and therefore it is proper to shorten the last year's wood. Other reasons will also readily appear to his view; the points of the shoots will also contain a quantity of wood-buds, and from the tree being a native of a warmer climate it is not sufficiently defended to endure our frosts; added to which, the tendency of the upper parts of shoots to acquire a direct elongation. (See § 15.)

In cherries, plums, &c., where the wood is fully ripened, and fruiting-buds are formed the full length of the former year's wood, and when luxuriance is checked by the proper and healthy secretion of true sap, it is found to be quite in unison with Nature's laws to let the wood remain its whole length.

In pears, apples, and particularly currants and gooseberries, when the principal fruit-buds are formed on spurs that grew out of the former year's wood, and seldom any fruit-buds on

those of the young wood, it indicates to him the practice of shortening the young wood to a moderate rate, in order to increase the number of spurs; and on this principle are the grape-vines now deprived of their previous year's wood. Apples and pears may also be improved by this system.

We thus trace the true sap forming those great changes in the state of trees, while it is kept within certain bounds and regulated by the skilful hand of the practical gardener; and we are prepared to observe, for our future practice, a phænomenon in the course of vegetation that shews in a striking degree the wonder-working hand of Providence—this precious substance at once appropriated to the purpose of forming seeds. Adapted to this, we find the *epidermis* end in the *calyx* or flower-cup; the inner bark, *liber*, terminate in the *corolla*; the *lignum*, in the stamens; and the *medulla*, in the style of the flower.

The termination of the wood through which we have traced the common sap to flow (see § 15) is marked, in the bloom, to terminate in the stamens; from which exudes a fine powder, thrown into the open atmosphere, for the double purpose of giving food to numberless tribes of insects as well as to assist in the great work of the reproduction of the plant: the blooming of a plant, therefore, is the great end of this reservation of the true sap, which is absorbed in this process by the flower, and forms in the seed those peculiarly nectariferous organs, cotyledones, corculum, &c., &c., as described in § 9.

Our directions to the student have been confined to these objects as they apply to plants and seeds, according as they may be the offspring of any particular variety of plant. At this time, it is necessary that he be informed on the subject of improving gardens, by the production of new, or mixed description of, fruits: and here we must just pause, to consider, that the first fruits produced in this country—the common crab, the bullace, the sloe, the wild pear, and the black cherry—form the originals of those fine high-flavoured fruits with which our gardens abound; and that it is now in the gardener's power so to manage his fruits, his flowers, and his garden vegetables, as to produce new varieties at pleasure, and with the same certainty as those persons who have game-fowls or canary-birds produce a brood marked either with peculiar constitution or colour. Thus when, under peculiar circumstances, a tree producing sweet apples has been growing near to one producing sour fruit, and the branches of both intermix at the time of their blooming, the seeds from the

fruit of either may produce an apple partaking of the peculiar varieties, and they probably will become agreeable, between sour and sweet.

Such is the effect, if the bloom of any differently-coloured flower or flavoured fruit-tree be brought into contact; when, if the pollen or fertilizing dust of one be destroyed, and the seeds becoming fertilized by the other, a hybrid kind will be produced. Those fathers of horticulture, Evelyn, Bradley, and even Miller, would have been much surprised to read such a passage as this, written for the purpose of elucidating a Tract on Kitchen Gardens. This is, however, the way in which not only new varieties of fruits are produced, but of flowers; and by which an old lady (the late Mrs. Davy) has produced geraniums and other flowers, that, from their extreme beauty, now bear the names of the principal potentates of the world: and those who wish to know the various productions with which our gardens are graced, owing, in great measure, to this mode of assisting Nature's elaboratory, will be compensated by reading the Transactions of the Horticultural Society.

GATHERING PLANTS FOR MEDICINAL PURPOSES.

(42.) In the Journal of the Royal Institution, by Mr. Brand, are some observations relative to the gathering plants for medicinal purposes; and he illustrates the important difference in the powers of the extract of *Hyoscyamus* or Henbane, as it appears when made from young or old plants. The fact is, that, like the morphine in the lettuce (see § 30), the juice of the Hyoscyamus is not perfect till the true sap is formed; which does not take place till the second year, as the plant is biennial. Had the writer been a physiologist, he might have added "*a reason* why," to the fact "*that it is so.*"

PROVING THE FERTILITY OF SEEDS.

(43.) It being often necessary that the fertility of seeds should be ascertained, the most eligible mode is to count 100 seeds, and place them within the fold of a piece of flannel, to be kept moist in a warm place; and, in a few days, those that are good will vegetate, by which their value will be ascertained.

(44.) The nurturing affinity of plants is also worthy of notice. A single plant of any species of Heath will not, when kept in a pot, with every attention to soil, water, air, &c., if placed with other plants, grow equally well as it will in company of others of the same natural affinity. The cultivators of flax

are well aware of the injury these crops receive from the plant called the Gold of Pleasure; and Linnæus quotes the *habitat* for it *(i.e. Myagrum sativum)* in crops of flax. Cockle will seldom grow naturally (and never fine, although a beautiful flower) without being mixed in corn-fields.

POTTING PLANTS.

(45.) Independently of growing flowering plants and tender exotics in pots, the gardener will find great convenience in thus keeping many plants used for ordinary purposes; and the nurserymen also, in wintering many of his productions while in a young state. Plants placed thus in an artificial place of growth require one or two especial modes of treatment.

1. In effecting this, care should be taken that the hole in the pot be covered with some hollow or convex shell or piece of pottery, so that the moisture may drain away; and if, on the approach of winter, some loose gravel-stones, powdered crockery, or other light material be placed there, this will be effected.

2. Whenever, from any cause, the water does not freely pass off, the plant should be immediately turned out, and this great obstacle to proper cultivation remedied.

3. Plants in this state will be kept with less inconvenience if they are during the summer months plunged up to the rims of the pots in the mould for which shady places are usually set apart.

4. Repotting plants.—To the experienced cultivator, this practice affords the means of accelerating the bulk of plants to much greater extent than by any other mode of culture. Plants of every description grow much faster by being shifted from a small-sized pot to one a little larger: heed should therefore be taken, that one inch difference in the diameter of the second pot is fully sufficient for plants to be changed into. And it may be observed, that till the roots strike afresh after this operation, and till they begin to turn round the outside of the pot, they do not make much progress in growth. In this operation, the crockery for draining should be removed from the bottom, and a fresh supply placed in the first pot to be used.

The regular growth of plants could not be promoted by any means so quickly as by constantly putting them into various sizes, as follows—beginning with the smallest, and changing as may be necessary. As the size of pots is a subject of some importance, and not so perfectly understood as might be by a plain explanation, the following rule is applicable to those made use of by London gardeners.

A certain portion of clay is formed into eight garden-pots, whose diameter at the top is about twelve inches, and the depth about one-third more, *i.e.* fifteen inches: the same quantity of clay will make twelve pots of less size in proportion, *i.e.* about nine inches in diameter.

Sixteens, seven inches. Forty-eights, four inches.
Twenty-fours, six inches. Sixties, three inches;
Thirty-twos, five inches.

and a size smaller, called Thumb-pots. These sizes are termed Casts, and usually sold at the same price; that is to say, sixty of the smallest size are charged at the same price as the eight.

It is found to be convenient to call the pots that are recommended for use simply by the numbers.

(46.) A mixture of pollen produces hybrid plants; and forms a necessity, in many cases, of saving plants for seed under peculiar circumstances.

COTTAGE GARDENING.

(47.) From the number of improvements introduced of late years into this country, a great portion of work once performed by labouring people is not required. It has properly become a subject of research, What can be done for the supply of profitable occupation for those persons? and it has been proved, that granting allotments of land will be most advantageous. It is therefore a consideration, to discover what may be made the objects of cultivation, best adapted to such purposes.

If we look into the Price-current Lists, we find many articles imported into this country from abroad, that, if grown here, could be afforded at a cheaper rate and in better quality; at the same time, the poor would become greatly benefited by the introduction of such a system.

Such persons also may benefit by being directed to the vegetables and fruits that will be most valuable; for which purpose we shall refer to these remarks in the progress of this work: independently thereof, we must beg leave to observe, that if this system of husbandry was perfectly understood by the English Cottagers, all persons capable of exercising their physical powers may be profitably employed every hour of their lives. To shew this fact in its true light, let it be generally understood, that many of our most useful drugs are found, when grown and prepared for market in this country, better in quality, and consequently sell for more in the British market, than those that are imported. The limits of this work will enable us to enumerate only a few examples.

The average price of oil of peppermint, as prepared from the herb at Mitcham, nets about forty-seven shillings per pound, while that which is imported sells for eighteen shillings.

The essential oil of lavender, prepared from the herb grown here, bears a price equally high in proportion.

Opium grown by Messrs. Cowley and Staines, at Maidenhead, has always sold much higher than any imported. At the celebrated Insane Institution at Brislington, near Bristol, the ingenious proprietor, Dr. Fox, shewed the Editor this drug in process of growth and preparation, which he raised on his own land, because he could get none so good.

The Surveyor-general of His Majesty's Customs supplied, some time since, a list of the different articles imported into England, which partook more or less of similar advantages; the amount of which considerably exceeded, in that year, the parochial fund raised for keeping the unemployed, industrious population in idleness and misery.

Why should not such a system of cultivation be generally promoted in England? The articles thus imported are grown by persons in similar situations in other countries. (See PALLAS's *History of the Rural Economy of the Russian Empire*, and other similar works.) Let the philanthrophic reformer look into the *Transactions of the Society for Encouraging Arts, Manufactures, and Commerce*, and reflect how anxiously our forefathers were to raise all the necessaries of life on our own soil. With this information, land should be granted to the industrious man, and his rising family furnished with instruction—not to read political poison, but in practising domestic industry; the only channel through which that distressed class of society may be expected to become happy, and to bear due respect to their opulent neighbours, and obedience to the wholesome laws of this fertile land.

ROTATION OF CROPS.

(48.) Nothing tends more to relieve the soil than a rotation of crops; for plants of different constitutions not only strike to different depths, and in different directions with their roots, but the terminal fibres or feeders of the roots appear to take up separate and peculiar constituents of the soil.

To apply this practically:—We will suppose a strawberry plantation requires to be renewed, as the plants seldom continue fully productive more than three or four years: instead of introducing young strawberry-plants into the same bed, entirely eradicate the old bed, and let it be succeeded by a crop of beans, or of some other esculent as different as may be

in constitution and habit. In the same manner, let a new plantation of strawberries follow some light crop which left the ground in a good state, or which allowed it to be trenched and fallowed for an interval, whether it were an annual or biennial. It is a rule, from which only extraordinary circumstances can warrant a departure, never to plant a new perennial crop on the ground whence a plantation of the same or a similar species, having worn itself out, has just before been removed. On the contrary, crops which strike deep, and occupy the ground long, should be succeeded by plants which pierce but a little way under the surface, and soon come off: but numerous ways of diversifying the rotation of crops will suggest themselves to an intelligent mind.

KITCHEN GARDEN.

ALISANDER, or *Alexander. Smyrnium Olusatrum.* (*One sort.*)

A hardy imperfect perennial, with stalky trifoliate leaves. It is used, when blanched, for salads and soups. This vegetable is not now in much request. A native of Britain; flowering in May and June. Those who may wish to know more of this, may consult the article Celery, which has been wholly substituted for this plant.

Entire course of culture.—When the plants are well advanced in growth, earth them up several inches on each side the rows, to blanch the lower parts white, for use in summer, autumn, &c.

AMERICAN CRESS. *Erysimum Barbaria.* (*One species.*)

A hardy annual. The leaves have some resemblance in flavour to the *Sisymbrium Nasturtium*, Water-cress, but are rather bitter. It is generally used as a winter and early spring salad; and in some places is in demand throughout the summer. A native of England; flowering in June and July. It is raised from seed. For winter and spring use, make a sowing in the last fortnight of August, or beginning of Sept.: if wanted, sow every six weeks, from March to Aug.; giving a sunny or shaded situation, according to the advancement of the season. Water occasionally, in dry hot weather.

To save seed.—Let a few choice plants, raised in spring, run; and they will ripen seed before the decline of summer.

ANGELICA. (*Only one economical species.*)

A hardy perennial; running up in a tall stalky growth. Being of an agreeable aromatic property, the green stalks are occasionally used for candying, and the leaves and seeds in medical preparations.

Course of culture.—The plants are raised from seed. Sow in August or spring. (See § 18, 19, 20, 21.) When they are advanced from four to six inches high, transplant them into rows two feet apart: they will soon strike root, and advance quickly in strong growth; producing, in the second year, large umbels of seed, which, as well as the leaves of the plant, are used in medicine, and are made into the sweetmeat called Angelica.

In the second year, if seed be not wanted, cut the plants down in May, and the stool will send out side-shoots. By repeating this practice every year, the same plant may be long continued. Cuttings will also grow.

Saving seed.—Save a little seed occasionally, for sowing every year or two; for the plants are but imperfect perennials.

ARTICHOKE. *Cynara Scolymus.* (*Two varieties.*)

A hardy perennial, of large growth. The plant has an upright stem, crowned by a large head, globular or oval according to the variety, composed of many diverging scales; the base of which scales and the bottom of the head, being of a fleshy eatable substance, are much esteemed for their agreeable flavour and wholesome quality. The bottoms, cleared from the scales, are also used for pickling. A native of the South of Europe: flowers in August and Sept. The varieties are:

Globe or *Largest*; with reddish head.
Conical or *Oval* (*French*); with green head.

Estimate of sorts.—The *Globe Artichoke* is preferable to plant for the main crop. Both sorts are raised by the same culture; produce heads for use from June till Nov.; and continue several years productive.

Propagation.—This esculent is propagated by suckers or young shoots rising in the spring from the roots of the old plants: these are fit to slip off for planting in March and April, when from five to ten inches high. Opening the ground to the old stool, slip them off clean to the root, leaving the three strongest on each mother plant, to advance for summer production. Prepare these slips for planting, by pulling away some of the under and decayed or broken leaves, and by

pruning any straggling long tops of the leaves remaining; also cut off casually hard or ragged parts at the bottom of the root. Then, having an open compartment, with a light rich soil of good depth, well dunged and digged, plant the sets by dibble, in rows four feet asunder, and two feet apart in each row. Give each plant some water, till they have taken root; and repeat this in the dry weather of summer.

They will produce some tolerable heads the same year, in Aug. and thence till Nov.: next year they will head sooner, in full perfection. By having fresh stools planted every year or two, the old and new plantations together furnish a production of heads from June or July till Nov.

When the entire crop on a stem is taken, cut off the stem close to the ground, to give the plant more strength for new shoots.

Winter-dressing.—In Nov. or early in Dec., the plants having terminated their year's production, give the winter-dressing. First, cut down all the large leaves: dig a trench out between the runs, and throw the mould, from both sides, ridgeways over the rows, and close about the plants, to defend the whole more effectually from frost. Further, in rigorous frosty weather, it is adviseable to cover also with dry long mulchy stable-litter, spread along the rows a foot thick, and close about each plant: which defence is not to be delayed, but is more particularly requisite if severe weather prevail before landing-up the rows.

Spring dressing.—At the close of March or beginning of April, when the plants have advanced, in young spring shoots, several inches above the surface, dig the whole ground level along the rows, and between and around every plant, loosening it clear to the crown of the roots; and throw dung into the bottom of the trenches at all times where found necessary. Where several shoots arise from the same stool, slip off the weakest at their origin, for which purpose the ground must be opened carefully; leaving three of the strongest outward suckers on each stock, to advance to full growth. Lastly, return the mould close about the shoots and plants, and over the crown of the roots, to the depth of about three inches; and press it smooth.

ARTICHOKE (JERUSALEM).—See *Jerusalem Artichoke.*

ASPARAGUS. *Asparagus officinalis. (Five varieties.)*

A perennial-rooted hardy plant, esteemed for its annual shoots, or rather for the buds on these, one of the greatest delicacies of the table afforded by the Kitchen Garden. The annual supply of shoots arise chiefly in May and June.

A native of Britain. Flowers in June and July.

Estimate of sorts.—All the varieties are equally good for the table, and succeed by the same mode of culture. Sometimes, however, branches from these varieties bear the names of places where they have attained a superior size or flavour, owing principally to the soil and situation; viz.

Battersea. *Large Reading.* *Large Cork.*
Deptford. *Large Gravesend.*

Propagation.—All the varieties are propagated from seed.

Sowing to transplant.—Sow in March, or beginning of April. (See § 16—19.) The plants come up in three or four weeks. Next spring, being one year old, transplant them where they are to remain: be exact in not letting them stand over the second spring before they are finally transplanted into the proper beds. Or, to save one or two years' time in raising a supply for planting, you may obtain ready-raised plants at the nurseries. In dry weather, let the seed-bed be frequently refreshed with water. And if sown as late as April, shade on hot days with a little light haulm, till the plants germinate. (See § 21).

Final Beds.—For planting asparagus, allot a compartment in an open quarter, full to the sun. Having trenched it thirty inches deep, or as near that depth as the soil will allow, manure the bed with well-reduced dung, six inches thick, or more; digging in the dung regularly one spade deep. Then lay out the ground in regular beds four feet and a half wide, with intervening alleys three feet wide. If the soil is naturally too light and poor, improve it with a little vegetable mould or pulverized alluvial compost, after the bottom has been dunged. There is no crop that will better repay the expense and trouble of making land for it than this. If it be too stiff and retentive of moisture, it should be trenched three feet deep, and fagots or other materials laid in the bottom of each trench, to let off the water; as nothing is more fatal to asparagus than too much moisture in the winter season.

Season of removal.—The proper season for planting is March and the beginning of April. (See § 36.) Expose them to the air as short a time as possible; and at the time of planting, place them among a little sand, in a basket covered with a mat. (§ 35.)

Method of planting.—Stretch a line lengthwise the bed, nine inches from the edge; and, with a spade, cut out a small trench, about six inches deep, perpendicular next to the line, turning the earth displaced along by the other side the trench; and, having the plants ready, set a row along the trench, nine inches apart, with the crown of the roots two inches below the

surface; drawing some earth just to fix them as placed. Having planted one row, directly cover them in fully with the earth of the trench, raking it back regularly an equal depth over the crown of the plants. Proceed then to open another trench, a foot from the first: plant it as above: and in the same manner plant four rows in each bed. Then lightly raking the beds lengthwise, draw off any stones and hard clods, and dress the surface neat and even. Then let the edges be lined out in exact order, allowing three feet for each alley. But sometimes, in planting large quarters of asparagus, a first trench having been made, and the roots planted as above, then a second trench is opened, of which the earth is turned into the first, over the plants. So proceed in planting the whole; making allowance between every four rows for an alley of three feet. In a dry spring or summer, water the roots from time to time, till the plants are established. During the first two years the land may be cultivated where the beds are formed, giving proper room for the asparagus to grow. Onions, spinage, and other crops, can thus be raised to advantage.

Progressive culture.—The asparagus will come up slender the first year; and larger the second: permit the entire crop in both years to run up to stalks all summer, keeping them very clean from weeds. In the third year, they will probably begin to produce some shoots large enough for gathering; but they generally bear in good perfection the fourth year, to admit a general cutting of the shoots, as they rise. The proper season of cutting extends from the end of April, or beginning of May, to the 21st of June; and must not be protracted later than this, that the roots may not be too much exhausted for future production.

Autumn dressing.—Towards the end of Oct. or beginning of Nov. the stalks which have run up to seed, having done growing or begun to decay, cut them down close, and carry them away; then hoe off all weeds from the beds into the alleys: this done, proceed with the line and spade to mark out the alleys the prescribed width; then dig each alley, lengthwise, a moderate spade deep; and spread a good portion of the earth equally on each side over the adjoining beds; digging down the weeds, as you advance, clean to the bottom of the alleys, under a proper depth of earth. Form the edges of the beds full and straight, and the alleys of an equal depth; and thus let them remain till spring. Remember, manure is the "life and soul" of horticulture; it is therefore usual during the winter to wheel into the trenches dung of any kind

that is to spare; and moreover, in the autumn, to lay over the beds some well-rotted dung, and throw out the mould from the trenches over it: and, in fact, the trenches between the asparagus beds and those of the rows of artichokes form a slut's hole, where the gardener usually casts every offal that will make manure, when decomposed.

Spring dressing.—About the end of March, or towards the middle of April, before the buds begin to advance below, proceed, with a short three-tined fork, to loosen the surface of the beds: introducing the fork, slanting, two or three inches under the mould, turn up the top earth near the crown of the roots, with care not to wound them. Then rake the surface, lengthwise the bed, neatly level, drawing off the rough earth and hard clods into the alleys: also trim the edges of the beds and surface of the alleys regularly even. Thus to loosen the bed, enables the shoots to rise in free growth, admits the air, rains, and sunshine, into the ground, and encourages the roots to produce buds of a handsome full size.

Mode of cutting.—As the rising shoots project two, three, four, or five inches at most above ground, while the top-bud remains close and plump, they are in the best condition for gathering. Cut them off within the ground, with a narrow sharp-pointed knife, or small saw nine inches long.

To save seed.—Plenty of seed, in small red berries, ripening in Oct. Gather a competent portion of the berries; lay them on a heap, or in some vessel, wash out the seed, and place it to dry, ready for sowing as above.

EARLY ASPARAGUS, BY HOT-BEDS.

Early asparagus is obtained by forcing full-grown roots, at three years old: they are planted in hot-bed for immediate production the same season. Begin six weeks before you propose to have a crop, if in mid-winter: when the days are longer, five weeks, or but a calendar month, before.

Preparation of plants.—The plants for forcing are raised from seed, and planted out, when a year old, into beds in the open garden, as before directed, but need not be planted at more than six to nine inches distance. When of two or three years' standing in the beds to which they have been transplanted, they will generally be of eligible growth and strength to force in hot-beds under frames or in flued pits. In forcing, observe that the plants should be placed as close in the hot-beds as they can be possibly crowded, so as to stand with the crowns upright and level; in order that, from the abundance

of roots, a considerable produce may be obtained, to compensate for the trouble and expense incurred in forcing. Provide from five to nine hundred roots for a hot-bed under a three-light garden frame.

Forcing.—Hot-beds for this purpose are made from Nov. till the beginning of April, or monthly during that period, to have a continued succession. Half-rotted bark is better than horse-dung or fresh bark for asparagus, on account of its milder equable heat. Where there is a scarcity of horse-dung, half the bed may be made of tree-leaves. See the Œconomical Pit at § 18, which is peculiarly adapted to this purpose. As it may not be convenient to have this, the Editor has continued to give the following rules:

Having provided a competent portion of fresh stable dung, abounding in a good lively heat, make the hot-bed in a defended dry situation, full to the sun, ranging it lengthwise east and west; build it about a yard high, and five or six inches wider than the frame. Then, without putting on the frame at present, directly earth the bed at top, six or eight inches thick, with rich light mould, ready to receive the plants, in order to take advantage of the heat from the beginning. Next, having the prepared roots, mark out on the surface of the mould the width of the frame, which still continue off the bed: then, beginning at one end, raise a small ridge of earth crosswise, and proceed to planting; placing the first course of roots nearly upright, close against the said ridge, and with the crowns in contact, either upon the surface of the level earth, or with only the lower ends of the roots a little inserted: place more against these in the same manner, as close together as possible, and extending to the width of the frame: add successive ranges, as close as they can be set, with the crowns all of an equal height. When the bed is completely filled in width and length, bank up some moist earth upon the outward top ledge of the dung; lay it close against the outside roots all round, raising it an inch or two higher than the crowns; and then earth the crowns over regularly, about two inches thick, in a level order. This completes the business at present, till the roots commence growth, and the buds are advancing; then more earth is to be added to the surface, as hereafter directed, and the frames placed on the bed.

But observe, in the interim, that the bed in its early state, if of some considerable substance, will probably acquire a strong fierce heat; in which case it may be adviseable to con-

tinue it still unframed, till the violent heat is moderated, and the danger past either of scorching or steam-scalding the roots, to which they would be very liable in a strong extensive bed, were the glasses put on while the vigorous heat remains. As a guide to judge when the strength of the bed becomes sufficiently moderated to allow of finally setting on the frame, provide two or three long sharp-pointed sticks, thrust down between the plants, in different parts, to draw up daily, to feel what is the temperature below. If, while the bed remains without the frame, heavy rains or much snow fall, either defend the top with long straw-litter and large garden-mats, or set on the frame and glasses as a temporary protection.

As asparagus is a native plant, and sends up shoots early in the summer, before the natural heat of the season is great, and as there is no fruit to ripen, the standard artificial climate for forcing it is some degrees under that necessary for tender exotics. The temperature at night should be never under 50°. In the day-time, keep the maximum heat down to 62°. The roots, from the excitement of the bed, will soon strike down into the mould, while the buds will begin to push above, through the surface of the first earthing; when prepare to apply three or four inches' depth of additional earth over the crowns of the plants, and then permanently to place the frames on the bed. Or, previous to this earthing and framing, make a large twisted straw-band wreath, three or four inches thick; and, with some sharp-pointed sticks a foot long, fix this round upon the top-edge of the first earthing; then, within this wreath, apply the additional earth as above, making it altogether five or six inches deep over the crowns of the plants. As soon as the heat of the bed is moderate, set on the frames, resting the bottom upon the above straw-band wreathing: and put on the glasses; giving a little vent occasionally, for the rank steam to evaporate.

Cover the glasses at night, and in very severe weather.

When the buds come up, admit fresh air every calm mild day, more freely in sunshine, by raising the upper ends of the lights, or sometimes by drawing the glasses down, one, two, or three inches. In the spring-forcing, as mild warm weather prevails, give more air in proportion; or, occasionally in the warmer part of a fine sunny day, take the glasses entirely off for a few hours, but put them on close early in the afternoon. Give, at times, a gentle watering in the forenoon of a sunny day.

If the bed, in a fortnight or three weeks, begin to decline

considerably in heat, revive it by a lining of hot dung close to the sides, eighteen inches wide; raising it gradually as high as the dung of the bed. Lay some dry litter at top, even with the bottom of the frame, to defend the outward roots more effectually.

In a month or five weeks after planting the bed, it will begin to produce shoots for gathering in considerable abundance, according to the number of the roots deposited. When the shoots are advanced above the earth from two to five inches, they are of proper growth for gathering. As they generally come up very thick all over the bed, while numerous younger buds are advancing below the surface, it is adviseable to perform the gathering by breaking the shoots off to the bottom, not cutting them with a knife, for fear of wounding many of the rising buds below: thrusting the finger and thumb straight down into the earth close to the shoot, give it a gentle twist, and it will readily break off close to the root, without injuring the subterranean buds. The successive shoots will furnish a gathering, every two or three days, for a fortnight, in perfection, and about a week longer in an inferior degree as to quantity and size: the roots then mostly discontinue bearing, except some small stragglers; and the plants become useless for future culture.

As the same hot-bed will continue only about three weeks in good production, if a constant supply be required in succession, a new hot-bed should be made every three weeks, or month at farthest, and planted with a fresh set of roots.

As improvements can only be estimated by comparison, the Editor begs leave to refer to the Economic Hot-bed (§ 18); where it will be seen that the great labour of forming a hot-bed may be obviated, by clearing from out of the frame the remains of any previous crop, and putting in place thereof a few barrows of proper earth; and the plants set therein will be at once effectual, with the small attention of boiling the pot for half an hour occasionally. The same boiling, with additional tubes, serves for a number of beds.

WINTER ASPARAGUS. *Stachys palustris. (One species.)*

This is a hardy perennial, indigenous to this country, thriving most in low marshy soils; producing long white roots, which, cooked as asparagus, are considered a great vegetable dainty. This valuable addition to our tables was made known to the *Society for the Encouragement of Arts &c.* by Mr. Hutton of Islington; for which he has been honoured with a medal by that Society.

It is also capable of much improvement, by cultivation: plant the roots, when broken into lengths of two inches, either in drills (see § 16), or with a dibble (see § 36). The crop is in season from the end of November to March.

The plantation may be made any time between autumn and spring. For the convenience of those who may desire to cultivate this root, the Editor has collected a quantity; which may be obtained at Mr. Gibbs's, Nursery and Seedsman, Half-moon street, Piccadilly.

BALM. *Melissa officinalis.* (*One officinal sort.*)

A hardy perennial herb, of the aromatic kind. The young tops and general leaves are the serviceable parts, used chiefly for balm-tea, both green, and when dried. Native of the south of Europe. Flowers from June till October.

Course of culture.—The plants propagate abundantly by parting the main roots into separate slips, in March or April, when of three inches' growth, taken off close to the bottom, with some root to each; which sets plant by dibble, in any bed of common earth, from eight inches to a foot apart.

To have young green Balm all summer, cut down some advanced stalks every month (see § 37). For drying, cut the stalks close to the bottom.

Cut down all remaining stalks in autumn: and in spring loosen the earth a little between the plants; and spread a little loose earth thinly over the beds.

After three, four, or five years' standing, make a fresh plantation.

BASIL. (*Two officinal species.*)

Both the culinary species of Basil are tender annual summer plants, high-flavoured aromatics, used occasionally as pot and salad herbs: the leaves and young leafy tops are the useful parts. Both the *Ocymum minimum*, Bush Basil, and *Ocymum Basilicum*, Common Basil, are natives of the East Indies. Flower from July to Sept. They are usually known as the

Bush, or *Least.* | *Sweet*, or *Larger.*

These are low bushy plants, from six to twelve or fifteen inches high, garnished with small oval leaves.

Course of culture.—Sow in March on a hot-bed, for transplanting into the open garden in May. Some plants of each may remain where raised, to gather young; and the rest be transplanted in May and June into beds of rich light earth, a foot apart. They will afford gatherings all summer. After

the young leafy tops have been cut, the plants will shoot again in successional supply.

Saving seed.—As the plants are but of one summer's duration, endeavour to save some seed, which, in favourable warm dry autumns, will ripen in August and September.

BEAN. Garden Bean. *Vicia Faba. (Several varieties.)*

A hardy annual, comprising several useful varieties, raised every year from seed; yielding profitable crops in June, July, August, and Sept. A native of Egypt. Flowers in June and July. The following are some of the best varieties:

Early Small Mazagan.	*Largest Taylor's Windsor.*
Early Long-pod.	*Sandwich*, largish.
Early Small Lisbon.	*Toker*, middling large.
Large Long-pod.	*White blossomed*, smallish middling.
Larger Sword Long-pod.	*Green Nonpareil*, smallish.
Broad Spanish.	*Mumford*, smallish middling.
Windsor Broad.	*Dwarf Cluster*, or *Fan*, smallest.
Large Kentish Windsor.	*Green Genoa.*

Times of sowing, with *particulars dependent on the season.*—For the earliest crop, plant some Mazagans in Oct. Nov. or Dec. in a warm border, under an exposure to the full sun.

The most successful plan for nurturing a crop over the winter, is, to sow the beans *thickly together* in a bed of light earth, under a warm aspect; for the intermediate object of protecting the infant plants the better from rigorous weather, and with the view of transplanting them at the approach of spring, or when the size of the plants (two or three inches in height) require it, into warm borders, at the distances at which the plants are to fruit. For this object, the width of a garden frame is a convenient width for the bed, which should slope a little to the south. Sow two inches deep, either in drills, or by drawing off that depth of the earth with a hoe or spade, scattering in the beans at the distance of about a square inch. At the approach of frost, protect the rising plants with a frame, hand-glasses, or the half-shelter of an awning of matting. In Feb. or March, as soon as mild weather offers, transplant them into a warm south border, placing one row close under a protecting fence, as far as that advantage can be given. Ease them out of the seed-bed with their full roots, and with as much mould as will adhere. Then plant them at the proper final distances, closing the earth rather high about the stems. Besides the benefit of previous protection, the fruiting of the

beans is accelerated about a week by transplanting. Further, if sevère frosts kill the early-advanced plants, or if it was omitted to sow an early crop at the general season, a quantity may be sown thick in a moderate hot-bed, in Jan. or Feb. or in large pots placed therein, or in a stove, to raise some plants quickly, for transplanting as above; previously hardening them by degrees to the full air. In all cases, as the young plants come up, give occasional protection in the severity of winter; and earth up the crop with any haulm or straw till they become inured to the change of climate. Plants which can have no other shelter should be covered lightly.

To succeed the above, plant more of the same sort, or some of the Early Long-pod or Small Lisbon, in Dec. or Jan. when mild weather, for larger supplies, in more open exposures.

And in order to obtain either a more full succession, or a first general crop, plant some Early and Large Long-Pods, and Broad Spanish, at the end of Jan. if open weather, in some warmest quarter of good mellow ground. Some of the larger Sword Long-pod, Sandwich, and Toker beans, may also be planted in fuller crops in Feb. if the weather permit, both for succession and principal supplies. You may likewise plant any of the preceding kinds, as well as Windsors and other sorts, in full and succession crops, in Feb. March, and April.

For the main summer crops, adopt principally the Windsor, Sandwich, and Toker, Large Long-pod, and Broad Spanish; all to be assigned under a free exposure, to the main quarters. The Windsor ranks first in regard to flavour; but proves, on common soils, not so plentiful a bearer as the other late sorts. Plant also full succession crops in March and April, and smaller portions in May and June, for late production, especially of the Long-pod, Broad Spanish, and Toker; also any of the Early sorts, which are more successful in late planting than the Larger Broad varieties.

The White-blossomed Bean, though the smallest of the middle-sized, is a very desirable sort to plant as secondary crops, both in the general and late planting seasons, from March till June and July; being a great bearer, and a tender and sweet-eating bean, if gathered young.

Any of the other sorts named in the above list may also be planted occasionally, to increase the variety.

For sowing in June and July, the small or early kinds again become the most proper, as their constitution fits them for standing late as well as early. Thus regular supplies may be provided for in succession from June till Sept.

Method of sowing.—Drill or dibble in rows four inches apart, and from two to three feet distance row from row.

For late sowings, observe the practice of steeping (§ 16).

Subsequent culture.—As the plants come up, and advance from two to four or six inches high, repeat the hoeing, as future weeds arise, both to keep the ground about the plants clean, and to loosen the earth to encourage their growth.

As the different crops come into full blossom, pinch or cut off the tops, in order to promote their fruiting sooner.

To save seed.—Leave some rows of the different crops ungathered. The pods will ripen in August. Pull up the stalks, place them in the sun to harden the seed thoroughly, and thresh out each sort separately.

BEET. *(Several species, with their varieties.)*

The genus *Beta* comprises several biennial species, which with their varieties are useful culinary plants; some esteemed for the root, and others for the leaves. The Red sort is in season from autumn till spring. The others, most part of the year. The *Beta vulgaris*, comprising Red and Green Beet, is a native of the south of Europe; *Beta Cicla*, White Beet, is indigenous to Portugal; [*Beta maritima*, Sea Beet, is a native of Britain.] Other varieties come to us from Switzerland and Germany. All the above flower generally in August. The following are the sorts commonly cultivated:

Red Beet, for its root; of which there are,

Common Long-rooted; suits light deep rich soils.

Short or *Turnip-rooted*; proper where the soil is shallow.

In both sorts, the root is large, of a deep red colour, as also are the leaves; but the root alone is the edible part, used for pickling, also to boil for slicing cold in salads, or to eat alone, seasoned with vinegar and spice. There is also a *Yellow* variety.

Common Green: for its leaves, used as a pot-herb, and sometimes boiled, and served to table alone.

White: for its leaves, as the Green; also for leaf-stalks, to dress like Asparagus.

Great White, or *Swiss Chard*; as the last.

Mangel Wurzel, or *Great-rooted German Beet*. As the two preceding.

CULTURE OF RED BEET.

Sowing.—Sow in the last fortnight of March, or beginning of April, in a free situation, and light mellow ground. For the

long-rooted kind, trench to the depth of eighteen inches. Thin out a foot asunder.

Subsequent culture.—When the young plants are advanced into leaves, one, two, or three inches in growth, they must be thinned to twelve inches' distance. Young plants of Beet may be transplanted if requisite, in the failure of any portion of the crop.

They will acquire a large full growth in the root by Sept. or Oct. to take up for use as wanted, and in continuance all winter and spring following: or in Nov. it may be proper to dig up a quantity, cut off the leaves, and deposit the roots in dry sand, under cover, ready for use in winter, in case of hard frosty weather; or the rest may be digged up at the same time, and trenched-in close together in some dry compartment, to be covered occasionally in severe frost.

CULTURE OF GREEN AND WHITE BEETS.

All the three kinds are raised from seed every year in spring, and occasionally at the end of summer. Perform the early sowing in March or April, to produce leaves for use in summer and autumn: make the late sowing in July and Aug. for plants in winter and next spring. They will grow well in any common situation.

The White and Yellow kind are sometimes blanched. The foot-stalks, and thick ribs of the leaves, are peeled for stewing, and eaten as asparagus: in this state they are called Chards.

CULTURE OF MANGEL-WURZEL.

The Mangel-Wurzel, or Great-rooted German Beet, is a mongrel variety of the Red and Green sort, growing with a large long root, and large oblong leaves. It is easily raised from seed in the spring, as the others. Sow in drills two foot asunder, and thin the plants to one foot distance: they will advance in large long leaves, for use in summer, autumn, and winter. These being cut off close, new leaves will shoot up again in succession, yielding an abundant supply. This will be found a most valuable crop.

This root is principally cultivated for feeding cattle, and is the most useful and nutritious food for the dairies in the vicinity of the metropolis. Being produced much larger on the alluvium of the London clay than on any other soil in this country, it hence becomes a valuable plant for the metropolitan cow-keepers; and is worth attention to the promoters of cottagers' gardens.

BORAGE. *Borago officinalis. (One officinal sort.)*

A hardy annual, cultivated for its young leaves and tender tops, to put into negus and cool-tankards. The plant grows with oblong roughish leaves spreading on the ground, and shoots up into stalks of branchy growth two feet high. A native plant: flowers from June to September.

Course of culture.—It is raised from seed every year, in the spring, any time in February or March, till May, &c. for summer supply; and in any of the summer months.

To save seed.—Leave some of the plants which first run: they will produce plenty of seed in autumn.

BORECOLE; or SCOTCH KALE. *Brassica oleracea.*

Several varieties, chiefly biennial; all of the Cabbage tribe. They grow with upright stems, crowned by a large open head of curled fimbriated leaves, and are very hardy to stand the winter. The heads being gathered for open colewort greens, the remaining stems produce abundance of fine side sprouts in the spring. The varieties are:

Green Curled Borecole.
Red or *Brown Curled.*
Scotch Curled.
Spreading leaved.
Milan, or *Chou de Milan.*
Brussels Sprouts.

Estimate of sorts.—The first three sorts are preferable, having leaves most fully curled or crumply, and others closely curled and finely fimbriated; all equally good, as boiling greens, from September till the following spring, deserving culture in every garden, for their singular hardiness to stand the winter. The cultivation is the same as for Savoy cabbage, which see.

BROCCOLI. *(Several varieties.)*

All hardy biennials, somewhat similar to a cauliflower. They are raised every year from seed, in the spring, for transplanting in summer; and produce useful heads the latter end of autumn; but, nearly like the first crop of cauliflowers, come into cutting in the spring.

Early Purple-headed.
Large Purple.
Dwarf Purple.
Branching Purple.
Late Large Green.
White, or *Cauliflower Broccoli*;
and *Plymouth Broccoli*; both of which sorts head similar to a cauliflower, white, close, and curdly, generally large and fine in the spring production.

Estimate of sorts.—The first three or four Purple kinds are

generally chosen for the early crops; and the Green and other sorts as secondaries, for variety.

Sowing.—They are all raised from seed sown in April and May, for early, general, and late crops, to come in from Oct. or Nov. till April or May following. Sow, towards the middle or close of April, the early sorts as above; and make also a principal sowing in May, for winter, and late spring.

Sow each sort separately, in an open situation, in beds three or four feet wide, broad-cast.

Thinning and intermediate transplanting.—When the plants have leaves an inch or an inch and a half broad, prick them in other beds, four inches apart. Let them have a month's free growth, in good strength for final transplanting (see § 21).

Final transplanting.—As the plants attain the proper size, proceed to plant them out. Allot them open compartments of the best rich mellow ground, well manured with dung; in which, plant them in rows, two feet and a half asunder.

Subsequent culture.—Earth up the plants; and during the dry weather of summer, give plentiful waterings. ☞ In the last fortnight of November, take up the whole by the roots, and lay them by the heels quite up to the heads: this will prevent the frost from killing the crop, as in hard winters is too frequently the case: when laid in thus, in comparatively small compass, the whole may be protected by mats or litter. This practice is good economy, as the land may be planted with other articles, and the broccoli laid-in will not occupy so great an extent.

Generally gather the heads for use while they remain tolerably close; cutting five or six inches of the stem to each, and preserving the surrounding small inner leaves.

To save seed.—In March or April, mark some plants of the spring crop, with fine full central heads, to remain where growing. They will run up in branchy stalks in summer, and ripen seed in August or September.

BURNET. *(One species.)*

A small hardy perennial evergreen, of low tufty growth, with pinnate leaves, of a warm flavour, used in salads and in soups, &c. It continues in leaf all the year, and the plant is of several years' duration.

Propagation.—The plant is raised either by seed in the spring, or by parting the roots in spring or autumn. A small bed will raise a sufficient supply for a family.

To save seed.—Permit some plants to shoot in stalks, which will produce plenty of seed in autumn.

CABBAGE. *Brassica oleracea. (Many varieties.)*

The esculent cabbage is a hardy biennial, the parent of many varieties, profitable to cultivate in extensive crops at all seasons of the year.

It is a native plant. Flowers in May and June. The sorts chiefly cultivated, are,

Small Early Dwarf.
Early Dwarf York.
Large Early York.
Early Dwarf Sugar-loaf.
Large Sugar-loaf.
Early Battersea.
Penton; large round head, leaves white and fleshy, wrinkled like the Savoy—very delicate and fine; in perfection during the later summer months, when other cabbages are of strong flavour. (From Pembrokesh.)
Antwerp.
Russian.
Early London Hollow.
Large Hollow Sugar-loaf.
Long-sided Hollow.
Large Round Winter (White).
Great Drum-head, flat-top'd.
Red Dutch; having a round very close firm head, with dark red thick fleshy leaves; esteemed chiefly for pickling, and occasionally shred raw in a winter salad, either alone or in composition.

Estimate of sorts.—The first five or six sorts are suitable for the earliest and secondary summer crops; and the middle-sized and large kinds, for the principal summer, autumn, and winter supplies. The Small Early Dwarf, Early Dwarf York, East Ham, and Sugarloaf, for cabbaging in April, May, and June. The Battersea, Penton, Imperial, Antwerp, Russian, &c. for general summer crops. Choose the larger later sorts, for succession summer and general autumn cabbages. The Large Hollow Sugar-loaf, and large Round Winter (White), are excellent for full cabbaging in Aug. Sept. and Oct. The Red Dutch Cabbage, cut in autumn, winter, and spring, is peculiarly useful for pickling.

Soil and situation.—The soil should be moderately rich. Dig the ground well, previous to planting. Let the situation be in general open. Forward plants, which are to stand the winter, should have the driest soil, and be favoured in the aspect.

For the early and main SUMMER crops, sow at the beginning of August, to raise plants to stand over the winter, the first or second week in Aug., being that most conducive to ultimate success; though some sow at the close of July, to have the plants stronger before the approach of winter.

When the plants have two or three leaves an inch or two

broad, prick them into other beds of good earth, about four inches apart (see § 18).

Transplant in September, into rich soil, and keep the earth stirred with the hoe, and also to land-up the crop, and these will be at maturity in early spring and summer (see § 12.) Plant some of the Dwarf Early in rows, from a foot and a half to two feet asunder: those of the middle-sized intended for main crops plant at two feet or two and a half distance. The large autumnal kinds, and Red Cabbage, plant at least from two feet and a half to a yard asunder, giving water at planting, in dry warm weather.

In their subsequent growth, pass the hoe frequently between the plants, and earth them up: if any run to seed, be careful to pull them up directly, and supply the deficiencies with fresh plants.

The different sorts will cabbage in succession from April till Oct. Some may be forwarded in cabbaging, by tying the leaves together, moderately close, with osier-twigs, or strings of bass. The succeeding main crops will not need that assistance, but will head spontaneously in due time.

EARLY SPRING-SOWN CROP.

To succeed the crops of the preceding autumn sowing, it is requisite to sow in the spring, to raise plants FOR USE THE SAME YEAR, partly as young summer cabbages, and partly with full heads in autumn and winter. For this purpose, sow at the close of Feb. or in March and the beginning of April. A few for early summer use may be sown in the third week of Feb., on a slight hot-bed, or on a warm border under glass. In case no plants were raised the preceding autumn, or if the young crop which has stood the winter be much cut by severe weather, there is an additional motive for sowing a competent portion in the spring, of dwarf, middle-sized, and large sorts, according to the above estimate of sorts. In general, the plants remaining in beds, when pricked out, afford a better supply for planting in the spring; but in case of failure, the above direction will apply.

LATE SPRING OR SUMMER-SOWN CROP.

For LATE YOUNG SUMMER AND AUTUMN cabbages, and WINTER PLANTS, you may sow small portions at any time from May till July, principally of the quick-hearting kinds. Plant out finally in summer and autumn, to produce young heads, and small cabbage-hearted coleworts in August, Sept. Oct. and thence till midwinter.

In some places, the White Cabbage is buried during winter, to preserve it from frost.

CULTIVATION OF RED CABBAGE.

The Red Cabbage is cultivated as the White, except that all the plants should be permitted to grow till they have full close firm heads. Sow, 1. in August for a crop to stand the winter, to come in at the close of next summer, thence till the end of autumn. 2. A sowing is made early in spring, for returns in the following winter and spring.

CABBAGE SPROUTS.

The stalks of the summer and autumn crops, remaining after gathering the main heads, will produce abundance in the same seasons, and throughout winter, green, tender, and good for the table; sometimes with little cabbagy hearts.

To save seed.—Select in Oct. or Nov. some best plants, rather than at the close of Feb. or beginning of March, with full cabbaged heads; which take up with entire roots, for transplanting. Divest them of the large outward leaves, and plant each sort at a distance from any other cultivated for seed, to prevent a commixture of the farina when in flower, which would occasion a degeneracy (see § 47).

For COLEWORTS *and* SAVOY, *see each head respectively.*

CAPSICUM. *(Two species.)*

Both the culinary species of Capsicum are tender annuals, of small branchy growth, cultivated for their green and ripe seed-pods, which are of a very hot quality, used as spices, and for pickling, preserving, &c.

The *Capsicum annuum*, Long-podded, is a native of both Indies. Flowers in July and August. The varieties are:

Long-podded. *Round Short-podded.*
Short-podded. *Heart-shape.*

The *Capsicum cerasiforme* is also a native of both Indies. Flowers from June till Sept. Several curious varieties:

Cherry-shape. *Angular-podded.*
Bell-shape, or *Ox-heart.* *Yellow-podded.*

The plants are all bushy, and rise one or two feet high, producing green and ripe pods in July, August, and Sept. mostly red when ripe, and some yellow.

Course of culture.—Sow at the end of March, or beginning or middle of April, in a moderate hot-bed, under a frame. When the plants are two or three inches in growth, pot them into sixty single pots (see § 49), and, as the season advances,

transplant them into the open garden, in beds of light rich earth, from twelve to eighteen inches apart.

Under the deficiency of a hot-bed or stove, or for succession, capsicums may be raised in a bed of light rich earth, under a hand-glass. But the sowing must be deferred to fine warm weather in May. Give the plants air in the day; but cover them close at night, till danger from frost is over. At the close of June, transplant as above.

To save seed.—Ripe pods furnish plenty of seed in autumn.

CARDOON. *Cynara Cardunculus. (One species.)*

A hardy imperfect perennial, of large upright leafy growth, somewhat similar to the Artichoke, but larger; and is a species of that family, but different in the eatable part: the tender stalks, &c. of the inner leaves of the Cardoon, when blanched, are used for certain made-dishes, but by no means in general use: but not being in much request, is only cultivated in some particular family-gardens, and a few market-grounds.

Propagation.—It is raised from seed sown in pots, either in the heat of a hot-bed or hothouse.

Plant them either in the level ground or in drills, or form a hollow patch for each plant; in all cases, at four feet and a half distance. Thus you will have ample scope for their growth, and considerable space of ground to land them up.

Cardoons are best raised by potting the young plants in sixties (§ 49), as soon as they are up; and forwarding them by placing the pots on a hot-bed or on the flue of a hot-house; and if planted out in April, the crop will be much larger.

Landing-up.—When the plants are advanced in large growth, two or three feet high or more, in August, Sept. and Oct., proceed to land them up for blanching. First tie the leaves of each plant together, with hay or straw bands: then, digging and breaking the ground, earth up round each plant, a foot or more high, or two-thirds of the stem. As the stems rise higher, tie and earth them up accordingly; giving them a final earthing in October.

Taking the crop.—When they are blanched a foot and half, or two feet in length, or more, they may be digged up as wanted, in Sept. Oct. and throughout winter.

To save seed.—Leave some full-grown plants in the spring, to shoot up in stalk.

CARRAWAY. *Carum Carui.*

A hardy biennial; the seeds of which are used both in confectionary and in medicine. A native plant. Flowers in June:

is raised from seed; and delights in a rich moist soil. Sow in the course of March or April, scattering thinly broad-cast, or in shallow drills, six inches asunder. When the plants which promise best can be distinguished, thin them to six square inches apart.

Saving seed.—As the plant is cultivated for its seed, a competent portion is easily reserved.

CARROT. *Daucus Carota. (Two varieties.)*

A hardy biennial; having a profitable esculent root. A native plant, the parent of the two cultivated varieties. Both flower in June and July.

Orange; large long root, of an orange colour, best sort for the main crop.

Early Horn; short, smaller root; for a small early crop. Also for shallow soils.

Times of sowing.—Make a principal sowing of both sorts in the spring.

For the earliest crop, begin with the Early Horn in the last fortnight of Feb., or first week of March, as dry, fine, and open weather may occur. The first-sown beds should be in a favourable situation, and covered for a time with haulm. Follow with the Orange in the first fortnight of March, and make successive sowings thenceforth till the 20th of April, for main crops.

Add smaller sowings twice in May, for plants to draw young late in summer: also sow a few at the commencement of July, for a later succession of young carrots in summer and autumn. Lastly, in the beginning of August, two separate small sowings may be made, for plants to stand the winter, and afford young roots early in spring, March and April.

It is common with gardeners to sow Early Frame Carrots on the same hot-bed on which radishes are grown.

Process.—The carrot requires a light mellow soil, which may be digged or trenched one or two spades deep, well breaking all the lumpy parts, so as to form a yielding bed and an even surface. The Orange sort, on account of its longer root, requires a soil proportionately deeper than the Horn. The ground may be laid out in beds, four or five feet wide; or for large crops, the seed may be sown in one continued plat. Be particularly careful to have fresh good seed. As this seed adheres closely together, it should, previously to sowing, be rubbed between the hands, and mixed with dry sand, in order to separate it as well as possible. Carrot seed may be drilled with good success when properly rubbed, and particularly so if a

little powdered whiting be mixed in the rubbing. Disseminate it equally, not over thick; and directly rake it in even; or if the ground be light and dry, you must first tread down the seed, and then rake it in.

When the plants are up, two or three inches in growth, in May and June, they will require hoeing. Thin from three to five inches' distance, such as are designed for drawing in young and middling growth. But the main crop, intended for larger and full-sized roots, thin to six or eight inches' distance.

Some of small and middling growth will be fit for drawing in June and July; large sizeable roots, in August and Sept.; and those of full growth, by the end of October. At that time, or in Nov., dig up a quantity, or the whole, as may be convenient: cut off the tops close, and deposit the roots in dry sand, under cover; in which they will remain sound and good for winter. In autumn, carrots keep best if taken up as soon as the leaves begin to change.

To have early summer carrots.—Sow on a warm border in the beginning of Feb.; or, to have them still more forward, sow in a moderate hot-bed; when it is usual to sow therewith a crop of early radishes (see RADISH). Carrots under glass require copious admissions of air.

To save seed.—Plant some largest best roots in Oct. Nov. or the last fortnight of Feb., two feet apart: insert them over their crowns. They will yield ripe seed in autumn.

CAULIFLOWER. *Brassica campestris. (Two varieties.)*

A tenderish annual, of the Cabbage family, cultivated for the large white flower-head produced in the midst of the leaves. A native plant. Two nominal varieties.

Early; for the first early crops.

Later or *Large;* for principal early, and main crops.

CROP TO STAND THE WINTER.

For the early and general crops make a considerable sowing in August, about the 18th, and thence to the 24th day of that month; or two different sowings between those extremes, at three or four days' interval, to raise young plants to stand the winter under protection; some being planted out finally the same year, in Oct. or Nov., under hand-glasses; and the others pricked into frames and warm borders, for planting out finally in the spring, into the open ground.

Sow in a bed of rich, light, mellow earth. When the plants have leaves an inch, or an inch and a half broad, in Sept., prick them into intermediate beds (§ 34), three or four inches

apart; watering, and occasionally shading from the midday sun, till they have taken root; to remain in such beds, to gain strength, till October.

Hand-glass division.—Then, towards the close of Oct. transplant a quantity finally, into rich ground, which has been well dunged, under hand-glasses, in rows three feet and a half or four feet asunder (with intervening alleys a foot wide) and three feet apart in the row. Set three or four plants centrally under each glass, about four inches apart. Give a moderate watering at planting, and put on the glasses close till the plants take root. Continue the glasses all winter; but in temperate weather, tilt up the south side daily, two or three inches, to give the requisite admission of free air; and you may occasionally take the glasses off, especially if the plants appear to draw, as they are sometimes apt to run into small button heads in their nursery state, useless for future culture: but put on the glasses early towards evening; and during rigorous frosts it would be advisable to give some protection, with long dry stable litter, round the glasses, or to cover with mats, removing the covering when settled mild weather occurs.

In March, if all or most of the plants have stood the winter, be careful to leave only four of the strongest under each glass; transplanting the superabundant into the open garden, in a quarter of rich mellow earth, improved with rotten dung digged in a spade deep: setting the plants two feet and a half asunder; and giving water.

To assist those remaining under the glasses, draw a little earth about the stem of each; and as they expand in the herb, raise each glass upon three props, three or four inches high, to admit air freely, and to give a larger scope of room above for the free growth of the plants; or you may draw a ledge of earth round the bottom of each glass, both to raise the props higher, and to contain water, when occasionally given in dry weather. Towards the end of April, or the beginning of May, when the plants will, in a manner, have filled the glasses, remove these from the most forward; but continue the aid of glass as long as practicable, to accelerate the plants into early heading.

Frame division.—The other plants of the same sowing, designed for wintering in frames, may, in young growth, at the end of Sept. or beginning of Oct. be either pricked at once into the winter beds, or be, at that time, removed into a preparatory bed in the open garden, to have a month's growth; in order to be transplanted into the frame-beds at the end of Oct. or beginning of Nov. in rows cross-wise the bed, four by three

inches apart. The best mode of preserving cauliflower plants for a second spring crop, is to put them into single pots in autumn, and place them under hot-bed frames during the winter: if the pots are plunged in coal ashes, it will preserve them from the ravages of worms and slugs, both of which much annoy these plants. Give a light watering, and put on the lights of the frame close till the plants have taken root; then prop up the lights behind, two or three inches, or draw them off occasionally to the back of the frame in mild dry days; but keep on when very cold, and in rain, snow, frost, and always at night; and in severe frost cover the glasses and round the frames with dry long strawy litter and mats. In March, or beginning of April, transplant the whole into the open garden, in rows two feet and a half asunder.

Half-sheltered portion.—In want of frames or hand-glasses, you may in Oct. either prick some plants into a warm south border, close under the fence, three inches apart, to be protected in rigorous frosts with mats, dry litter, or reed-pannels; or you may prick some into a bed arched over with hoops, to receive a covering of mats during cold nights, or heavy rain, snow, and frosts, in the day-time in winter. Give the full air in all moderate weather, till March or April: then all to be transplanted finally as above.

SECONDARY SOWING, *or* FIRST SPRING-RAISED CROP.

For Cauliflowers to succeed the early and main summer crops, described above, sow in the spring, Feb. or beginning of March, in a moderate hot-bed, or, where that cannot be had, in a warm border under a frame or hand-glass; and when the young plants have leaves an inch broad, prick them into other beds of the same description, three inches apart, to gain strength by three or four weeks' growth, in order to be planted out in the open garden at the end of April, or beginning of May; where they will produce tolerable heads in Aug. Sow also in the open garden during the last fortnight in March, and the first in April for a later succession with small flower-heads in Aug., and throughout autumn. Plants of the last crop, removed as late as May, should be planted in a shady border.

SECOND SPRING-RAISED CROP.

The next and last sowing is for the late autumn and winter crop, commonly called the Michaelmas crop; to be made towards the twenty-fourth of May, in a bed of light earth. Prick out the young plants in June, to remain in the intermediate bed till about the middle of July; then to be trans-

planted two feet and a half asunder. Give occasional watering, till they have taken good root. They will begin to produce heads in Oct.; but they will be of superior size in Nov. and Dec., if temperate weather follow. Cauliflowers are a delicate vegetable at this season; but it must be obseryed, they must be protected from the frost: it is usual to lay them by the roots in earth or sand, in some covered shed. These are succeeded by the White Brocoli; late Cauliflowers, however, are generally preferred.

FINAL CULTURE OF THE THREE CROPS.

Hoe the ground occasionally, and draw some earth round the stems of the plants. When the early crops are nearly advanced to full growth, in May and June, one or two good waterings to the roots will contribute to their producing large heads. In the dry weather of high summer, water those not in flower twice a week; and those in flower, every second day. As the flower-heads shew themselves, turn down some of the larger leaves, as defence from sun and rain, and to preserve them white and close, in perfection.

To save seed.—Mark and leave some of the prime plants of the thoroughly-nursed early and main crops, in May and June, when the flower-heads are in highest perfection; as those of late production will not ripen seed effectually.

CELERY, or SMALLAGE. *Aprium graveolens.*

(Several varieties.)

A hardy biennial, used in salads, soups, &c. The blanched stalks are in season, by successive crops, from the middle of summer, through autumn and winter, till the beginning of spring. When the stalks cannot be obtained, the seed bruised will impart the same flavour to soups. A native plant. Flowers in June and July. The parent of several cultivated varieties:

Common Upright Italian.
Large Hollow Upright.
Solid-stalked Upright.
Large Red-Stalked Upright.
Turnip-rooted, or *Celeriac.* This is hardier than the other kinds, and will continue longer in spring.

Propagation.—All the sorts are raised from seed.

Soil.—Celery delights in a soil rich in vegetable mould, but not rank from new unrotted dung.

EARLY CROP.

For early summer and autumn celery: Sow a small portion towards the end of Feb. in a moderate hot-bed. Prick out the plants (§ 35). As soon as the leaves are six inches high,

in May or June, transplant them into trenches for blanching, as directed below for the main crops. But as these early-sown plants will not continue long in full growth before many of them will pipe or run, you should plant only for a temporary supply.

In default of a hot-bed to raise an early crop, you may sow on a warm border when the twenty-first of March has arrived.

MAIN CROPS.

To raise the main crops for summer, autumn, and winter, make a considerable sowing at the commencement of April. In very dry weather, give moderate watering both before and after the plants come up. When they are two, three, or four inches high, thin the seed-bed, and prick out a quantity.

Transplanting into trenches.—When either the plants left in the seed-bed, or those removed, are from six to twelve inches high, transplant them into trenches for blanching.

For this purpose allot an open compartment. Mark out the trenches a foot wide, and from three feet to three and a half distance: dig out each trench lengthwise, a spade in width, and six or eight inches deep. Lay the excavated earth smoothly in the intervals, making the edges of the trenches equally full and straight. Apply some good rotten dung in each trench, two or three inches thick; and let it be digged-in at the bottom regularly, a moderate depth. Then, having lifted the plants, just trim any long straggling tops of the leaves and fibres of the roots; also slip off side shoots: plant a single row along the bottom of each trench, four or five inches apart. Give a good watering directly; and occasionally after, if the weather be dry.

Continue planting out a monthly succession, in June, July, Aug. and Sept.; thus providing for a supply from July and Aug. of the present summer, throughout the course of autumn and winter, till May in the following spring.

Landing-up.—As the plants in the trenches rise from ten to fifteen inches high, they should be landed-up for blanching. In performing this essential operation, the soil must be gently stirred with a hoe or spade. When the rows should be gone over, and each plant taken in the hand, and while the stems of each are placed closely round the plant, the mould must be placed on each side; this should be carefully done during the whole season, otherwise, by the mould getting between the stems, the crop is greatly injured. N.B. This is to be occasionally completed with the spade, and the bulk of the mould thrown over where the above has been effected, till, by degrees, they

are landed-up from twelve inches to two feet; which will increase the length of the blanched part, and also protect the latter crops more effectually during the winter.

It is usual to plant out celery at two or three distant periods, in July, Aug. and Sept., in order that if the first crop should become rotten or deteriorated in winter, there may be a chance of later crops being safe; otherwise, one general cultivation will suffice.

Taking the crop.—Begin at one end of a row, and dig clean down to the roots, that the heads may be drawn up entire, without breaking the stalks. On the approach of frost, take up a part of the crop, and lay it by, under dry sand, for winter use.

CULTIVATION OF CELERIAC.

The preceding directions chiefly respect Upright Celery. Celeriac is of lower growth, and cultivated chiefly for the root.

The times of sowing and planting are the same as for the other sorts. Having digged the ground level, draw shallow drills with a hoe, two feet asunder, and about three inches deep: set one row of plants along each drill, five inches apart. When the plants are of advanced growth, earth them up four or five inches. In warm dry weather, the celeriac requires frequent watering.

To save seed.—Either leave some established plants in the spring when growing; or, in Feb. or March, dig up a competent number, cut down the top leaves, and set the plants full in the ground, two feet asunder. They will produce seed in autumn.

CHAMOMILE. *(A species, and one variety.)*

A perennial, of low creeping growth; cultivated for its aromatic flowers, which have a bitter flavour, and are used medicinally. The officinal species, *Anthemis nobilis*, is a native plant: flowers from the end of June till the beginning of Aug.

Common Single-flowered . . This is the species.
Double-flowered . . . . . A variety.

The flower of the Single is supposed to possess the most virtue: the Double, however, is generally cultivated, on account of its greater bulk. A small bed is sufficient for the supply of a family. May be advantageously and tastefully planted on slopes, in lieu of grassplot.

Course of culture.—This herb likes a poor soil. Both kinds are propagated by parting the roots, or by slips of the rooted

offsets or of the runners. Detach them with roots, in little tufty sets, in March, April, or May; and plant them from eight to twelve inches asunder, giving water till they root. They will soon overspread the bed, producing plenty of flowers the same year, and continuing several years productive.

The flowers should be gathered just when full blown. Let them be spread to dry in a shady place; then put them in paper bags, and house them for use. But when cultivated on the large scale, and the weather humid, they may be dried on a hop or malt kiln; or in a cast-iron oven, which may be readily fitted up for the purpose, with a number of fine-wire shelves resting on tin ledges: the oven, however, should contain steam-valves, and the heat never raised above moderate, about 100° Fahrenheit.

Chamomile flowers are much in use in various departments of the healing art, and are not cultivated in England to the extent the market requires, and therefore would form a valuable article for the culture of cottagers in the country. Vide *Salisbury's Cottager's Companion.*

CHERVIL. *Scandix Cerefolium.* *(One species.)*

An annual, a small hardy aromatic plant, somewhat similar in growth to parsley. It is used as a pot and salad herb. A small bed or two may suffice for a moderate family. A native of Europe. Flowers in May and June. Is propagated from seed. Sow a bed or two in Aug. and Sept., as well to come in use at the end of the same autumn, as to stand for winter and spring. If a continued succession be required, begin to sow again in the last fortnight of Feb., and sow a portion every month, or twice a month in the midst of summer (see § 16). The plants are to remain where sown. When the leaves are two, three, or four inches in growth, they are proper for gathering. Cut them off close: they will shoot up again, though the plants of the spring and summer sowing soon spindle up into seed-stalks.

To save seed.—Leave some plants in the spring: they will give ripe seed in July or Aug.

CHIVES, or CIVES. *(Only one species.)*

A diminutive hardy perennial, of the garlic and onion family; growing with small bulbous roots connected in bunches, producing a tuft of awl-shaped leaves, which are the parts generally used in cooked dishes. Occasionally, the leaves and roots are taken together, in lieu of young onions,

for salads, &c. This species, *Allium Schœnoprasum*, is a native plant. Flowers in June.

Course of culture.—Chives may be planted in any common soil and situation. The plant is propagated by dividing the bunches of roots in the spring, from the last week of Feb. till April, and even May or June. Plant them from eight to twelve inches apart: they will soon increase. A bed lasts three or four years; after which period it must be renewed. In gathering the leaves for use, cut them close, and others will shoot up in succession.

CLARY. *(Only one sort.)*

A hardy biennial; growing with broad, low-spreading wrinkled leaves, of strong scent; used in some families in culinary preparations, and medicinally. Its flowers are also used for a fermented wine. See further, FLOWER GARDEN, Table IV. There is only one sort, *Salvia Sclarea*, a native of Syria and Italy.

Course of culture.—Sow in the last fortnight of March or the course of April, thinly (see §16). When the plants are advanced two or three inches, transplant, from twelve to eighteen inches apart: they will be fit for use the same year. A small bed or two will be sufficient for the supply of most families.

To save seed.—In the spring, allot some old plants to run up into stalk: these will yield ripe seed in autumn.

COLEWORTS. *(Cabbage-Coleworts; from any varieties of close-heading Cabbage.)*

These are useful; as young open greens, and with small closing hearts. Such are properly called Cabbage-Coleworts, being young cabbages raised from the seed of any approved variety of the *Brassica oleracea.*—See the list under art. CABBAGE.

Best sorts.—Procure seed, of the Early and large York, and Large Sugar-loaf. Occasionally, for larger coleworts, you may adopt some Battersea Imperial, Antwerp sorts, or Early London Hollow: but avoid the larger kinds of cabbage, which, in a colewort state, are too spreading and open.

Times of sowing.—To have a good supply for autumn, winter, spring, and returning summer, it is proper to make one sowing towards the middle of June, a second about the same time in July, with a third in the last week: these are for transplanting in Aug. Sept. and Oct., and will afford cole-

worts from Sept. till March or April, at which time the plants of these sowings will mostly start for seeding.

Sowing and transplanting.—Sow and thin as for cabbages. When the plants have leaves two or three inches broad, transplant them into open compartments, in rows twelve or fifteen inches asunder, by eight or twelve inches in the lines, as it may be intended to gather them in smaller or larger growth.

Gathering the crop.—Cut or draw them as they come to hand; or take only the largest; or make openings, in a regular thinning order.

Coleworts are sold under the name of *cabbage-plants*, tied up in bunches, and form the bulk of the winter supply at Covent Garden and other London markets.

CORIANDER. *(One species.)*

This is an annual, used in some families as a salad herb. Confectioners, druggists, and distillers consume also great quantities of the seed. *Coriandrum sativum* is a native plant. Flowers in June.

Culture.—This herb likes a sandy loam. It may be sown as early as Feb. (see § 16), when the weather is mild and dry. The plants are to remain where sown.

CORN-SALAD, or LAMBS' LETTUCE. *(One species.)*

A small hardy annual, used in salads through winter and early spring. There is only one species, *Valeriana (Locusta)*; a native plant. Flowers from April to June. The appellation *Corn-Salad* is derived from its growing spontaneously in some corn-fields.

Propagation.—From seed annually.

Times of sowing.—To answer the common demand, two or at most three sowings will be sufficient; viz. A principal sowing at the beginning or towards the middle of Aug.; a secondary sowing early in Sept. to furnish together crops in winter and early in spring; and a smaller sowing in spring, the close of Feb. or course of March; as the plants are apt to get rank-tasted in warm dry weather: but if wanted throughout summer, sow once a month, and cut the crop quite young.

"The following information ought to be generally made known, that the poor in many parts of England may provide excellent vegetable food from the abundance of this plant, that is spontaneously produced in many places. It is excellent when boiled. On the red sands at Radford, and other places

in Warwickshire, it is most abundant, and common vegetables very dear." *Observations by the Editor, made at Leamington*, 1830.

To save seed.—Leave some plants in spring: they will produce seed in July or August.

CRESS (GARDEN). *(Three varieties.)*

A small annual, cultivated for its warm grateful relish when of very young growth, on which account it ranks smong the principal of the SMALL SALADS, which see.

One species, *Lepidium sativum*, Garden Cress, a native of the Levant, is the parent of the following varieties:

Common *Plain-leaved*, principally cultivated.

Curled-leaved; equally good. Also serves as a garnish.

Broad-leaved; not so acceptable for general use.

To save seed.—Either sow a portion in the spring for that purpose; or leave some rows of any overgrown old crop in April and May. The plants will yield seed in autumn.

For CRESS (INDIAN), *see* NASTURTIUM.

CUCUMBER. *Cucumis sativus. (Several varieties.)*

An annual plant of the most tender nature, and of but a few months' duration; cultivated for its fruit, which is used as a table esculent both in a raw and pickled state. A native of the Levant. Flowers in July and August. Has produced many varieties, of which the following are commonly cultivated:

Early Short Prickly.	*Early African.*
Early Long Prickly.	*White Prickly.*
Most Long Prickly.	*Long Green Turkey.*
Long Smooth Green.	*White Turkey.*

Estimate of sorts.—The first three are the principal sorts. Allot a few of the Short Prickly for very early fruit; but always sow most of the Long Prickly kinds for the chief early and main summer crops. You may likewise adopt any of these three, as secondary crops; and any of the others, for variety. The Early African is much fancied by some gardeners. The Long Green Turkey and White Turkey are late sorts and scanty bearers; but the fruit grows to a great size, sometimes exceeding two feet in length.

Propagation.—From seed annually.

Department of culture governed by the season.—The plants require the constant aid of HOT-BEDS UNDER FRAMES, when raised in winter and early spring. They may be raised in

HOT-BED RIDGES, UNDER HAND-GLASSES, in April, May, and June. At the end of May and beginning of June, they may be sown in the OPEN GARDEN. If it be attempted to have cucumbers ready for cutting at Christmas, or between that and April, a flued pit is better adapted for them than a hot-bed of common materials. *See* HOT-HOUSE, *Miscellanies.*

Choice of seed.—It is advisable to have that from two at least to four years' old, in preference to newer seed, which is more apt to run luxuriantly in vine, and the plants from it do not shew fruit so soon, nor so abundantly as those from seed of a greater age. But when seed has been kept more than four years, it is sometimes found to be too much weakened.

FRAME CROP.

Time of beginning to force.—To provide for early cucumbers, raise the seedlings from twelve to ten weeks before the fruit will be required, according to the length of the days in the interval.

In proportion as the growth embraces a greater part of midwinter, the liability of failure from obstacles in the weather will be greater. The last fortnight in Jan. or the first week of Feb. is a good time for beginning to force the most early crop. To have a constant succession, seedlings should be raised twice a month.

Site of the bed.—It should range east and west, fronting the south. Allot some dry situation open to the full circuit of the sun, and sheltered from the north and east winds. In winter, build the bed on a level surface, rather than in a trench; in order that, when linings of fresh dung become necessary at the sides, to revive the declining heat, they may be applied quite to the bottom. It is only in late forcing, when the natural season requires but a small addition of heat, that a trench is eligible: at that season, on dry soil, the bed may be sunk a foot deep.

General rules for building a bed.—Provide a competent supply of stable dung, mixed with long and short strawy litter. The most suitable is that which has been from seven days to a fortnight out of the stable: the dung for a hot-bed ought not to be more than a month old, at which age it will require less preparation.

In case of a deficiency of dung, tree-leaves may be combined with it, to the extent of half the bulk of the bed: they will require a preparatory fermentation, as under HOT-HOUSE FRAMES.

To temper dung for forcing—Fork it up into a conical heap; mixing it thoroughly and equally. After it has sweated three or four days, turn the heap entirely, bringing the inward parts to the outside: and leave it to ferment from two to five days. This will, sometimes, be enough; and if the fermentation has been free, eight or ten days in all may bring it to a sweet well-tempered heat: but if the litter be very fresh and dry, it may be necessary to moisten it with water, to accelerate fermentation; and to repeat the above process, leaving it to lie and steam a few days more. Should cold and rough weather prevent the heap from heating, lay some dry litter round it. When the straw in fermenting dung begins to turn dark-brown, it will be fit for building into a bed.

The superficial extent of a bed must be governed by the frame which it will have to support, being from four to six inches larger all round: the height will depend on the season, and the temperature requisite for the plant to be forced. Thus, the minimum heat for the cucumber is 58° of Fahrenheit at the coldest time of night: in the day-time, 65° is sufficient for the maximum; because air admitted when the sun has great influence will do more good than a higher heat. But it requires a larger body of dung to produce the above temperature, in proportion as the heat of the natural season is withdrawn or defective. The following is an outline of the average dimensions for three successive months: in JAN. let the bed be 3 feet 9 inches high in front; 4 feet 6 inches at the back; and 6 inches larger than the frame all round. In FEB. 3 feet 3 inches high at the front; 4 feet at the back; and 4 inches to spare round the frame. In MARCH, 3 feet high in front; 3 feet 6 inches at back; and four inches beyond the frame every way.

Having decided on the site and dimensions, drive stakes at the corners, as a guide for building the bed regular. Begin by laying at the bottom some of the most littery part of the dung. Then shaking out and breaking the lumpy parts, mix them equally with the lighter materials in proceeding upwards. Having completed a layer to the height of a foot, tread it down equally, to make the foundation firm: but in building the upper courses of the bed, beat it down well with the back of the fork instead of trampling, lest the dung may not ferment kindly, if too violently pressed. Finish with some of the smallest of the dung, beating the surface quite level; and when the whole is a little settled, proceed to framing.

Framing.—Having provided frames, according to the extent

of the crop to be raised, put on the frame and glasses presently after the body of dung is built up, to defend it from the weather. At the same time, raise the glasses a little at the upper end, to give vent to the rising steam, until the bed is reduced to a regular temperature. In connection with the thermometer, the cultivator may be assisted to form a judgment of this, by *trying-sticks*, that is, two or more sharp-pointed smooth sticks, thrust down in different parts of the bed; which at intervals may be drawn up, and felt by a quick grasp of the hand. The smell of the vapour is also a criterion: it should not be strong and fetid, but mild and sweet. If the temperature appear not sufficiently high, take off the frame, and add another course of dung.

Moulding.—As soon as you deem the bed to have a lively, safe, well-tempered heat, which may be in a week or ten days after building, proceed to mould it. A light rich compost should have been provided long enough to be perfectly incorporated, and in a dry state.

Begin to earth under the middle of each light, laying the mould so as to form a little hill, from six to ten inches in height: then earth over the intervals between the hills and the sides of the frame only, from two to four inches, as a temporary measure, until the heat is ascertained to be within safe limit. After the whole bed has been some time covered, examine the mould: if no traces of a burning effect appear, discoverable by the mould turning of a whitish colour, and caking, it will be fit to receive the plants. But if the earth appears burnt, such part should be replaced by fresh, and vacuities made to give vent to the steam, by drawing away part of the hills from the centre. If there be any motive for haste while an excess of heat is to be suspected, the danger from burning may be obviated by leaving vacancies in the top mould; by placing patches of fresh cow-dung or decayed bark to receive the pots of seeds or plants; and by boring holes in the bed with a round pole sharpened at the end, which holes thould be filled up with hay or dung when the heat is sufficiently reduced. When the bed is in fit order, level the mould to six inches deep, to receive the plants; which are to be raised in the mean time from seeds.

A one-light frame will be large enough for raising seedlings.

Sow some seed in small pots, of the same kind of earth, which may be plunged a little into the bed. Continue the glasses on the frame; giving occasional vent above, that the heat may not become too violent. The plants will be up in a

few days; when it will be proper to admit air daily, but more guardedly, at the upper ends of the lights, which may be raised from half an inch to an inch or two, according to the temperature of the weather. In frosty weather, hang part of a mat over the aperture. When the plants are a little advanced, with the seed-leaves about half an inch broad, take them up, and prick some in small pots of light earth, previously warmed by the heat of the bed. Put three plants in each pot, and insert them a little slopingly, quite to the seed-leaves. Plunge the pots into the earth; and you may prick some plants also into the earth of the bed. Give a very little water just to the roots: the water should be previously warmed to the temperature of the bed. Draw on the glasses; but admit air daily. Cover the glasses every night with garden mats, and remove them timely in the morning. Give twice a week, once in two days, or daily, according to the season, a very light watering.

To force the cucumber into early fruit, stop the runners as soon as the plants have made two rough leaves; and as the bud that produces the runner is disclosed at the base of the second rough leaf, it may be cut off or picked out; or if the runner has already started, it may be pinched off close. This is called stopping at the first joint, and is necessary to promote a stronger stocky growth, and an emission of fruitful laterals.

Fruiting bed.—When the first rough leaves are two or three inches broad, or when the plants have been raised about five weeks, transplant them to the larger hot-bed.

Having this bed prepared and moulded as above, when the temperature is ascertained to be right, bring the plants in their pots; turn over the hills of mould, forming them again properly, and proceed to planting. Turn the plants out, one pot at a time, with the ball of earth whole about the roots; and thus insert one patch of three plants which have grown together, with the ball of earth entire, into the middle of each hill, earthing them neatly round the stems. Also any not in pots, having been pricked into the earth of the bed, if required for planting, may be taken up with a small ball of earth, and planted similarly. Give a very light watering about the roots, and shut down the glasses for the present, or till next morning. Shade the plants a little from the mid-day sun, till they have taken root in the hills; and cover the glasses every evening with large mats, which should be taken off in the morning. Admit air every day. Give occasional circumspect waterings; always using very soft water, warmed as above.

Be careful to support a proper degree of heat in the bed,

when declining, by timely linings of hot fresh dung, which may be applied to the sides, fifteen or eighteen inches in width, and as high as the dung of the bed. Generally line the back part first, and the other in a week or from ten days to a fortnight after, as may seem necessary by the degree of heat in the bed. Sometimes, if the heat is fallen abruptly below the minimum degree, it may be proper to line both sides, moderately, at once, to recover the temperature sooner and with better effect: but be particularly careful never to over-line, which would cause a too violently-renewed heat and steam in the bed. The dung for linings must be fermented, as in the first building a bed.

Observe also, in proper time, when the first heat of the bed is moderated, to begin adding more earth between the hills, as the extending roots require to be covered, or the runners to be supported with mould; raising it by degrees equal with the tops of the hills.

When plants which have been once stopped have extended the first runners to three joints without shewing fruit, they are to be again stopped, for the purpose of strengthening the plant, and disposing it for bearing. As fertile runners extend, train them out regularly along the surface, fastening them down neatly with pegs.

Admit air every day, when the weather is moderate without much wind; and always more freely in sunny days. Open the lights behind, only a little at first, sooner or later in the day, according to the season; increasing the opening, from about half an inch, to one, two, or three inches, or very little more; and shut closer, in the same gradual order, towards afternoon; generally shutting close in the evening, unless, in the early state of the bed, a considerable heat and steam continues. In this case, you may occasionally leave open about half an inch, hanging the end of a mat before each opening. Give necessary waterings as above, mostly in the forenoon of a mild day, in early forcing; and in a morning or afternoon, in the advanced season of hot sunny weather. Cover the glasses every night till June. If the sun occasion the leaves of the plants to flag considerably, spread a slight shade over the lights, in the heat of the day. Continue the glasses till the end of June, or till July; so that they may either be drawn off fully in warm days, or remain on if the weather be unfavourable; but admit plenty of fresh air, day and night, at that season. Although this is the usual practice for raising cucumbers, to produce which in best and earliest perfection is the pride of gardeners, the Editor

cannot refrain from adverting to the Economic Frame, § 18, where by all the above expensive and laborious process is substituted with good effect.

Setting the first.—The cucumber bears male and female blossoms on the same plant. The latter only produce the fruit, which appears even before the flower expands. There is never any in the males: but these are absolutely necessary, by the dispersion of their farina, to impregnate the female blossoms. Plants under glass, not having the full current of the natural air, nor the assistance of insects to convey the farina, require artificial aid to affect impregnation.

At the time of fructification, watch the plants daily; and as soon as a female flower and some male blossoms are fully expanded, proceed to set the fruit the same day, or next morning at furthest. Take off a male blossom, detaching it with part of the foot-stalk; hold this between the finger and thumb; pull away the flower-leaf close to the stamens and anthera or central part, which apply close to the stigma or bosom of the female flower, twirling it a little about, to discharge thereon some particles of the fertilizing powder. Proceed, thus, to set every fruit, as the flowers of both sorts open, while of a lively full expansion; and generally perform it in the early part of the day; using a fresh male, if possible, for each impregnation, as the males are usually more abundant than the female blossoms. Cucumbers attain the proper size for gathering, in about fifteen, eighteen, or twenty days from the time of setting; and often in succession, for two or three months, or more, in the same bed, by good culture. The male flowers are often plucked wholly off as useless, under a notion of strengthening the plant; but their agency being absolutely necessary in fertilizing the females, they should only be displaced as they begin to decay, except where they are superabundant.

Taking the crop.—As the fruit advance to proper growth, from four or five, to six, eight, or ten inches in length, they should be cut or gathered. While young and green, they are in best perfection for the table.

HAND-GLASS CROP.

To have a general summer crop, *to fruit in hot-bed ridges under hand-glasses*, sow some seed of the Long Prickly kind, in a hot-bed, under a frame or hand-glass, or in any cucumber hot-bed in cultivation, about the middle of March, or thence till the middle of April. When the plants have been up three, four, or five days, prick some in the same, or another hot-bed, three or four inches asunder. A portion may be put in small

pots, three plants in each, and plunged in the bed. Give water, and shade from the sun, till they take root; and manage as for the Frame Crop. In three or four weeks, when advanced in the first rough leaves, about two inches broad, and stopped at the first joint, the plants should be transplanted into hot-bed ridges, under hand-glasses. The period for this may fluctuate from the middle of April to the beginning of May.

Having a sufficient quantity of prepared dung, make a hot-bed on the level ground, three feet and a half or four feet wide, and two and a half high, the length as required, according to the number of hand-glasses intended. Earth it at top, six or eight inches shick, and place the hand-glasses along the middle, at three feet and a half distance. Sometimes the bed is made in a moderate trench, twelve or fifteen inches deep, in some good soil in the kitchen garden, in order to have the excavated earth of the trench ready at hand for moulding the bed. When the earth under the glasses is warm, proceed to put in the plants, removing them from the nursery bed with as much earth as will adhere about the roots. Plant three plants under each glass. Give a light watering; put down the glasses; and shade the plants from the sun, till they have taken root; after which, let them enjoy the sun and light fully, only covering the glasses and bed every night with mats, till June, or commencement of warm weather. Admit air every mild day, by propping up the southward side of the glasses, one or two inches; and about the beginning or middle of June, they should be raised upon three props two or three inches high, and the runners trained out in regular order; but cover them, in cold nights, with mats, for the first week or two. Continue the glasses, and circumspectly water, in dry weather, as may be necessary: the plants will produce fruit in June, July, Aug. &c.

In default of plants raised in a previous nursery, sow seed under the hand-glasses in April or May, inserting several seeds in the central part under each glass. When the plants have been up a few days, thin them to three or four of the strongest in each patch, managing them afterwards as the others.

Should there be a scarcity of dung to make a regular bed, in the last week of April, or in May, dig circular holes, two feet wide, a spade deep, and four or five feet asunder; fill them with hot dung, trodden down moderately firm, and earthed over six inches. In these, put either plants or seed; and place on the glasses: the plants will produce fruit in June or July, till Sept.

In defaulf of hand-glasses, make a hot-bed, or holes of dung, as above, in May: put in plants or seed, and defend with oiled-

paper frames to remain constantly day and night, till settled warm weather in June or July. Give the additional protection of mats over the paper frame in cold nights and bad weather.

In the culture of all the crops, give proper supplies of water in dry warm weather, two or three times a week, or every day in the hottest season of June, July, and August.

In the hot-bed ridges made above ground, in April or May, if in three or four weeks or more after making the heat be much declined, and the nights or general season remain cold, let a moderate lining of hot dung be applied to the sides; which will both throw in a reviving heat, and widen the bed.

NATURAL-GROUND CROP.

To have a crop in the natural ground, the seed is sown in warm compartments of rich earth, towards the *end of May or beginning of June*, when the weather is settled, warm, and dry. The plants should mostly remain where sown, to produce late fruit, towards the end of July, or more generally in August and Sept.; small for picklers, and in larger growth for ordinary consumption.

At the season aforesaid, sow a portion in a warm border, and the main crop in an open compartment. Dig the ground neatly even. Trace lines, with intervals of five or six feet; and in the lines mark stations three and a half feet distant; then, with the hand, at each of these spots, form shallow circular saucer-form cavities in the surface, ten or twelve inches wide, and about an inch deep in the middle. Sow in the middle of each cavity, eight or ten seeds, half an inch deep.

When the plants are come up, and begin to put forth rough leaves, thin them to three or four of the strongest in each hole. Earth these up a little, between and close round the stems, pressing them a little asunder; and give them some water, to settle the earth below and above. In their advancing growth, train out the leading runners.

Supply them with requisite waterings, early in a morning, or late in the afternoon towards evening.

CROP ON SLIGHT HEAT.

Sometimes in cold wet seasons, or occasionally to have a portion of picklers a little forwarded, some seed is sown, in patches, in a slender hot-bed, towards the end of May, or beginning of June. After the plants are up, as the season is more or less favourable, take them up in little clusters, as produced in patches, with a small clump of earth about each cluster of plants; which plant out in separate cavities, at the distances mentioned above. Give the subsequent culture as to the others.

Upright training.—Cucumber-plants being climbers by means of their tendrils, if some branchy sticks are placed to any advancing runners, they will ascend and produce fruit, at a distance from the ground.

To save seed.—Select some best summer fruit, from good productive plants; which permit to continue in full growth, till they become yellow. Then cut them from the vine, and place them upright on-end, in the full sun, for two or three weeks; when they may be cut open; and the seed being washed out from the pulp, spread it to dry and harden; then put it up in papers or bags for future sowing. It will remain good many years. See above, "Choice of Seed."

DILL. *Anethum graveolens. (One species.)*

A hardy biennial; an aromatic herb of upright stalky growth, somewhat similar to fennel, and of the same family, but smaller. The seeds and leaves are applied to heighten the relish of some vegetable pickles, particularly cucmbers: the leaves are sometimes put into soups and sauces: and the whole plant is employed in medicinal preparations. A native of Spain. Flowers in June and July.

Course of culture.—It is raised from seed, sown February, March, or April, in any open compartment. The plants should remain where raised; and may be thinned moderately, should they rise too thick. They will shoot up in stalks, with leaves and seed-umbels, in summer and autumn.

To save seed.—Leave some plants where raised: they will furnish plenty of seed in autumn.

ENDIVE. *Cichorium Endivia. (Three varieties.)*

An annual; cultivated for the stocky head of leaves, which are used in salads and stews. Endive is of the Succory family. A native of the East Indies: flowers in July and August; and is the parent of the following varieties:

Green Curled-leaved; principal sort for the main crops.

White Curled-leaved.

Broad-leaved Batavian; of largest upright growth.

Estimate of sorts.—Allot, principally, the Green-curled for the main crops of autumn and winter, being of the most stocky growth, and hardiest to stand severe weather. Allot a smaller portion of the White-curled for early summer and autumn use. Of the Broad-leafed kind, provide a moderate crop for autumn, till Nov. or Dec.; being by some esteemed for stews and soups, though not much used in salads.

Propagation.—They are all raised from seed, by two or three different sowings, every year.

Times of sowing.—The proper seasons are: May, for a smaller crop; and, principally June and July to the beginning of August, for full and succession crops all autumn and winter, till the following spring. For if sown earlier than the middle of May or beginning of June, they will mostly run to stalk the same season.

Culture in the seed-bed.—Sow each sort separately, in beds of rich mellow earth, in an open situation.

Transplanting.—As the plants attain a growth from four to six inches high, or in a month or five weeks from the time of sowing, proceed to transplant the successive crops. The ground should be light and rich, on a dry subsoil. Dig it a full spit deep. Set in shallow trenches, or drills the depth of a hoe, endive blanches with less trouble than if inserted on a level surface. The lines may be fifteen inches asunder; the plants ten or twelve inches distant in the line. Drawing the strongest first, plant out portions from June to October. But the principal removals will fall in Aug.; in which month three different plantings may be made for succession. Also for a general winter crop at the beginning of Sept. While the plants are in hand, trim the extremities of the leaves, and shorten the top-roots a little. Water at planting; and moderately afterwards, till the plants take root.

At the end of Sept. and in Oct. likewise plant some in a warm dry border, to stand the winter more effectually. Also, in the last fortnight of Oct. or beginning of Nov. it would be proper to insert some stout plants thickly on a terrace of dry light soil, raised a foot or two behind, sloping to the south. Thus they will be preserved more securely from rotting in winter. The bed might be also defended in severe weather with frames and glasses, or with an occasional awning of mats or sail-cloth.

Instead of being planted upright in the terrace, full-grown plants may be taken up in a dry state, or, if damp, hung up by the roots till dry, then tied round with bass, and laid-in horizontally, nearly to the top of the leaves.

Blanching.—As the transplanted crops advance to full growth, some should have the leaves tied up every week or fortnight, to blanch or whiten, and to render them tender, crisp, and mild-tasted. Perform this in dry days, avoiding frost. Using strings of fresh bass, or small osier twigs, tie the leaves regularly together a little above the middle, moderately close. If the soil be light and dry, earth them up half-way;

but if moist, merely tie them. The two Curled sorts, if neatly earthed up, will blanch pretty well without being tied. The Batavian, from its loftier looser growth, in every case hearts and blanches better with a bandage. The blanching will be completed sometimes in a week, when the weather is hot and dry; at others, it may take a fortnight or three weeks: after which the endive should be taken up for use, or it will soon rot, in six days or less, especially if much rain fall.

To save the trouble of tying, this esculent is also occasionally blanched by setting up flat tiles or boards on each side the plants, which resting against others, in an angular form, and confined with earth, exclude the light. Further, endive may be blanched under garden-pots, or blanching-pots, in the manner of sea-kale.

In the heat of summer and autumn, tying up is best; but in wet or cold weather, to cover the plants preserves, while it blanches them.

Occasional shelter.—At the approach of severe frost, cover some thickly with straw-litter. Also plunge a portion into a raised bank of light dry earth, under a glass-case, or covered shed, open to the south. Protect with litter in rigorous weather; but uncover, and give plenty of air, on mild days.

To save seed.—Allot some of the strongest old plants in Feb. or March, if any remain; otherwise, sow seed in March or April, and transplant or thin the plants to twelve or fifteen inches distance. They will shoot and the seed ripen in autumn.

FENNEL. *Anethum Fœniculum. (Two varieties.)*

A hardy perennial herb, of aromatic quality; growing with finely-divided leaves, and upright leafy stalks. Its leaves are adapted for several culinary purposes, and to eat with pickled-salmon, mackarel, &c. This herb affords a plentiful succession of leaves in spring, summer, and autumn, till the commencement of winter. A native plant. Blows in July and August.

The following varieties are principally cultivated:

Common or *Sweet.* *Dark-green-leaved.*

Propagation.—They are raised from seed; and occasionally by off-sets of old plants. Sow in the spring, in light earth. When the plants are three or four inches high, thin or transplant a quantity fifteen inches asunder. As the roots of old plants divide into side off-sets, these may be slipped off in spring, summer, or autumn, and planted a foot apart.

To save seed.—Permit some plants to grow up to bloom: they will produce large umbels of seed, which will ripen in autumn.

FINOCHIO, *or* ANNUAL DILL. *Anethum segetum.* (*One species.*)

A native of Portugal and the Azores, of the fennel tribe; an annual plant, of aromatic flavour; rising with a thick, fleshy stem, swelling below, which part is blanched, to slice in salads, and for soups. Blows in June and July.

Propagation and Soil.—It is raised from seed. Likes a dry soil, containing some rich mellow loam.

Culture.—Sow in a warm or open compartment, according to the season. For the first crop, sow early in March. As the plant lasts but a short time in perfection, soon running to seed, sow for succession once a month till the end of July. To receive the seed, make drills two feet asunder: the plants may remain where sown. Thin them, in young growth, to six inches distance; and loosen the ground, to encourage the swelling stems. When of some tolerable substance, and before they are full grown, earth-up the stalks on each side five or six inches, to blanch them white and tender: this will be effected in ten days or a fortnight. Under this culture, the successive crops will come in for use from June or July till November or December.

To save seed.—Let some of the April-sown crop run.

GARLIC. *Allium sativum.* (*One species, large-rooted.*)

A hardy bulbous-rooted perennial. The root, composed of many small cloves, is introduced in culinary dishes, and occasionally prescribed in medicine. Dried for use, it may be had all the year. A native of Sicily. Blows in June and July.

Propagation.—By planting the divided cloves of the bulbs.

Culture.—Garlic likes a light dry soil, rich, but not recently dunged. In Feb. March, or beginning of April, having some large full bulbs, divide them into separate cloves, and plant them singly in beds, in rows lengthwise. Set them from six to nine inches asunder, two or three inches deep, either in drills, or in holes made with a blunt-ended dibble. In placing the cloves in drills, thrust the bottom a little into the ground, and earth them over. The plants will soon come up. The bulbs will be full grown in July or beginning of August.

Taking the crop.—The maturity of the bulbs is discoverable by the leaves changing yellowish, in a decaying state; when they may be taken wholly up. Spread them in the sun to dry and harden, and then tie them in bunches by the stalks, and house them to keep for use as wanted; they will remain good till next spring and summer.

If, in their advancing growth, some are required for present

use, before attaining maturity, a few of the early planting may be drawn in May or June; but permitting the general supply to attain full growth as above.

GOURD. *Cucurbita. (Several species.)*

All the species are annuals, half-hardy in temperament. The fruit may be taken as food, both in its young green state and when at maturity. Pumpkin-pie is very common: but the fruit of the Succada, the Squash, and similar branches of the gourd family, is most grateful to most palates when of the size of a hen's egg, dressed in salt and water, sliced and served on a toast. It is also used for pickling. The chief species are,

Pepo, Pumpkin: a native of both Indies. Flowers July to Sept.

Melopepo, Squash; East Indies. Flowers within the same period.

Succada, Vegetable Marrow; a native of America.

Culture.—Sow the seed in April, in a hot-bed, under a frame or hand-glass, to raise plants for transferring to the open garden at the end of May, under a warm aspect; or for planting out in the middle of May on a trench of hot dung, under a hand-glass or half-shelter. Otherwise sow, at the beginning of May, under a hand-glass, without bottom heat, for transplanting into a favourable situation. Or sow three weeks later (after the twentieth) at once in the open garden, under a south fence, for the plants to remain. Cover the seed nearly an inch. The smaller-fruited kinds do best trained to an upright pole or trellis. From time to time, earth-up the shanks of the plants. As the runners extend five feet or more, peg down at a joint, and they will take root. Water copiously whenever warm weather without showers makes the ground arid.—See also *Flower Garden*, Tables I. II. *Gourd.*

HOP.

The cultivation of the Hop does not belong to the Gardener's department; yet many of our Readers may wish to know, that the stools or white buds of the Hop furnish an agreeable esculent, when boiled. The method is, to open the earth about the stools, in the early spring months, and to break off some of the buds.—The green tops, or young sprouts, are also esteemed for their delicious flavour, when boiled.—There are several different varieties of the Hop: that of Farnham, called the White-binds, is preferred, and usually sells at 30 per cent. higher than those of Kent and Sussex, that are called Red and Black-binds. In Warwickshire, the White-binds are indigenous, and great quantities grow in the hedges in favourable seasons, yet

left to rot; while Kent and Sussex hops, of much inferior quality, are used all through that county, and the beer, in general, "Shocking bad stuff:" neither do the poor know the delicate taste of *Hop-tops*.

HORSE-RADISH. *Cochlearia Armoracia. (One species.)*

A hardy native perennial. The long root-shoots, noted for their hot flavour, are generally eaten raw, scraped in fine shreds, and used in sauce, or as a salad. It is always in season.

Propagation.—It is raised by cuttings, both of the crown of the main root, and of the bottom and lateral off-sets thereof. Rather take the cuttings from the top part, cut about two inches long, with the top entire. Under a deficiency of top-cuttings, you may substitute some old knotty roots, cut into pieces about two inches long, with an eye or two to each. The produce from these will not be so soon useful as from the others.

Culture.—The soil should be deep, light rather than stiff. In the proper seasons, Feb. or March, prepare for planting. The ground should be trenched one or two spades deep; and the sets placed in the bottom of each trench.

The cuttings will soon strike root below, and send up long straight shoots to the surface in May or June; and the root will enlarge in growth till Oct., when you may occasionally begin taking up for use: in another year's growth they will be much finer and larger. They may be dug up generally as wanted, in autumn, winter, spring, and summer.

To take up horse-radish for use, cut a trench close along the first row, or as far as wanted for present supply, going to the depth of the upright root-shoots; which then cut off with a knife or the spade transversely, close to the mother stools, leaving these undisturbed. Earth them over again the proper depth. Take the side shoots from one row after another. They will send up supplies of fresh shoots for several years to come. Plantations last in perfection many years.

Plantations of horse-radish should be made in some bye place in the garden; as, if it be necessary to clear the land of it, much labour and inconvenience will ensue to eradicate it.

HYSSOP. *Hyssopus officinalis. (One officinal species.)*

This is a small evergreen under-shrub, of the aromatic tribe. Its leaves and young shoots are used sometimes as a pot-herb; but the leafy tops and flower-spikes are more in demand for medical purposes. Native of the south of Europe. Flowers from June till Sept.

Officinal Hyssop (Common). White, blue, and red-flowered. The blue is mostly cultivated.

Propagation.—It is raised by seed, and by slips of the root and top together.

Culture.—It likes a dry or sandy soil. When it is propagated by seed, sow in March or April. The plants may be transplanted into final beds in June or July, nine inches apart; or some may be planted as an edging. Or, you may also sow some seed for an edging, to remain where sown. Give the edgings occasional trimming, in their established growth; cutting away, also, any decayed flower-spikes in autumn.

Loosen the earth about the stems, in spring or autumn. They will continue several years in flourishing growth.

JERUSALEM ARTICHOKE. *(One species.)*

A hardy tuberous-rooted plant, which sends up a stem several feet high. The roundish-oblong fleshy tubers, which in shape somewhat resemble the potatoe, are a wholesome nutritious food, and come into use opportunely in autumn, and last as a store vegetable all winter and spring.

Propagation.—It is raised by planting some small offset tubers of the small roots.

Culture.—It will grow in any spare part of the garden; but to obtain large roots, give an open compartment of pretty good mellow ground. The season for planting is Feb., March, or beginning of April. Plant them either by dibble, in rows two feet and a half asunder, about eighteen inches in the lines, and three or four inches deep. The plants will come up in April and May. In their advancing growth, draw a little earth to the bottom of the stems. The root will multiply into a progeny of tubers, increasing in size till Sept. and Oct.: you may then cut away the stems, and dig up the produce as wanting.

The observations as to the difficulty of eradicating the roots of Horse-radish, applies also to the roots of this plant.

KIDNEY-BEAN; *also called* FRENCH-BEAN.

(Two species, and many varieties.)

An annual; comprising Dwarf and Climbing kinds; profitable in the production of numerous edible seed-pods, from June or July till Oct.: and on the continent, the seed of the white sorts is highly esteemed, either in soups, or separately boiled, and eaten with melted butter. There are numerous cultivated varieties under each species.

I. *Dwarf Kinds.*—The *Phaseolus vulgaris,* Common or

Dwarf Kidney-Bean, is a native of the East Indies. Flowers from June till Sept. It is the parent of the following sorts:

Early Yellow Dwarf.	*Canterbury White.*	*Tawny.*
Early Red-speckled.	*Black-speckled.*	*Large White Dwarf.*
Early Black, or *Negro.*	*Brown-spekled.*	*Lima Pole.*
Early White.	*Dun-coloured.*	*Asparagus Pole.*
Battersea White.	*Streaked* or *Striped.*	*Cranbury Pole.*

II.—*Runner*, or *Climbing-Kinds.*—*Phaseolus multiflorus*; supposed by Mr. Donn to be a native of South America. Flowers from July till Sept. Has produced several varieties.

Scarlet Runner; the most plentiful and lasting bearer, preferable for the main crop of runners.

Large White Runner; a variety of the Scarlet. Seed and blossom white, but the pods similar to the Scarlet Kind.

La Princesse; small pod, seed & blossom white, seed roundish and very protuberant, and full formed while the pod is tender: a lasting bearer.

White Dutch Runner; very long smooth pods, but not so long in flower as the former.

Constitution and habits.—Both the above classes of Kidney-beans, Dwarfs and Runners, are tender in their nature, unable to grow freely in the open garden before April or May, the seed being liable to rot, and affected by sharp cold.

Estimate of sorts.—The DWARFS bear sowing a little sooner, and make returns quicker than the Runners. The Early Yellow, Early Black, and Early Red-speckled, are among the most hardy and most forward: the Early White comes in a few days later, but is of superior flavour. The Canterbury, Battersea, Black-speckled, Brown-speckled, Dun-coloured, Striped, and Tawny, are plentiful lasting bearers. Growers for sale in general depend on the Canterbury and Battersea for main crops; but the others are also profitable sorts. The Dwarf Kidney-bean produces pods in perfection only about three weeks or a month.

The RUNNERS yield fruit a much longer time than the Dwarfs. The Scarlet Runner ranks first. The White variety is eligible for a principal crop. The Dutch Runner is also a great bearer, but not so lasting as the former. *La Princesse* is an abundant bearer, very mealy, without much flavour. Other smaller Runner kinds are degenerate varieties of the Canterbury and Battersea White Dwarfs, casually shooting into runners, and bearing in tolerable abundance.

Soil.—The soil for both species should be light and mellow, inclining to a dry sand for the early sowings, and to a moist loam for the sowings in summer.

SEPARATE CULTURE OF DWARFS.

Open garden.—About the beginning of April, if the weather be temperate, make the first sowing, in a dry south border or other sheltered compartment with a good aspect; or sow in a single row close under a south fence, beginning with a small proportion of the most hardy early sorts. It is a good method to follow in a week with a second sowing, in case the former should fail. You may sow for a larger crop about the middle or twentieth of April. For the early crops, make the drills two feet asunder. The common depth is an inch and a half for the smaller-sized beans. Drop the beans in each row, at this season, pretty close together, as many may fail; from one to two inches apart. Cover in evenly, the full depth of the drill.

For the main crops, sow towards the end of April; and in full crops in May and June, a portion once every fortnight or three weeks. Draw drills, two feet or two and a half asunder, an inch and a half or two inches deep. Drop the beans therein, three inches apart, and earth-in the full depth of the drills.

For supplies in succession, sow in July, once or twice; and make a moderate sowing at the beginning of Aug. for last crop.

In the drought of high summer, it is advisable to accelerate the germination of the seed, by laying it in damp mould, till it begins to sprout, or by soaking it in soft water for six or eight hours previous to sowing; and by watering the drills to receive it.

Crops sown after the middle of July should be favoured in situation, or the time of their bearing will be much shortened by the decline of summer.

From this course of sowings, a regular succession of young green pods will be produced from June and July till Oct.

As the crops advance in growth, draw earth to the stems.

A small white variety of the dwarf kind is sown abundantly in various parts of the continent of Europe, the seeds of which are cooked, and denominated Haricots; a dish greatly prized by many, but not very pleasant to the palate of our countrymen. This article produces almost the greatest portion of nutritious matter of any vegetable grown in this climate.

Crop raised under glass, to fruit in the open garden.—At the end of March, you may sow a small portion under glass, for transplanting into the open garden in the first or second week of May. Sow in small pots, because the plants can be turned out with less check to their growth. Sow three beans in each pot. When the seedlings are two or three inches high, harden them by degrees to the air; and plant them on a good open

border as soon in May as the season will suit. They will yield fruit about a fortnight sooner than the earliest raised under exposure to the weather.

Crop raised on slight heat.—A crop to fruit early in the open garden may be accelerated with more certainty by plunging the pots containing the seed-beans into a gentle hot-bed; or some sown in shallow pans or boxes may be set on the shelves of a stove. Just at the opening of April will be early enough to begin. Having nursed them to the proper stage, plant out under a south fence; either three inches apart, if in a single line; and eighteen inches by three, if in two lines: or it may be better to set the plants in patches of nine or seven, to receive the temporary shelter of a hand-glass, lest the transition from a hot-bed, at once to the fluctuating air of spring, be too violent.

Entire course of forcing.—The most early fruit in perfection is obtained by culture in a stove, sowing from mid-winter till the end of March. Other forcers, quite in opposition to the season, raise kidney-beans in Aug.; and thence till the twenty-first of Dec.; which day may be regarded as the boundary between late and early forcing. See HOT-HOUSE, *Miscellanies*, "Kidney-bean," for the culture in a stove.

From the middle of Feb. to the beginning of April is the most successful period for forcing the Kidney-bean in a hot-bed. The Early White Dwarf, from its low growth, is to be sown in preference to the kinds recommended for a stove, unless it be intended to fruit the plants in a deeper frame than ordinary. Early Yellow and Early Black are next, as not growing very high.

The temperature for the Kidney-bean is 60° for the minimum; and 75° for the maximum of the fruiting-bed.

In forcing soon in the spring, raise the plants on a smaller bed, earthed over with light rich compost, six inches deep. Sow the beans thickly, covering them an inch deep.

The second hot-bed should be earthed over to the depth of eight or nine inches. Into this transplant the seedlings as soon as they are two or three inches high; setting them in cross rows twelve or fifteen inches asunder, by four or three inches in a line.

Or when the season is so far advanced, that one bed, with the help of linings, will bring the plants well into fruit, you may sow at once, at the full distance, in a similar hot-bed, to continue for podding. Cover the glasses every night with garden-mats; also partially in severe weather. Admit fresh air

moderately every mild day, and give occasional gentle waterings. The plants raised in Feb. will come into bearing in April and May, making moderate returns: a new crop every three weeks will keep up the succession: those sown at the beginning of April will last till the middle or end of June, when they will be succeeded by the early half-sheltered crops in the open garden.

CULTURE OF RUNNERS.

The Runner Kidney-beans may be sown in a small portion, towards the end of April, if tolerably warm dry weather: but the beginning or middle of May will be time enough to sow a considerable crop: this crop will last from the time the plants begin first to bear till the end of Autumn; and the different time of sowing can only be useful as a safer guard against the frosts, or the casualty of the first crop being cut off. Allot, principally, the Scarlet and Large White Runners. Some Dutch Runners are eligible. In sowing, draw drills about an inch and a half, or not more than two inches deep. Let parallel rows be at least four feet asunder, to admit in the intervals tall sticks or poles for the plants to climb upon. Place the beans in the drills four inches apart, and earth them in evenly, the depth of the drills. A row contiguous to a fence or building may ascend upon lines; and this forms a most economical crop. Some may be sown in a single row along a border, or on each side of a walk, and have the support of a slight trellis of laths and lines; or they might be arched over with similar materials, to form a shady walk or bower.

With a view to get the crop early, Scarlets may be sown in April, either in a slight hot-bed, or in pots, under frames or hand-glasses, to raise and forward the plants till two or three inches high: then, at the end of May, transplant them into the open garden.

As the plants come up, and advance from three to six inches in growth, hoe some earth to the stems. When they begin to send forth runners, place suitable supports to each row; and conduct the tendrils to the sticks or lines. They are so prolific, that the returns from three sowings, in May, June, and July, will last from July till Oct.

CULTURE COMMON TO BOTH KINDS.

Taking the crop.—Gather the pods, both from Dwarfs and Runners, while they are young, fleshy, brittle, and tender; for then are they in the highest perfection for the table: and the plants will bear more fully, and last longer in fruit, under a course of clean gathering, not leaving any superabundant pods to grow old.

The seed is cooked separately, as soon as the beans are sufficiently formed in the pods; and, of course, is most agreeable while tender.

To save seed.—Either sow a portion for that object, or leave rows wholly ungathered of the main crops, or preserve a sufficiency of good pods promiscuously. The beans saved should be the first-fruits of a crop sown at a period which throws the entire course of growth into the finest part of summer. Let them hang on the stalks till they ripen fully in Aug. and Sept.; then let the haulm be pulled up, and placed in the sun, to dry and harden the seed, which should be afterwards cleared out of the husks, bagged up, and housed.

LAVENDER. *Lavandula Spica.* (*One officinal species.*)

A shrubby evergreen; cultivated for its spikes of small blue flowers: these are put into bags, and placed among clothes, to diffuse their aromatic scent: but used in larger quantities, to make lavender-water. It is indigenous to the south of Europe. Flowers from July to Sept.

Propagation.—It is propagated by cuttings of the last year's shoots, at the end of March and in April. Detach them five, six, or seven inches in length; pull away the under leaves, and plant them in a shady border. Water occasionally, and shade in hot weather till the germs take root. They will be fit for final planting out in the following Sept. or Oct. or in spring.

Final planting.—Lavender likes a dry, chalky, or oolite soil. It may be planted either in distinct plants, two feet asunder, or to form a sort of hedge-row, in one or more lines, especially where large supplies of flowers are required for distilling. Give the plants occasional trimming, taking off the gross and rampant shoots of the year, and the decayed flower-spikes.

New plantation.—The plants will continue in useful growth several years: when they become stubby, naked or disorderly, make a fresh plantation.

Note.—The cultivation of Lavender will be an object worthy of attention to those who wish to promote cottage gardening; as the importation of this, in the state of oil of lavender, is to a large amount; and what little is produced in England is much superior in quality, and sells at a larger price. (See § 47.)

LEEK. *Allium Porrum.* (*Three nominal varieties.*)

A hardy biennial; used in autumn, winter, and spring, for

soups, broths, stewing, and to boil for eating like greens. A native of Switzerland. Flowers in April and May. The following are nominal varieties :

Large London. *Flanders.* *Scotch*, or *Flag.*

Propagation.—It is raised from seed.

Soil and site.—The soil should be light and rich; the situation should be open. Let the ground be dug in the previous autumn or winter, ready for sowing in spring.

Times of sowing.—A small first crop, or the subordinate crop in the onion bed, may be sown at the end of Feb. if the weather be mild and the ground in a dry state : but it is better to sow the first week of April. It is eligible to sow a secondary crop at the end of April, or beginning of May, for a late succession in winter and the following spring.

Transplant when from six to ten inches high, from June till August. For this purpose, thin out a quantity regularly from the seed-bed, either in showery weather or after watering the ground : trim the long weak tops of the leaves and the root fibres ; and plant them, by dibble, in rows from nine to twelve inches asunder, by six or eight inches in the row.

The main crops will attain a mature size in Sept. Oct. and Nov. ; and continue in perfection all winter and the following spring.

To save seed.—Transplant some best full plants, in Feb. or the beginning of March, into a sunny situation. They will shoot in summer, in single tall seed-stalks. Support them, as necessary, with stakes ; and they will produce ripe seed in Sept.

LETTUCE. *Lactuca sativa. (Many varieties.)*

An annual, but of a few months' duration ; yet by successive sowings, in spring, summer, and autumn, this vegetable is obtained in most parts of the year. Besides being a principal salad, it is sometimes used in soups.

Green Cos.
White Cos.
Silver Cos.
Spotted Cos.
Egyptian Early Cos.
Black-seeded Green Cos.
Brown Cilicia.
Green Cilicia.
Common White Cabbage.
Large White Cabbage.
Brown Dutch Cabbage.
Imperial Cabbage, large and fine.
Grand Admiral, or *Admirable*, a very large fine Cabbage Lettuce.
Large Roman.
Hardy Green Cabbage (Capuchin.)
Tennis-ball Cabbage.
Prussian.

Estimate of sorts.—In a very young state, the Cabbage

Lettuces have a milder taste than the Cos: but when both are full grown, the Cos is preferred for salads, while the Cabbage kinds are more used for soups. The Cilicia is of a nature between the other two.

For principal summer and autumn crops, the White, the Silver, the Green, the Spotted, the Egyptian, with the other kinds of Cos, are eligible in the first degree. Next to these are the Common and the Large White Cabbage, the Brown Dutch, the Imperial, the Grand Admiral, the Roman, and both sorts of the Cilicia. Those kinds should be reserved for the end of summer which are the most backward in starting for seed; among which are, the Hardy Green, the Brown Dutch, and the Tennis-ball. Any of the other kinds may be resorted to for secondary crops.

For a very early crop, or for a late sowing, to stand the winter, the fittest of the Cos kinds are, the White, the Green, the Black-seeded, and the Egyptian: the latter is hardy, forms a close head, and comes early. Of the Cabbage class, the Brown Dutch, the Hardy Green, the Common White, and the Tennis-ball, are much relied upon for their hardiness in standing severe weather.

Propagation.—From seed.

Soil and situation.—All the sorts grow freely on any rich mellow soil, where the sub-soil is dry.

For the first early crops, sow at the end of Jan. or beginning of Feb. if mild dry weather—or, more generally, later in Feb. or in the first week of March,—on a sheltered south border.

But for the main summer crops—sow in March and April, in any open situation. Follow with secondary sowings twice or oftener every month, from May till about the seventh of Aug. to provide for a succession through the summer, till Oct.; as the plants sown early in the year soon fly up to seed-stalks. The sowing in the midst of summer should be on shady borders.

Process in sowing.—Lettuce of all kinds should be planted in good rich soil, when they have about four leaves: if placed in rows, at about one foot by nine inches, they will have plenty of room to come to their full growth.

Cos Lettuces, when about three parts grown, may be forwarded in cabbaging, by tying the leaves together, moderately close, with strings of bass.

CROP RAISED ON HEAT.

For an accelerated crop, some may be sown in the beginning or middle of Feb., on a gentle hot-bed. When the plants are

one or two inches high, in March or April, prick a portion either into a warm border, if a mild season, and let them be shielded with mats during nights and bad weather; or into a frame, or slender hot-bed, to bring them more forward. According to their progress, in April or May, transplant them into the open garden, from six to twelve inches asunder.

Lettuces are at all times desirable; and a crop may be thus raised by sowing the seeds in a large pot, and pricking them out into any sheltered frame. It is also usual with gardeners who force radishes, to sow lettuce amongst them; and when the former are off, the latter are in good state for planting out.

WINTER-STANDING CROP.

To have lettuces for drawing in minor growth, during winter, and to stand over in part for next spring and the beginning of summer, sow in the third week of Aug. and in the first fortnight of Sept. the suitable hardy sorts. Some of these may remain where sown; but about the middle or end of Sept. prick out a quantity (of the Aug. sowing) into prepared warm-lying ground, in rows six inches by four apart; and, as Oct. advances, let some considerable quantity (of the Sept. sowing) be pricked out, three or four inches asunder. A quantity of choice Cos may be planted under frames or hand-lights, or under awnings.

The kinds that are found to stand the winter best, is the Brown or Egyptian Cos, and the Black-seeded Green Cos, the Brown Dutch, and the Tennis-ball Cabbage Lettuce.

During the winter, let those in frames, and the others under occasional shelter, have the free air on all mild dry days; but let them be defended alawys at night: in the day-time, protect them from heavy rain, snow, and frost, but so as to admit the light. Also, in a severe season, you may cover the choicer plants, in the open borders, with mats, light straw-litter, or fern; or occasionally with reed-pannels or wattled hurdles, placed slantingly over to the wall. These coverings should be continued only in rigorous frosts; and removed when the weather is open.

Then in the spring, about March or April, the plants in open borders, which have survived the winter, should be thinned, so as to stand from six to twelve inches apart. At the same period, all the lettuces which have wintered under frames, hand-glasses, or mats, should be transplanted into the open garden.

Winter and early spring lettuce may be further accelerated

by transplanting some of the strongest autumn-raised plants into hot-beds, or the borders of forcing-stoves, in Dec. Jan. and Feb. Those excited by heat in Dec. will have cabbaged-hearts by the beginning of March. You may further, towards the close of Sept., sow a small portion on a warm border or slopping terrace; the plants to remain, and take the chances of the weather.

Lettuce, when run up to the seed-stalk, contains a juice called morphin, a powerful narcotic: if the plants are pulled up in this state, and given to fatting hogs, it tends to cause the animals to sleep, and thus become highly beneficial in this department of rural economy.

To save seed.—Leave or transplant either some of the early winter-standing plants, in March or April, or of the forwardest spring-sown crops, in May or beginning of June, fifteen inches asunder. They will produce ripe seed in Aug. and Sept.

LIQUORICE. *Glycyrrhiza glabra. (One species.)*

A perennial, cultivated for the root, which contains a saccharine juice of medicinal quality. It is a native of the South of Europe.

Propagation and soil.—On account of the depth to which the root strikes, when the plant has room to flourish, the soil should have a good staple of mould thirty inches or three feet in depth. To prepare it for the plants, trench all the staple well to the sub-soil.

Culture.—Taking the small horizontal roots of established plants, that are possessed of buds, cut them into sections six inches long. Having, in the spring, traced out rows a yard asunder, plant the sets along each row, at intervals of nine inches, covering them entirely with mould. For the first three years, you may cultivate a crop of onions between the rows. During the summer, keep the plot clear from weeds; and when the subordinate crop comes off, hoe and dress the ground. At the close of autumn, or as a winter-dressing, fork or dig between the rows, to stir and refresh the surface; and cut down the decayed stems of the plants.

Taking the crop.—After three or four years' growth, the main roots will be of a mature size. In the course of the following winter, begin to dig them up, opening a trench close to the first row, as deep as the roots: then, with the spade, turn out all the roots clean to the bottom. So proceed from trench to trench; and prepare the ground for some other crop.

Whenever the allotment system of giving bread to the in-

dustrious shall be established, the cultivation of Liquorice will afford remuneration for labour; cause land to produce triple what most other general crops will do; and form a wholesome substitute for malt, instead of the mischievous drugs used by porter and ale manufacturers, and the horrid mixture sold to publicans by brewers'-druggists. (See § 47.)

LOVE-APPLE, or TOMATO. *(Three principal varieties.)*

A tender annual; of long trailing growth, producing bunches of large round berries, which are used by the cook and confectioner, as an ingredient in soups, as a pickle, and as a preserve.

The species, *Solanum Lycopersicum*, is a native of S. America. Flowers from July till Sept. Has produced three varieties:

Large Red Fruited: small cherry-shaped.
Large Yellow: small cherry-shaped.
Large White.

Estimate of sorts.—The first sort is in most estimation; but a few plants of the other kinds may be raised, for variety.

Constitution.—The plants must be raised and forwarded in a hot-bed, under glass, to yield ripe fruit timely in autumn.

Course of culture.—Sow in any general hot-bed, about the end of March, or beginning or middle of April. As soon as the plants are about two inches high, pot them singly into sixty-sized pots placed in the hot-bed. Let them have fresh air, and occasional waterings. Then, about the middle, or end of May, transplant them into a south border, to have the full sun. Let them stand from six to twelve feet asunder. If the nights be cold, defend them with hand-glasses, or by whelming a large garden-pot over each plant. Or, in May, the progress of the plants would be better kept up, by transplanting them from the hot-bed, upon holes or hot dung, earthed to six inches' depth, allotting one plant to each hole; and they may be covered with hand-glasses, till they begin to run in June.

As the plants advance in strong trailing stalks, either train them to stakes, spreadingly, or, where planted near a wall or pales, nail the branches to the fence. The runners produce bunches of fruit at the joints; which will ripen, the earlier in August or Sept. and the later in Oct. Some of the late-ripening fruit, gathered in Oct. and hung up in bunches in any dry apartment, will continue good for use in Nov.; or some may be gathered for pickling, when green.

To save seed.—Gather some of the best ripe fruit in autumn; clear out the seed; wash and cleanse it from the pulp, and dry it thoroughly. Put it up in papers or bags, for use next spring.

MARJORAM. *(Three species.)*

The three species consist of an annual and two perennials; all aromatics, of sweet flavour, used as relishing herbs, in soups, broths, stuffings, &c. The annual is sometimes used in medicine.

The annual species, *Origanum Majorana*, came originally from Portugal, where it is a biennial: flowers in July and August. One of the perennials, *Origanum heracleoticum*, Winter Marjoram, is a native of Greece: flowers from June till Nov. The other perennial species, *Origanum vulgare*, is a native of Britain: flowers from June till Nov.

Sweet or *Summer* or *Knotted Marjoram.*
Common Pot Marjoram. *Winter Marjoram.*

Soil.—All the species like a light, dry, unexhausted soil.

Culture of the annual.—The Sweet or Knotted Marjoram is raised from seed every spring. Sow in April. When the plants are one, two, or three inches high, plant six inches apart, giving water. Take the crops green in summer and autumn. It is usual to gather a supply to dry for winter.

Culture of the perennials.—May be propagated by off-sets, slipping or parting the roots in spring or autumn, which are to be planted from eight to twelve inches asunder: they will grow freely; and increase in stocky bunches, furnishing green tops for use all summer and autumn. The Winter Marjoram will afford tops in winter; or a store, gathered in summer (July or August), may be dried to keep for winter.

MARIGOLD. *Calendula officinalis. (Two varieties.)*

A hardy annual. Its flowers are the useful part, chiefly as an ingredient in broth. The Marigold also enters into some recipes of domestic medicine. Native of South of Europe. Flowers from June till Oct. Has produced two varieties:

Orange-coloured Flowered. *Lemon-coloured.*

The first is most generally esteemed; and the single flower is preferred.

Course of culture.—Sow in the spring, Feb. March, or April; or you may deposit the seed in autumn (Sept.), to have it forwarder. Sow on a light dry soil. When the plants are up, they may be transplanted to about one foot by nine inches asunder. A store for winter should be gathered when in full flower, spread to dry out of the sun, and afterwards put up in paper-bags.

To save seed.—The flowers, as far as they are left to run, will in autumn produce a competency.

MELON. *Cucumis Melo. (Several varieties.)*

A tender annual; introduced from the warmer climates of America, Asia, &c. This exotic requires the aid of artificial heat and glass in this country; where it is cultivated with eminent care, on account of its large fine fruit, of peculiar rich flavour. Ripe fruit may be had, by forcing, at any season; but the main crops, raised for the general demand, are seldom cut, at the earliest, before May; and the last succession mostly ceases to yield fruit after Oct. The melon was originally brought to us from Jamaica. It is also a native of the Levant. Flowers from May till Sept. Some of the best varieties of the fruit are:

Netted Cantaleupe, large round.
Early small Black Rock Cantaleupe.
Carbuncled Rock Cantaleupe, cheese-shaped.
Green Cantaleupe (Oblong Rock).
Orange Cantaleupe.
Early Golden Cantaleupe.
Scarlet Cantaleupe.
Silver Cantaleupe.
Small Romana, oval.
Larger Netted Romana, oval.
Polignac.
Musk, or *Oblong Ribbed*, Netted-rinded.
Oblong, smooth-rinded.
Round, smooth, green-rinded.
Round, white-rinded.
Green-fleshed.
Water-Melon, a very large roundish green fruit.

Estimate of sorts.—The Cantaleupes are in high estimation, for their general superior flavour and curious shapes, although not uniformly such great bearers as some others: some of them grow very large. The Netted Cantaleupe is a good bearer; the fruit above the middle size, and high-flavoured. The Early Small Black Rock Cantaleupe is a good bearer: but there is a large Black Rock which holds an inferior rank, both for bearing and the flavour of the fruit. Of the Carbuncled Rock, the smaller is by far the best. The Green Cantaleupe grows rather larger tha nthe Early Black Rock, and vies with it in flavour. The Orange Cantaleupe is an excellent early variety, a great bearer; the fruit under the middle size. The Early Golden and Prolific sets speedily, and soon ripens; the fruit middle-sized, the flavour not so elevated as might be expected from a Cantaleupe. The Silver Cantaleupe bears freely; the fruit middle-sized, and for flavour ranking with the finest. The Small Romana is one of the most plentiful bearers, either for an early or main crop; the fruit not abundantly juicy, but good flavoured. The Larger Netted Romana bears more freely than large sorts in general; the fruit is substantial and heavy, a single melon sometimes weighing ten pounds, not so juioy as the best Cantaleupes, but the flavour high and grateful. The

Polignac is also a rich-flavoured fruit. The old Oblong Ribbed is generally a good bearer, and the fruit agreeably flavoured. The other kinds also will ripen here in good perfection, except the Water-melon, which does not always ripen freely with a good full flavour. For principal culture, however, the Cantaleupes, Romanas, and Polignac, are indisputably preferable: any of the others may be adopted in secondary crops, or for variety.

Constitution.—The melon requires a minimum heat, of about 65° of Farenheit, from the time of germination till that of fructification; and a heat of about 75° to fruit in.

Propagation.—From seed.

Time of beginning to force.—From the time of sowing, ripe fruit may be cut in about fifteen weeks, as an average period: when many short and wintry days fall in the course, it may last eighteen weeks; but when the forcing is not commenced till the days are nearly twelve hours long, and continually lengthening, ripe fruit is sometimes cut in ten weeks. The period also depends upon the sort. Little time is gained by beginning excessively early. The early and main crops are commonly originated from middle of Jan. to first week of Feb.; the later, or succession crops, at the beginning of March; and late crops, intended to fruit at the end of summer, in the middle of April.

Choice of seed.—Seed under the age of two years is apt to run too much to vine, and shew only male flowers: but new seed may be mellowed by being carried in the pocket a fortnight or more, till the heat of the body has dried and hardened it. Seed, twenty years old, has been known to grow and make fruitful plants; but seed which has been kept three or four years is quite old enough, and less likely to fail than older.

Compost.—The melon will succeed in any inexhausted loam rich in vegetable rudiments, with a mixture of sand, but not too light. The ingredients should have been incorporated and pulverized by long previous exposure and turning over. The compost should be dried under shelter before it is used, and warmed in the frame for potting.

Pigeons'-dung is very generally applied by the Persians in the rearing of melons; and on this account, probably, their melons are finer than those of other countries. Hence the great number of their dove-cotes, and the high value of this dung, which rears a fruit indispensable to the existence of the natives during the intense heat of their summer.

FRAME CROP.

Culture in the seed-bed.—The plants may be originated in a

cucumber-bed; though a separate bed is to be preferred, a slight degree higher than for the cucumber at the same season.

Having moulded the bed, and proved the heat, sow in pans three inches, or pots four inches, deep, rather than in the earth of the bed. Sow a second portion in five or seven days, to provide against failure. Do not at once plunge the pots to the rims. As soon as the plants appear, give air cautiously; guarding the aperture with matting at night, and on frosty or gloomy days. At favourable opportunities, wipe the condensed steam from the glasses. When the seed-leaves are about half an inch broad, prick the plants into small pots five inches in diameter, three in each pot, giving a little aired water, just to the roots; then plunge the pots into the earth of the hot-bed partially, or to the rims, according to the heat. Admit fresh air, every day in moderate weather, at the upper end of the lights, raised an inch or two, according to the temperature of the external air; more freely when sunny than cloudy; shutting closer, or quite close, as the afternoon advances towards evening; or sooner, if the weather changes cuttingly cold: and cover the glasses every night with mats; and uncover in the morning, as soon as the sun is high enough to reach the frames. Give occasionally a very light watering, when the earth appears dry. As the plants advance into the first rough leaves, the first runner-bud in the centre should be stopped, by pinching the top off, close to the first or second joint. Be careful to support a regular heat in the bed, by laying, first, an outward casing of straw-litter round the sides, to defend it from the weather: afterwards, if the heat declines, remove the above casing; and apply a moderate lining of hot dung, to one or more of the sides. In matting at night, be careful not to drive the rank steam of the linings into the beds, by letting the ends of the mats hang down.

Fruiting-bed.—The pile of dung should be about six inches deeper than is required for the cucumber at the same season.

As soon as the plants have leaves two or three inches broad, or begin to push lateral runners, prepare for transplanting them into the fruiting-bed; which should have been made a sufficient time previously, to allow to be moulded by the proper stage for receiving the plants. Having framed and proved it as directed for the cucumber, mould it by degrees, to eight, ten, or twelve inches depth; first laying the compost in little hills of that thickness, one under each light, with the intervals earthed only two or three inches, for the present, till the general heat is moderated. When the earth of the hills is warmed by the

heat of the bed, put in the plants from the nursery-frames, turning them out of the pots with the ball of earth entire: set a ball, containing one plant, in the middle of each hill, inserted clean over the ball; or set at most two plants under the centre of a large light. After planting, give a gentle watering over the hills and round the roots, avoiding to wet the shanks of the plants: shut down the glasses close, till the heat and steam rise; then give air moderately. Extend a slight shade over the glasses in the middle part of warm summer days, if the plants shrink or flag their leaves before fully rooted in the hills; which they will be in two, three, or four days after planting.

As long as rank steam is perceived to rise from the bed, leave an aperture, even at night, for it to escape; guarding against the influx of cold air by a curtain of matting. Admit fresh air to the plants, by tilting the glasses more or less at the most favourable hours in a mild dry day. After the bed has come to a sweet heat, shut close down at night. Cover the glasses every night with mats. Give, opportunely, gentle waterings. When the general heat of the bed is become moderate, earth up, by degrees, the intervals between the hills, till the depth of earth be equal.

As the plants advance into the first runners, three or four joints in length, if no fruit be shewn, stop them at the third joint, in order that they may produce fruitful laterals. As the runners extend, train them over the surface of the bed with neat pegs.

As the plant proceeds, the runners will shew embryo-fruit at the joints; at which stage, if there were any deficiency in the bottom heat, should the weather be unfavourable, the young fruit will turn yellow and dwindle off. Therefore, if before the 1st of July the heat be much declined, apply a good lining close to the sides of the bed, as high as the bottom of the frame: any former lining, if not much decayed, may be forked up, and the best of it worked in with the new dung: such addition of a fresh lively heat will greatly conduce to the free setting and progressive growth of the fruit. As the fruit enlarges, it becomes more necessary to seize every proper opportunity of admitting air; raising the lights from one to four inches, according to the season, the heat of the bed, and temperature of the external air; shutting close, if that should turn cold, and always timely towards evening. Continue to cover the glasses with matting every night, till settled, fine, warm weather, in June or July. Admit air more freely as confirmed summer approaches.

Water circumspectly and scantily while the fruit is setting or young in growth, as too much moisture would make it decay. Take a warm morning for watering, before the middle of May; in summer, the afternoon or evening. Use soft water, warmed to the air of the frame; and let as little as possible fall on the setting or new-set young fruit; nor much near the main-head of the plants, for fear of rotting that part. Shut down the lights, after watering, for a short time; and if in the morning part, and a strong sun, spread a mat over, to prevent the sun from injuring the plants by acting on the water lodged on the spray and leaves. As a strong steam will now arise, remove the mats in an hour or two, and raise the glasses at the top, to give vent to the steam and admit air to the plants.

In the middle of hot days, if the sun cause the plants to flag much, extend a shade over the glass, for three, four, or five hours, as may seem expedient.

As the plants sometimes run into many useless runners, it is occasionally necessary to regulate them; cutting out the superfluous, unfruitful, or evidently useless shoots, especially the very weak and the most luxuriant; for the middle-sized are the most fertile.

As the fruit-bearing runners come into blossom, you may assist the setting of the fruit, by impregnating some of the female blossoms with the male flowers, as described for Cucumber. They, however, will also set naturally; and produce fertile seeds, if the time of fructification fall at a season when the glasses can be left almost constantly open.

As the fruit increases to the size of a walnut, place a flat tile or slate under each, to protect it from the damp of the earth: the slab, thus interposed, will also assist the fruit to ripen, by reflecting the rays of the sun. The interval between the setting of the fruit and perfect maturity is generally from thirty to forty days: but the plants in the same bed, and the vines on the same plant, often shew some difference in the time of reaching maturity. As the fruit becomes nearly ripe, lessen the quantity of water given; barely keeping the plants from flagging; or withhold water when the fruit begins to turn colour. Ripe melons are distinguished by their full size; sometimes by turning yellowish, more constantly by imparting an agreeable odour, often by the base of the footstalk, close to the fruit, cracking in a little circle. On these indications of maturity, the fruit should be cut, before too mellow or dead-ripe, that it may eat with a lively sharp flavour. The morning is the time for cutting.

Second crop from the same plants.—When the fruit of the first crop is off, a second crop may be obtained from the stools; which often proves more productive than the first. If the first crop is taken before the middle of June, the second will come in at a very good time.

For this purpose, as soon as the fruit is cut, prune the plant. Shorten the vigorous healthy runners at a promising joint, to force out new laterals; cutting about two inches above the joint. At the same time, take off all decayed or sickly vines, and all dead leaves. Stir the surface of the mould; and renew it partially, by three inches' depth of fresh compost. Water the plant copiously; shutting down the glasses for the night. Shade in the middle of hot days; and give but little air, until the plant has made new radicles and shoots. Afterwards repeat the course of culture above described, from the stage when the first runners are sent out, till fruit is cut.

PIT FRUITING-BED.

A glazed pit, to receive either stable-dung, leaves, or tanner's-bark, is calculated to ripen superior fine fruit. The well of the pit may be formed either by a nine-inch wall, or by strong planking; a yard in depth, from six to eight feet wide, and in length from ten to twenty feet, or more, as required. A low glass-case is to be fitted to it, adapted to the growth of the melon. Having raised the plants in a small seed-bed as for the Frame crop, ridge them out into the pit, as above described under *Fruiting-bed.* Give the same subsequent culture; and when the strength of the hot-bed begins to decline, support the standard temperature by a sufficient outward lining.

HAND-GLASS CROPS.

A succession, or late crop, to fruit in Aug. and Sept., may be raised on hot-bed ridges, under hand-glasses. Sow in a hot-bed, from the middle of March to the middle of April. When the plants have been up a few days, prick some into small pots, two plants in each; managing as directed for the young frame-plants. When the plants are a month or five weeks old, they will be fit to ridge out, under hand-glasses. With well-prepared stable-dung, or with a mixture of fermented tree-leaves, build the hot-bed four feet wide, and two feet and a half thick; the length, according to the number of glasses intended; allotting the space of four feet to each.

In a week or ten days, or when the dung, or dung and leaves, is brought to a sweet well-tempered heat, mould the bed ten or twelve inches thick; then place the glasses along the middle, and keep them close till the bed has warmed the

earth. The same, or next day, insert the plants: turn them out from the pots with the ball of earth entire; and, allotting plants for each glass, insert the ball into the earth clean down over the top, closing the mould about the stems. Give a little water, and place the glasses over close. From about nine in the morning till three in the afternoon, of the first two or three days, shade the plants till they have taken root; when admit the sun more freely; yet only by degrees from day to day, till they can bear it fully without flagging much. Give air, daily, in temperate weather, by tilting the edge of the glasses, on the south side, an inch or two; but in the present stage of the plants, shut close at night. Cover with mats till morning; constantly keeping the glasses over. Give occasional moderate waterings, with aired water. Cover in the day-time with mats, in bad weather, or heavy or cold rains; and continue the night covering till confirmed summer in July. Meanwhile, attend to the heat of the bed: if this be declined, so that the minimum temperature be not 65° at night, with the aid of matting, line the sides with hot dung, covered with a layer of mould. The revived heat from the lining will forward the plants in fruiting; while the earth at top will enlarge the surface for the runners, and the bed for the roots. When the runners have extended considerably, and filled the glasses, they must be trained out. Accordingly, at the beginning of June, in favourable settled warm weather, train out the runners; cutting away dwindling and useless crowding shoots: then the glasses must be raised all round, two or three inches, upon props, to remain day and night. Cover with mats in cold nights and bad weather; having, to support the mats, first arched the bed over with rods or hoop-bands. Apply moderate waterings as necessary, in the morning or afternoon. Oiled-paper frames, formed either archwise or with two sloping sides, about two feet or two and a half high, and of the width of the bed, are very serviceable in this stage. Some persons use them from the first, under a deficiency of hand-glasses. But the proper time for recourse to them is when the plants have been forwarded in hand-glasses, till the runners require training out beyond the limits of the glasses, some time in June: then removing the glasses, substitute the oiled-frames. As these paper-screens will entirely cover the bed and plants over which they are to remain the rest of the season, they will afford protection from heavy rains or tempests, as well as from nocturnal cold, and also screen the plants from the excessive heat of the sun, while, being pellucid, they admit its influence

of light and warmth effectually. Give proper admission of free air below, and occasional watering.

With respect, however, to the crop, for which no oiled paper-frames have been provided, continue the hand-glasses constantly on the bed, over the main head and stem of the plants throughout the season, to defend those capital parts from casual injuries by the weather.

Throughout June, and thence to the decline of summer, be careful, if much rain, or other unfavourable weather or cold nights occur, to shelter the beds occasionally with an awning of mats or canvas, particularly when the plants are in blossom. Likewise, turn in some of the best full-set exterior fruit under the glasses; or some spare glasses might be put over the outside melons, to forward them without check to maturity. Some will be ready to cut in July; others in August, the more general time, and in Sept.; they being generally, after setting, from thirty to forty days in ripening.

The crop coming in at the decline of summer will not ripen well, unless guarded from cold at nights, and assisted by linings. N.B. The pomes that do not ripen may be used for mangoes.

Wide ridge.—Or, the fruiting bed may be made six, seven, or eight feet wide, for the plants to have an ample surface for their extending runners; defended either with a regular frame and glasses of proportionate dimensions, or with a case formed of inch-and-half boarding, ranged connectedly along both sides of the bed, without any internal cross divisions, other than top cross bars, to stay the sides, and support the glasses.

Such has been, and is, the most usual way of growing this delicious fruit; but when large quantities of dung cannot be at all times procured, the Editor recommends the use of the Economical Pit (see § 18).

To save seed.—Pick some best ripe fruit of the approved sorts. Preserve the seed; clean it from the pulp, and let it be well dried and hardened; then put it up in papers. It will keep good several years. See above, "Choice of Seed."

MINT. (*Two species.*)

Both hardy aromatic perennials. One sort, Spear-mint, is used for sauce, salads, and culinary purposes; and, in full growth, to dry for winter, and occasionally for distillation. The other sort, Pepper-mint. is cultivated principally for distilling.

Both Spear-mint, *Mentha viridis*, and Pepper-mint, *Mentha piperita*, are natives: the first has two varieties,

Green, Common, or *Spear-mint,* { Narrow-leaved; Broad-leaved.

Both varieties flower in July or August.

Pepper-mint; rounder, dark-green leaves. Flowers in August.

Propagation.—Both the species are raised by parting the roots, by off-set young plants, and by cuttings of the stalks.

1. By the roots.—This is performed in spring or autumn. Having some full roots from any established beds, divide them as expedient; and drawing drills with a hoe, about two inches deep, and six inches asunder, place the roots in the drills moderately close, and earth them over to an equal depth.

2. By off-sets; in the spring.—When the young plants are from two to six inches in growth, draw them up with the roots to each set: plant them by dibble, in rows, six inches asunder.

Soil.—Both species like a moist soil.

Subsequent culture.—The plants from germs set in spring or summer will come into use the same year. Keep them clean from weeds, slugs, and insects. At the end of autumn, cut away any remaining stems; at which season, or in spring, spread a little loose earth thinly over the beds.

Taking the crop.—The Spear-mint, for culinary use or salads, may be gathered both when the young green tops are from one inch to six inches in length, and in their advanced growth, throughout the summer. When beginning to flower, gather a store for winter. Spread the heads thinly in some dry place, shaded from the sun, to be well dried: then, tied in bunches, house the store. When designed for distilling, let them attain full growth, coming into flower; then cut, and use immediately.

Pepper-mint, being principally used for distilling (see § 37), should stand till it begins to flower. Cut it in dry weather; tie it in bunches, and carry under cover, ready for immediate use.

Cut full-grown stalks close to the bottom.

The cultivation of Mint of each kind for distilling is an object worthy the attention of the cottage cultivator (see § 47).

New plantation.—Both species continue by the roots many years; but when the plants shoot dwindling, or weakly, make a fresh plantation in time.

Forcing Spear-mint.—Mint in a young green state may be obtained all winter, and early in spring, by planting some roots in a gentle hot-bed, or in pots or shallow pans, to be plunged therein. Plant the roots pretty thickly, and earth over an inch and a half deep. Or some roots, thus planted in pots or boxes, may be placed in a stove. Plant for succession every three weeks, as forced roots soon decay.

MUSHROOM. *Agaricus campestris.*

The peculiar habits of the Mushroom, and the method of propagating it, are unlike the way of raising any other plant in the whole garden.

Spawn.—The first thing is, to provide spawn. This is a white fibrous substance, running, like sprigs of thread, in such dry reduced dung, or other nidus, as is fitted to nourish it. The true sort has exactly the smell of a mushroom. The month of Sept. is the best time to look for it in the places where it is naturally formed:—the droppings of hard-fed horses are found to produce it more plentifully than the dung of any other animal. It is found, in strength and purity, in the path of a bark-mill worked by a horse, in any other horse-mill track under shelter, in covered rides for horses, in dry half-rotted dung-heaps, and in decayed hot-beds; it is afforded, in a less degree, by cattle-sheds for horses, cows, or sheep: the dung of the two latter is better than that of horses living entirely on green food. Spawn may also be collected from downs and upland pastures, where mushrooms are observed to spring naturally; but this, in general, is not so productive as the other; and there is greater danger that a sort not wholesome or safely edible may be taken. The spawn dug up near the roots or old stools of gathered mushrooms is full of small white knots, which, in fact, are young off-sets.—Having found cakes of dung which contain the desired spawn, take them up as entire as possible, with the earth adhering, and lay them carefully in a basket or any other conveyance. These are to be stored, till used as below, in a dry covered place; and if they were found in a damp state, should be dried, in hollow piles, before they are laid together in a mass. The DRY SPAWN may be preserved three or four years. To preserve alike from perishing, and from running before it is planted, a dry shed, furnished with a current of air, is indispensable.

Propagation of the Spawn.—There are several ways of increasing the quantity of it. 1. Pieces of it may be laid along the ridge of a cucumber-bed raised in spring. Plant them about a foot apart. In about two months, the surface of the spawn will assume a mouldy appearance: it is then to be taken up with the earth adhering thereto, broken into pieces, and laid upon the shelf of a dry shed. 2. In the course of May, collect a heap of the droppings of cows, sheep, and horses: if one or two of the ingredients be not plentiful, they may be taken in the proportion most convenient; but no straw should be left in, that is not rotten. Add, of coal-

ashes, a twentieth part; of road scrapings, a fifth part; and as much sludge from the descent of a dung-hill as will give the mixture the consistence of morter. Having incorporated the whole, spread it on a dry floor, under an airy shed, half a foot thick; smoothing it at the top with a spade, and beating it down firm. As soon as it is as tenacious as clay, cut it with a spade, either into slabs eight inches square, or into pieces shaped like bricks. Let these be piled to dry in a current of air. To propagate mushroom-spawn, bury a small quantity of it in the middle of one of these cakes of dung. When the spawn has extended to the surface, divide each cake, that the air may affect it, and that there may be no mass sufficient to become a bed for mushrooms; and lay each piece separately on a shelf quite dry.

Bed for Mushrooms.—It is better to have the bed under the cover of an open shed; for though the mushroom will grow exposed to the light, it does not require it; and the plant is very impatient of cold, damp, or abundant moisture. The spawn is also liable to be destroyed by excessive heat. The floor which is to receive the bed, if not perfectly dry, should be laid with rubble: the principal season for making a mushroom-bed is Sept. The time next to be recommended is early in spring. Beds may be made indeed at any time, but not with equal success. In June, July, and Aug. the weather is rather too warm; and in the depth of winter, it is not equally easy to excite and cherish the spawn. To form the bed, provide good horse-dung, purged of its fiery heat by the usual preparation; with which some old linings from a melon-bed may be mixed, if it be not winter. Some light dry sandy earth will be wanted for intermediate layers. Different modes of building and spawning the beds have produced good crops.

1. Mark out the ground-line of a bed four feet wide at bottom; the length to be governed by the room, or the quantity to be raised: from this, work with an inward slope, so as to terminate with a narrow roof-shaped ridge along the centre, three feet or more in height. In building the bed, shake and mix the dung well together: beat it down with the fork, but do not tread it: leave it to settle, and to expend the first heat in vapour. Having proved, by trial-sticks left some days in the bed, that the heat is become moderate, you may cover two-thirds of the sloping bank with mould two inches thick, leaving the top of the ridge open for the steam to evaporate as it gradually rises. When the exhalation is finished, the top may also be earthed over. Divide the large cakes of spawn

into small lumps. These may be planted in rows six or eight inches asunder. Place the lumps of spawn about six inches apart in the same row, inserting them, through the mould, close down to the surface of the dung: Or, the dry spawn may be broken and scattered over the bed; being covered with earth to the depth specified above.

2. Some persons proceed thus: They earth round the bed four inches high, forming a ledge of mould two inches thick; upon this they lay the spawn close to the dung. They make a second layer of earth six inches high, including what is necessary to cover the first row of spawn; upon this is deposited the second row of spawn. In this way they proceed to the top.

3. Others lodge all the pieces of spawn in the surface of the dung, before they lay on any part of the earth.

4. A good crop of mushrooms is sometimes obtained without making a bed on purpose, by introducing lumps of spawn along the margin of late cucumber-ridges, just into the top of the mould. This may be done from March to May.

5. Another method differs fundamentally from any of the preceding, in that the bed is composed entirely of droppings of hard-fed horses, so that the spawn is propagated where the Mushrooms are to grow. Begin by laying a collection of these in a dry state on the floor marked out, making the first course from four to six inches deep. As the intention is not to ferment the dung, but to avoid that, the first course must lie uncovered, in a current of air, from a week to ten days. Then earth over with mould to two inches thick. Proceed, by the same steps, to add a second and third course. The ridge may be made either pyramidal, or with a rounded top. A bed thus composed will be about five weeks longer in producing mushrooms, than where the spawn is visibly formed at first putting it in; but it will be very productive and lasting.

Mushrooms are now raised with less expense and trouble, if, in any cellar or close place, heat can be obtained at command, to 60°.

Covering.—The inconvenience of a bed exposed to the weather, is, that it is sometimes necessary to cover it from wet, where there is danger of thus exciting a fermentation. When the bed is even under a shed, it is necessary to apply a covering from three to twelve inches thick, as the strength of the dung declines, or as the bed may be exposed, at the sides, to rain, snow, or frost. The covering may be either clean straw and long dry stable-litter, or sweet hay and matting: the latter

is to be preferred. Lay it thin at first, and increase it as circumstances demand.

Watering.—When the bed is to form the spawn, as in sect. 5, in the preceding page, give no water until you can find samples of spawn in the layers. In autumn, the bed will want no water until the first crop is gathered: then a sprinkling will help to excite a fresh vegetation. In spring, should a drying air long prevail, it may be necessary to moisten the bed a little. In summer, the bed may be now and then exposed to gentle showers, or otherwise watered according to the dryness and heat of the season. In order to give water, without wetting the bed excessively or unequally, scatter a thin layer of short hay over the ridge; and let a small quantity of water be gently distributed, to all parts alike, from a rose-pan. Leave it to filter through the hay, and cover the bed up with litter. In winter, the substitute for watering must be some warm mulch from a dung-heap, laid over the dry litter: the moisture evaporating from this will promote the growth of the mushrooms. Excessive moisture is not only apt to destroy the spawn, but it debases the flavour of such *fungi* as can be produced under it. It is also supposed to render the salutary sorts less so, and to make the unwholesome kinds more acrimonious.

Time of growth.—In autumn and spring, the ridges will often begin to produce plentifully in four, five, or six weeks. In summer or winter, they are much longer before they become productive. In any season, however, the ridge ought not to be hastily destroyed; since mushroom-beds have been found to yield abundantly after the spawn has laid dormant five or six months.

Gathering.—When the bed is in full production, and the season fine, mushrooms may be gathered two or three times a-week. Turn off the straw covering, and return it carefully, at each gathering.

The preceding mode of culture is adopted with the greatest success; but Mr. Roger's practice is as follows: He mixes cow-dung with the scrapings of roads, in the proportion of one half of the latter to one of the former, adding to it about one third or a fourth of vegetable mould. This compost is formed into bricks, about nine inches long, three and a half broad, and two thick: these are exposed to the air and sun, and suffered to attain such a degree of solidity as to bear a considerable degree of pressure, but not to dry hard. They are then removed to a shed, and laid up in strata. Three or four rows are first placed on the ground, with spaces of about an inch between the rows and the bricks: into these spaces,

loose spawny litter, such as is found in old mushroom-beds, is scattered, and likewise spread over the whole surface of the layer: or spawn-bricks, broken to pieces, may be used to furnish the scatterings. The first layer being thus completed, another is put upon it, and interspersed and covered with spawn, in the same way; and so on with a third or fourth layer, or more. The whole pile being completed, it is covered over with hot stable dung and litter; and in two, three, or more weeks, according to the state of the weather, the bricks are filled with spawn, and may be laid by for use. When the spawn is bred, the bricks must be laid in a dry place, to prevent the process of germination.—A piece of spawn, which appears in filaments or fibres, may produce a mushroom in itself, but it is not applicable to a mushroom-bed. To receive its developement there, it should only have the appearance of indistinct white mould. The beds to receive the spawn are made in a shed against the wall; about two feet high at the back, and perhaps a little less than one foot in front. The materials are, horse-dung mixed with litter, to which dry leaves may be added; or the entire bed may consist of leaves. Temperature, between 50° and 60°: from 52° to 55° may be sufficient. The mode of spawning is the usual one. If the bed happen to be dry, a layer of moist manure is spread upon the spawn; or if too moist, a layer of drier manure is put over it. These layers are made about two inches thick. After the beds are earthed over to the depth of an inch and a half, they are ultimately covered with hay of different thickness, according to the state of the season.

PARTICULAR DESCRIPTION OF THE TRUE MUSHROOM.

The *Edible Mushroom* is from one to seven inches broad. The crown or hat, at first appearance, is smooth, and almost globular, the edges of it pressing upon the pillar; while a white membrane, which almost covers the gills, extends from the edge of the hat to the top of the pillar. In this state the *fungus* is called a button. By degrees, the hat expands; the membrane bursts, the edges of the hat recede from the pillar, and the gills may be seen underneath. In this second stage, the hat is convex; afterwards, almost flat, sometimes a little scaly. In some, the crown is of a dirty cream colour; in others, ivory-white. Gills of unequal length; in a young plant, they are of a lively pink, or flesh-colour; this soon fades into a purple; and, in a mushroom left some time ungathered, the hue of the gills turns to a chocolate or blackish brown. Found chiefly in old pastures, in Sept.

NOTE—*The crown of the true sort may be rubbed on the coat-*

sleeve without changing colour, unless the cortex be broken, when the surface will be pure white.

Flued Sheds.—To force mushrooms in the middle of winter, with less danger of miscarriage, some persons have a thatched shed fitted with a fire-flue, carried once round, close to the wall, with one branch of flue under the bed. The heat, with the aid of occasional fire, is to be kept to 50° min. 60° max. The bed is managed as in other cases.

MUSTARD. *Sinapis alba.* *(One species.)*

Cultivated as a principal small salad herb, in its young seed-leaf growth. This White-seeded mustard is a native plant, flowering in June.—See "*Small Salads*," p. 120.

To save seed of salad mustard.—Either sow a portion, in March or April, to stand for that purpose; or, for small supplies, leave some rows of the spring sowing, grown too large for salads: they will ripen seed in autumn.

NASTURTIUM, *or* INDIAN CRESS. *(Two species.)*

These are annual plants. One sort is of long-trailing and climbing growth; the other dwarfish: both are somewhat tender, but grow freely in the open ground, in spring and summer: they are cultivated principally for their unripe berries, as a pickle, to be used as capers: the young leaves and flowers are used in salads; the flowers also serve to garnish dishes. ☞ Half a gallon of these berries, with a small quantity of vinegar, makes a condiment that will add a most grateful flavour to many an otherwise unsavory meal.

Both species, *Tropæolum majus*, and *Tropæolum minus*, are natives of Peru. Flower from June till Oct.

Major or *Greater Nasturtium.* *Minor* or *Dwarf Nasturtium.*

Estimate of sorts.—The Major extends several feet in its trailing climbing growth; flowering and berrying, at the joints, very abundantly; and is the most eligible sort to cultivate. The Minor being of weakly growth, not extending much in runners, its production of flowers and berries is inconsiderable.

Soil.—The Nasturtium will flourish in almost any soil or situation.

Course of culture.—Sow in March or April, or not later than the beginning of May, in one small crop, of one, two, or three rows. Allot to the large sort a situation in a single row, near a vacant fence, trellis, or wall, on which the runners may be trained.

The Minor Nasturtium may be managed as above, or planted in patches, either to spread upon the ground, or to receive support from small sticks.

Gathering the crop.—For pickling, let the berries just attain their full size; but pluck them while green, plump, and tender.

To save seed.—Gather as they ripen; spread them to dry and harden; then put them up for sowing next year.

ONION. *(Four species, and several varieties.)*

There are four species; the common Bulbous Onion; the Welch Onion; the Tree Onion; and the Underground Onion.

Allium Cepa, the common bulbous onion, is biennial, and a native of Spain. Flowers in July. There are various sorts generally cultivated.

Strasburg.	*Large Portugal.*	*Lisbon.*
Deptford.	*White Spanish.*	*Silver-skinned*, for pickling.
Long-keeping.	*Blood-red.*	*Tripoli.*

Estimate of sorts.—The Strasburg is most generally adopted for principal crops: the second and third sorts, being capital varieties of the Strasburg, are also highly eligible. The fourth and fifth are desirable kinds, yielding fine large onions for a full crop. The Spanish and Silver-skinned are very mild-tasted. The other kinds are cultivated in a secondary way, for smaller supplies. The Small Silver-skinned for pickling.

Soil.—The bulbous species, to attain a good size, requires rich mellow ground. If the soil be poor or exhausted, recruit it with a compost of fresh loam and well-consumed dung. Turn in the manure to a moderate depth.

Times of sowing.—For the main crops, to bulb at the end of summer, sow towards the end of Feb., if the weather be mild, and the ground dry; otherwise, to avoid frost, or where the soil is wet and heavy, sow from the beginning of March to the middle of April, finishing by the latter period at farthest. For picklers, sow late in April.

Onions are usually sown broad-cast, and men are engaged to hoe them three times over during the first six weeks of their growth, for which from 40*s.* to 70*s.* per acre is paid by the market-gardeners. For the Spanish, the final distance should be six or seven inches. Keep the whole very clear from weeds, in their young and advancing state. In Aug., when the leaves begin to dry at the points and turn yellow, lay the stems down close to the ground, bending them about two inches up the neck; which promotes the ripening of the

bulb, particularly in wet or backward seasons. When the necks shrink, and the leaves decay, pull them wholly up in due time: spread them on a compartment of dry ground, in the full sun, to dry and harden completely, turning them every two or three days; and in a week or fortnight they will be ready to house. Clear off the grossest part of the leaves, stalks, and fibres: then deposit the bulbs in some close dry apartment; in which, sometimes turn them over, and pick out any that decay; and they will thus keep sound and good, all winter and spring, till May following.

CULTURE OF THE CROP LAID BY IN WINTER.

The crop sown in June, that the plants may be kept back from running at the usual time in the second season, will have made small bulbs in Oct.; at which time, while the weather is still fine and the ground dry, let them be carefully taken up, and laid by as dried bulbs are for the winter. In this manner small onions are raised for pickling. The kinds usually sown for such purpose are, the White Spanish, or Silver-skinned. Early in spring it is customary also to replant them in drills, about nine inches apart: the plants will not go to seed like the onions transplanted at their full size, and will bulb much larger than the crop taken at the end of the first summer. It is, however, to be remarked, that although onions grow large at a comparative early season, find a ready sale for eating with cucumbers, and for sauce, yet such are not to be depended on for a general crop, as they do do not keep so well as when raised in the usual way.

CULTURE OF THE WINTER-STANDING CROP.

Allot a soil rather more light and sandy than for the summer crop, on a subsoil at least equally dry. The compartment should lie warm and sheltered. The time for sowing, about the seventh of Aug. Tread down the seed evenly; and then rake it neatly. When the plants are come up, one, two, or three inches, carefully hand-weed in time; not thinning the plants, because they should remain thick, for their chance in winter, and to be by degrees drawn thinningly, for use in salads and otherwise. The kind of onion most esteemed, for its mild flavour and white delicate appearance, is a kind lately introduced, called the Lisbon Onion.

The large Portugal Onion imported to us is grown from seed, and transplanted in drills, sixteen inches distant; and as the plants continue to increase in growth, drills are repeatedly opened between the rows, and which are every way, during

hot weather, filled with water, observing not to allow the crop to be made wet.

Mr. Francis Shieler, an intelligent gardener of the King's Road, Chelsea, grew a crop in this way equal in size to any usually imported. It must be observed, however, that the mild and delicate flavour of the *Portugal onion* imported is dependent on the climate.

To save seed.—Select some of the largest, well-housed, sound, firm bulbs, either in Oct., the beginning of Nov., or in Feb. Draw drills three or four inches deep, either a single row, or two or three together, a foot asunder; in which plant the onions, six, ten, or twelve inches apart, and earth in about three inches. In planting double or treble rows, allow an interval of two feet between each bed of two or three rows, to admit of going in, both to place stakes and horizontal lines for the support of the seed-stems, and to cut down weeds. The plants will shoot up in stalks two or three feet high, producing each a large head of seed, which will ripen in Aug. or Sept.

Welch Onion, or Ciboul. *Allium fistulosum.*

A hardy fibrous-rooted perennial; a native of Siberia. It is sometimes useful in a green state, when the bulbous kinds are scarce. Flowers from May to July.

Culture.—Sow in Aug. as directed for the Lisbon; and observe, that about mid-winter this onion commonly dies down to the ground; but the root sends up a new vigorous stem in Feb. and March. It has a ranker taste than the bulbous onions.

For seed of the Welch onion.—Leave or transplant some roots of the winter-standing crops, in March, April, or beginning of May; or if there be any remaining stools of old plants, they may be slipped or divided, and planted a foot asunder. Either method will ripen seed in autumn.

Tree Onion. *Allium Canadense.*

This species is perennial. It is cultivated for the clusters of small bulbs which it produces at top of the stalks: these are much prized for the pickling-jar. Is a native of Canada. Flowers in June and July.

Propagation.—Is raised either from the offset bulbs of the root, or from the bulbs growing on the herb.

Culture.—Plant in spring or autumn. The stem runs high, and will require support.

Underground Onion.

A small perennial species, cultivated and propagated like the

Shallot. Plant singly in March; and take up in Aug. Each onion produces, at its root, three or four offset bulbs, of mild flavour, and good for pickling. This kind of onion is now grown very generally in the West of England: the vegetable markets of Bristol, Bath, Exeter, &c. are supplied abundantly with it in the early part of summer.

PARSLEY. *Apium Petroselinum. (Three varieties.)*

A hardy biennial, of which three sorts are cultivated. The leaves of two varieties are used as pot-herbs, at all seasons of the year; also as a garnish. The third kind is esteemed for its large white carrot-shaped root, especially in Germany, to cut into slices for soup. Is a native of Sardinia. Flowers in June and July. The varieties are:

Common Plain-leaved. *Broad-leaved, Large-rooted,*
Curled, Thick-leaved. or *Hamburgh Parsley.*

Estimate of sorts.—The first two are the pot-herb kinds: of which the Curled-leaved is preferred for its thick, close growth, though it is not always permanent; and the Plain-leaved is equally good and hardier.

CULTURE OF THE POT-HERB KINDS.

One sowing in spring will mostly furnish young leaves all the year.

Sow in a single drill, along the edge of any compartment, or, occasionally, in rows, nine or twelve inches asunder. Draw small drills, something less than an inch deep; in which drop the seed moderately thick, and cover a little above half an inch. The plants will come up in three or four weeks: and when two or three inches high, may be gathered as wanted.

CULTURE OF HAMBURGH PARSLEY.

Allot a compartment where the soil is deep and has been well digged. Any common mould will suit, if dry and not too rank. Sow in Feb. March, or early in April. The plants should be thinned to nine inches' distance. The Hamburgh Parsley is considered a useful palliative taken in cases of stone in the bladder and other complaints in the urinary canal, for which purpose it is given in this country: the root, in decoction, is the part recommended in the Materia Medica.

To save seed.—Permit some old plants to run to stalks in May: they will produce plenty of seed, ripening in July or Aug.

PARSNIP. *Pastinaca sativa.* (*One species.*)

A native hardy biennial; valued for its esculent root. Flowers in July.

Soil.—Allot an open compartment of the best mellow deep ground, rather light, trenched or digged two spades, or one full spade deep at least, that the root may run down long and straight.

Course of culture.—The general season for sowing is towards the end of Feb., or in March, or not later than the middle of April. A variety of parsnip brought from Jersey is much esteemed by the London Gardeners, in consequence of the large size that the roots acquire. When the plants are about one, two, or three inches high, in May or June, let them be thinned to eight or twelve inches' distance. The roots will be pretty large by the end of Sept., from which time a few may be drawn for present use: but the parsnip is far best at full maturity, about the close of Oct., indicated by the decay of the leaf. It is not so liable as the carrot to be hurt by the frost, if left in the ground.

To save seed.—Transplant some of the best roots in Feb., two feet asunder, inserted over the crowns: they will shoot up in strong stalks, and produce large umbels of seed, ripening in autumn.

PEA. *Pisum sativum.* (*Several varieties.*)

A hardy annual, comprising numerous varieties; the seeds of which are esculent, chiefly when green or immature. Is a native of the south of Europe. Flowers from June till Aug. The following are some of the most esteemed varieties:

Early Charlton, an excellent early sort, nearly equal to the genuine *Frame*.
Early Golden Charlton.
Early Nichol's Golden Charlton.
Common Charlton.
Early Single-blossomed.
Reading Hotspur; long pods.
Dwarf Marrowfat; large long pods.
Tall Marrowfat; most large, long pods.
Green Marrowfat, Patagonian.
Knight's Wrinkled, or *White-blossomed*; a tall luxuriant grower: the fruit of excellent flavour.
Spanish Moratto; largish.
Prussian Blue; great bearer.
Egg; largish.
White Rouncival; large, fine pods.
Green Rouncival; large, fine pods.
Grey Rouncival; ditto.
Tall Sugar; large, crooked pods.
Dwarf Sugar.
Crown, or *Rose*; of tall, strong growth; producing its blossom and fruit in a bunchy tuft at top.
Leadman's Dwarf; a great bearer, but of small pods: good for a latter crop, or as required.

Spanish Dwarf; of low growth; small pod.
Fan; of very low growth, with small edible pods.
Early Dwarf Frame; for forcing.
Long dark green-Pea; long curved pods: fruit small: but thickly set, and protuberant: late, hardy, and fruitful bearer. Purple podded. (Saxony.)

Estimate of sorts.—The Charltons are not only very early, but great bearers; and are well fitted for the early crop and forward succession crops, and inferior to few even for the main summer crops. The Frame Pea may, indeed, be raised without the assistance of heat for a forward crop; and if a genuine sort, will fruit a few days sooner than the Charlton: but it grows low, and bears scantily. The Hotspur is hardy and prolific, and makes returns nearly as quick as the Charlton, and about a fortnight before the Marrowfat. The sorts already specified, therefore, embrace the best for sowings made from the end of Oct. till the middle of Jan., and for late crops raised between the middle of June and the beginning of August.

The fine flavour of the Marrowfat is well known. A few Dwarf Marrowfats may be sown in Dec. and Jan. as mild weather may occur: but the time for sowing full crops of the larger kinds of peas is from the beginning of Feb. till the end of April. Knight's Pea, one of the newest varieties, is very prolific, and retains its fine sweet flavour when full grown. The Egg, the Moratto, the Prussian Blue, and the Rouncivals, the Large Sugar, and the Crown, are all very fine eating Peas, in young growth; and, like the Marrowfat, may be sown freely, according to the demand, from the third week of Feb. till the close of April, and, in smaller crops, until the middle of June. For late crops, in addition to the early sorts already mentioned, the Dwarf Sugar, Leadman's Dwarf, and Spanish Dwarf, are very suitable. The Leadman's Dwarf is a small delicious Pea, a great bearer, and in high request at genteel tables: but as the crop is long in coming in, it is not advisable to sow it after the third week in June: rather sow it in March, April, and May, and then it will be later than the Charltons sown five weeks afterwards. The Charltons and Hotspurs may be sown in May, for late full crops in June, for a smaller supply; and in July, along with the Frame and Saxon, for the last returns. The Grey Rouncival Pea is sown for the seed; which, in a dried state, are boiled and eaten by persons in many parts of the country: and though some years since sold ready cooked and cried as "Hot Grey Peas" about London, at present they are generally unknown, as an article of food.

Times of sowing.—Much that relates to this has been incidentally mentioned in the "Estimate of Sorts."

To try for a crop as early as possible, sow, of the sort preferred as hardy and forward, a small portion on a sheltered south border, or other favourable situation, at the close of Oct. or rather in the course of Nov. Follow with another sowing in Dec., that if the former should be cut off in winter, this may have a better chance. But for more considerable, and less uncertain returns, sow larger portions in Dec. or Jan. if open temperate weather.

To provide for main crops, make successive sowings of the suitable sorts for Feb. till the end of May. It frequently proves, that the fruit from a sowing at the beginning of Feb. is not a week later than that from a crop raised in Nov.; nay, the Feb.-sown plants sometimes surpass all that have stood the winter, in forward returns as well as quantity. From the middle of Feb. make successive sowings every three weeks in the course of March, April, and May; or twice a month in summer, when a continued succession is to be provided till the latest period. At the close of the sowing season, July and the first week of August, sow a reduced quantity each time; because the returns will depend on a fine mild autumn following, and whatever fruit is obtained will be small and scanty.

Soil and situation.—The soil should be moderately rich, and the deeper and stronger for the lofty growers. Peas are not assisted, but hurt, by unreduced dung recently turned in. A fresh sandy loam, or road stuff, and a little decomposed vegetable matter, is the best manure. The soil for the early crops should be very dry; and rendered so, where the ground is moist, by mixing sand with the earth of the drills. For early crops, put in from Oct. till the end of Jan.: let the situation be sheltered, and the aspect sunny. Before the end of Dec. every one or two rows should stand close under a south or south-eastern fence. In Jan. several parallel rows may be extended under a good aspect further from the fence. After Jan. till the end of May, sow in an open situation. For the late crops, return again to a sheltered sunny border.

Process in sowing.—For early sorts, make the drills one inch and a half deep; and let parallel drills be two feet and a half, three, or four feet asunder. Peas that are to grow without sticks require the least room. For summer crops and large sorts, make the drills two inches deep, and four, five, or six feet asunder. As to the distances along the drill, distribute the peas according to their size and the season: the Frame, three in

the space of an inch; the Charltons, Hotspur, and Dwarf Marrowfat, two in an inch; the Prussian Blue, and middle-sized sorts, three in two inches; the large Marrowfat and Knight's, a full inch apart; the Moratto, Rouncivals, and most larger sorts, an inch and a half apart; and the Patagonian, two inches.

Subsequent culture.—As the plants rise, draw earth to the stems, doing this when the ground is dry; and earth gradually higher as the stems ascend. Early crops should be protected during hard frosts, by dry straw, or other light litter, laid upon sticks or brushwood: but remove the covering as soon as the weather turns mild. If in April, May, and the course of summer, continued dry weather occurs, watering will be necessary, especially to plants in blossom and swelling the fruit; and this trouble will be repaid in the produce. Rows partly cut off may be made up by transplanting. This is best done in March. In dry weather, water, and in hot days, shade, until the plants strike.

All Peas fruit better for sticking, and continue longer productive, especially the larger sorts. Stick the plants when from six to twelve inches high, as soon as they begin to vine. Provide branchy sticks of such a height as the sort will require: for the Frame and Leadman's Dwarf, three feet high; for the Charlton and middle-sized, four or five feet; for the Marrowfat and larger kinds, six or eight feet. Place a row of sticks to each line of peas, on the most sunny side, east or south, that the attraction of the sun may incline the plants towards the sticks.

Some gardeners stop the leading shoot of the most early crop, when in blossom; a device which accelerates the setting and maturity of the fruit.

Gathering the crop.—The early crops are generally gathered in very young growth, often too young. In the main crops there is no cause for precipitation: take them as they become pretty plump, while the peas are yet green and tender. Leave none on, to grow old; the young pods will then fill in greater perfection, and the plants will continue longer in bearing.

FORCING.

Peas may be forced, either in a progressive heat, beginning at 40° or 50°, and rising to 52° or 66° from the origin of the plant to the state of flowering, and, after flowering, increased from 55° to 70°; or, in a regular heat between the latter limits. The standard temperature may be 50°—55°. The best kind to force is the genuine Early Frame.

Sowings may be made from the end of Oct. till the middle

of Feb., either in a hot-bed or forcing-house; or, in the open garden, or under glass, with the intention of removing the plants to a hot-bed or forcing-house when from one to two inches high. Peas that have been transplanted run less to straw, and are more productive than plants of the same kind which remain where sown.

If you sow in a hot-bed or stove for transplanting, sow thickly in boxes or shallow pans filled with light dry earth, and cover in an inch and a half: but if you sow to remain, distribute the seeds in drills twelve or fifteen inches asunder, and allow each plant two inches' space in the row. For fruiting, the plants may be set either in boxes, or in the earth of the hot-bed or forcing-house.

Give a gentle watering at sowing and transplanting; and at other times, when the mould is dry.

To plants in a hot-bed, admit air in the middle part of every mild day, at the upper end of the lights. Mat at night, in frosty weather.

From the time of sowing, fruit will be obtained in five, four, or three months, according to the shortness or length of the days.

To save seed.—Either sow approved sorts in the spring, for plants to stand wholly for seed, to have the pods ripen in full perfection; or occasionally leave some rows of any main crop: let all the early-podded ripen, and gather the late-formed only for the table, as the last gleanings of a crop seldom afford good full seed. Let the seed attain full maturity, indicated by the pods changing brown and the peas hardening: then to be cut up, and prepared for threshing-out in due time, cleaned, and housed.

PENNYROYAL. *Mentha Pulegium. (One species.)*

A small hardy perennial. Its young leafy shoots are used in different branches of cookery, and also to distil. Is a native plant. Flowers in Aug. and Sept.

Course of culture.—Pennyroyal likes a strong loam. This herb may be propagated in any of the spring or summer months, or in autumn, by dividing the roots, or taking slips of the rooted shoots. Put the sets at ten or twelve inches' distance: water at planting. They will quickly take root and grow freely, soon overspread the surface, and remain several years in useful growth.

The young tops may be gathered any time in spring and summer, for culinary use, in a green state, or it is useful dried.

POTATOE. *(Several principal varieties.)*

This plant is of the nightshade family, denominated, by botanists, *Solanum tuberosum*, or Tuberous-rooted nightshade, commonly called Potatoe; originally a native of Peru. Flowers in July and August. Many varieties:

Early Dwarf; round.
Early Ash-leaved.
Early Champion; middle-sized round.
Larger Champion.
Ox-Noble; large roundish, with deep eyes.
Best Common Kidney; oval.
Large Red-ended Kidney; commonly called *Red-nosed Kidney.*
Round Red.
Oblong Red.
Large Round Rough Red, or *Lancashire.*
Small Round Rough Red.
Bright Red, or *Apple Potatoe.*
Pale Reddish, clouded.
Whitish Red.
White Kidney.
Purple Pink-eyed.

CULTURE FROM SETS.

Choice of roots.—Pick, for cutting into sets, middle-sized potatoes, having the most perfect character of the particular kind requisite, both the very large as well as the more diminutive kinds.

Cutting for sets.—Having taken off any clustering eyes at the end, cut each potatoe into pieces, so as to leave one good eye, and not more than two, in the middle of each cutting.

Methods of planting.—The sets should always be inserted in regular rows.—These rows may be fifteen inches apart for the small early sorts; and for the larger, twenty inches or two feet, according to the poorness or richness of the soil. In the lines traced, make holes for the sets, at eight, twelve, or fifteen inches' distance, letting their depth not be less than three, nor more than five inches.

Planting on a level surface will answer on a light soil. For considerable crops, a strong dibble, about a yard long, is used, with a cross handle at top for both hands, the lower end being generally shod with iron, and having a short cross iron shoulder about four or five inches from the bottom, as a guide to make the holes of an equal depth; one person striking the holes, and a boy directly dropping a set into each hole. Strike the earth in upon them, either as each row is planted, or when the whole planting is finished.

To avoid the inconveniences of low wettish ground, potatoes are planted in raised beds four feet wide, with alleys half that width between. The beds are thus raised: without digging the surface, lay some long loose dung upon the intended beds. Upon this place the sets, about a foot apart; then digging

out the alleys, turn the earth thereof upon the beds, five or six inches deep; or if grass, turn the sward downward, levelling in the top spit to the above depth. On strong heavy land, the beds may be raised by previous digging, throwing on earth till the beds rise to the desired height.

Subsequent culture.—As soon as the crop appears above ground, go over the alleys again with a spade, and throw another spit and the crumbs also over them. This is called second spitting the crop. *N.B.* This is the mode called the Lazy-bed fashion in Ireland, and it is found to answer well in damp ground.

The market-gardeners raise crops of early potatoes in hot-beds made in December, and, having hooped them over, cover the beds during frost with mats; at the same time they usually sow, on the surface, Radishes that become fit to pull when the potatoes require moulding up.

During summer, only a small portion should be taken up at a time, as wanted for immediate use. Permit the main winter crops to continue in growth till towards the end of Oct. or beginning of Nov. when the stalks will begin to decay; an indication that the potatoes are fully grown, and fit for keeping. Let them then be taken up before frost sets in; having, for large crops, a proper potatoe-fork of three or four short flat tines, fixed on a spade-handle. Cut down the haulm close; then fork up the potatoes, turning them clean out of the ground, large and small; and collect every forking into baskets. House them in a close, dry, subterranean apartment, laid thickly together, and covered well with straw, so as to exclude damps and frost. Look them over occasionally, and pick out any that decay. In spring, as probably many will then begin to shoot, turn them over, to break off the shot parts, and to retard their future shooting as much as possible. If the above direction be carefully followed, the store will continue good all the winter and spring, till May and June, when new potatoes may be procured.

EARLY CROPS BY FORCING.

It must be observed, that for this cultivation the best Dwarf frame-potatoe should be selected; *i.e.* the kind that does not usually go to flower. (See § 32.)

It is usual to sow radishes, lettuce, and cauliflowers, if wanted, in the same hot-bed in which early potatoes are forced.

A young crop is easily obtained soon in spring, by planting the Early Dwarf sort on a slight hot-bed. Put in the sets pretty thickly, at six or eight inches square distance, as the

potatoes are not to grow large. If planted successively in Jan. and Feb., they will produce young crops for use in April and May, to be taken up in small portions, as wanted for present eating. During the growth of the plants, open the lights fully in the middle of fine dry days: but mat at night, to guard against frost. Water attentively, as the mould and weather may require.

Potatoes will grow in almost every kind of soil, or in any situation, provided the land be made rich with manure; and the mode of planting may be varied, so as to suit the convenience of the grower. But one part of the culture is indispensable, *i.e. the earthing them up*; which is necessary, both to encourage the growth of the plant, and also to prevent the tubers swelling out of the ground; as, when that occurs, they turn green, and are not wholesome.

DUTCH POTATOES.

A small variety of potatoe has been of late years introduced from Holland: these, if planted late in the season, will produce a considerable crop of white delicate tubers, equally esteemed for table as new potatoes in early spring. It is not usual to take up the crop, but as wanted; and in order to preserve them from frost, they are covered with straw or litter sufficiently thick. This variety is well worthy the attention of gentlemen's-gardeners, as they are equal to early potatoes all the first months of the year.

PURSLANE. *(Two species.)*

A small tender annual; growing with short succulent shoots and leaves, used, in the spring and summer, as an ingredient in salads, as a pot-herb, and otherwise. *Portulaca oleracea*, Garden Purslane, and a variety called Golden Purslane, are natives of Southern Europe. Both species flower in June and July.

Culture.—Both sorts are raised from seed. Each is a little tender. The Green, which is usually preferred, is perhaps rather the hardiest. An early crop may be sown in Feb. or March, on a moderate hot-bed: the plants will require the aid of a gentle heat till the middle of May; when the seed may be sown in a warm border.

To save seed.—Leave some of the first open-border plants to run: they will give ripe seed in autumn.

RADISH. *Raphanus sativus. (Two principal varieties.)*

An annual, of short duration; comprising two principal and several subordinate varieties, esteemed for the esculent root; which is eaten raw in spring, summer, and autumn, as it respects most of the kinds; but one sort is principally eaten in winter. Radish seed-pods, when of plump growth, but still young and green, are used to increase the variety of vegetable pickles. The Radish, in its young seedling growth, likewise serves as a principal small-salad. A native of China. Flowering from June to August.

Long, or *Spindle-rooted Kinds:*

Early Dwarf Short-top.
Common Short-top.
Early Short-top Salmon-Scarlet.

Round, or *Turnip-rooted Kinds:*

Small White.
Small Red.
Spanish Radish; for autumn and winter.

Estimate of sorts.—The spindle-rooted kinds are cultivated in the largest proportion for the first crops. See "Times of Sowing." The Small Turnip-rooted sorts may be sown in spring as secondary crops, and in summer and autumn for more considerable supplies. Black Spanish has a coarser flavour than the other kinds; but being of a hardy nature, it is frequently sown in July and August, for a winter crop.

☞ Radishes are successfully raised on the same beds as early potatoes or carrots.

Soil and situation.—The soil should be light and mellow, well broken by digging. For sowings between the middle of Oct. and the middle of Feb. let the site be a dry sheltered border, open to the full sun. From the middle of Feb. to end of March, any dry open compartment will be suitable. As spring and summer advance, allot cooler and shaded situations.

Times of sowing.—The kinds sown between the middle of Oct. and the middle of Feb. are usually confined to the SPINDLE-ROOTED kinds. Of the early Short-top Red, a first small sowing may be made at the end of Oct.; another in Nov.; and a third in the last fortnight of Dec.: but make the principal early sowings in Jan. or the beginning of Feb. The beds on which these sowings are made should be immediately covered about six inches thick, with stable litter, which is removed off as soon as the crop is up, and, during the cold weather, replaced over the young crop at night, as the weather requires.

Sow each sort separate. All the kinds may be sown either

broadcast or in drills: but the latter is preferable, as allowing the roots to be drawn regularly, with less waste.

Early radishes by hot-beds.—To obtain the earliest spring radishes, sow on a hot-bed some early Dwarf Short-tops in Dec. Jan. or the beginning of Feb. Having made a hot-bed, two feet, or two and a half, high in dung, place on the frame. Earth the bed, at top, six inches deep; sow on the surface, covering the seed with fine mould, about half an inch thick; and put on the glasses. When the plants have come up, admit air every day, in mild or tolerably good weather, by tilting the upper end of the lights, or sometimes the front, one, two, or three inches, that the radishes may not draw-up weak and long-shanked. If they have risen very thick, thin them, in young growth, moderately at first, to about one or two inches apart. Be careful to cover the glasses at night, with garden-mats or straw-litter. Give gentle waterings about noon, on sunny days. If the heat of the bed declines much, apply a moderate lining of warm dung, or stable-litter, to the sides; which, by gently renewing the heat, will forward the radishes for drawing in Feb. and March. As they advance in growth, give more copious admissions of air. It is usual with gardeners to sow lettuces or carrots with radishes, or to plant early potatoes, as the growth of these is accelerated while the crop comes to perfection, and succeed well after the radishes are off.

Small Turnip-radishes of the White and Red kinds may be forced in the same manner.

For raising early radishes on ground not accommodated with frames, a hot-bed, made in Feb., may be arched over with hoop-bends, or pliant rods, which should be covered with mats constantly at night; and during the day, in very cold weather. In moderate days, turn up the mats, at the warmest side; and on a fine mild day, take them wholly off.

To save seed.—Transplant in April or May, when the main crops are in full perfection. Draw them for transplanting in moist weather; selecting the straightest best-coloured roots, with the shortest tops, preserving the leaves to each; plant them, by dibble, in rows two feet and a half distant, inserting each root wholly into the ground, down to the leaves. Keep the Red and Salmon-coloured kinds in separate situations, to preserve the kinds distinct.

In transplanting for seed the Turnip-rooted kinds, select those with the neatest-shaped roundest roots, of moderate growth, and with the smallest tops. They, as the others, will yield ripe seed in autumn.

RAMPION. *Campanula Rapunculus. (One species.)*

A hardy biennial, with a small root and oblong-oval leaves. The root is the eatable part; but is not now in much request. Raised in the spring, it comes in for use in autumn, winter, and the following spring. A native plant; flowering in July and August.

Culture.—Sow in March or April (see § 16). Let the plants remain where sown. Thin them to four or five inches' distance in May or June. The roots will be of proper growth in autumn and winter, and continue good till April or May following. They are most acceptable when drawn young.

To save seed.—Leave some old plants in spring: they will shoot and ripen seed in autumn.

RAPE, *or* COLE-SEED. *Brassica Napus. (One species.)*

A biennial, of the open Colewort tribe; cultivated in gardens as a Small-salad herb; also in extensive field-crops, to attain full growth for feeding cattle, and to produce large quantities of seed for rape-oil; and sometimes, in hard winters, cut for culinary purposes. A native plant; flowering in May and June.

Culture.—See "Small-Salad," and Cabbage.

RHUBARB. *Rheum Rhaponticum. (One species.)*

A hardy perennial, bearing large leaves, the stalks of which, being gratefully acid, are used, when peeled, for pies and tarts in spring. Of late years, the cultivation of rhubarb has been rendered more common, and several large varieties of this vegetable is now produced: that of the Giant Rhubarb is the most esteemed. The culture of each kind is the same, and little difference in the flavour of the one from another.

Culture.—It is propagated by seed, or parting the roots in spring or autumn, one bud to each division: these are planted in rows, from two to three feet asunder, and at least two feet distance. Dress the ground lightly in autumn, and fork it every spring. During summer, cut down the flowering stems, as these weaken the plant. In gathering the leaves, be careful not to break them from the stool, but cut them off as close to it as possible.

ROCAMBOLE. *Allium Scorodoprasum. (One species.)*

A bulbous-rooted perennial. Is a native of Denmark. In growth and quality it nearly resembles garlic; but the root-bulb, which is composed of several connected cloves, is smaller,

and shoots up in a slender stalk, producing a head of many small cloves at top. The stalk-cloves, as well as the root-cloves, are edible. Rocambole is milder than garlic. Flowers in June and July, and is but seldom cultivated.

ROSEMARY. *Rosmarinus officinalis. (Three varieties.)*

A perennial evergreen plant, shrubby and aromatic; cultivated for its young leafy shoots and flowery spikes, which are used for some medicinal purposes; also at funerals, and in sick rooms, to prevent contagion. A native of the south of Europe: flowers at the end of Feb. or in March, and is the parent of two varieties:

Green or *Common.* *Silver-striped.* *Gold-striped.*

Culture.—The Green is hardiest, and is the sort generally used. The finest plants are raised from seed. Sow either broad-cast, or in small drills six inches apart. The Green is also raised by layers or cuttings of the young shoots in spring and summer (see § 22).

A light sandy soil assists exotic evergreens, to stand the winter, by preventing them from growing too luxuriantly, and by not being a conductor of frost.

Train the plants, either with a bushy head, of moderate growth; or, if near a fence, in a fan-like order.

The Striped sort may be propagated as above; or with most success, by layers of the young wood planted in a warm situation. It is retained chiefly on account of the variegation of its leaves.

RUE. *Ruta graveolens. (One species.)*

An evergreen under-shrub, of a peculiarly strong scent. The leaves are sometimes gathered as a simple for medical use: they are also given to poultry having the roup, &c. A native of Southern Europe; flowering from June till September.

Culture.—It is propagated both by cuttings or slips of the young shoots, in March, April, or May. (See § 27.)

SAGE. *Salvia officinalis. (Several varieties.)*

An evergreen under-shrub; esteemed for the grateful flavour of its leaves. These are used to improve the savour of several articles of cookery, and to make Sage-tea. A native of Southern Europe. Flowers in June and July. The parents of several varieties.

Common or *Red.* *Small-leaved Green*, or *Tea.* *Green.*

Estimate of Sorts.—The Red is the principal sort in culinary

use; the Green is next in estimation; the Small-leaved is used for making Sage-tea.

Culture.—All the varieties may be propagated by layers or cuttings, taken from March to June. (See § 22.)

In gathering sage for use, be careful not to stub too close, especially towards winter, and during that season. In summer, gather some of young top growth, to dry for winter.

Keep the plants in regular bushy heads, by cutting away disorderly growths; and loosen the earth between and about the plants, in spring and autumn. Make a fresh plantation, once in two, three, or four years, or as may be necessary by the plants becoming naked, stubby, and dwindling.

SALSAFY, or *Purple Goat's-beard. Tragopogon porrifolium.*

A hardy native biennial; with an esculent root, which, boiled as the carrot, eats good and tender. Only this one sort, which flowers in May or June.

Culture.—Salsafy is raised from seed annually, in the spring. The soil should be light and mellow, full two spits deep, that the long tap-root may run down straight. Sow in March, April, and in May. The plants are to remain where sown. When they are two or three inches high, thin them about six inches apart. The roots in Aug. and Sept. may be taken up occasionally for present use. Those which remain, perfect their growth in Oct. For winter use, take up a portion before frost hardens the ground, and preserve in sand.

To save seed.—Leave or transplant some of the old plants in spring; which will shoot, and produce ripe seed in autumn.

SAVORY. *(Two species: a perennial, and an annual.)*

Under this genus there are two species of aromatic herbs: one, *Satureja montana*, Common Winter Savory, is a small evergreen under-shrub; the other, *Satureja hortensis*, Summer Savory, is an annual; both natives of Southern Europe; flowering in May and June.

Common or *Winter Savory;* under-shrubby, perennial.

Summer Savory; herbaceous, annual.

Culture.—Both sorts are hardy.

The PERENNIAL is generally propagated by cuttings of the young side-shoots, in April, May, June, or July; also by dividing the bottom off-set rooted shoots. This herb, as well as the annual, may also be raised from seed, as directed for Summer Savory. Some may be gathered, when of full growth, in autumn, to dry for winter use.

The plants may either remain, to be thinned; or some may be transplanted in June, nine by six inches asunder. This herb comes in for gathering from June until Oct. When a store is to be dried, draw it by the roots.

SAVOY. *Brassica oleracea Sabauda. (Two principal varieties.)*

This, like the Cabbage, of which it is a capital variety, is a hardy biennial: the sorts grow with crumply curled leaves, cabbaging in large full heads, in autumn and winter, and lasting till Feb. and March; when they mostly fly open, and start in the heart for seeding; hence it is a most valuable resource for winter supply. The sprouts are delicate greens. It was most probably first introduced from Savoy. It flowers, like the cabbage, in May and June. Gardeners distinguish two chief sorts:—

Green Savoy. *Yellow Savoy.*

Estimate of sorts.—In these there is no material difference: the green has the best appearance: both sorts are hardy enough to stand our ordinary winters.

Soil and situation.—This esculent answers best on a light rich soil: poor or exhausted ground should be manured according to the defects of it. Allot an open compartment in the full air, that the seedlings and advancing plants may grow stocky, and not draw up weak and long-shanked, as they are liable to do in close situations, or narrow borders under walls.

Times of sowing.—A crop may be sown at the end of Feb., to plant out in May or June for early autumn Savoys. Sow a full supply in the second or third week of April, for a main crop to be planted out in June, July, and the beginning to the middle of Aug., to attain a full-cabbaged growth late in autumn, and to stand over the winter.

As soon as the plants have two or three leaves, if they stand too crowded, thin the seed-beds by drawing out a quantity regularly; and prick them into other beds.

When the plants, both in the seed-beds and those pricked out, are sufficiently advanced, transplant them finally into the most open quarters of ground, where they will be less annoyed by caterpillars; to do which, take all possible advantage of showery weather. (See § 35.) In drawing the plants, observe if any are clubbed or knotty at the root, and cut off the protuberances close. Plant in rows; two feet and a half, or not less than two feet, asunder; by the same distance in the rows. In scarcity of vacant ground, some Savoys may be occasionally planted between wide rows of previous-standing crops, such

as Beans, that are sufficiently forward to be gathered off by the time the Savoys will want the entire ground.

As the plants advance, loosen the surface of the earth, and draw some about the stems.

If the ground occupied by the stalks be wanted, the sprouts may be preserved, by taking up the stalks, and laying them in a terrace of dry earth.

To save seed.—Select some of the best full-headed plants in Nov. or Dec., or any time in open dry weather till Feb.; dig them up with full roots: pull away the large under-leaves; and trench them down, by the root and stem, clean to the head, in rows two feet and a half asunder. They will shoot and flower in summer, and the seed ripen in July or Aug.

SCORZONERA. *Scorzonera hispanica. (One species.)*

An imperfect perennial: the edible part is the tap-root, which grows long and rather large. It is not now in much request. Is a native of Spain. Flowering from June till Sept.

Culture.—Although the plant be perennial, the root, continuing only one season useful, must be treated merely as a biennial. Sow, therefore, every spring, at the end of March. This root likes a deep light soil. Allot an open compartment. (See § 16, 17.) When the young plants are two or three inches high, thin them to six or eight inches' distance. The roots will be of a moderate size in Aug., but will not attain full growth till the end of Oct.; when they may be used as wanted.

To save seed.—Leave some old plants in the spring; which will produce ripe seed in autumn.

SCURVY-GRASS. *Cochlearia officinalis. (One species.)*

A hardy native biennial, cultivated for its medicinal virtue: grows on the sea-shore; flowers in May.

Propagation.—From seed.

Culture.—Scurvy-grass delights in a sandy soil, and a moist atmosphere; but will grow in moist alluvial soil, or almost any other. It rises best from an early autumn sowing, made as soon as the seed is ripe (See § 16, 17.)

To save seed.—Leave some plants to run; which they do in May, and ripen seed in June and July.

SEA-KALE. *Crambe maritima. (One species.)*

A hardy native perennial. Its useful parts consist of its young spring shoots, peeled, and dressed as asparagus.

Propagation.—The plant is best raised from seed; but occasionally by detaching rooted off-set shoots from established plants, or by cuttings of the roots, leaving about two eyes to each piece.

Soil.—The native bed of Sea-kale is deep sand: hence a light, dry, moderately rich mould, of a loose texture, suits it best. A fit soil for it may be composed of one-half drift sand; two-sixths rich loam; and one-third, small gravel, road-stuff, or sea-coal ashes. If the loam be not rich, add a little rotten dung. Sea-weed is a good manure for this maritime plant.

Times of sowing and planting.—The last fortnight of March and the course of April comprise the best time for putting in seed or removing plants.

Process.—Trench the ground to the depth of two feet, or thirty inches. To provide for landing up, either leave alleys two feet wide between each bed, making the bed broad enough to contain three rows; or trench independent rows at intervals of about two feet. For sowing to transplant, trace the drills from a foot to eighteen inches asunder. In sowing for the plants to remain, let the drills be two feet apart. Make the drills two inches deep. Sow thinly; dropping three seeds within the space of a foot, to be finally thinned to one plant at the anniversary season. When the leaves decay, earth up the young seedlings an inch or two, with dry mould from the intervals; giving all of them a chance of weathering the winter. At the end of the first year, keep the best plants for permanent culture, thinning or transplanting them to a foot or fifteen inches' distance in the line. In planting sets, insert them three, or not more than four inches deep.

Gathering the crop.—Cut the shoots while young, white, close, and of but a few inches' growth above the surface; taking them clean off to the bottom, within the ground.

Spring and winter dressing.—After taking the crop, loosen the earth with a small fork. The plants, as soon as the shoot-season is past, run out into spreading leaves close to the ground, and continue to do so all the summer. As these leaves clear off in winter, clean, and again fork the ground; and repeat the culture of landing up.

New plantation.—When the plants seem declining, and yield weakly shoots, make a fresh plantation in time.

To save seed.—Let a stool which has not been cut run in spring; and seed will be produced on every stem.

ON FORCING SEA-KALE.

Have a sufficient number of established plants, raised to

two or three years' old. They may stand in rows, with a space of two feet between, and eighteen inches apart in the same row.

Seven weeks before the time at which you wish to cut shoots for the table, begin to prepare the plants for forcing, and to ferment a sufficient quantity of fresh stable-dung.

Having trimmed the leaves from the plants, carefully point the surface of the ground; and over the tops of the roots spread fresh light earth, mixed with drift-sand or coal-ashes, two or three inches in depth. When the dung is well prepared, which will be in about three weeks, proceed to the forcing. If you mix tree-leaves with the dung, begin to ferment them a week or fortnight sooner.

Cover each of the plants, either with a regular blanching-pot, or with a garden-pot of the largest size. When the latter is employed, stop the hole with a cork, and cement it with clay, to keep out both the weather and the rank steam from the lining. Then lay a portion of prepared dung, alone or mixed with tree-leaves, about and over each pot; pressing it down firm, extending it eight or ten inches all around, and raising the bank six or eight inches above the pot.

It will be necessary to examine the plants frequently, and to measure the heat within the covers now and then, lest, by some inadvertency, the quantity of litter should not have been well apportioned or rightly prepared. If the heat be under 50°, there is not enough; and if above 60°, it is too fiery.

In about three weeks or a month after being covered up, the first shoots will be from six to ten inches long, and fit for the table; and successive supplies of shoots will be produced till perhaps the end of the third month from beginning to force.

Unless the weather be unusually rigorous, it will not be necessary to renew the linings of hot litter oftener than once in seven or eight weeks. The expediency of renewing will be indicated by the thermometer. Take away the exhausted part; and mix the remainder with fresh dung and leaves.

When the stools will produce no more shoots, remove the litter and the covers, and dress the ground.

SHALLOT, *or* ESCHALOT. *Allium ascalonicum.*

A small bulbous-rooted plant, of the garlic family, and onion tribe. Its bulby root is the edible part; which is composed of a cluster of small off-sets. The shallot, on account of its milder agreeable flavour, is often preferred to the onion; either dressed, or in a raw state. Native of Palestine.

Culture.—It is propagated by dividing the clustered root into separate off-sets: these may be planted in Feb. or as early in March as the ground will suit, or in Oct. and Nov.

Where the soil is dry, and other circumstances favourable, sets planted in autumn produce the finer bulbs; but if much wet reach the bed in winter, the cloves perish: spring planting is the safer, but it should be done before the cloves begin to shoot. Lay out some light rich ground, in beds four feet wide: in rows extending along these, plant the off-sets six inches apart, either in drills, two inches deep, or inserted to that depth, by the dibble, or with the fingers and thumb. The bulbs attain full growth in July or August, indicated by the decay of the leaves; when they should be taken up, dried, and housed. Dry them in an airy place shaded from the meridian sun, for a sudden violent heat tends to make the cloves shrivel.

Should any be occasionally wanted in summer, before the roots are mature, a few may be taken up for immediate consumption.

SKIRRET. *Sium Sisarum. (One species.)*

A small perennial plant with an esculent root, growing in a divided, fingered form: it is now seen but in few gardens, yet merits culture for variety at table: boiled, and served up with butter, it is tender eating, of somewhat sweet relish, and very wholesome. It is a native of China; flowering from June to August.

Culture.—This plant grows freely in a lightish soil moderately good. It is propagated both from seed, and by off-sets of established roots. The better method is to raise seedlings.

By seed.—Sow between the twenty-first of March and the fifteenth of April (see § 16) for seed in summer, on an open compartment of light ground, in small drills eight inches apart. When the plants are one or two inches high, thin them to five or six inches asunder. Before the roots are full grown, in Aug. Sept. or Oct. some may be taken up for consumption as wanted: those left to reach maturity will continue good for use throughout winter and in spring, till the stems run to seed.

By slips.—Having some plants of last year's raising, furnished with root off-sets, slip them off; taking only the young outward slips, and not leaving any of the larger old roots adhering to the detached off-sets: which plant by dibble, in rows from six to nine inches asunder.

To save seed.—Leave some old plants in the spring: they will shoot in stalks, and ripen seed in autumn.

SMALL SALADS.

This title comprises principally the small herbs, or very young plants, which are used in the seed-leaves as Salads, such as, Cress, Mustard, Radish, and Rape. Sometimes the White-Cabbage Lettuce is also sown, to cut young, as a Small Salad, early in spring.

Times of sowing.—These should be raised three or four times every month, as may be in demand, to have crops delicately young in constant succession. For culture in the open garden, begin in the first, second, or third week in March, as a forward spring may bring mild weather or otherwise: allot some warm situation for the early spring sowings; and, if the weather take a cold turn, either put on a spare frame, or cover with matting between sunset and sunrise. When spring is confirmed, sow in any open compartment. At the beginning of summer, the same: but in hot dry weather, either sow in a shady border, or, if the situation be opened, shade with mats in the middle of the day. For autumn sowings, when cold weather is approaching, allot some warm borders, and give occasional protection.

Culture.—Having allotted a fine mellow soil to receive the seed, dig the surface, and rake it finally, preparatory to sowing; which mostly perform in small flat shallow drills, four, five, or six inches asunder. Sow the seed very thick, each sort separately; and earth over very lightly, or but just thinly cover. Give occasional waterings in warm dry seasons.

Taking the crop.—To gather salads in perfection, cut them while moderately young, clean to the root.

SORREL. *(Two species.)*

Both are hardy perennials: their leaves contain a fine acid, which renders them useful in soups, sauces, and salads. *Rumex acetosa*, Garden Sorrel, is an indigenous plant. *Rumex scutatus*, French (or Roman) Sorrel, is a native of France. Both species flower in June and July.

Garden Sorrel: the varieties are:

Common Long-leaved.
Broad Long-leaved.
French Sorrel; with round leaves.

Estimate of sorts.—The Broad-leaved is more succulent than the common native sort, and its acid rather pleasanter; while the exotic kind is reckoned to excel that in gratefulness of flavour.

Propagation.—The finer plants are raised from seed: but good plants can be obtained by parting the roots, and it is a

most expeditious way. Some gardeners raise a crop annually from seed.

Soil.—The native varieties flourish both in humid meadows and sandy pastures: their roots strike deep. The French Sorrel requires a dry soil.

By seed.—Sow in any of the spring months, best in March. Drop the seed in small drills, six or eight inches asunder. When the plants are one or two inches high, thin them to three or four inches apart: when advanced to be a little stocky, in summer or autumn, transplant a quantity into another bed, from six to twelve inches apart; leaving those in the seed-bed with the same intervals. They will come in for use the same year.

By off-sets.—Part the roots in spring or autumn. Either detach a quantity of off-sets, or divide full plants into rooted slips: plant them at a foot distance, and water them.

Care of established plants.—As these herbs run up in stalks in summer, cut them down occasionally; and cover the stool with a little fresh mould, to encourage the production of large leaves on the new stem.

Fork, and clean the ground between the plants every autumn or spring; and keep it clear from weeds.

If, in two or three years, they have dwindled in growth, bearing small leaves, let them be succeeded by a new plantation.

To save seed.—Permit some old plants to run up in stalks all the summer: they will ripen seed in autumn.

SPINACH. *Spinacia oleracea. (Two principal varieties.)*

An esculent annual, whose leaves are esteemed and can be obtained in most seasons of the year. Its habitat is not known. The two sorts, by the different characters of the seeds, appear to be species: both flower in June and July.

Round-leaved, or *Smooth-seeded.*

Triangular Oblong-leaved, or *Prickly-seeded.*

Estimate of sorts.—The Round-leaved sort, of which the leaves are larger, thicker, and more juicy, is mostly sown in spring and summer: the Triangular-leaved is chiefly sown in autumn, to stand for winter and the following spring, when the other sort is principally raised.

SUMMER CROP.

Times of sowing.—Begin in Jan. if open weather, with sowing a moderate crop of the Round-leaved; and more fully in March: it is to sow about once in three weeks, from the beginning of March to the middle of April: then every week till

the middle of May; from which time, till the end of July, sow once a fortnight.

Soil and situation.—The soil which suits any of the general summer crops will do for spinach (see §16): or spinach and a thin crop of radishes may be sown together; and the radishes will be drawn in time to give room for the spinach, on any spare ground.

WINTER CROP.

Times of sowing.—The Prickly-seeded, or Triangular-leaved, is alone constituted to stand a severe winter. The main winter-crop should be sown in the first or second week of August, and a secondary one towards the end of that month, to stand later in the spring, until the Round spinach comes in.

Site.—Allot a compartment of dry-lying mellow ground, with an open aspect to the winter's sun; and let it be digged regularly.

When the plants are advancing with leaves an inch broad, in Sept. thin to two or three inches' distance. If by Oct. and Nov. the plants are forward in growth, some may be gathered, occasionally, in the larger leaves; or, where most crowded, plants may be cut out to give the others room. At the end of winter, thin the plants to seven inches by seven, ten by five, or twelve by four. On a dry day, stir the surface of the mould, if it has been much battered by rough weather. In April and May, the larger plants may be cut out fully for use, clean to the bottom; or drawn, if the ground be wanted; as they will then soon go to seed-stalks.

To save seed.—To obtain seed of the Round-leaved, leave a sufficient quantity of established plants in April, May, or June; or transplant in autumn some of the spring-sown which have not run. To save seed of the Triangular Spinach, transplant in March some good strong plants, of the winter crop. For large supplies, a portion of each may be sown in Feb. or the first fortnight of March, to stand wholly for seeding. The seed ripens in July and August.

TANSEY. *Tanacetum vulgare. (Two varieties.)*

A hardy aromatic perennial, cultivated as a culinary herb, and for use in medicine. The leaves, in young growth, are the parts for use. It is a native plant; flowering in August: there are two varieties:

Common or *Plain-leaved.* *Double* or *Curled-leaved.*

As a kitchen-herb, either sort is eligible: the Curled is preferred. The Plain-leaved is proper for medical purposes.

Culture.—Tansey may be propagated in spring or autumn, by rooted slips: plant them in any open compartment of the

kitchen or physic garden, from twelve to eighteen inches asunder. As they run up in strong stalks in summer, these should be cut down, to encourage a production of young leaves.

To have young Tansey in winter.—Plant some roots, either in a hot-bed, or in pots placed therein, or in a pinery or forcing-house, at any time from Nov. to March.

TARRAGON. *Artemisia Dracunculus. (One species.)*

A hardy perennial aromatic herb. The young leaves and leafy tops are used in salads, soups, and other compositions for the table, to heighten their relish. It is a native of Siberia: flowers in August.

Culture.—Avoid planting Tarragon in wet tenacious soil; as in that case the root is apt to perish in severe winter. This herb may be propagated in the spring, by sections of the root and top; and from June to August, by slips or cuttings of the stalks or branch-shoots, will readily grow and quickly increase in a branchy head, for use the same year, to gather green as wanted; and a portion may be dried and housed for winter. It would be proper, towards the end of autumn, to transplant some full plants close under a south fence, to preserve them more effectually in winter, and cause an earlier production of young tops in spring.

To obtain green Tarragon in winter.—Plant some stocky roots in a hot-bed, or in pots placed in a hot-house.

THYME. *Thymus vulgaris. (Two varieties.)*

A perennial aromatic evergreen; the young tops and leaves together being the useful parts. It is a native of the south of Europe: flowering from May to August. Besides the Silver and Striped varieties, which are chiefly ornamental, there are three sorts for culinary use:

Common or *Green;* broad-leaved.—There is a narrow-leaved minor variety.

Yellow or *Lemon-scented.*

Culture.—To raise the plant from seed, is the general and most eligible method. It is occasionally multiplied by parting the roots of stocky close plants, and by slips of the young shoots.

By seed.—Sow in March or April, in a bed or border of light fine earth. Give occasional light waterings in dry, warm weather, both before and after the plants are up. As soon as they are from three to five inches in growth, in June or July, taking the opportunity of rain, thin some out, and plant six

inches asunder, and water at planting. Seedlings thus treated will come in for use the same year.

By off-sets—Thyme is also propagated by slips of the branchy shoots in the spring, or early in autumn; but more effectually by sections of the stool, top and root together, or by removing rooted branches. The best time for removing established plants is March, April, or May; August or Sept.

To save seed.—It is produced abundantly, and ripens in summer and autumn. Gather the seed-spikes, spread them upon a cloth to dry; rub out clean, and put the seeds up for sowing the following year.

Ornamental kinds.—There are many sorts little adapted for domestic use, though sometimes cultivated, chiefly for variety; such as *Thymus serpyllum*, Wild Thyme, or Mother-of-Thyme; *Teucrium Marum*, or Cat Thyme. The latter being rather tender, is commonly kept in pots, to be placed under the protection of a frame or green-house in winter.

TURNIP. *Brassica Rapa. (Several principal varieties.)*

A hardy biennial. The root gives this esculent its chief value: this, by successive crops, can be had for the table from May or June till the following April. The top shoots from such roots as have stood the winter are dressed as spring greens. It is a native of Britain. Flowers in April. It has produced many of the following varieties: but some of the sorts appear by their names to have come from other parts of Europe.

Early White Dutch.
Early Stone.
Common Round White.
Large Round White.
Yellow Dutch.
Green-topped Large Round White, skin of the crown-green.
Red-topped Large White.
Tankard; large oblong.
French; small oblong.
Small Round French.
Swedish; large round, and a very hardy plant, more valued for field culture than in gardens for the table.

Estimate of sorts.—The first three sorts are the fittest for early, first succession, and main summer crops. The Early White Dutch is proper both for the most early and first succession crops, as is also the Early Stone. The Common Round White is highly eligible for the main crop; and the Large Round White stands nearly on a par with that, and, if not sown to come in with it, should at least succeed it, as a late summer and autumn crop. In large grounds, portions of the Large White Green-topped, and the Large White Red-topped, may be sown for autumn and winter; but the surest plant for

winter consumption is the Yellow Dutch: although constituted to stand intense frost unhurt, it has a fine flavour, and is very nutritive. Small portions of any of the other sorts may be cultivated in secondary crops, for variety, or to answer a particular demand. The small French is in request in some families, principally to boil whole in soups, &c.

Times of sowing.—Make, first, a small sowing in the last fortnight of March, or the first days of April, for early turnips in May and June: but as these soon run up to seed, adopt a larger sowing about the middle of April. The first main sowing should follow at the beginning, or towards the end of May, for roots to draw young about the end of June, and in full growth in July and August. Sow full crops in June and July to provide the main supplies of autumn and winter turnips. Make a final smaller sowing in the second or third week of August, for late young crops, or to stand for the close of winter and opening of spring: the turnips of this sowing continue longer than those of the previous sowings before they run in the spring. As the crops standing over winter shoot up to seed-stalks in Feb., March, or April, the root becomes hard, stringy, and unfit for the table.

Make the sowings a day or two before or after the prescribed times, for the opportunity of showery weather; or, if done at a dry time, give a gentle watering.

Soil and situation.—The turnip grows best in a light, moderately rich soil, broken fine by good tilth. Sand or gravel, with a mixture of loam, produces the sweetest-flavoured roots. In heavy excessively rich land, the plant sometimes appears to flourish as well; but it will be found to have a rank taste, and to run more speedily to flower. A poor or exhausted soil ought to be recruited with a proportion of manure suited to the defect of the staple earth.

A minute insect, less known by any descriptions of its animated nature than by the ravages it commits on young Turnips, is necessarily to be guarded against: hence the following precautions are of great interest to large cultivators: it is usually spoken of by writers on Agriculture as "the Fly."

Process in sowing.—Let the ground be well broken by regular digging, and neatly levelled to receive the seed. Procure bright well-dried seed. At a season when the turnip-fly is not apprehended, the seed may be put into the ground without any preparation, either alone, or mixed with a little sand.

Precautions against the fly.—In the hot weather of summer, it is advisable to use some cheap and effectual PREVENTIVE of

the fly. It appears, from a trial by Mr. Knight, at the suggestion of Sir H. Davy, that lime slacked with urine, and mixed with a treble quantity of soot, if sprinkled in with the seed at the time of sowing, will protect the seeds and germs from the ravages of this pernicious insect: but this antidote cannot be conveniently applied, unless the sowing be in drills. A yet simpler remedy, found by Mr. Mean to be perfectly successful, is, to steep the seed in sulphur-water, putting an ounce of sulphur to a pint of water, which will be sufficient for soaking about three pounds of seed. Such are the precautions recommended by men from whose skill and industry the public have much benefitted. But it appears strange, that it should not have struck them, that no mixture in which seeds can be steeped will so alter the cotyledones, when formed into seedlings, so as to become noxious to animals.

The fly, or more probably the larva of some insect, and supposed by a practical man, in *Young's Annals of Agriculture*, to be a small slug, that thus destroys the turnip crop, eats it only in the first stage of growth above ground; and the only preventive is, to accelerate the growth (see § 16). The best remedy that was suggested by Mr. Knight, which that gentleman shewed some years since to the Editor, was, to mix the turnip-seed with the manure, as the dung-cart was filled, and for the whole to be turned into the furrows between the Northumberland ridges; and by this stimulus a fine crop of Swedish-turnips was procured, when a general failure had otherwise taken place.

Sow broad-cast, unless some particular purpose will be answered by drilling. In the former method, scatter the seed regularly and thinly; in dry weather, tread or roll it in lightly and evenly; but after heavy showers, merely beat it gently down: rake in fine. Let drills be an inch deep, and twelve or fifteen inches asunder. In the heat of summer it is of great importance to wait for rain, if the ground be too extensive to be properly watered; for the fermentation caused by copious rain and heat gives an extraordinary quick vegetation to the seed, which in a few days will be in the rough leaf, and out of all danger from the fly. This insect is weakened or killed by drenching showers, and does no injury to the turnip when much rain falls. It is desirable to have the last sowing finished by the twentieth of August.

To check the fly on a rising crop.—When the PREVENTIVE has been neglected, should the fly seize the infant crop, strew over the ground, at its first appearance, a little soot or wood-

ashes, or fresh-slacked lime: also water the plants profusely, as far as circumstances will permit. But after-remedies seldom take effect in time.

Replacing a crop destroyed by the fly.—In the event of hot and dry weather setting-in immediately after a sowing is completed, should the plants (for want of the above precautions, or in spite of them) be attacked by the fly, when but of a few days' growth, and while in the seed-leaves, the whole crop may be destroyed in a day or two, in this case the necessary reparation of the mischief is, immediately to hoe, dig, or harrow the ground, and make another sowing; which will succeed the better if rain falls.

Subsequent culture.—As soon as the plants have rough leaves about an inch broad, hoe and thin them to six or eight square inches' distance, cutting up all weeds. Water garden-crops sometimes, in hot weather.

Taking the crop.—As the turnips increase in the root, a part may be drawn young, by progressive thinnings, so as to leave those designed to reach a full size ultimately ten or twelve square inches. Of the winter crops, draw a portion occasionally, in Nov. Dec. or whenever there is an appearance of the frost setting-in severe.

Preserving of the crop.—By experiments of Messrs. Cowley and Staines, "two circumstances appear to have contributed to the successful preservation of turnips; namely, the state of *dryness in which they are kept*, but principally the great care taken to wound the roots as little as possible; and especially, in topping the turnips, *to avoid any injury to the buds of the crown.* That is, "Cut off the tops, leaving the roots undisturbed; with particular care not to remove the crown, or any part of the neck, even although the latter should be of considerable length, as they contain the rudiments of those buds, which are so efficacious, as organs of respiration." The like precaution will tend to preserve carrots, beet, or mangel-wurtzel, to be kept on straw or sand, covered and protected from the air and weather, in some lower shed or cellar.

Of such winter-standing crops as remain in the spring, the young tops, if wanted as greens, should be taken while tender.

Field culture.—To raise extensive crops, in large grounds or in fields, for autumn, winter, and spring, adopt, for the most part, some of the larger kinds. The principal season for sowing is June and July for the main crops; and from the beginning to the middle of Aug. in smaller portions, for late succession crops, to come in for winter and following spring.

Have the ground prepared by ploughing and harrowing. While the surface remains fresh stirred and mellow, especially if the weather be dry and you cannot wait an indefinite time for rain, proceed to sow thinly and regular, by a proper spreading-cast, and let the seed be light-harrowed into the ground; then, with a wooden roller, press and close the surface evenly, that the seed may germinate freely and equally, and the plants rise regularly. When the young plants are of one or two inches' growth, hoe and thin them regularly, to about eight, ten, or twelve inches' distance, or to a greater distance in the larger sorts, that they may have clear room for general growth, and for the root to swell to its full size, being careful, in hoeing, to cut down all weeds clean to the bottom.

To save seed.—Transplant in Nov. or Feb. a quantity of full-grown well-shaped roots of the autumn or winter-crop, into large deepish drills, two feet asunder; inserting the bottom fibre into the ground, and the main root fully to the bottom of the drill: and earth well over. The plants will shoot in large branchy stalks in summer, and ripen seed in July or Aug.

TURNIP-CABBAGE. *(One species.)*

This is a hardy biennial. When introduced into Kitchen-garden, a small quantity of either is sufficient; for they are only admissible at table when quite young; but will be found to grow much larger, if planted out as Savoys, which see.

WATER-CRESS. *(One variety.)*

A hardy biennial, very universally used as an early and wholesome spring salad. The *Sisymbrium Nasturtium* of Willdenow.

A constant stream of water is required for the perfection of this vegetable. The plants being disposed in rows parallel with the course of the stream, are then of superior flavour, and more easily freed from weeds. They thrive best in shallow water, when the depth is about an inch and a half: this increases to about three inches as the plants grow, which thereby check the current. Water-Cresses are found growing very plentifully, wild, in running streams.

Culture.—Select the youngest plants with most roots; place these on gravel, in rows eighteen inches distant, in shallow water—but in deep water they should be five, six, or even seven feet apart—putting a stone on each plant, to keep it in its place. The times of planting are in May and June, and from September to Nov. In replanting, remove all the rows,

beginning at the stream-head, and clear the bed. As cress does not thrive in a muddy bottom, nor taste well if mud is about the roots, this should be removed, and replaced by gravel or chalk.

WORMWOOD. *(Several officinal species.)*

The Common, and most of the other officinal species, are perennial herbs, which die down in winter. The Tartarian is an under-shrub. The following kinds for the Physic Garden are all bitter aromatics: *Artemisia Absinthium*, Common Wormwood, a native plant; flowers from July to Sept. *Artemisia maritima*, Sea Wormwood, (Drooping-flowered,) also a British plant, growing on the coast; blows in August. *Artemisia pontica*, Roman Wormwood, a native of Italy; flowers in Aug. and Sept. *Artemisia Santonica*, Santonicum, (Tartarian Wormwood,) indigenous both to Persia and Siberia; blossoms from Sept. to Oct.:

Common. *Roman.*
Sea. *Tartarian.*

Estimate of sorts.—The seeds of the three first sorts are used as stomachics: those of the Roman have the least disagreeable taste, but are seldom to be obtained; for though the plant will grow well here in the open garden, it seldom perfects its seeds; the Common is therefore generally resorted to. The Sea Wormwood, though a native, seldom lives in gardens, for want of a congenial soil. The seed of the Tartarian is an antidote to worms; but this plant is difficult of culture, and in a severe winter can only be preserved in a frame. The distilled oil of Wormwood is used externally, for which the common sort is good as any.

Culture.—Plant in Aug.; and when finally planted out, let the exotics be favoured as to aspect and shelter.

FRUIT GARDEN, AND ORCHARD.

I. PRELIMINARY OBSERVATIONS.

Fruit-trees are distinguished by the terms Standards or Dwarfs, *i.e.* such as have stems grown sufficiently high for admitting work to be done beneath the branches, to be out of the reach of cattle in orchards, or to fill the upper part of walls.

Half-standards are trained with shorter stems, from three to five feet high.

Dwarfs are raised with low stems.

Dwarf wall-trees are trained with a head spreading superficially to the right and left, to be nailed to a wall or fence; the branches being laid in, either horizontally or ascending diagonally, as the best way of occupying the space may dictate.

Standard wall-trees are trained with stems from three to six feet high, at which elevation the branches are led out as above.

Espaliers have the branches trained to an upright superficial trellis, standing detached from a wall, and thus bear on both sides. Occupying little room, they drip and shade less than standards, but are more troublesome to manage. While young, they may be rendered in some degree ornamental: but as the plants get old, the most skilful pruning can hardly keep espaliers fruitful, or prevent them from looking formal, unless the order of bearing will allow the old wood to be freely cut out. Not having the benefit of reflected heat from a wall, there is a distinct motive for training them with a short stem, and with the branches laid horizontally rather than in a fan-like expansion; and with the highest branches at four feet, or not exceeding six from the ground; for thus they receive a stronger reflection of sun from the earth. At planting, it is easy to set them to the best aspect.

Mr. Knight has endeavoured to demonstrate the age to which the species of a fruit-tree will live and flourish, when raised from a seedling; and on the length of time during which the variety has been continued by grafting. Thus the apple-tree is said to live, on the average, 200 years: and when any particular variety has been propagated by grafts, about that time the last grafts, which are but remote ramifications of the original sorts, begin to decay; participating in the old age and decline of the parent, of which, in a strict view, it is not the offspring, but rather one of the extreme branches.

"Although the world is indebted to this gentleman for many curious and interesting facts in various departments of horticulture, this doctrine, like many others, has not retained its

once-considered importance, so long as the promulgator has retained his life and vigour."—*Salisbury on Orchards.*

Raising seedlings.—Seeds borne and matured by the most highly-cultivated plants are found, under equal circumstances, to afford the most vigorous produce. Mr. Knight's experiments have been followed up with great advantages, from applying the pollen of one variety to the pistil of another of the same species. (See § 41. p. 22.)

CRITERION OF A PROMISING SEEDLING.

The gardener having made choice of his two varieties of fruit, and after preparing them, and the seedlings have been growing, the following is to be attended to. Plant only a selection from the seed-bed. The larger and thicker the leaves of a seedling, and the more expanded its blossoms, the more it is likely to produce a good variety of fruit. Short-leaved trees should never be selected; for these approach nearer to the Crab or Wilding.

Sort those to be transplanted by the strength of their roots, that they may rise evenly together. The extremities of the tap-roots should be taken off, and the longer side rootlets shortened.

Having marked out lines three feet asunder, plant the young trees from fifteen to eighteen inches distant in line.

Second removal.—At the end of two years, let them be again transplanted. Give them fresh unexhausted ground, not recently manured, except by a perfectly reduced compost, prepared by digging two feet deep. Plant in the quincunx order, four feet apart every way. Select the plants whose wood and leaves wear the less degenerate, or the most improved appearance. Such as are rejected may be planted in the ordinary way for stocks. In this second, and at every transplantation, prune the extremities of the root circumspectly; shortening the arms, and taking off radicles in such a manner as to provide for the formation of a globular root, sufficiently small to be removed with the plant, yet large enough to support the stem firmly. Also reduce the head to correspond with the root.

Progressive culture.—Let the probationary plants remain in the nursery (transplanting them every two years) until they begin to bear. It will be fortunate if a few prove of such good quality in the fruit as to be fit for grafting without further improvement.

II. ORCHARD.

An Orchard is a plantation of standard fruit-trees which in general have stems high enough to keep the boughs, leaves, and fruit, from the reach of cattle; but where cattle are

excluded, dwarf and half-standards may occupy two rows next to the sunny side.

Site.—As to the site of an orchard, land sloping to the east or south is better than a level: a sheltered hollow, not liable to floods, is better than an upland with the same aspect; and yet a gentle rising, backed by sufficient shelter, or the base of a hill, is eligible. Before planting, drain, if necessary: trench to the depth of two feet; manure according to the soil; and give a winter and summer fallow: or cultivate the site for a year or two as a kitchen-garden, so that it may be deeply dug, and receive a good annual dressing.

Manure.—Trees do not like the hot dungs alone, nor any dung in a fresh crude state; but the cooler dungs, which are less esteemed in manuring for esculents, are serviceable in compost for trees, when the soil is deficient in animal or vegetable remains. Whatever dung is turned in just before, or at any time after planting, should be well reduced: mixed with road stuff, or with fresh earthy ingredients, and a small proportion of the ashes or soot of coals or wood, it is, in almost all cases, more beneficial than when alone.

For *Season of Planting*, and *Process in Planting*, see these heads under IV. *Miscellanies*, p. 142. and § 36, p. 17.

Culture to sustain the soil.—Turn the ground once a year, by the plough or spade, carefully rooting up all weeds; and hoe three times in the growing season. Where roots run near the surface, the ground is stirred with a fork, as a substitute for digging. The progress of young plants to the state of making profitable returns, the health of the trees in all stages, and the flavour of the fruit, are best promoted by this method, if the tillage be well-timed and clean. Orchard-trees receive injury from the grass being allowed to grow close to the stems: this should be avoided, by having a few feet round each left for the purpose of digging every season. (See *Salisbury's Hints to Proprietors of Orchards.*)

Pruning standards.—The mode of bearing is always to be attended to as a fundamental principle in pruning, though it is not capable of the same extensive application to standards as to wall-trees.

To form a head.—In pruning young standards, the object is to form a circular head, compact and proportioned to the strength of the stem, with the branches well distributed, and sufficiently open in the centre to admit the free circulation of air. The primary branches should be so placed as to balance each other, and be equally distributed round the tree. Thus,

three in a triangle; four at right angles; five, six, and even seven, shooting at pretty equal distances, might be retained: but it is seldom that more than four well-placed offer, which is a good number. These first branches, if there be no secondary laterals, or none well placed, should be shortened down to two or four eyes each; or reduce a strong shoot one-third of its length, and a weak shoot two-thirds. (See § 13. p. 8.)

The second spring again revise the branches and secondary shoots, and reserve only so many as are vigorous and well distributed. Afterwards, leave the head to form of itself, cutting out superflous and ill-placed shoots, and shortening for the production of new laterals only to fill a vacancy. Luxuriant limbs, which are likely to be disproportionately large, should be rejected as weakly shoots. In the third or fourth year after planting a maiden tree, the foundation of a good head having been obtained by judicious shortening, and the plant sufficiently strengthened, it will become proper to let the tree proceed to bearing, with no greater check from the knife than is unavoidable. To this end, the lower branches should not be shortened at all, and the upright leaders very little. But where two shoots cross, let the worst be cut out. Moderate-sized and slender shoots are more fruitful than strong luxuriant wood.

PRUNING AN ESTABLISHED BEARER.—The pruning of an established bearer may be performed either in spring or autumn; also on most kinds indifferently, in the course of winter. An autumn pruning is reckoned to strengthen the plant, and to make the blossom-buds bolder and fowarder; but it is best to prune a too luxuriant tree in spring.

After an orchard tree is come into bearing, continue, at the time of winter pruning, either every year, or every two, three, or four years, as an occasion is perceived, to cut out unproductive wood, crowded spray, and decayed parts. Also reduce long and out-running ramblers, and low stragglers, cutting them to some good lateral that grows within limits. Where fruit-spurs are too numerous, then cut the strongest and most unsightly. Also keep the tree pretty open in the middle.

Observe to keep the stem clear from all lateral shoots, and eradicate all suckers from the root. (See § 34. p. 17.)

If it be necessary to take off large branches from aged trees, use a chisel or saw, and afterwards smooth the wound with a paring knife. In case old wood is to be cut down to young shoots springing below, to make the separation in summer will be of more advantage to those young shoots; though it is not a common practice, on account of the liability of many stone-

fruit bearers to exude gum, when a large branch is lopped in the growing season; but gumming may be prevented by a plaster of clay or cow-dung.

III. FRUIT GARDEN.

Choice and improvement of the ground.—See the directions in the Introduction to the *Kitchen Garden*, § 1.

Distribution of wall-trees.—Allot the best border and wall to the vine, the peach, nectarine, fig, and apricot; letting the vine take the first place for aspect, as it is difficult, north of London, to bring it to ripen out of doors. Where the peach, nectarine, fig, and apricot, cannot have a south aspect, the south-east and south-west are the proper alternatives. Some early sorts of the apricot will ripen on an east or west wall. The west is the middling exposure, and by no means on a par with the east.

The cherry, in general, may have an exposure looking to any point of the compass, except full north; yet choice early kinds deserve a south border, nor do they attain the climax of perfection without.

The morella-cherry, the pear in general, the plum in general, and the mulberry, will do on any wall: but all late fruit is uniformly improved in proportion to the goodness of the aspect, from the west-east through all the intermediate points to the south; and some of the high-flavoured exotic pears require a fine wall to grow here in perfection. The end of a building is a good site for a free-growing pear-tree; which, if a garden wall is not uncommonly high, will require a great deal of lateral room. A long and high wall is also fittest for a fig-tree.

The apple, mulberry, medlar, quince, currant, and gooseberry, answer on espaliers.

The distances at which wall-trees should be planted, depend on the general growth of the species, and on the height of the wall: thus a higher wall is a compensation for a reduced distance.

While the principal wall-trees are making progress, standards may be introduced between them: these should be confined to sorts which are quickest in coming into bearing.

Dwarf and half-standards are rather for distribution than to be planted together; yet when in lines, they may be distant from ten to twenty feet. Some persons plant dwarf fruits, such as the currant and gooseberry, in quarters by themselves, reckoning them easier to manage than when planted in lines: the arrangements within the general garden must depend on the quantity of ground wanted for raising culinary esculents. Currants and gooseberries should stand six feet by nine asun-

der: raspberries, from three to five feet in a line, by four, five, or six between the rows.

A proportion of the hardier fruits is fitly planted in a north border, to prolong the succession.

Process in planting.—Plant a wall-tree nine inches from the wall, to give the root some room behind: detach or shorten the roots pointing towards the wall, so that the parts left on that side may not be cramped.

Espaliers may be inserted three feet from the edge of the border; but if the ground under the walks has not been prepared, five feet will be better. The stem or head of a wall-tree or espalier must be planted with a little inclination to the fence or trellis; and nailed or tied, to prevent the wind from shaking it.

Memorandum of sorts.—When the area is large, and the varieties planted numerous, it is a serviceable memorandum, either to have the names of the sorts painted on tablets and fixed in the garden by each tree, or to have them written in a plan of the ground.

TRAINING AND PRUNING FRUIT-TREES, EXCLUDING HIGH STANDARDS.

Nails and shreds.—The NAILS should in no case be larger than is absolutely necessary, nor be broad-headed. There is a sort of *nails* called garden-nails, with small flat heads and straight shanks, manufactured of two sizes: the larger, to hold the shreds over robust branches; the smaller, those over slender shoots. All nails intended to be used again should at the time of the winter pruning be purified in the fire from the larvæ of any insects which may hang about them.

Waste cuttings of fine new woollen cloth are the common and cheapest resource for the SHREDS: these may be of any colour; scarlet is most fancied; white looks the meanest; dark-blue, green, and brown cannot be objected to as glaring, and will generally harmonise pretty well with the objects at hand: uniformity of colour is desirable. In length and breadth, let the bands be adapted to the shoot to be secured, and cut particularly narrow where the buds are close. The common length is from two to five inches. Use as few as is consistent with proper support: the more they are multiplied, the greater the deformity: besides, every one is a nidus for insects and their eggs. On the last account, some persons never use the same shreds twice; but there is no occasion to reject old shreds that are sound, provided they are boiled in a heat of 120 degrees, which will destroy both the insects and larvæ lurking in them.

In fixing the shreds over the branches and shoots laid in, take care to allow ample room for the wood to swell without constraint. Drive the nail in a direction sloping from the branch or shoot, that this may neither rest upon, nor grow in contact with it; which often induces canker, especially in stone fruit-trees. If a negligent stroke of the hammer bruise the bark of a shoot, canker in that part is to be feared; and hence it may spread to other parts.

Wall Trellises.—In the latitude of London, and generally to the north of it, those species of fruit-trees which have been mentioned to require a south or east wall will not ripen their produce well, unless in absolute contact with the wall, so as to have the most intense reflection of sun-heat. Otherwise, a trellis against a wall keeps the wall sound; and where there are no cavities broken into it by reiterated nailings, there is less harbour for insects. Also, the fruit has room to swell freely.

When a trellis stands a little detached from the wall, barely far enough to put the fingers behind, the branches and shoots can be tied to the trellis with bass; and thus the expense of nailing, and, what is of more importance, the casual injuries from it, are avoided. But the climate, in the greater part of our island, forbids this, in respect to the vine, the fig, and at least the cling-stone sorts of the peach and nectarine: but mealy varieties of the apricot, trellised against a south wall so as not to touch it, acquire an improved generous flavour.

Direction on the wall.—As to the comparative advantages of the horizontal and fan-like methods of training: The HORIZONTAL is incontestably the most proper on low walls, because room is an object; and it is exclusively proper on detached espaliers, because, if the branches are elevated far above the ground, the reflected heat is less intense. On the other hand, it may be said for the FAN-LIKE method—in which the lowest branches are only horizontal, and the others diverge a little by a gradual diagonal rise, so as to render the entire head a complete half circle—that plants thus disposed grow more freely, and are generally reported to bear better, provided the constitutional fault is not luxuriance. Where, however, a tree shews a disposition to run to wood, to train it in the strict horizontal form, to the very top shoot, or even with the points of the branches inclining downward, is an artifice which, by retarding the motion of the sap, tends to promote the conversion of the younger shoots into fruit-branches. (See § 41. p. 20.)

In training a fan-head, the higher branches will be nearly perpendicular, and parallel to the leader: now in case the plant

be weak, or its vigour not above the desired medium, adopt weak shoots for this situation; as strong ones would grow too luxuriant, and, by the fluent passage of the sap, take more than their share of nourishment: but supposing that the whole tree be too vigorous to allow three or four rampant branches, this advantage will serve to moderate the growth of new horizontal shoots below, and dispose them to be more fruitful.

Pruning.—The intentions of pruning and training fruit-trees are, To furnish nursling-trees with heads according to their class; to train the branches to a good figure; to provide a constant succession of fruit-shoots; to dispose the plant to bear plentifully without exceeding its strength; to keep established trees within limits, and make them the longer productive; to preserve the health of the tree, and disencumber it of decayed wood and useless spray; and to invigorate a weak, and check a luxuriant plant.

Trees planted one year from the graft, or two from budding, must be pruned as though still in the nursery, in order to furnish them with a head. At the end of March, or the beginning of April, as the wood-buds begin to shoot, one of these courses must be taken: either shorten the shoots of the preceding summer; or head down the tree to two, three, or four eyes, taking all those shoots off. The latter course is most commonly expedient on the peach-tree, or nectarine, or apricot. If the first shoots happen to be unexceptionably placed for beginning the figure, instead of heading down the stem, cut these into two or three eyes. On wall-trees and espaliers, rub off the fore and back wood-buds.

On all trees during the tender age of infancy, spring, exclusively of autumn and winter, is the fit time of pruning, even for wood, and for proceeding in the formation of a head, as successive sets of new branches are yearly obtained by shortening the last. Something may also be done in summer to promote this object.

If, between the end of May and the end of June, a pair of shoots have not started as desired, one on each side, from a stem headed down, or from the mother branches shortened; and, in lieu of such, one solitary shoot has arisen, or two both on one side, or not equally proper to be retained; the desired end may yet be attained, and a season saved. Pinch down the solitary shoot two or three eyes: this will force out new shoots in the course of summer. In the case of two shoots, one of which is evidently unfit for beginning the head, take off the one rejected without delay, and pinch down the other two or

three eyes. Of two shoots on the same side, equal in regard to strength and direction, to preserve the lower on wall-trees and dwarfs, is a rule to which an exception can scarcely be imagined. The summer pruning of heads, progressively forming, will afterwards fall in with that of established trees.

If a tree, crooked at the time of planting, produce the first year a fine straight branch, shorten the whole stem to that branch, and commence there the foundation of a head.

Summer Pruning.—Rub off ill-placed and superfluous wood-buds, as they can be certainly discriminated; or, after waiting till appearances are no longer doubtful, pinch off the shoots from such wood-buds before they are above three inches long. In some kinds, to avoid the destruction of wood-buds, or the germs of fruit-spurs, the disbudding ought to be postponed until the wood-shoots can be distinguished from spurs, and pinched off without injuring the fruit-buds. While you avoid displacing infant spurs on plants which bear on such, be as careful to discourage the wood-buds and shoots on old spurs, for shoots from these are cumbersome and unprofitable. If any spray that wants displacing has got woody, use the knife, lest the bark of the mother-branch be torn, and the extremities of the tender spray, when cut, are apt to blacken and die.

The mode of bearing, and the duration of the bearers, is the first thing to be adverted to for regulating the proportion of new wood to be retained. Thus, in the kinds which bear on spurs, a less quantity of advancing wood is necessary for future supply, according to the time that a bearing branch continues fruitful; but as the fruit-shoots on some of these kinds are two, three, four, and even five years in coming into bearing, the difficulty of exercising a proper foresight is increased. On the sorts which bear on the shoots of last year, although a greater reserve, and constant annual succession, is wanted, it is more easy to suit the provision to the expected vacancy.

The spring and summer growths will require three revisions: one beginning at the end of April; another in July; and the third in September: all which have a preparatory respect to the winter pruning.

Stone-fruit trees, if much wounded in summer, are apt to gum; so that if superfluous shoots have not been removed before they get woody, it is best to defer the retrenchment of these to the winter pruning. A weak tree is strengthened by reducing its spray: let it however be low and compact, rather than naked. To keep a luxuriant tree full of wood tends to make it less rampant: but a crowded intricacy is to be avoided.

All the shoots rising after Midsummer are to be displaced, unless a vacuity cannot be furnished without reserving some of them; or unless the excessive luxuriance of a plant makes it proper to cut it as little as possible, and to let the sap expend itself in numerous channels.

The spring shoots laid in are generally to be preserved at full length, as far as the limits will permit, until after the fall of the leaf; because to stop them in summer would cause them to shoot from almost every eye, and fill the wall with spray: hence, when a vacancy wants several branches to furnish it, it is a good resource to shorten a strong contiguous shoot to three or four eyes; and the operation called *breaking* is expedient for this purpose, which is the pinching of a tender shoot, instead of cutting it; and the best time for pinching with this object, is at the end of May and beginning of June: observe, that it is never to be performed on weak branches, which would only produce slender sapless shoots, not worth preserving.

Winter Pruning.—On established trees which have FULLY RIPENED THEIR SHOOTS, and of which the young wood is NOT SUCCULENT, AND THEREFORE SUSCEPTIBLE OF INJURY FROM FROST, there is a wide latitude of time for the capital or winter pruning, extending from the fall of the leaf to the time of the sap's rising, or just before. To prune in autumn strengthens a plant, and will bring the blossom-buds more forward: to cut the wood late in spring, tends to check a plant, and is one of the remedies for excessive luxuriance. At the opening of spring, the blossom-buds can be certainly distinguished, which is a great guide to the judgment in many critical cases; but, on the other hand, if the blossom-buds get much swelled, they are liable to be bruised or knocked off, in the various operations of untacking, cutting, and re-nailing the branches. Supposing the common course of winter pruning to be divided into three periods—autumn, the cold months of winter, and the beginning of spring—the plants to be excepted from the first two, are: uniformly the fig, when not in a forcing-house; the vine for the most part, because the autumn is seldom hot and fine sufficiently long to ripen the year's shoots. Some except the peach and nectarine from the middle period, but not from the first; because they say, that if a severe frost happen immediately to follow the pruning, the points of the unripened shoots, and particularly the wood-bud next to the cut, are generally so much hurt, that there must be a second shortening, further in than was intended, to furnish these shoots with leaders.

Of all that depends on art, nothing contributes more to strengthen a weak shoot from a strong branch not already at the extremity, than shortening the mother-branch down to this weak shoot. But when the weak shoot is already at the extremity, the only certain way to strengthen it, is to remove an old branch originally superior to that whence this weak one sprung.

Whereas in vigorous trees we only expect fruit upon the slender shoots; on the contrary, in languid trees of little vigour, we must look for fruit upon the strong shoots; and never upon the weak, these being too famished to produce fine fruit; while those which appear thick are only so, compared with the little vigour of the tree: so that in such weak trees all the small branches must be taken away.

Never prune a branch for wood, when you have no occasion to provide fresh wood. For example, when a rider begins to be pressed by the neighbouring top of a principal wall-tree, so that you foresee the necessity of cutting off at a given time the lowest branches of the rider to make room for the principal, in such case, leave the lowest branches of an extraordinary length, especially if the tree be vigorous, in order that some fruit may be got on their extremities before the necessity of cutting them away arrives. There is nothing so much to be feared, as to see a tree grow thin towards the bottom, the part which ought to be fullest: on which account, no branches for wood should be left long in the pruning, unless perhaps one here and there, on an extraordinary vigorous tree.

Particular trees are sometimes so vigorous, that they cannot be reduced to a small compass within the first two or three years: therefore they must be allowed to extend either upwards or along the sides; otherwise they will only produce false wood. Afterwards, when they begin to bear fruit, you may by degrees reduce them to the designed limits. Such are commonly the Virgouleuse, Robinet, Cuissemadame, Rousselet, and similar pear-trees.

Recovery of stinted, ill-shaped, or barren trees.—Where a tree is stinted from disease, or the head ill-shaped from being originally badly pruned, or barren from having overborne itself, or from constitutional weakness, the most expeditious remedy is, to head down the plant within three, four, or five eyes of the place of grafting or budding, in order to furnish it with a new head. The recovery of a languishing tree will be further promoted by taking it up at the same time, and pruning the roots: for as, on the one hand, the depriving too luxuriant

a tree of part even of its sound healthy roots will moderate its vigour; so, on the other, to relieve a sickly or stinted tree of cankered or decayed roots, to prune the extremities of sound roots, and especially to shorten the gangling tap-roots of a plant affected by a bad subsoil, is, in connection with heading-down, or very short pruning, and the renovation of the mould, the most availing remedy that can be tried. Cut sloping; and dress the section with a little tar.

In pruning trees that are weak, branches may be taken off close to the stem: but if the tree is too luxurious, cut the rejected branches, at first, off stumpways, to induce a little sap in them for two or three years; and they may be severed so as to leave the thickness of a crown-piece at the place whence they issue: or cut through slopingly; so that on the inside the tree there may not remain the least part; and on the outside, enough for some new lateral to shoot out of it.—If larger stumps are left, strong laterals are almost certain to arise from them.

When a tree of extraordinary vigour produces nothing but large wood, devoid of fruit, the best remedy is, to *reduce the roots*, to lay open half of the tree by digging away the mould, and wholly to take away one, or two, and sometimes more of the most vigorous and active limbs of the roots, which I retrench so completely, that there does not remain the least part capable of performing the function of a root, or of producing capillary radicles. To take up such trees, and replant them, seems to me rather too violent; since at times it threatens death, and often makes an ugly tree.

We must never begin the winter pruning of a wall-tree, until it be quite unnailed; for besides that the pruning is performed with more ease and quicker, the work of re-nailing, not being in patches, will be entirely adapted to the new circumstances of the tree and the right ordering of the preserved branches: and having finished pruning a tree, lay in the branches and shoots directly; tacking them, in a neat manner, to the wall or trellis.

Winter pruning to be revised.—Revise the pruning, when a sufficient time has elapsed to see it with another eye; or when the expansion of the blossoms decide the competition between probationary fruit-shoots which have been laid in too close. In those stone-fruit trees which bear on the last year's shoot, such as the peach and most kinds of the apricot, it is particularly necessary to revise the winter pruning at the time of blossoming; because, if on any branch the blossoms are observed to have been spoiled, either by gum, by blight, or spring-

frosts, that branch is quite useless as a bearer, and, unless it has made some shoots which may prove bearers the following year, is to be entirely cut away: but if the blighted branches have made well-placed shoots, shorten them to these.

IV. MISCELLANIES

COMMON TO THE ORCHARD AND FRUIT GARDEN.

How to choose trees as they stand in the Nursery-grounds.—The middle of September is a good time to pitch upon, and mark what trees we intend to carry from a Nursery-garden; whether they are to be removed in autumn, or not until spring.

1st. We fix only upon such trees as have a smooth, clear, and shining bark; that have made vigorous shoots since last spring; and that appear sound in the leaves and at the end of the young shoots. On the contrary, if we observe any trees that have no shoots of that year's growth, or none but what are very feeble; if any, before the due season for the fall of the leaf, are found with starveling leaves, smaller than they ought to be, or with the extremity of the shoots black and mortified, and with the bark rough, wrinkled, and full of moss; if canker be detected in the wood, which is apt first to shew itself near the insertion of the graft; or if a stone fruit-tree be found to have any gum, either about the herb or root; all these are so many criteria of plants which we ought to reject.

Those trees that make a due progress the first and second year usually prove satisfactory in regard to the permanent health of the plant; because the stock is undoubtedly vigorous, and the graft has taken well. Choose moderately free growers, declining the most luxuriant.

A peach-tree two years from the budding is far preferable to one older: at this age, the proper size for the stem is about an inch and a half round. Peach-trees that have been budded above two years, without being trained clear below, are worth nothing; they being hardly vigorous enough to sprout above the old branches. The same judgment is to be pronounced of such as have not a proper medium thickness of stem, that is to say, are less than an inch in circumference, or above three inches. A peach-tree ought to have fine and sound buds at the lower part of the stem.

Plum-trees and apricot-trees are passably good at two inches and a half in circumference, and admirable at three or four. In plum-trees, a graft-shoot may be of one, two, or three years' growth; or a top from budding, older by an additional year.

An apricot-tree, two years from the budding, is better than one older: yet the age is not so nice a point as in the *peach.*

The early sort of the cherry is eligible with a stem from an inch and a half to two inches round.

Apple-trees grafted on paradise-stocks, with stems from an inch and a half to two inches round, have reached the proper thickness.

In all other dwarf-trees, between two and three inches circumference is a good medium size for the stem.

For beginning a well-proportioned dwarf or wall-tree, the graft should spring about six or seven inches from the ground.

The stem of high-standards should measure five or six inches round at the lower part, and four or five above: it should be quite straight.

Trees grafted on old stunted stocks, or that have been repeatedly headed down, may be considered to have remained long on hand, and seldom prosper when transferred to a new soil.

As to the manner in which the figure should be originated: it is better to have only one graft for the foundation of the head, than to have it composed of two or three grafts; because the new shoots that will arise from a single stick, when topped and new-planted, are more easily moulded, and trained to the intended figure, than the branches from two or more scions. In the latter case, the new shoots commonly rise awkwardly, as to their place and direction; and grow so confused, that we are forced to cut them away. Indeed, when I find two grafts, if I like the tree in other respects, I take away one, preserving that which is most vigorous and best placed.

How to choose trees when already drawn.—If the plants be already lifted, we not only have regard to all the particulars above expressed, but carefully examine into several additional circumstances, connected with the removal of the plants and the exposition of the roots.

We must take care that they have not been too long taken up, so that the bark is grown shrivelled, and the wood dry, and perhaps quite dead; nor that the bark be too much peeled off, nor the grafting-place strangled, from being bound too tight with packthread or other bandaging.

Above all, we must look to the roots; because any considerable damage or defect there renders a tree good for nothing.

In the first place, a well-conditioned root is strong in proportion to the stem; that is, there ought to be, at least, one shaft of root, nearly as big as the stem, with a correspondent cluster of principal roots; for when the roots are all small and

fibrous, and like a head of hair, it is almost an infallible symptom of weakness in the tree, and of its never being likely to produce any good effect: neither is an over great quantity of such fibres a very good sign.

Secondly, we must see that the principal roots are neither rotten, nor split, nor very much peeled or unbarked, nor grown black, very red, or dry or hard. If they be rotten, it is a symptom of great infirmity in the stamina or vegetable life of the whole tree; for either the principal roots of a healthy tree never rot, or the rottenness with which some external cause has infected them will spread to the top. If the roots be split in the tap, or the stools out of which the main arms spring, it is a wound that may be deemed incurable; and rottenness will, in consequence, soon attack the very foundation of the tree. Therefore those who have to take up a tree, should spare no pains in digging sufficiently underneath, that the danger of straining or splitting the foot, by violence in drawing it, may be avoided.

If likewise the main roots be much chafed or unbarked, the wound or bruise is dangerous; and especially in stone fruit-trees, the gum seldom failing to breed in the injured roots.

Finally, if the roots be dried up, either by frost or by long exposure to the air, the plant is to be rejected, for it will not grow again.

Besides, being exempt from these defects, it is to be wished that the trce to be chosen have its roots so well disposed, that we may find one tier of young roots in some measure perfect; so that when all the bad are cut off, whether above or below this tier, there shall remain two, three, or four branches, on a level from the main root, so well situated, that when the tree is planted, they may be conveniently turned towards that side where the good soil is.

I highly prize the young newly-formed roots; and these are commonly emitted from that part of the main root nearest the surface: young roots are pretty smooth and even. I care little for the old roots, which are commonly knotty. In pear-trees, plum-trees, and cherry-trees, the old roots are blackish, whereas the young ones are reddish. In almond-trees, the young roots are whitish; in mulberry-trees, yellowish.

Season of planting.—Every one knows the full latitude for this extends from the fall of the leaf till just before the bursting of the bud, in spring. On light and dry grounds, much time is gained by planting at the commencement of Nov.; because the plant, aided by the moist condition of the atmo-

sphere, may put out some small fresh roots before the close of autumn, which will be a great advance towards its perfect establishment under the excitement of spring. Between the beginning of Nov. and the first of March, rainy weather is not only incommodious to the planter, but also hurtful to the trees, because the mould is then too apt to be like mortar in consistence; and, with the mould in that state, contrary to what many suppose, it is not so easy to settle all cleverly, under, about, and close between the roots, without leaving some intervening hollow, into which loose and friable earth would have trundled.

On cold and moist soils, it is well to postpone planting till the end of Feb.; because the roots can do nothing in winter, and are more likely to be spoiled, than preserved, before fine dry weather arrives to qualify the wetness of the soil.

On soils which are neither arid nor moist to excess, the planting of hardy trees may proceed in the mild intervals of winter. It is too often deferred to these intervals, without regard to the nature of the ground, merely because many other branches of work in the open garden are suspended.

Process in planting.—We take it for granted, that the tree has been dug up carefully, with as full roots as possible. The sooner trees are planted, after being taken up, the more likely they are to do well. Trees packed to go a distance, should have their roots well covered from the air: in this state, they will sometimes live out of the ground a fortnight, so as to recover when planted, though materially the worse. Packed in moss, they have survived many months. The *sphagnum palustre* is the best kind of moss for this purpose.—Vide Communications on this subject by the Editor, in *Transactions of the Society of Arts &c.* vol. XXVI.

CAVITIES FOR THE ROOTS.—The extreme depth for planting young trees is, a foot deep for the lowest roots; and three, four, or five inches for the upper tier, after the loosened earth under and about them shall have sunk from three to six inches, as may be calculated. Or the tree, whatever its size and age, should stand at the same depth in the ground it did before, allowing for settling: to which end, plant it a little higher, and make up the difference by a little hillock of earth, to be afterwards taken away. The planting should be the shallower, where the bottom is clay, or the soil strong and heavy. The nearer the surface any root, the more abundantly the tree bears. (See § 36. p. 17.)

The site having been fixed on, and the ground prepared,

trenches or pits should be dug, wide enough to admit the extremities of the horizontal roots, without being cramped or changed from their original direction. The longer the cavities are opened beforehand, the more will the soil be enriched by the influence of the atmosphere. At planting, loosen the earth at the bottom, by digging it a full spade deeper than the tree is to stand.

PREPARATORY PRUNING.—While the plants are in hand, dress the root and top with the pruning-knife; beginning with the root.

The root of a tree taken up with a ball of earth, to be planted immediately in another part of the garden, requires the least reduction; for then fewer of the small capillary fibres need be cut off, that is, only so many as, (1) have turned back and withered by exposure to the air; or, (2) such fibres as, part of the ball of earth having been broken off, cannot be laid in the ground spreading independently as they grew, but must come into collision with fresh earth, be pressed together, and perish; in which case, that branch of root to which they are attached will produce no more.

When a tree has been longer pulled up, or has no ball of earth to the roots, I take off, without distinction, all the capillary fibres. The greater roots are thus fully displayed to view. When the roots of a tree appear to have got dangerously dry, I order them to be soaked seven or eight hours in water, previous to planting.

The first and most essential thing is, to prune away all rotten, broken, and unbarked roots; cutting clean in to the sound part. The tap-root should never be left above a foot in length; and if the lowest tier of roots are not so far down from the base of the trunk, shorten it to a level with them.

Few planters think it safe to do more than this. I go farther; and cut away all old roots which may be expected to perish. *The reader is apprised, that a tree prepared according to the following principles must make new roots, or it dies; the old roots being of no service, as channels of nutriment.*

First, let us get a criterion, of a root about to perish. The perpendicular shaft of root immediately connected with the base of the stem is generally largest in that part where the main horizontal roots proceed. Therefore, when we find new horizontal roots to have sprung a little higher on the trunk of the root than the original lateral roots, and the part whence they rise to be swelling in proportion to the growth of the tree, while the part whence the old lateral roots proceeded remains

stationary in size, this is a symptom that the old roots are about to be abandoned by the sap, and we may expect them to perish: now, if left to perish in the ground, they would cause the tree to grow yellow and languish; we therefore cut these old roots away, with so much of the tap-root as served as their stool. The same if new thick roots have sprung in the course of a primary root; all beyond will even tually decay.

New roots have a smooth skin and a lively fresh colour: old roots look black, shrivelled, rugged, and worn out.

The best roots, and principally to be chosen, are those of latest growth out of the foot of the tree. One tier of new good roots is enough; and three, four, or five of these, well placed round the parent stool, are of more vital effect than twenty middling ones. I term those well placed which branch from the club of the root, like so many lines from the centre to the circumference.

If two or more tiers of new roots offer, they are to be adopted. In high standards particularly, it is desirable to have some main roots at a foot depth. Unless any of the principal new lateral roots shew fine promising radicles at the extremity, the whole are to be shortened in proportion to their extent, the longest and thickest being left longest. In young DWARF trees these may be pruned in, to six, eight, or nine inches; in most high-standards, to twelve or fifteen inches. We ought to leave a greater length to the roots of mulberry and almond trees; because those of the mulberry are very foft, and those of the almond extremely dry and hard: either will be in danger of perishing, if cut too short. Endeavour to leave somewhere an entire new root capable of acting immediately.

As to the secondary roots, the most slender are to be cut shortest: from two to five inches in length is enough, generally, for these. Both the principal and secondary roots are shortened, in order that they may produce new lively radicles at their extremities.

Standards thus prepared will go nigh to stand upright before they are planted. But the roots of wall-trees must be cut away on one side.

When the pruning of the root is finished, prune the top according to circumstances. If furnished with branches, they must be thinned and shortened, in correspondence with the retrenchment made on the root, and the figure in which the tree is to be trained. If the plant is weak, the head must be

reduced more on that account. Plants which have heads to form should be headed down in March.

SETTING IN THE GROUND.—The tree is now ready to plant in the cavities prepared as above. In case any holes have been made too deep, return some of the loose earth before planting. As high-standards are more subject to the insults of winds, the full depth of a foot is necessary for their roots. See above, "*Cavities for the Roots.*" Where there are on one side contiguous walks, or an inferior bed of earth, or any thing that may obstruct or discourage the roots, turn the best roots in the contrary direction. Stakes for high-standards are best put in while the hole is open. Set standards perfectly upright. Lay the flexible roots as horizontally as may be without violence. Then let the earth be broken fine, and thrown in gently between and upon the roots: when the cluster of roots is partly covered, move the tree gently up and down, to cause the earth to tumble into any vacuities. When the whole is filled up, tread the surface gently, beginning on the outside: the earth about the foot of a high-standard requires to be made particularly firm.

Watering.—If the planting be performed early in autumn, while the weather is yet hot and dry, a little water may be given to assist the roots to strike; but they ought not to be soaked with water, nor need watering be repeated. At planting late in the spring, should the ground be dry, give a moderate watering; which repeat about once a fortnight, during the hot months. Supposing the plantation to have been made in winter, should a very dry spring follow, a few waterings may be necessary, until the plants strike.

Staking.—Having set up a firm stake to each high-standard newly planted, twist part of a hay-band round the tree, to prevent it from galling; and with the remainder tie it securely to the stake.

Mulching.—To protect the roots of newly-planted trees from frost the following winter, and from drought in the summer, lay mulch about the stem, to the distance of two feet round, and six inches in thickness; or substitute dry litter in winter, or a thin layer of turf in summer. Loose litter may be kept from blowing about, by heavy stones.

Culture of the soil.—The taking of light green crops near and among fruit-trees tends to keep the ground more effectually stirred and recruited, than if periodical digging or hoeings were prescribed merely for the sake of the trees; because

labour, for which the recompence is not direct, is constantly liable to be neglected. Nevertheless, circumspection must be exercised, neither to dig too near nor too deep among garden trees, lest the roots should be loosened or injured.—See *Salisbury's Hints to Proprietors of Orchards.*

Manure.—The natural defects of the soil, the habits of fruit-trees, and the preference of a species for a particular soil or manure, are to be considered. The hotter dungs are not liked by fruit-trees; and those of the horse and the sheep, if not wanted where they would be beneficial alone, should be mixed with twice as much of the cooler dungs, and three times as much fresh earth or road-drift; or with twice the bulk of earthy matter, if the cooler dungs are not to be obtained. The residuum of neats' dung, properly reduced by keeping, is a good simple manure for most fruit-trees, and excellent in a compost: but where the soil is naturally cold, a little ashes of coals, wood, straw, or burnt turf, or a minute proportion of soot, ought to be incorporated with it. Hog-dung is accounted to have a peculiar virtue in invigorating weak trees. Rotted turf, or any vegetable refuse, is a general manure, excellent for all soils not already too rich. One of the best correctives of too rich a soil is drift-sand. For an exhausted soil, where a fruit-tree that has been an old profitable occupant is wished to be continued, a dressing of animal matter is a powerful restorative; such as hog's or bullock's blood, offal from the slaughter-house, refuse of skins and leather, decomposed carrion; also urine diluted with water. The drainings of dung laid on as mulch are highly serviceable. In a soil which does not effervesce with acids, a little lime, dug in a spit deep, is beneficial to fruit-trees.

The manure intended to benefit fruit-trees should not be laid close to the stem, but in a circular or semicircular trench, at a distance proportioned to the age of the plant and the compass to which the feeders or extremities of the roots may extend.

Thinning the leaves of fruit-trees.—The leaves of a tree have too essential an office, as organs of growth to the entire plant, to be lightly parted with; and where the climate is not deficient in heat, compared with the habitat of the plant or the portion of year in which its season for vegetating falls, their shade is more likely to be serviceable than detrimental, even in the last stage of fruiting. Thus cherries, raspberries, strawberries, currants, and other species whose full term of fructification is more than comprehended in our summer, reach perfect maturity, and acquire the colour proper to each, though ever

so much covered with leaves: whereas for those kinds which ripen with difficulty here, because the direct rays and most intense reflection of the sun is scarcely equal to the heat in the shade during the full summer of their native climate, it is proper, when the fruit has nearly attained its full size, and is naturally losing its absolute greenness, to remove some of the leaves which shade it too much. Were the leaves thinned sooner, it would prejudice the growth of the fruit: and should they even now be swept off unsparingly, the growth of the year's shoots might be arrested. The leaves which cover the fruit, whether peaches, grapes, late pears, or other exotics, must be removed gradually; that is, at two or three times in the course of five or six days; otherwise the unusual full heat of the sun darting upon the fruit would occasion the rind to crack.

Remedies for disease.—The distempers to which fruit-trees are subject are too numerous to be distinctly specified; but a bare recapitulation of the causes and symptoms of some of the most common points may be necessary to the remedy. Among the causes of disease, may be reckoned, a poor exhausted soil—too rank a soil; for unreduced dung, or dunging to excess, will occasion blight in fruit-trees—the presence of some mineral acid in the soil—a wet sub-soil—defect of moisture in excessively dry and hot weather—want of mulch to roots which lie near the surface during severe frost without snow—bad pruning—wounding capital roots in digging—parasitical vegetables on the bark—the inroads of insects propagating in the leaves, bark, roots, and body of the plant. Curled leaves always indicate the presence of insects. The following unfavourable signs may proceed either from weakness or disease;—false shoots or suckers rising from extreme roots at a distance from the stem; the year's shoots ceasing to grow before the fall of the leaf. A close examination of each particular case can alone decide whether insects, weakness, or disease, or something destructive in the air, occasion the following appearances—the fruit dropping before it is mature; the leaves falling before their time; or the year's shoots decaying at the points. Leaving these and similar cases (in which the application of a preventive or a remedy, or the total rejection of the plant distempered, must be governed by circumstances), let us advert, in particular, to the CANKER, the GUM, and the MILDEW; all formidable diseases to plants, and easily distinguished.

1. The CANKER, or erosion of the bark and wood, is a disease produced often in trees by a poverty of soil: sometimes it may be traced to the wound inflicted at grafting; and it is

invariably connected with old age. Professor Davy inclines to think that the cause of it is an excess of alkaline and earthy matter in the descending sap. "I have often (says he) observed carbonate of lime on the edges of the canker in apple-trees; and ulmin, which contains fixed alkali, is abundant in the canker of the elm. Perhaps the application of a weak acid to the canker might be of use; or, where the tree is of great value, it may be watered occasionally with a very diluted acid. The nature of the secretion warrants the trial."

Mr. Mean is of opinion, that the disease arises from a minute insect; that is, from nests of animalcules. He finds, at least, that to rub the part affected with canker with a brush dipped in train-oil is an effectual remedy.

2. The GUM shews itself only on the class of stone-fruit bearers. It is generated by offensive matter in the soil. The distemper is also caused by the joint of a graft not uniting kindly; by bad or untimely pruning; by external accidents; or by a natural disposition in the tree to disease. Where this distemper gets confirmed, it closes up the eyes of blossom-buds, and produces barrenness.

If it shew itself in a part which can be cut away, the remedy is easy; but, like the canker, it frequently attacks the stem, or some main branch that cannot be spared.

When the gum exudes, from external injury, or from pruning large branches in summer, the cure is commonly easy: sometimes, on a sound tree, such a wound will heal of itself, by a prolongation of the bark over it, forming a kind of knob; or otherwise it will close with the aid of a plaster of cow-dung, covered with a piece of linen, to stop the discharge, and defend the part from the weather.

But when the distemper is constitutional, gum will be found in the inside of the wood: in this case, the plant must be condemned as incurable.

3. The MILDEW has the appearance of a parasitical fungus. It usually first attacks the young leaves and tender points of the new shoots. If this disease is permitted to ravage the leading shoots, and to stop their growth, young shoots of false wood will arise from the lower parts of the tree, contrary to the natural order of growth: the evil will gradually spread to these, and the whole plant sink under it.

On fruit-trees, the mildew may be easily subdued, at its first appearance, by scattering flour of sulphur upon the infected parts. The wash, also, of which the composition is given in the APPENDIX, under the title DESTRUCTION OF INSECTS,

General Remedy, will check this disease: but this can only be applied when a deciduous tree is at rest.

There is an opinion much entertained among gardeners and farmers, that a Berberry-tree, in the neighbourhood of a field of wheat, often produces the mildew. Professor Davy alludes to this opinion; and so far from deeming it unphilosophical, considers that the fungus with which the Berberry-tree is covered may be capable of degenerating into the wheat-fungus.

When moss is suffered to overrun a tree, the functions of the bark are affected, and the tree becomes stinted and unfruitful. This evil should be removed at the time of the winter-pruning. Some scrape the stem and branches with a curved blunt-edged knife, inserted at the back in a long wooden-handle. Others prefer using a hard brush.—In whichever way you clear the bark, afterwards scrub the stem and arms with soap-suds; or with a medicated wash for destroying insects, if the tree appears diseased from that cause.

Wherever the bark is DECAYED or CRACKED, remove so much of it, paring the edges of the sound part smooth. This deprives insects of a nidus, and promotes the reproduction of new bark. Dress the peeled parts with coal-tar, or with train-oil: the latter is preferable, as an antidote to insects.

In the heat of summer, to syringe wall-trees with water, on an evening, besides washing off many insects, helps to keep the bark from cracking, when the weather is excessively dry.

The following is an Alphabetical Arrangement of the different Species commonly cultivated in the open garden, arranged by their popular names. In each article will be found the botanic name of the species, the habitat, the time of flowering, and the best varieties of the fruit; with some particular directions respecting the nursery culture, the soil and site, final planting, the method of pruning, and the course of ultimate management.

ALMOND. *Amygdalus communis. (Several varieties.)*

This is a native of Barbary, and flowers in March and April. It belongs to the same genus as the peach. This stone-fruit has no eatable pulp. The almond-tree is cultivated for its kernel; but as the returns are not generally considered as very profitable, the trees are rather sparingly planted in the Orchard and Fruit-garden. In the Pleasure-ground, a greater proportion merit admittance, on account of their beautiful appearance during their early flowering and fruiting. The following are the varieties:

Common Bitter. *Sweet Jordan.*
Sweet. *Hard-shelled.*
Tender-shelled.

Estimate of sorts.—The tender-shelled is in great esteem. All the five sorts are proper to be cultivated as fruit-trees.

Soil and site.—Plants on an almond-stock like a light dry soil, moderately rich: in very strong earth they are more subject to gum. For a plum-stock, let the soil contain a greater quantity of fat loam.

Even for standards, allot a sheltered situation with a sunny aspect; for almond-trees are tender in their early blossom and young fruit, both which are liable to be cut off by the cold in unfavourable springs, when in exposed situations.

Nursery culture.—1. The different sorts, both hard and tender-shelled, come pretty regular from sowing their nuts.

2. To keep the varieties strictly permanent, they are propagated by budding the desired sorts upon plum or almond seedling-stocks, raised from the stones or nuts. The young seedlings, when a year old, are to be set out in lines for nursing two or three years, to a proper growth for budding; all trained with a clean single stem below: and when of the proper size, they should be budded: the bud will shoot the following spring. In the second spring, when the bud-shoot is one year old, shorten it, in March, to five or six eyes, to have it branch out laterally, according to its destination, to form the commencement of the head. Such trees as are designed for walls and espaliers, manage as directed for plants in the same stage, under *Peach.*

Final Planting.—The season for removing the almond-tree is either at the fall of the leaf, or in the spring, at the close of Feb. It cannot be transplanted too young; for large plants scarcely ever thrive after being removed, especially if on almond-stocks.

Mode of bearing.—The almond-tree bears chiefly on the young wood of the previous year, like the apricot and peach; and, in part, upon small spurs, on the two-year-old, three-year-old, and older branches.

Pruning standards.—After standards are furnished with heads, and begin to bear, they will require only occasional pruning, to reform any very crowded spray or irregular growths, or cross-placed and long rambling shoots, so as to preserve the head in some regularity, and keep the middle of the tree moderately open. Cut out also part of the old past-bearers, with all dead and decayed wood.

Taking the crop.—When the fruit is fully ripe, which is not before Sept. at the earliest, the outer cover opens naturally, to give out the stone or nut containing the kernel: the nut may then be gathered, as well for present use as to dry and preserve in sand for keeping in winter.

APPLE. *Pyrus Malus. (Many varieties.)*

This fruit, which is the first for usefulness in a family, is attainable almost the whole year. Besides the varieties of forms in which it may be cooked for the table, it is a good dessert fruit, and is the valuable material from which cider is made; so that select sorts of the apple merit culture abundantly, in proportion to the extent of ground set apart for raising fruit. It is a native plant. In a wild state here, it is the Crab of our woods and hedges. Botanists suppose that one single species has given birth to the innumerable varieties of the apple. The following list includes some old esteemed sorts, with some good new varieties:

Jenneting, or *June-eating Apple*; small, early ripe.
Striped Jenneting (Lawman's).
Margaret Apple; fine early sort.
Codlin; a valuable summer and autumn apple.
Summer Pearmain.
Honey-ball.
Strawberry Apple.
Peach Apple.
Plum Apple.
Golden Rennet, E. & D.
Golden Pippin, W. E. & D.
Franklin's Golden Pippin.
Yellow Golden Pippin.
Long-keeping Golden Pippin.
Balgone Pippin.
Royal Pearmain, E. & D.
Holland Pippin.
Kentish Codlin, E. & D.
Dutch Codlin.
Royal Codlin, E. & D.
Carlisle Codlin, E. & D.
Nonpareil, W.
Nonpareil Russet.
Royal Russet, W. E. & D.
Kentish Pippin.
Golden Russet, W.
Scarlet Pearmain.
Winter Pearmain.
Loan's Pearmain
Summer Calville (white & red.)
Autumn Calville (blood red).
Hertfordshire Fill-basket.
Carborelle.
Aromatic Russet.
Newtown Pippin.
English Rennet.
Pile's Russet.
Pomme d'Apis.
Margil Apple.
Kitchen Rennet.
White French Rennet.
French Pippin.
Summer Queening.
Gros Rennete de Normandie.
Fearn's Pippin.
White Costin.
Stone Pippin.
Rambour, summer.
———, *winter.*
Rennet Grise.
New Scarlet Pippin.
Cockle Pippin.
Golden Harvey.
Cœur-pendu (yellow).
Grey Leadington.
Nonsuch.

London Pippin.
Monstrous Rennet.
Cat's-head.
Queen's Apple.
Queen Charlotte.
Red-streak.
Canada Rennet.
Pomme du Roi.
Gilliflower (or *July-flower*).
French Pippin.
Glory of the West.
Royal George.
Pomme de Gélée.
Herefordshire Pearmain.
Syke House.
Flanders Pippin.
Winter Pippin.
Hudson's.
Costard.
Quarandon.
Hervey's Pearmain.
Spitzenberg Apple.
Arbroath Pippin, W. E. & D.
Saul Apple (Crofton).
Kerry Pippin.
Red Tankard.
Ross Nonpareil.
John Apple.
Ribston Pippin, W. E. & D.
Summer Stubbard.
Spanish Rennet.
Queen's Pippin.
Incomparable.
Norfolk Beaufin.
——— *Paradise.*
Norfolk Storing.
Jennet Moil.
Leather-coat Russet of Winter.
Two-year Apple.
Lemon Pippin.
Newbold's Royal Duncan.
Dutch Paradise Apple: the tree dwarf, and small; fruit of no estimation. The tree is used in the nurseries, raised from cuttings and layers, for dwarf stocks, to receive the grafts of approved varieties of the Common Apple, when the object is to have them of dwarf growth, and to bear sooner: but it is not eligible for general stocks.

NEW VARIETIES.

Cornish July-flower (or *Gilliflower*).
Hick's Fancy.
Borsdorf.
Lamb-Abbey Pearmain.
Waltham-Abbey Seedling.
Braddick Nonpareil.

MR. KNIGHT'S SORTS.

Downton Pippin.
Yellow Ingestree Pippin.
Grange Apple.
Wormsley Pippin.
Bringewood Pippin.
Foxley.
Siberian Harvey.

There are many other varieties of the apple, known by names peculiar to provincial parts of this and other countries: several others also are cultivated in the public nursery-grounds for sale, as well as the foregoing: but the preceding list offers a large field for selection.

Among the keeping kinds which are new, or at least comparatively young in respect to the series of grafts, and the vigour and fertility of the plants, are—the Balgon Pippin (this may serve as a substitute for the Golden Pippin, which it resembles, but is larger); the Ribston Pippin, which, though it has been well known a considerable time, is still in a vigorous state; the Kerry Pippin, Red Tankard, and Ross Nonpareil, well flavoured, and accounted quite new sorts in Antrim; the Saul or

Crofton apple, which first appeared in the parish of Saul, near Downpatrick; (this plant can be propagated by cuttings, and has the uncommon property of affording fruit the second or third year; and is also a good bearer, of large, beautiful, and well-flavoured fruit, which will keep for several months.)

The sorts marked *W.* *E.* and *D.* are respectively fit for walls, espaliers, and dwarf-standards. For general consumption, select a proportionate variety of the most-approved summer, autumn, and winter-sorts, that fruit may be obtained for use, in succession, throughout the year.

The following are species of themselves, quite distinct from the common apple.

Pyrus baccata; Small Siberian Crab; a native of Siberia: flowers in May. The tree dwarfish; the fruit small, growing in bunches, eats very agreeably, excellent for tarts and preserves.

Pyrus prunifolia; Large Siberian or *Tartarian Crab.* Siberia. May. The first large and beautiful, fit for tarts and preserves, and for the dessert when ripe.

These are very oramental plants, and rather fit to stand single in a pleasure-ground, or in a conspicuous part of a garden, than in an orchard.

Nursery culture.—The method to keep varieties permanent is, by grafting the desired kinds upon young stocks.

SECTIONS OF THE TOP FOR BEARERS.—A few sorts of Apples can be propagated by cuttings and layers: the trees thus raised grow with less luxuriance than grafts on free-stocks. The Arbroath Pippin will strike from a branch stuck in the ground like a willow-shoot. The Saul Apple also grows with much facility from cuttings; as do all the Codlins.

SOWING KERNELS FOR NEW SORTS.—The failure of some of the best old sorts has furnished additional motives for multiplying trials for new varieties.

Final planting.—The general season for planting is, either in autumn, towards the end of Oct. or in the course of Nov. or in Dec. or Jan., if open weather, or in the spring months of Feb. and March.

Soil and site.—All the sorts of the apple-tree may be planted in any good common soil, with a free exposure, whether that of a garden, orchard, or field; so that the ground be neither very low nor excessively wet, nor subject to inundation in winter. Avoid, as far as possible, very strong clayey and gravelly soils: where the only soil to be obtained is unfavourable, amend the places where the trees are to stand, with some

good virgin earth or mellow surface-loam, and rotten dung.

The allotment of apple-trees for an orchard should consist of standards; and for a garden, of espaliers and dwarft. Plant standards not less than twenty feet, and from that to fifty feet apart.

In espaliers, adopt the choicest kinds. Assign them a row along the inner edge of the borders next the walk: plant those grafted on dwarf stocks fifteen feet apart, and those on free stocks twenty or twenty-five feet from stem to stem. Train the branches of espaliers horizontally, from three to six inches asunder; mostly at full length, as far as the allotted space will permit them to extend.

Mode of bearing.—In all the varieties of the common apple, the mode of bearing is upon small terminal and lateral spurs, or short robust shoots, from half an inch to two inches long, which spring from the younger branches of two or more years' growth, appearing first at the extremity, and extending gradually down the side: the same bearing branches and fruit-spurs continue many years fruitful.

Fundamental principles in pruning the common apple-trees.—As, from the mode of bearing, apple-trees do not admit of shortening in the general bearers, it should only be practised occasionally: first, where any extend out of limits, or grow irregular and deformed; and secondly, a good shoot contiguous to a vacant space is shortened to a few eyes, to obtain an additional supply of young wood from the lower buds of the shoot for filling up the vacancy. But to shorten without such a motive is not merely the cutting away of the first and the principal bearing part of the branches, but also occasions their putting forth many strong useless wood-shoots where fruit-spurs would otherwise arise; and both effects greatly tend to retard the trees in bearing: whereas the fertile branches being cultivated to their natural length, shoot moderately, and have fruit-spurs quite to the extremity.

Pruning standards.—See *Orchard*, page 146.

Pruning dwarf-standards.—These may be kept in low growth, from six to nine feet high, measured to the top of the head, by pruning the wood-branches, and the too-extended bearers, down to some lateral bud or shoot, till they are reduced within the compass allotted.

Pruning espaliers and wall-trees.—These require a summer and winter pruning.

The SUMMER PRUNING trains in the young shoots of the same year which are likely to be wanted in the figure, and

retrenches them where ill placed or too numerous; for as the trees continue bearing many years on the same branches, they only require occasional supplies of young wood. Therefore, begin in May or June to pinch off or cut out close all fore-right ill-placed and superfluous shoots; retaining only some of the promising laterals in the more vacant parts, with a leader to each branch: train in these between the mother branches, at their full length, all summer. Or, where any vacancy occurs, some strong contiguous shoot may be shortened in June to a few eyes, to furnish several laterals the same season. Keep the shoots in all parts closely trained; both to preserve the regularity of the espalier, and to admit the air and sun to the advancing fruit.

The WINTER PRUNING may be performed from Nov. till the beginning of April. This comprehends the regulation of the wood branches, the bearers, and of the young shoots. First, examine the new shoots trained in the preceding summer; and if too abundant, retain only a competency of well-placed and promising laterals, to furnish vacant parts, with a leading shoot to each parent-branch. Continue these mostly at full length, as far as there is room. Cut out close the superabundant and irregular young shoots; and where any of the elder branches appear unfruitful, cankery, or decayed, cut them either clean out, or prune short to some good lateral, as may seem expedient. Also prune into order any branches which are very irregular, or too extended. Carefully preserve all the eligible natural fruit-spurs; but remove all unfruitful stumps and snags, and large projecting rugged spurs; cutting close to the old wood.

As each espalier is pruned, let the old and new branches be laid in at convenient distances, according to the size of the fruit, four, five, or six inches asunder, and neatly tied or nailed to the trellis.

Taking the crop.—The varieties of the apple come in successively for gathering from June or July to the end of Oct.; the earliest, as the codlin and some other kinds, begin to be useful in June, and are gathered, in young and middling growth, for present consumption, as culinary and dessert apples, from that time to August. Many different kinds fill up the season between the earliest and the latest, and are in highest perfection for the table in August and Sept. Some fine sorts of autumn apples acquire full growth in Sept., to gather as well for present use, as to keep a short time, till the later kinds of autumn and general winter apples attain maturity

at the end of Sept. and in Oct., then to be wholly gathered.

The late kinds of autumn and general winter apples are to be valued both for their property of long keeping and general superior goodness: they should be gathered in time, as they become fully mature; some for immediate use and large portions for keeping; and, where it is part of the domestic plan to make cider, apples from these crops should be set apart for that purpose.

The maturity of the apple is discoverable partly by the plump size of the fruit, and, in some kinds, by its turning yellowish: in others, the fruit undergoes no material change of colour: but in apples in general, a certain indication of maturity is, their easily quitting the branches when plucked, while a promiscuous few drop naturally from the trees: a separate criterion is derived from cutting one of the crop in two, as in a ripe apple the pips are of a dark-brown colour: on which appearances, all sorts of keeping-apples should be gathered. Observe: all such as are intended for long keeping should be carefully gathered by the hand, that they may not be bruised, as they unavoidably would if shaken down: they should likewise be gathered in dry weather, when the tree and the fruit are both alike dry: and in gathering, keep each sort separate.

Storing the fruit.—As they are successively gathered, house them in the fruitery, or some dry close apartment; and before placing them where they are to be permanently deposited, lay the principal keeping-kinds in heaps on the floor, each sort separately, covered with mats or dry straw, thus to remain ten or twelve days to sweat, and discharge the watery juices, that they may keep better and be improved in flavour: then let them be wiped dry; and deposit some upon shelves, &c.; others may be packed in hampers and baskets, in layers of dry paper or soft loose straw; observing generally to cover the whole with dry clean straw several inches thick, to exclude the external air, the damp, the frost, &c. Examine them occasionally, to pick out such as decay; and they will thus keep sound and good for winter and following spring, and some until summer.

An economical mode of preserving apples has been adopted by Mr. Donald, nurseryman at Woking; which is, to bury them in a trench, as is usual with potatoes, placing the fruit on a thick layer of fresh and perfectly dry straw, and covering the whole in the same manner; over which the earth is thrown, so as to prevent the wet from penetrating, and also as a safeguard against frost. Apples thus kept are noticed to preserve their best flavour, and may be kept later in the spring.

APRICOT. *Prunus Armeniaca. (Several fine varieties.)*

This is one of our superior kinds of stone-fruit. It is of a lively rich flavour, nearly of the quality and temperament of peaches and nectarines.

There is no fruit that receives so much improvement preserved in sugar; for an exquisite perfume, which was before latent, then becomes perceptible. Is a native of Armenia; flowers in March. The following are the chief varieties:

Early Masculine.	*Breda.*
Roman.	*Brussels.*
Orange.	*Moor-Park*; or, *Peach Apricot.*
Royal Orange.	*Grover's Breda.*
Turkey.	*Portugal.*
Transparent.	*Provence.*
Algiers.	

Estimate of sorts.—The Masculine is cultivated almost entirely because it is the earliest sort. The plant is a good bearer; but the fruit is not esteemed very highly: it is small, and has a sharp tartish flavour.

The Roman is a good bearer: the fruit middle-sized, not very juicy.

The Orange grows freely, and bears well: the fruit is rather large, and inferior to few in flavour. Makes a capital preserve.

The Royal Orange is a variety of the last.

The Turkey is an uncertain scanty bearer; but the fruit very superior.

The Transparent is like the Turkey. The Algiers the same.

The Breda is rather hardier as a plant than any of the preceding, and a plentiful regular bearer: the fruit large and juicy.

The Brussels is one of the least tender as a plant, and a good bearer; the fruit middle-sized, juicy, and of an excellent flavour.

The Moor-Park (Lord Dunmore's Breda), if well ripened on a south wall, has the most elevated generous flavour, and is accounted the best of all the apricots known in England.

Nursery culture. MANNER OF TRAINING.—The apricot is cultivated principally as a wall-tree in this country; for as the plant flowers early, and the tender blossoms and fruit are extremely liable to be cut off by the frosts which prevail in March and April, they require to be considerably sheltered in that stage; nor will many of the sorts ripen fully without the aid of a sunny wall: but occasionally some are trained in espaliers, and half and dwarf-standards, particularly the Brussels kind. Standard-apricots do not come into bearing under considerable number of years, sometimes ten or twelve; but then the fruit, in a congenial situation, is abundant, and of the

finest flavour. So, when the prevailing fault of a particular sort is mealiness, and yet it cannot be expected to ripen on even a dwarf standard, the medium course, of training the plant to a trellis almost touching a south wall, will improve the flavour. When the apricot-tree must be close to a wall, it is well adapted to come in as a standard between the dwarfs.

METHOD OF PROPAGATION.—The approved method of propagating the apricot-tree is by budding the desired sorts upon plum-stocks. The Wheaten Plum, or the Muscle Plum, forms an eligible stock. (See § 26. p.14.)

When the buds have grown one year, and are called maiden plants, they must be headed down to about six buds: from the shoots thus produced the future tree is formed. Train the primary and secondary branches as the figure is to be, that of a wall-tree or standard.

Final planting.—The young trees, raised as above, are proper for final planting, either in maiden trees of one summer's growth, or in trees that, having remained longer in the nursery, have been already headed-down.

The season for planting is either autumn or spring; that is, from the fall of the leaf until Feb. or March, on light dry soils; but in spring, where the ground inclines to be moist.

In planting, allot some best south walls for the most select varieties; and for others, south-east and west walls. Have the borders well prepared with proper soil (a light rich loam, or other good mellow fertile earth), at least thirty inches deep. Let the trees be planted fifteen, eighteen, or twenty feet asunder. If any are designed for espaliers, plant them at the same distance.

Training the first year.—Having nailed the shoots of the wall-trees, let them run mostly at full length all the summer. In the course of the winter pruning, toward the spring, shorten each shoot about one half, or more, to promote a further supply of laterals to increase the number of branches; and afterwards manage the head according to the general method of pruning these trees.

When the trees planted are already furnished with an expansion of several branches and shoots for immediate training to the wall, cut out, if there be such among them, any foreright or other ill-directed shoots; and, retaining the well-placed shoots, let them be shortened about one third, and nailed to the wall horizontally, at from three to six inches' distance. Head-down maiden plants which have the first bud-shoot entire, at the proper season.

Mode of bearing.—The varieties of the apricot in general bear chiefly upon the young shoots of last year, and casually upon small spurs rising on the two or three years' old fruit-branches.

The Moor-Park bears chiefly on last year's shoots, and on close spurs formed on the two-year-old wood.

The bearing shoots emit the blossom-buds immediately from the eyes, along the sides; and the buds have a round and swelling appearance.

Summer pruning.—Begin the summer pruning in May or early in June, and continue it occasionally in July, Aug. &c. This pruning is principally to regulate the young shoots of the same year. In the first place, take off close all the fore-right shoots, and others that are ill-placed or irregular, or too luxuriant in growth; taking care to retain a competent supply of choice well-placed moderately-growing side-shoots, with a good leader to each mother-branch. Continue these mostly at their full length all summer, regularly trained-in close to the wall, to procure a sufficiency to choose from in the general winter pruning, for new bearers next year.

If the summer regulation commence early, while the shoots are quite young, and as it were herbaceous, one, two, three, or four inches long, those improper to retain may be detached with the finger and thumb; but when of firmer growth, they must be removed with the knife. If any very strong shoot rise in any casually vacant part, it may be topped in June, which will cause it to produce several laterals the same year, of more moderate growth, eligible for training-in to supply the vacancy.

Thinning the fruit.—Sometimes the fruit are much too numerous, often growing in clusters; in which case, thin them in May and the beginning of June, in their young green state; leaving the most promising fruit singly, at three or four inches' distance, or from about two to six on the respective shoots, according to their strength. The apricots so thinned off, and the first principal green fruit, are esteemed very fine for tarts.

Winter pruning.—This may be performed either at the fall of the leaf, or in mild intervals from that time until the beginning of March. When it is deferred until the buds begin to swell, the promising shoots can be the better distinguished. It comprehends a general regulation both of the last year's shoots and the older branches.

A general supply of the most regular-placed young shoots must be everywhere retained, for successional bearers the

ensuing year. Cut out some of the most naked part of the two last years' bearers and naked old branches not furnished with competent supplies of young wood or with fruit-spurs, either to their origin, or to some well-directed lateral, as most expedient, to make room for training a general supply of the new bearers retained; and cut away all decayed wood and old stumps. Generally observe, in this pruning, to retain one leading shoot at the end of each branch; either a naturally-placed terminal, or one formed by cutting, where a vacuity is to be furnished, into a proper leader. Let the shoots retained for bearers be moderately shortened: strong shoots reduce in the least proportion, cutting off one-fourth or less of their length: from weak shoots take away a third, and sometimes half. This shortening will conduce to the production of a competency of lateral shoots the ensuing summer, from the lower and middle-placed eyes; whereas without it the new shoots would proceed mostly from the top, and leave the under part of the mother-branches naked, and the lower and middle parts of the tree unfurnished with proper supplies of bearing wood. Never prune below all the blossom-buds, except to provide wood; in which case cut nearer to the origin of the branch.

As, in these trees, small fruit-spurs, an inch or two long, often appear on some of the two or three years' branches furnished with blossom-buds, these spurs should generally be retained for bearing: but when any project foreright far from the wall, cut them in accordingly; for spurs projecting above three inches, though they may set their fruit, seldom ripen it, unless the season and situation are both favourable.

The thick clusters of spurs which are apt to form on aged trees ought also to be thinned.

As each tree is pruned, nail it, laying-in the branches and shoots from three to six inches' distance, straight and close to the wall.

Pruning standards.—Half-standards will require only occasional pruning, to regulate any branches which are too numerous, too extended, or cross-placed; and to remove any casually unfruitful parts and dead wood. At the same time, the regular branches, forming the head of the tree, should not be generally shortened. but permitted to advance in free growth.

Taking the crop.—The fruit of the apricot attains maturity in July, Aug., and Sept.; the time of ripening in the same sort does not always coincide, and is affected by the different circumstances under which wall-trees, espaliers, and standards

grow; so that a succession for the table may be easily prolonged. The mature fruit should generally be gathered before too soft and mealy ripe; the fruit being in perfection while it remains moderately firm and retains a poignant flavour.

Occasional shelter.—As the apricot blossoms early in the spring, when cutting frosts often prevail, it is advisable to give occasional protection to the principal sorts in wall-trees, by covering them with mats, netting, or other half shelter, as directed for peaches: the covering to be continued always at night, until the fruit is well set.

Forcing.—Artificial heat is not commonly bestowed on the apricot; nor do many sorts of it force well: but where early fruit is in demand, it may be forced under the same heat as the peach. The plants may either be planted in the border of a forcing-house, and trained to a light open trellis; or dwarf-standards may be introduced in large pots or tubs. The best kinds to force are, the Masculine, as being naturally an early sort, and the Moor-Park, for its superior flavour. To have ripe fruit in May and June, commence the forcing in Jan. or the beginning of Feb.

BERBERRY. *Berberis vulgaris.* (*Two principal varieties.*)

This is the smallest of our garden fruit, seldom eaten raw, but in estimation for preserving, candying, pickling, &c.; and being of a beautiful red colour, is occasionally used to garnish dishes served to table. The berries are of an acid flavour, except of one sort, which is not much prized. It is a native plant: flowers in April and May: and the parent of the following varieties:

Common Red, with internal stony seed.

Stoneless Red; of a more pulpy substance, and milder flavour than the Common Red. This sort is much the best for preserves.

The trees of both the varieties are of moderate growth, from six to twelve feet high. They are commonly trained in small standards, with a single stem, three, four, or five feet high, branching out at that height to form full heads for plentiful bearing. Regarded as fruit-trees, for their berries, it is eligible to plant a moderate proportion of them in gardens and orchards, in standards; also to introduce some into shrubbery plantations, where to utility they will add variety and ornament, as flowering shrubs, and please by the decorative appearance of their ripe berries in autumn and winter.

Nursery culture.—The varieties are propagated commonly by layers (see § 22. p. 12); also by cuttings and layers of the young

branches, and occasionally by grafting, especially the Stoneless kind. The Common Red sort is also raised by seed. Each of which methods of propagation may be performed in the spring: that by suckers and layers may be effected also in autumn, in Oct. Nov. &c. or in spring. The grafting is done in March, upon stocks of the common Berberry. Raised in whichever method, train the plants, either in dwarf or large standards, each with a single stem, one, two, three, four, or five feet high, to branch out thin, in a regular full head, and to have two or three years' growth, or more, for final transplanting: or the suckers, cuttings, or stocks, may be first planted where they are to remain.

Final planting.—According to the nature of the ground, plant either at any time from autumn to spring, or only in the spring. The plants may be already furnished with a head pretty well advanced, if thought proper. Allow them square distances of from fifteen to thirty feet.

Mode of bearing.—The Berberry produces its fruit at the sides of the branches, in small loose bunches: it bears both on young and old wood, chiefly towards the extremities.

Pruning.—The branches should not be shortened, except the design be to force out new wood. Permit the head to extend freely: and give only occasional pruning, to keep it in a pretty round form, open in the middle; cutting out weak, luxuriant, crossing, superfluous, and decayed branches. Reduce also long ramblers, and trim up low stragglers, also lateral shoots on the stem, and eradicate all root-suckers.

Taking the crop.—As a proportion of the berries ripen in the course of Sept. they will afford occasional gatherings for present use; and as they will be wholly ripe in October, all that are wanted for domestic supply should be then pulled. Always pick them in bunches.

CHERRY. *Prunus Cerasus.* (*Many varieties.*)

This is a desirable summer-fruit, for the refreshing quality of its juice, which makes it highly grateful in the dessert; and it can be prepared for the more substantial courses at table, by the cook and confectioner; nor should the agreeable way in which the Cherry qualifies brandy be forgotten. A fine wine may be also made from the juice. It is a native plant: flowers in April. Among the best varieties are the following, of which some have been imported:

Early May Cherry.
May-duke.
Archduke.
Harrison's-heart.

White-heart.
Black-heart.
Bleeding-heart.
Red-heart.
Hertfordshire-heart.
Carnation Cherry; red & white.
Kentish.
Amber-heart.
Bower's Early Amber-heart.
Morello.
Ox-heart.
Black Couronne.
Yellow Spanish.
Turkey Bigaroon.
Churchill's-heart.
Lukeward-heart.
Black Spanish.
Purple Black-heart.
Flemish-heart.
Ronald's Large Black-heart; from Circassia.
Large late Morella.
Kensington-duke.
Graffeon-heart.
Fraser's Large Black Tartarian Cherry.
White Swiss.
Double-flowering Weeping.

Estimate of sorts.—The chief to be recommended, for a limited selection, are: The May-duke; it thrives in all soils and aspects; grown under a free exposure, it ripens in June; from a north wall the fruit is acceptable; and perfectly ripened on a south wall, delicious. The Archduke is a capital wall-cherry; it ripens in July or August. The Morella is usually planted against north walls for fruit to preserve; yet if favoured with a south, an east, or west wall, it is an excellent late cherry for the dessert, coming-in in Aug. Sept. or Oct. The Early May, as the first ripe.—The qualities of the following sorts, which ripen in July, are generally known: Kensington-duke, Harrison's-heart, Hertfordshire-heart, Black-heart, Black Couronne, White-heart, Turkey-heart, Ox-heart, Bleeding-heart, Carnation Cherry. The Yellow Spanish and White Swiss; ripe in August. Where the plantation is large, to these may be added any other of the sorts cultivated solely for fruit. The trees which bear the smaller cherries, such as the Small Black Wild Cherry, and Red sorts, growing very large and lofty, are more proper for planting in large orchards, parks, and pleasure-grounds, and in the hedge-rows of fields: they will prosper in any common soil and situation, and yield considerable productions of ripe fruit in August.

The collective varieties of the Cherry ripen from the end of May, or more generally the middle of June, till October.

Cherries, as desirable summer-fruit, should be admitted in tolerable profusion into fruit-bearing plantations. Let the principal allotment embrace the most useful kinds, planted in standards; smaller portions, in half and dwarf standards; and a selection of the more choice sorts in wall-trees. Some may also be occasionally trained as espaliers, and will agreeably diversify a trellised border.

Cultivated for sale, the produce from standards is profitable, and generally meets with a ready demand, especially in the neighbourhood of large towns: therefore they are worthy of introduction into large orchards.

Nursery culture.—Approved sorts are perpetuated by grafting and budding the desired sorts upon cherry-stocks, raised from the stones of the Wild Black Cherry.

Soil and site.—All the sorts of the cherry may be planted in any common mellow soil of a garden or orchard. In Kent, this tree prospers in a deep loam, incumbent on rock. The situation should be open to the influence of the sun and air. If the soil be defective, it may be amended by the addition of some virgin earth, light loam, and rotten dung, or other manure called for by the nature of the staple.

The proper season for planting is from the middle or end of October, or any time in November or December, if open weather, till February or March.

Plant full standards from twenty to thirty feet apart: small standards, fifteen, eighteen, or twenty feet.

As to the sites of the wall-trees: Allot south walls to the finest of the early kinds, for fruit in May and June: train others against west and east walls, for supplies in succession: and some on north walls for the latest ripeners, particularly the Morella, which, so situated, will continue in perfection till September and October: but it is also proper to plant some trees of this sort on south walls, to have the fruit ripen earlier with improved flavour.

Plant the wall-trees at fifteen, eighteen, or twenty feet distance. Train the present branches to the wall chiefly at their full length, ranged horizontally from three to six inches asunder. As the branches increase in length, lay them along without shortening, as far as there is room for them to extend: in default of room only, prune such as are running out of limits to some lateral fruit-bed. Two or three occasional waterings, in the dry warm weather of spring and summer, will promote the striking of trees newly planted.

Mode of bearing.—Cherry-trees in general produce the fruit upon small spurs or studs, from half an inch to two inches in length, which proceed from the sides and ends of the two-year, three-year, and older branches; and, as new spurs continue shooting from the extreme parts, it is a maxim, in pruning both standards and wall-trees, not to shorten the bearing branches, where there is room for their regular extension. The Morella is in some degree an exception. See directions for pruning it separately.

Pruning Cherry-trees in general. STANDARDS.—Observing the mode of bearing, give only an occasional pruning, to reform or remove any casual irregularity from cross-placed or very crowded branches; and take away all cankery and decayed wood.

WALL-TREES.—A summer pruning, to commence in May or June, is necessary to regulate the shoots of the same year. Disbud the superfluous and fore-right shoot; or, if they have been suffered to spring, pinch or cut them off, with such as are disorderly. Retain a competent supply of some of the best well-placed side and terminal shoots, to remain for selection at the winter pruning. Nail or lay in the reserve close to the wall, at their full length; and so train them all summer.

The Winter Pruning may be performed at the fall of the leaf, or at any time in moderate weather till February or March. It comprises a regulation both of the old and young wood. Carefully preserve the sound productive branches and bearers in their full expansion; and reduce or remove such only as are irregular in growth, too crowded, unfruitful, decayed, or cankery. Any branches extending out of bounds, prune in to some good lateral shoot or fruit-bud. According to the time the bearers have already lasted, look to some promising shoots, for successors to those which may first wear out. To fill immediate vacancies, retain select shoots of last year and the year before, with uniformly a leader to the advancing branch, where there is room, and with lateral shoots in any open or unproductive space nearer the origin of the branch, to be trained as bearers between the main branches. Some cut superfluous fruit shoots clean away; others leave a sprinkling of short stubs, cut very short if foreright. The new laterals and terminals are to be trained in at full length, as far as room will permit. They will come into bearing the first and second year.

In pruning cherry-trees in general, be careful to preserve the small clustering fruit-spurs, except where in wall-trees any old spurs project considerably, and assume a rugged and disorderly appearance: cut such clean out, smoothly.

Pruning the Morella.—The Morella Cherry bears principally on the shoots of last year, the fruit proceeding immediately from the eyes of the shoots; and bears but casually and in a small degree on close spurs formed on the two-year-old wood, and scarcely ever on wood of the third year. Therefore, both in the summer and winter pruning, leave a supply of last year's shoots, on all the branches, from the origin to the extremity of the tree, for next year's bearers; cutting out past bearers to make room. It is plain that the Morella ought to have no

stubs left with a view to spurs, and all foreright shoots ought to be disbudded while young. To leave a convenient space for young wood, train the present bearers six inches apart; lay in between each of these one young shoot for bearing next year, which will make the promiscuous distance three inches.

Protection from birds.—As cherries, in a ripening state, are frequently attacked by birds, it is advisable to have choice wall-trees or espaliers defended with large nets in due time. Old fishing-nets may also be spread over the branches of dwarf-standards. To protect other standard-trees, let scare-crows and clap-boards be put up *in terrorem.*

Forcing.—Ripe fruit is obtained in April, by beginning to force at the beginning of January, or three weeks later, by commencing a month later. The May-duke is the best sort to force: the other early kinds do not set their fruit so well under artificial heat. The Morella will bear well in a house; but it is not general to force it. The plants may be either planted in the border of a house, worked by fire-heat, and trained to the wall or a trellis; or dwarf-standards may be introduced in large pots or tubs, twelve or fifteen inches in diameter. A light sandy loam, moderately rich, forms a proper soil for the border; but plants in pots require a greater proportion of vegetable mould, or black impalpable matter, in the compost. Principal wall-trees for the back border may have been trained one or two years; Riders, three or four years. Where the whole bottom space of a forcing-house is prepared as a border or bed, dwarf-standards with the lowest stems may be planted in front, and other dwarfs rising gradually higher towards the back part; choosing such as are fully furnished with immediate-bearing branches, fruit-spurs, and blossom-buds: and if any top-shoots are too extensive, prune them to order, cutting to some principal fruit-buds.—For the Temperature, see HOT-HOUSE AND FORCING GARDEN, "Cherry-house."

Cherry-trees are made dwarf by grafting or budding them on the common laurel, and may be forced to good account in pots.

The plants must be watered moderately at root, as the state of the mould may require. Twice or thrice a week, syringe the branches; but from the time the flowers open till the fruit be well set, steam the flues instead of watering over-head.

The Cherry is sometimes forced in a glazed pit; and sometimes by a dung hot-bed in such a pit. See Introduction to HOT-HOUSE AND FORCING GARDEN, "Upright Glazed Frames."

Temporary hot-houses have been, in some places, contrived to erect over a standard-tree of the best sorts, with the best effect.

CHESNUT. *(Only one principal sort of the fruit.)*

Chesnuts are desirable nut-fruit for autumn and winter. The trees, when of some considerable growth, produce abundant crops; they are adapted principally for extensive grounds, in which they are frequently planted for ornament as well as for the fruit.

In this country, the nuts rarely attain an equal perfection of size and flavour with the foreign nuts annually imported from Spain and Portugal; though, in a warm dry autumn, they reach a tolerable size, and are well-flavoured. As, however, the trees are often productive in fruit, are always fine ornaments to a landscape, and are highly valuable as first-rate timber-trees, they are well worth cultivating in extensive grounds. There is only one species of the Edible Chesnut, *Fagus Castanea*. We are indebted to this tree for the valuable hints relative to grafting. (See § 24, 38. pp. 13, 18.)

The earl of Egremont, about the year 1770, observed the fine large shining-leaved Spanish Chesnut to be propagated by grafting; and having brought over some trees from a nursery on the Continent, he found, to his agreeable surprise, that such trees produced fine nuts in a few years, which could only be attributed to the grafts being taken from the old tree. This induced his lordship to suggest the idea of grafting walnuts also, which is now done with the best effect. (See § 38. p. 18.)

Particulars relating to its natural history.—The seedling-raised trees sometimes run into slight varieties in the fruit; such as, the nuts coming a little larger or smaller, or shewing some other trivial difference, which may be occasioned by the soil. The trees from seed, which have not had the roots retrenched, advance to a lofty stature and very considerable magnitude, and continue in growth several centuries. They rise with a branchy head of the grandest compass, adorned with large spear-shaped leaves. The species bears it male and female flowers separate on the same tree: the time of flowering is July and August. From the female flowers the nuts are produced in large prickly cups, two, three, or four in each.

It is uncertain whether this tree is indigenous to Britain, as it is to Spain and other southern parts of Europe. It is incontestably an ancient inhabitant of this country; in which we have partial records of some very large old trees, supposed to be of nearly a thousand years' standing, which are still in growth, and have advanced to the astonishing size of five or six yards in diameter. History mentions, that several ages back there were large woods, consisting principally of chesnut-trees, in

different parts of England, particularly in Kent, and in the vicinity of London: at Cheshunt there was a forest of chesnut-trees. The timber being strong and durable, was then used in great part of the buildings of the metropolis: the roof of Westminster Abbey is constructed of it. The great chesnut-tree of Mount Ætna surpasses in size all others yet known, as mentioned by Sir William Hamilton, in the narrative of his excursion up that mountain, and by later travellers. The trunk of this celebrated tree is stated to be one hundred and sixty feet in circumference; and is quite hollow, which affects not the verdure of the branches; for the tree derives its subsistence from the bark, while it is losing by age its internal substance. Taking the diameter at about fifty feet, some idea may be formed of the magnitude of the limbs, and the astonishing loftiness and compass of the whole tree.

Soil.—The Chesnut thrives best on a deep sandy loam: it will grow pretty freely on good loam on a clayey bottom, on improved clay incumbent on sandstone rock, and on gravel mixed with an alluvial deposit from a river; but it does not succeed in wet land, or on a stiff unqualified clay.

Nursery culture.—New plants are raised most commonly from the nuts, which should be full grown and thoroughly ripe, dry, and firm. These may be sown in November, if a dry fine season; otherwise not till February or March: in the latter case, they should be preserved through the winter in sand. For sowing, it is usual to adopt the nursery bud. (See § 20. p. 11.) They will vegetate in the spring; and the plants will come up the same season, and should receive occasional watering in dry warm weather. By the autumn or spring following you may transplant them into nursery-beds, in rows a foot asunder, by six inches in the row, to have one or two years' growth: after which transplant them into wider nursery-rows, eighteen inches or two feet apart, by one foot in the row. They are always trained in full standards. Keep them trimmed up below to a single stem, if six or seven feet high, to branch out above and form the head; and when trained to the intended height, they may be transplanted finally where they are to remain.

Final planting.—In their final planting, they may be distributed towards the northern boundary of orchards; and, in larger groups, over any vacant tracts in extensive pleasure-grounds or parks, and to form spacious avenues, or a row along any out-boundary. A great number should not be placed close to a residence, as the smell of the flowers is offensive. Plant

them at not less than thirty feet, and thence to fifty feet distance.

Subsequent culture.—Permit the trees to branch out freely above, mostly in their natural order, to advance in large regular heads. Give occasional pruning only to very irregular and cross branches, and low stragglers. After they have attained some tolerable branchy growth, they will come into bearing in moderate plenty; and when they have expanded into large full heads, they may be expected to yield considerable quantities of nuts.

Taking the crop.—The nuts ripen from the end of Sept. to the end of Oct. When the outer capsule containing the nuts begins to divide, and the nuts appear of a brown colour, and some fall promiscuously from the tree, their full maturity is indicated. They may be gathered by hand, or beat down by long poles. Selecting the finest and best-ripened, clear them from the husks; let them be well dried and deposited in the fruitery, upon shelves, &c.; and some packed in layers of very dry fine sand, for longer keeping.

Culture for Timber.—The Chesnut-tree particularly merits to be cultivated largely, as a most useful timber-tree; and therefore to be comprehended in all forest-tree plantations, while groves and avenues might be formed wholly of Chesnuts. For this object, plant trees, when from three to six feet high, in rows distant between five and twelve feet: in advanced growth, let them be thinned by degrees for inferior purposes, and those which are retained grow up for timber. Some may also be raised in coppices of underwood, to cut thinningly, for poles and stakes.—See Nursery, Table I.

CRANBERRY. *Vaccinium macrocarpon.* (*Two species.*)

A native of North America, commonly called *American Cranberry.* The fruit is chiefly imported; and appropriated to cookery, for pies and tarts.

They are propagated by layers; and flourish in wet situations, as boggy ground, or on the banks of ponds and streams: and where such localities occur, they may be adopted for its culture with complete success; no further attention being required, than to keep the young sets free from from weeds.

Culture.—Choose an open situation, where the plants may have a due enjoyment of sun and air. Let the bed be four feet in width, and of any given length, according to the quantity required to be raised. In the centre part of this bed, and throughout its whole length, make an excavation eighteen

inches in width, and two feet in depth: and having first covered the bottom of the trench with small wood to the depth of two inches, fill it up with peat-earth, well trod in. On the sides of the bed, to the extent of its width, six inches depth of peat-earth will be sufficient.—The path should be level with the bed; it being desirable not to drain off the moisture.

Planting.—The plants are to be placed in a single row, in the centre of the bed, at a distance from two to six feet apart, as they soon put forth luxuriant runners extending in all directions.

Peat-earth is the only soil in which the American Cranberry will flourish: manure is altogether useless; and dung absolutely destroys it. In the year after planting, the runners put forth upright bearing-shoots; and from these annually increasing, fruit is produced in abundance.

Gathering and preserving the crop.—Gather the berries before they are over ripe; putting them into dry bottles, and corking them up close for winter use. The flavour of fruit cultivated in this country is far superior to any imported in water-casks.

Note.—While in Staffordshire (many years since) the Editor received a present of some berries of the *Vaccinium Oxycoccos*, gathered by peasants in Bishop's-Wood, near Eccleshall. The fruit was very small; but its flavour superior. Perhaps this species, which is a native plant, might be deserving of culture in some situations, for the sake of variety.

CURRANT. (*Two species, and some principal varieties.*)

A pleasant and useful summer fruit, in season from June to Sept. There is little demand for them till in a ripe state, though they are occasionally used in small tarts when green or just beginning to ripen: when fully mature, they are grateful and wholesome, eaten as dessert fruit; and great quantities are used for pies &c., also to make currant wine and jelly, and for preserving. Black-currant jelly is a fine medicine in cases of sore-throat, quinsey, cough, and disorders from cold.

The Red Currant, *Ribes rubrum*, is a native plant: flowers in April. The following are accounted varieties:

Common Red Currant.
Large Red.
Long-clustered Red.
Champagne Large Red.
——— *Pale Red.*
White Dutch.
Large New White Dutch.
White Crystal.
Large Pale Red Dutch.
Gooseberry-leaved.

The Black Currant, *Ribes nigrum*, is also indigenous: flowers in April and May. There are no varieties.

Estimate of sorts.—The Red and White sorts principally merit culture. The Black Currant, though very good and wholesome, yet, on account of its peculiar and less delicate flavour, is not in general estimation for the table, nor used in any culinary way, except for making jelly: as, however, the fruit is esteemed by some persons, a few trees of it should be admitted. The Whites please in a dessert; but the great demand is for the Reds.

Soil and site.—All the sorts are very hardy, will grow freely, and bear plentifully almost any where, alike in open and shady situations; by which the fruit may be obtained early, in June and July, and prolonged for several months in succession till Oct. As to the soil, the currant generally does well in any common garden-ground, well tilled and recruited: it bears the greater crop in a strong loam, or improved clay, somewhat moist; the earlier in a sandy light mould, which is not poor. Previous to planting, the ground should be dug two feet deep.

Nursery Culture.—All the varieties are usually trained in bushy standards for the general supply, from three to five feet high, either with one short stem, or sometimes with several branchy stems quite from the bottom: though I would advise training all classes of them with a single stem, from six to twelve inches high in standards, then to branch out to form a head; but for principal wall-trees, or espaliers, they should branch out near the ground.

All the sorts may be raised abundantly, by cuttings of the young shoots: these will begin bearing in two years, and in three or four years will bear plentifully.

To raise the tree by CUTTINGS: Proceed in autumn or spring to take some strong straight shoots of last summer, cut from nine to twelve inches long. Plant them in rows twelve or fifteen inches asunder, inserted half way into the ground.

In the first year, train the new plants with a single shoot, or at most a pair; and next March, head down the single shoot to six or seven eyes, or shorten the pair to three each; by which a fine head will be formed. After two or three years from the time of raising, they will be fit for final planting.

For a season or two after the head begins to be furnished, although the trees have been finally planted out, prune the young shoots further than is proper for established bearers;

leaving them longer each time of pruning, that the plant may not be weakened while the head is extending.

Final planting.—The season for planting on a dry soil is any time in open weather, from the fall of the leaf till Feb. or March. Plants expected to bear the following summer are best moved in Oct., unless the ground be wet in winter.

To raise large supplies, full plantations are formed in parallel rows, with intervals between the rows of eight or ten feet, and of six feet between the trees in each row.

Where convenient, have also some choice sorts trained against walls or palings, of different aspects, to obtain early and late fruit in perfection; some against a south exposure, for early production; others on east, west, and north walls, for intermediate succession and late fruit. Plant them at six, eight, or ten feet distance; letting them occasionally fill up the vacant spaces between other wall-trees. The branches should be allowed to advance from near the bottom, and be trained in a nearly horizontal direction, from three to six inches asunder. Before nailing them, cut out superabundant and irregular growths, retaining a competency of regular shoots for orderly training; among which if any are of very considerable length, prune them to moderate extent.

Some may likewise be trained as espaliers, in a detached row, in the borders or divisions of the quarters. The trees so trained may either be left to grow without support, or be tied occasionally to stakes, and the branches thus will not overspread the round. Kept moderately thin and regular, they will bear fine large fruit, and make an agreeable appearance.

Mode of bearing.—Currant-trees in general bear the fruit both on the young wood of one, two, and three years' growth; and on the older branches, from small spurs and snags along the sides, which continue several years fruitful; but the fruit produced on the last year's shoot is always finest, especially when the old mother-bearers have borne more than four years.

First, as to STANDARDS:

Pruning.—This extends both to the old and young wood. The time for it is when the plant is at rest. Of the shoots of the preceding summer, cut out the cross-placed and the otherwise irregular, with those which are not wanted for vacancies: but superfluous good lateral shoots are to be cut down to short stubs or artificial spurs, about half an inch long, so as to leave an eye or two, in order that they may send out fruit-shoots and spurs. With regard to the old bearers, take away those

which are naked, or getting unfruitful, or of which the fruit is declining in size: reduce any of excessive length, pruning-in to some well-placed lateral young shoot, to preserve the head within some regular compass. Cut out also any decayed or cankery parts. Retain a competency of the finest best-placed new shoots above and below vacant parts, to come in for successional bearers, or to supply the places of defective old wood; and preserve a leading shoot to the principal branches, where within orderly limits; shortening such terminal shoots as are of greatest length, to ten, twelve, or fifteen inches, according to their strength and situation on the branches; and leaving those of small extent mostly entire. Thin out spurs on the old branches, where very thick. Keep the trees always furnished with full-bearing branches, and advancing young bearers, in a regular open expansion, six, eight, or ten inches asunder at the extremities; circumscribing the general head within the height of three or four feet, or five at most.

Lastly, prune up any low stragglers or other undergrowths, and eradicate all root-suckers, so as to have a clean single stem below, and a regular open head, which is as pleasing in appearance as it is essential in conducing both to the plenty and fineness of the fruit.

To Wall-trees, Espaliers, and Standards, the same course of summer and winter pruning is applicable; but the following additional points for regulation spring out of their figure and situation, and make the timely discipline of the knife still more requisite. Cut out the fore-right and other irregular shoots, either close in, or leave short spurs an inch long. Throughout summer, train the shoots retained at full length, as far as the bounds will permit: and in the winter pruning, let the long shoots retained for bearers be shortened down to twelve, fifteen, or eighteen inches, according to their strength and the allotted space. Nail or tie the branches more or less horizontally as room admits, four, five, or six inches asunder. Tying is preferable, as fruit can then proceed from the spurs at the back of the branches.

Culture of the soil.—After the winter pruning, dig or fork the ground over, being careful not to injure the roots. Add such manure as the defects of the soil may require; disposing of it so as to feed the advancing extremities of the root.

Taking the crop.—The ripening fruit comes in for small gathering in June, advances to maturity in July, and continues in perfection till the end of August. Currants planted against

walls or fences can be conveniently covered with mats, by which means the fruit may be preserved for several weeks after the usual crop is over.

Forcing.—To obtain early Currants by forcing, let some good bearing trees, in pots, be placed, as early as Jan. or Feb., in any common forcing department, to produce ripe fruit in May and June.

ELDERBERRY. *Sambucus nigra.* (*Two varieties.*)

Although generally considered as a most inferior sort of fruit, this tree merits culture, for the berries, which it abundantly produces, and for which there is a considerable demand in the London Markets, in order to make wine of the expressed juice. It is a native plant: flowers from March to June. Both varieties are used for making wine; but the Black is the more common.

Black Elder-Berry. *White Elder-Berry.*

Site.—As the tree will grow anywhere, either in open or shady situations, it may be planted in any out-ground or waste spot, in single standards or in rows, to assist in forming boundary fences, as it is considered a preventive to the visits and ravages of insects. Trees planted in the hedge order, if suffered to grow up untrimmed, will produce abundance of berries for use.

Nursery culture.—The Elder is raised by cuttings of the young shoots in the spring. Select for CUTTINGS some strong young shoots of last summer, cut into lengths of one foot and thence to three feet or more: these may be planted either where it is intended the plants should remain, or in a nursery for a year's growth. Insert them from six to fifteen inches into the ground, according to their length: they will soon strike root; and will shoot strongly at top the same year. Train those designed for standards with a single stem from three to five feet high; and those for hedges, with branches out from the bottom

Final planting.—Standards may be planted from ten to twenty feet apart. They should be allowed to shoot out above, to form a branchy head, nearly in their natural order; in which they will soon become plentiful bearers: they are frequently planted in hedges.

The berries ripen from the end of Sept. to the end of Oct.

FIG. *Ficus Carica.* *(Many different sorts of the fruit.)*

This is a choice autumnal fruit, of delicious flavour, and highly esteemed for the table, either gathered ripe off the trees, or preserved for use in winter. It is indigenous to the South of Europe: flowers in June. The choicest varieties are:

Early Small White.
Large White Genoa.
White Marseilles.
Large Blue or *Purple.*
Brown Ischia.
Green Ischia.
Black Provence.
Long Brown Naples.
Yellow Ischia.
Green Naples.
Chasselau.
Brown Malta.
Milward.
Black Genoa.
Yellow Cæsar.
Brunswick, or *Madonna.*
Black Ischia.
Brown and the *Black, Small Italian Fig:* the trees are sometimes cultivated in pots.

Situation and soil.—Without the cherishing influence of a warm border, it will rarely ripen in this country. Further, the trees annually produce many succulent tender shoots for the principal bearers, which are liable to be killed by frost in severe winters, and require every possible protection. It is advisable, therefore, to cultivate the principal supply in wall-trees: but in a very favourable situation, a few may be trained in espaliers, and in dwarf-standards; also some dwarf sorts in pots.

The fig thrives in a light warm soil, moderately rich. Where such a soil is to be formed, the following is a good compost. Common garden mould, or virgin earth, mixed with an equal quantity of night-soil kept till reduced to mould, or other dung equally reduced, and with a third part of drift sand, and a twentieth part of ashes.

Nursery culture.—This tree is propagated by layers, and also by cuttings of the young branches and shoots. Plants from layers are sooner rooted than from cuttings. After they are rooted and established, shorten the top of the shoot, to produce laterals for forming the first set of branches. On account of the tenderness of the plant, spring is the fitter time to detach them from the mother stool. Plant them, either finally, or in a nursery for a year or two.

By CUTTINGS.—In Feb. or March, cut some moderately strong firm young shoots about a foot long. Plant them, by a dibble, in a shady border, and they will be rooted by autumn. In the open garden, always transplant the fig in spring.

Final planting.—When the trees are finally planted against the allotted walls, let the branches be trained in a regular

expansion, nailing them along to the wall horizontally, or with a slight diagonal rise, at their whole length, from eight to fourteen inches' distance; for as they produce large shoots and leaves, they should have proportionate room.

In fastening the branches, let them not be much constrained, nor the ligatures numerous or tight.

Mode of bearing.—The Fig bears its fruit almost entirely upon little shoots of the current year, which spring from the young wood of last year. The fruit comes out immediately from the eyes of the shoots, like small round buds, without any external appearance of blossom, which, consisting of numerous minute florets, is wholly concealed within the integument. This bud, being the general calyx, becomes the fruit, increasing in growth all the summer. The bearers produce the fruit mostly towards the upper and extreme parts. Two-year-old wood will sometimes bear fruit; but is never to be counted upon. At the end of March, shorten the extremity of every thick branch; as the wood does not in general ripen to the extreme ends.

Summer Pruning.—As the established trees will produce numerous shoots every summer, these must be regulated in June, July, and August, by pruning out the superabundant and the irregularly-placed. But observe, as the trees bear on the young wood only, to leave an ample supply of as many promising well-placed shoots, moderately long, but of strong growth, as can be conveniently trained in, to afford a selection, in the spring pruning, for next year's bearers. Nail them in close to the wall, without shortening; the whole to be neatly trained, to admit the action of the sun on the growing fruit, and on themselves, that the young wood may be ripened. Let them thus continue during the summer, and till the growing season is ended.

Winter Nailing, and Spring Pruning.—At the approach of winter, nail the principal shoots close to the wall (unless they are laid down and sheltered), the better to screen them from inclement weather and the power of the wind.—See *Protection in winter.*

As the young shoots, from their succulent nature, are liable, if pruned in winter, to be killed by the frost, it is advisable to defer the pruning, which corresponds to the winter pruning of other trees, wholly till March or April. Having then an ample choice in the entire number that will have escaped the frost, select a competency of the most promising well-placed shoots from the bottom of the tree upward, to be laid parallel at

proper distances, wholly for next summer's bearers. The most fertile shoots in the Fig-tree are round, short-jointed, and thick in proportion to their length. Cut out the redundant, the irregular, the excessively long, with as many of the last bearers as may be, and prolonged naked old branches. Of the wood branches take some clean out, and prune down others to some orderly good lateral shoot or eye. Cut off the rejected shoots, and old branches not wanted for wood, close and smooth. The most essential thing is to have all parts of the head, particularly the bottom and centre, furnished with young bearers. It is seldom necessary to prune a Fig-tree to provide wood branches; but these may be obtained by shortening at a wood-bud contiguous to the vacuity. When the pruning is finished, nail branches and shoots to the wall at proper distances.

Displacing after-shoots.—The young figs will begin to advance in small green buds in April or May; from which time be careful to keep the trees cleared from all useless after-shoots until the fruit ripens.

Picking off Autumnal fruit.—In fig-trees, a secondary production of autumnal green fruit arises on the same year's wood, too late to attain maturity in this country, which should be picked off when the leaves decay in Nov.; for these after-productions are not merely useless, but, if permitted to remain, would weaken the young wood in its fruit-buds for next year's bearing.

The Fig-tree may be checked in its useless habit of luxuriant growth, by decortication (see § 41. p. 19), so as to become fruitful at a very small size. This process is practised with success.

Protection in winter.—The tender nature of the Fig-tree makes it advisable to shelter it, on the approach of severe frost until the opening of spring, with stout mats, nailed up close, or with reed panels, or straw litter, fern, or dry warm haulm, placed thickly between the main branches over the shoots. Or a more commodious method is, to unnail the branches, lay them down in or close to the ground, and cover them with dry sand or litter. Also lay some ashes or litter over the roots.

FILBERT, AND HAZEL-NUT. (*Different species & varieties.*)

The Filbert and the different sorts of the Hazel-nut are all of the same family: but the Filbert, being an improved variety, much larger, and of superior goodness, is more generally esteemed and cultivated. Several other sorts, however, are very good and eligible for culture in a secondary degree. The

Common Nut, *Corylus Avellana*, is a native of Britain: flowers in March and April. It has given birth to several varieties:

Filbert, Red-kernelled. *Great Cob-nut.*
White-kernelled. *Large Long-nut.*
Cosford-nut. *Constantinople.*

The Large Spanish Nut (*Barcelona*) is indigenous to the South of Europe: flowers in March and April.

Estimate of sorts.—The Filbert merits culture; and its returns are very profitable for sale. The Red Filbert is accounted to have a finer flavour than the White. The Cob-nut is large, with a thick shell; but the kernel is considerable in size, and sweet, in most parts of England.

The Cosford-nut is remarkable for size, fine flavour, and thin shell; raised some years since by a gentleman of the name of Hawkins, near Godalming in Surry, by whom Mr. Curtis, the late partner of the Editor, was furnished with it, who introduced it in the London nurseries.—See *Salisbury on Orchards.*

Soil and site.—A cool, dry, poorish soil is to be chosen for Filberts; for example, a sandy loam, mixed with minute shattery stones or grit, and with a low proportion of vegetable or animal remains; for the plants fruit best when but moderately strong. They may be planted in any general garden, and largely in orchards; and select trees may increase the variety of pleasure-grounds and shrubberies. In wet situations, the trees are apt to run too much to wood, without throwing out those short twigs upon which the fruit is generally produced.

Nursery culture.—All the sorts can be propagated by grafting or layers. Plant the layers out in beds; and after the first year's growth, cut them down to a few buds of the young shoots, and the next growth will form the future plant: cut them down within a few inches of the ground. From the remaining part, if the trees are well rooted in the soil, five or six strong shoots will be produced.

Care must be taken to retain a due supply of catkins, which are perfectly visible at the time of pruning.

In the Filbert Orchards about Maidstone in Kent, it is a prevailing practice to train the trees with short stems, like a gooseberry-bush, but with the heads in the shape of a punch-bowl and exceeding thin of wood, and to prune them with exact attention to the mode of bearing.

Final planting.—The season for planting all the sorts is autumn or spring; or any interval in mild weather, from Oct. till the beginning of March.

Mode of bearing.—All the species bear principally upon the

sides and ends of the upper young branches. They produce the male and female blossoms separately on the same tree. The males appear toward the end of winter, and in spring, in small loose *amenta* or catkins; and the females or fruit-blossoms only in the spring, March and April, in close-sitting cups, generally in bunches.

Pruning.—The principal thing is, to provide for the annual succession of young wood, by shortening and removing some of the old. Besides which, keep the detached standards to a single stem, by cutting off all lateral shoots, and eradicating suckers from the root; prune long rambling and low straggling branches; reduce thickety shoots in the middle of the head; and remove decayed wood.

Much has been heretofore recommended with propriety for forming the Filbert-shrub, during its first growth from the nursery; but the pruning, for the purpose of causing those thus raised to produce a regular crop of fruit, is altogether another thing, and requires the consideration of every gardener.

This plant is of the class *Monœcia*, of the Linnæan System of Botany, a science that all who study the art of gardening should know; as thereby they will be able to detect the circumstance, that the fertile portion of fructification only appears in early spring, usually Feb. and March, and then so minute in appearance and often so scarce as not to be known generally; added to which, this is enveloped in the heart of a large bud, that, till the bloom absolutely appears, gives no intimation, by its form, of what particular buds are fruiting. (See § 31. p. 15.)

The above circumstance has been long known to the Kentish growers of Filberts, and induced a practice of regular pruning. When the Editor, some years since, heard of the circumstance, he purposely visited that county, and saw the operation, which is most simple; *i. e.* to examine the young wood, and to cut out all that is not furnished with the small scarlet shrubby stigma, leaving occasionally a few catkins: but there is little occasion for this; the business of fructifying is usually over, as the stigmata have turned of a crimson colour; and the only aid the pruning-knife can give, is to remove all the buds that may, if left on, rob the fruit-bearing branches of their necessary portion of the blood of the plant, and thereby prevent the usual secretions of the true sap.

Men are hired to travel through the above county to perform this operation, usually in the month of March. The Editor has frequently had to remark to his hearers, when adverting to this portion of vegetable physiology, that one

acre of land in Kent will produce, in some seasons, more filberts than are produced in Devonshire, Gloucestershire, and Warwickshire, though otherwise great fruit districts, where in every well-planted garden you see the Filbert-hedge.

Another circumstance worth notice, is the idea gardeners have of encouraging the propagating plants by suckers from the roots of trees: this ought to be strictly avoided: every tree tending to produce suckers, let it be what it will, should be completely cleared of them in early spring, as soon as produced. In explanation of this apparently new doctrine, let them refer to the axioms laid down in vegetable physiology, in the commencement of this work.

Gathering the crop.—The maturity of the fruit is indicated by turning brown, and readily quitting the husk. House a quantity for keeping: gather them in bunches, as they grow. If a portion, after being properly dried, be laid in boxes, and covered with dry sand to exclude the air, it will tend to preserve the kernels from shrinking; and they will thus keep well for several months.

GOOSEBERRY. (*Two species, and many varieties.*)

This fruit is very useful in a family; first in its young green state, for pies, puddings, sauce, &c.; and after coming to maturity as an agreeable table-fruit. While in a green state, it is also bottled up for long keeping. The varieties of fruit come in for use, in their green state, in April, May, and June; begin to ripen in June; and ripen in succession till Sept. The following are good varieties:

Small Early Red.
Early Black.
Early Green Gascoigne.
Large Smooth Green.
Large Hairy Green.
Large Round Red.
Large Hairy Red.
Large Smooth Red.
Scarlet.
Red Champagne.
Large White Dutch.
Large Amber.
Round Yellow.
Long Yellow.
Large Rough Yellow.
White Crystal.
Hairy Amber.
Rombullion.
Golden-drop.
Supreme Red.
Red Warrington.
Old Ironmonger.
Goliath Champion. Green.
Dawson.
Green-gage.
Pigeon-egg.
Royal George.
Golden-eagle.
White-walnut.
Red-walnut.
Golden-Orange.
Lancashire Admirable.
High-sheriff of Lancashire.
Lancashire Farmer.
Royal-oak.
Royal-sorereign. Yellow.

Estimate of sorts.—The above list includes the principal sorts of Gooseberries: there are many other intermediate varieties of Reds, Greens, Yellows, Whites, &c.; especially of new sorts, raised of late years from seed, known by various fancy names, adopted by the different cultivators.

The larger sorts of Gooseberries have been much extolled; yet some of the smaller are of finer flavour, and ought to be more prized.

Soil and site.—The trees of all the sorts are very hardy, so as to grow freely in any common good soil and situation.—See the same head under CURRANT.

Nursery culture.—This plant is of the shrubby class, naturally emitting its bushy branches quite from the bottom. The different sorts grow from three to four feet high; some nearly upright, others more spreading, a third class bending toward the ground: of which three kinds, the first is generally most commodious in culture; but all are equally good bearers.

All the sorts can be propagated by cuttings of the young top-shoots, or layers.

By CUTTINGS.—In autumn (Oct. &c.), or in spring (Feb. or March), collect cuttings of young straight shoots. Choose the strongest clean outward top-shoots of last summer, cutting them from eight to fifteen inches in length, as shoots of proper growth offer. Plant them in a shady border, in nursery-rows, fifteen inches asunder; inserted one third or half way into the ground. Give occasional watering in dry weather, in March, April, and May. Being careful in time to trim up very low under-shoots, train the plants with a single stem, to rise six, eight, or ten inches, and then form a branchy head.

Final planting.—The season for planting Gooseberries is any time, during open weather, from Oct. or Nov. till March. When trees are procured from the public nurseries, choose such as are of some advanced size, about three years' growth, with pretty full heads for immediate plentiful bearers. Let the general supply be in standard bushes. When the object is to raise large quantities of fruit, plantations are made in continued parallel rows, eight or ten feet asunder, by six feet in the row. It would be eligible to plant a few choice sorts, against south and other sunny walls or paling, for earlier and larger fruit; and on north walls, to ripen late in succession.

Mode of bearing.—The Gooseberry produces its fruit not only on the shoots of last summer, and on shoots two or three years old, but also on spurs or snags arising from the elder branches along the sides; but the former afford the largest

fruit. The shoots retained for bearers should therefore be left at full length, or nearly so.

Pruning.—The bushes will require a regulating pruning twice in the year. Cut out the cross-shoots of the preceding summer, and the superfluous among crowded branches. Prune long ramblers and low stragglers to some well-placed lateral or eye; or if an under-straggler spring very low, cut it away. Of last year's shoots, retain a sufficiency of the best well-placed laterals and terminals, in vacant parts, to form successional bearers, and to supply the places of unfruitful and decayed old wood, which, as you proceed, should be removed. Mostly retain a leading shoot at the end of a principal branch; leaving it either naturally terminal, or, where the branch would thus be too extended, pruning to some competent lateral within bounds.

Observe, too close cutting, or general shortening, occasions a great superfluity of wood in summer; for the laterals thus forced from the eyes of the shortened branches increase to a thicket, so as to retard the growth and prevent the full ripening of the fruit. On which account, it is an important part of pruning to keep the middle of the head open and clear, and to let the occasional shortening of the shoots be sparing and moderate. Between the bearing branches keep a regulated distance of at least six inches at the extremities; which will render them fertile bearers of good fruit.

Gathering the crop.—From Gooseberries being useful for different purposes, both in a green and in a mature state, and from the compass of time afforded by early and late sorts, they are in season and great request four or five months in summer, from April till Sept. The early sorts, on south walls, come in for gathering in small green berries, for tarts, &c. in April or early in May. The fruit is in general ripe in July; and by protecting, as is done with currants, may be preserved under mats for a month or six weeks after the crop is generally off.

Forcing.—To forward a few early green Gooseberries, have some established bearers in pots, placed in Jan. or Feb. in any forcing-house for fruit-trees.

For GRAPE-TREE—*See* VINE.
For HAZEL-NUT—*See* FILBERT.

MEDLAR. *Mespilus Germanica.* (*Three principal varieties.*)

A singular fruit, of round form and rusty brown colour, with a large open crown: when full grown, it is still hard and

austere, nor is eatable till some time after being gathered; but being laid up to get mellow, it acquires almost a buttery softness. It is a native plant, though its name implies an exotic origin: flowers in May and June. The following varieties are cultivated in the English gardens:

German (Large *Medlar*). *English* or *Nottingham* (smaller).

Estimate of sorts.—The first is most generally cultivated; but the fruit of the other, though smaller, is esteemed the best-flavoured: both are equally hardy, so as to grow in any soil and situation of common fertility. The tree reaches a moderate size.

Nursery culture.—The most eligible mode of propagation is grafting or budding on pear-stocks.

This fruit-tree is trained chiefly in standards, and occasionally in espaliers.

Final planting.—This may be performed any time in open weather, from the fall of the leaf till the beginning of April. Plant standards from twelve to twenty feet apart; espaliers, fifteen or twenty.

Mode of bearing.—The fruit is produced on small natural spurs, at the ends and sides of the branches.

Pruning.—Standards, when furnished with full heads, will require only occasional pruning. Keep them to a clean single stem; but allow the head to sboot freely, except where irregular or cross growths, or redundant shoots or cankery or decayed wood, call for retrenchment or removal. Keep the middle and general branches moderately open.

Gathering.—The fruit attains full growth about the end of Oct.; when it may be gathered, housed, and laid upon shelves, to acquire, in the course of winter, the peculiar mellowness which fits it for eating. This is accelerated by depositing portions of the fruit in moist bran successively for a week or fortnight; or some may remain on the tree until they become rotten ripe.

MULBERRY. (*One principal and two other species.*)

The following species are cultivated in the English gardens:

Common Black Mulberry (*Morus Nigra*). A native of Italy: flowers in June. This is the sort for principal culture; the fruit being larger and more grateful to the taste than that of the White Mulberry.

White Mulberry (*Morus Alba*). —China. June. The fruit is sweetish, and very insipid. The plant gives variety to the pleasure-ground: but it has a higher use, and is much cultivated in many places for the leaves; which are preferred in Europe as the prinpal food of silk-worms.

Estimate of Sorts.—The Black Mulberry is the only one cultivated for fruit. The Red Mulberry (*Morus Rubra*) is grown here merely as a shrub.

Nursery culture.—The Mulberry is propagated by layers; and when advanced in large spreading growth, sometimes a single standard will root in one year for planting into nursery lines for training.

Final planting.—Mulberry-trees are sometimes planted against walls, and succeed pretty well. This tree thrives remarkably well in the centre of London: some fine trees used to be in the Garden of Carpenters' Hall; and near to Southwark Bridge, on the City side, are to be seen the remains of a fine plantation that have grown there for many years.

Soil and site.—The Mulberry-tree thrives well in any fertile mellow ground, having a free situation in the full sun. Spreading its branches widely, a standard has a good effect on a lawn. When the trees begin to bear pretty fully, the ground under them, if cultivated, may be laid down with grass, in order that, as the ripe berries often drop promiscuously, they may fall on the soft clean sward, off which they may be picked up daily, in good condition for the table. So nice is the criterion of perfect ripeness, that berries falling without damage are superior to those gathered. Besides, a grass surface harmonizes best with trees of magnitude, and increases the beauty of a rural scene.

Mode of bearing.—The mulberry produces its fruit chiefly on little shoots of the same year, which arise on last year's wood, and on spurs from the two-year-old wood; in both stages, mostly at the end of the shoots and branches.

NECTARINE. *(Several fine varieties.)*

This is a fine richly-flavoured stone-fruit, intimately related to the Peach; the trees of both being similar in general growth, and in the mode of bearing: but in the Nectarine the fruit has a smooth firm rind, while that of the Peach is downy: the Nectarine has also a firmer pulp. The following are some of the principal varieties:

Fairchild's Early Nectarine.
Early Violet.
Newington.
Golden.
Elruge.
Scarlet.
Murrey (murrey-coloured).
Roman.
Brugnon Nectarine.
Temple's.
Early Nutmeg.
Cleremont.
Peterborough (Late *Green*).
Aromatic.
Tawny.
White (Italian).

Estimate of sorts.—In a selection from the above, include, particularly, Fairchild's Early: this tree is one of the most hardy, and bears well: the fruit is rather small, of a red colour, a free-stone, and high-flavoured:—Elruge; the fruit middle-sized, of a dark purple colour next the sun; on the other side greenish yellow; the pulp quits the stone, is melting, juicy, and good flavoured; ripe early in August; the tree a free grower:—Roman or Cluster-red; the fruit large, of a deep red towards the sun, but yellowish on the shady side; the flesh is red at the stone, and has an excellent flavour; ripe about the end of August:—Newington; the fruit pretty large, of a beautiful red towards the sun; on the other side a bright yellow; the pulp red at the stone, to which it clings; rich-flavoured; ripe towards the end of August:—Scarlet; the fruit rather less than the Newington, of a fine scarlet next the sun, pale red on the shady side, a free-stone, ripe at the end of August; the plant delicate, and requires a good climate:—Murrey; the fruit middle-sized, of a dingy red on the sunny side, greenish yellow underneath, the pulp firm and of pretty good flavour, a free-stone; ripe early in Sept.; the tree a free grower:—The Golden; the fruit middle-sized, of a cheerful red colour contrasted with bright yellow; a cling-stone; pulp firm, very yellow except at the stone, where it is pale red; of an elevated flavour; ripe in Sept.:—Temple's; the fruit middle-sized, of a light red colour next the sun, on the other side yellowish green; pulp white near the stone, from which it separates; of a rich poignant flavour; ripe in September.

Culture.—Every garden with an extent of south, south-east, south-west, and east walling, should have a proportionate part allotted for raising this delicious fruit.

The similarity in the Nectarine and Peach trees, before adverted to, so entirely pervades their general growth, leaves, blossoms, and mode of bearing, that they are distinguishable only by the fruit, which are supposed to be accidental varieties, because Peaches and Nectarines have been produced naturally on the same trees, and sometimes on the same branch. Hence Linnæus, and most of his followers, merge the NECTARINE in the species *Amygdalus Persica*, as a variety of the PEACH. Practical gardeners find the course of culture under which the Peach prospers to suit the Nectarine entirely; except that fewer sorts of the Nectarine will ripen in perfection on an east or south-west wall, even in a good situation; and that if any difference is made, late and delicate sorts of the Nectarine should have the first places on south-east and south borders.

PEACH. *Amygdalus Persica.* (*Many fine varieties.*)

This choice species of stone fruit comprises many varieties, and is divided into two distinct kinds; one having the pulp of the fruit adhere to the seed, called Cling-stones; the other is where the pulp is detached, and the seed parts freely. It differs from the Nectarine only in having a downy rind and more melting pulp: like that, it is a dessert fruit of the first order, and makes a delicious preserve. It is indigenous to Persia: flowers in April and May; early sorts in March.

Free-stone Peaches ripen, in most parts of Britain, more kindly than cling-stones, when the plants have only the aid of a warm wall. Therefore, in making lists for a selection, it is convenient to keep them in separate classes; and to subjoin the time of ripening.

FREE-STONES.

White Nutmeg. Round, small; rind and pulp white; juice of a sugary musky flavour. End of July.

Red Nutmeg. Round, large; rind of a bright vermilion and yellowish red; pulp white, red at the stone, of a rich musky flavour. Early in Aug.

Avant. Large; rind red next the sun; flavour very fine. Early in Aug.

Superb Royal. Large and very fine. Middle of Aug.

Early purple. Round, large; rind of a fine deep red; pulp white, red at the stone, rich and vinous. Middle of Aug.

Early Anne. Round, middle-sized; rind a fine deep red; pulp white; red at the stone. Middle of Aug.

Great Mignonne. Round, large; skin rose-coloured & greenish-yellow; pulp white, full of a sugary high-flavoured juice. Middle of Aug.

Small Mignonne. Round, middle-sized; rind darkish red and pale yellowish; pulp white, red at the stone, full of a vinous sugary juice. Just before middle of Aug.

Belle Chevreuse. Oblong, middle-sized; rind red and yellow; pulp yellowish, full of a rich sugary juice. Just after the middle of Aug.

Smith's Newington. Middle-sized; skin of a fine red on the sunny side; pulp white and firm, very red at the stone, of a pretty good flavour. Middle of Aug.

Early Admirable. Round, large; pulp white, red at the stone, of a sweet high vinous flavour. Middle of Aug.

Chancellor. Oval, middle-sized; rind thin, of a fine red next the sun, pulp white and melting, of a sugary rich flavour. End of Aug.

Montauban. Middle-sized; rind purplish-red and pale-red; pulp white, melting, juicy, and rich flavoured. End of Aug.

Bourdine. Round; skin dark-red next the sun; pulp white, deep-red at the stone, flavour rich and vinous. Early in Sept.

Red Magdalen. Round, large, of a fine red next the sun; pulp firm, white, very red at the stone, juice sugary and of an exquisitely rich flavour. End of Aug.

White Magdalen. Round, rather large; rind slightly streaked with red, and of a yellowish white; pulp white to the stone, of a pretty high flavour. End of Aug.

Royal Charlotte. Very fine. End of Aug.

Early Violet. End of Aug.

Double Mountain. Fine large French Peach. End of Aug.

Bellegrade. Round, large; rind deep purple next the sun; pulp white, deep red at the stone, juice rich and excellent. Early in Sept.

Malta. Almost round; skin of a fine marbled red and deep green; pulp white, deep red at the stone, somewhat musky, flavour pleasant. Early in Sept.

Yellow Alberge. Longish, middle-sized; rind deep red and yellow, pulp yellow, deep red at the stone, juice sugary and vinous. Early in Sept.

Rossana. Long; rind much like the last; pulp yellow, red at the stone, juice rich and vinous. Early in Sept.

Double Swalsh. Large fine melter. Early in Sept.

Vanguard. Ditto, ditto.

Late Violet. Very large and very good. Beginning of Sept.

Violet Hative. The largest sort very fine flavour. Beginning of Sept.

Gallande. Fine large Peach. Beginning of Sept.

Incomparable. Very large and fine. Middle of Sept.

Nivette. Roundish, large; rind of a bright red and pale yellow; pulp greenish yellow, red at the stone, copiously stored with rich juice. Middle of Sept.

Rambouillet. Roundish, middle sized, divided by a deep furrow; rind of a fine red and bright yellow, deep red at the stone, rich and vinous. Beginning of Sept.

Royal George. Round, large; rind sometimes interspersed with warts; pulp white, melting, and full of rich juice, deep-red at the stone. Beginning of Sept.

Grimwood's Royal George and *Millet's Mignonne* are similar in character to the preceding, but apt to mildew.

Vineuse. Round, middle-sized; rind thin, all over red, pulp white and fine, red at the stone; juice copious and vinous. Middle of Sept.

Noblesse. Very large; rind of a pale red next the sun; pulp juicy, and rich flavoured. Middle of Sept.

Late Purple. Round, large, dark red and yellowish; pulp white and melting, red at the stone, sweet and high-flavoured. Late in Sept.

Persique. Oblong, large; skin of a fine red next the sun; pulp firm, white, red at the stone, juicy, and of a high pleasant flavour. Late in Sept.

Teton de Venus. Middle-sized, has a breast-like protuberance; rind of a faint red and straw colour; pulp white and melting, red at the stone, juice rich and sugary. Late in Sept., but a shy bearer.

CLING-STONES.

Golden, or *Orange*. Above the middle-size, round; skin of a crimson or rich purple on the sunny side, underneath golden or orange-coloured; pulp a deep yellow, crimson at the stone, the flavour very superior. Course of Sept.

Late Admirable. Round, rather large; rind of a bright-marbled red next the sun; pulp greenish white, veined with red at the stone, rich and vinous. Middle of Sept.

Old Newington. Large; rind of a fine red next the sun; pulp white, deep red at the the stone, of an excellent flavour. Late in Sept.

Portugal. Large; rind of a beautiful red, and spotted; pulp firm, white, red at the stone, which is small and deeply furrowed; juice rich and sugary. Late in Sept.

Catharine. Round, large; rind dark-red next the sun; pulp firm, white, red at the stone; juice rich and pleasant. Early in Oct.

Monstrous Pavie. Round, exceedingly large; rind of a fine red and greenish white; pulp white and melting, deep red at the stone, pretty juicy, flavour vinous and agreeable. End of Oct.

Estimate of sorts.—The description annexed to each name above will furnish the grounds on which one sort may be preferred to another, as the circumstances of the garden and the design of the cultivator may vary. It may be a useful caution to add: Except the situation be completely favourable as to climate, aspect, and shelter, forbear to plant late fruit; as those but seldom ripen.

Site and soil.—The main assortment of Peach-trees should be planted against south walls; others on south-east, south-west, and esterly walls, to ripen fruit in succession. The tracts in this island where the fruit would ripen on standards are very few; though dwarf standards are sometimes tried in fine situations towards its southern extremity.

Nursery culture.—The Peach-tree is propagated by budding the desired sort upon plum-stocks. The stock used for the Common Peach is the Muscle-plum; but the Cling-stone varieties are propagated on the Pear-plum or Mignonne stock, with which the London nurseries are usually supplied from large cultivators in Surrey.

The plants a year old must be headed down, in March, to four, five, or six eyes, to produce lateral shoots, with one upright leader, to begin the formation of the head in a fan-like expansion: the second year's shoots should also be shortened to a few eyes at the return of March: and those also of the third year in such degree as may seem expedient. See NURSERY, *Budding*, and *Pruning*, Sect. VI.

Final planting.—The trees may be removed in Nov. or Dec., in mild weather.

It is usual, in making a garden for the planting of Peach and Nectarine trees, to have the borders made up with proper compost for the growth. A good soil for peach-trees is composed of three parts mellow unexhausted loam, and one part drift sand, moderately enriched with vegetable mould or the cooler dungs. If the soil be lean and poor, and at the same time light, have the borders improved with decomposed dung and fertile mellow earth (new top-spit loam if attainable): if the ground be strong and heavy, add some light earth or dung: if very gravelly, remove the grossest part, excavating to a proper depth: and in the same proportion apply a compost as above. Let the soil be made good to the depth of thirty inches, or three feet. The Nectarine wants the warmer, richer, and deeper soil.

Mode of bearing.—All the varieties of the Peach and Nectarine bear the fruit upon the young wood of a year old; the blossom-buds rising immediately from the eyes of the shoots. The same shoot seldom bears after the first year, except on some casual small spurs on the two years' wood, which is not to be counted upon. Hence the trees are to be pruned as bearing entirely on the shoots of the preceding year; and a full supply of every year's shoots must be trained-in for successional bearers the following season.

Pruning.—Young trees under training, as well as established trees, require a summer and winter pruning.

The SUMMER PRUNING, in May and June, and occasionally in the succeeding months, is to regulate the shoots of the same year. Pinch off fore-right buds or shoots; and pinch off or cut out ill-placed, very weakly, spongy, and deformed shoots, and very strong luxuriant growths; retaining a plentiful supply of good lateral shoots in all parts of the tree, and leaving a leader to each branch. Let them mostly be trained-in at full length all summer, about three inches asunder, for next year's bearers; and divest them of any lateral twigs, to promote a healthy fruitful growth in the shoots themselves.

Retain, in all parts of the tree, a competent supply of such regular-grown shoots of last year as are apparently fruitful in blossom-buds. Most part of these should be shortened, not indiscriminately, but according to their strength and situation: the very strong shoots should be left longest, being topped about one fourth, or one third: shoots of middling vigour reduce one third or one half; and prune the very weak

to two or three buds. Always cut at a leaf-bud, to advance for a leader: sometimes a leaf-bud lies between a twin blossom-bud: cut half an inch above the bud. As many new shoots as will lay from three to six inches asunder may be deemed a competent supply for next year's bearers.

Cut out, quite close, the redundant, irregular, and other improper shoots: remove or reduce some part of the former bearers of the two preceding years, cutting the most naked quite away, and others down to the most eligible younger branch or well-placed shoot. Also take out all diseased and dead wood; retaining young, where necessary to fill a vacuity.

Occasional shelter.—As the blossoms unfold early in spring, March or April, when severe weather frequently prevails, cover the principal sorts with large garden-mats whenever a frosty night may be expected; or occasionally so protect them in the day, when the weather is rigorous, or a cloudy atmosphere threatens cold rain. Another expedient is, to stick small cuttings of spreading evergreens, as laurel, yew, fir, or fern, in the trees, thus forming a substitute for leaves which are not produced till the blooming is over, which may afford some protection to the blossoms and young fruit; there to remain till the fruit is well set and danger is past, which may be about the beginning of May. Sometimes the trees are defended with large old fishing-nets, suspended double-fold, and continued night and day, till the weather is settled mild, when all covering should cease. The seedsmen sell yarn nets, wove on purpose.

Summer culture.—During the progress of the fruit, in the rest of spring and throughout summer, keep the trees clear from superfluous shoots and lateral twigs, as well that the sun and air may have proper access to the advancing fruit and the young wood training for future supply, as to preserve the regularity of the trees.

THINNING FRUIT.—In favourable seasons, the trees set much more fruit than they can support, or than have room to attain full growth; and if all were to remain, it would hurt the trees in their future bearing: therefore the fruit should be thinned, when of the size of half-grown gooseberries, by nailing close to the wall the summer shoots necessary to the future welfare of the tree, and detaching the rest. Finish the thinning with great regularity, leaving those retained at proper distances, three, four, or five, on strong shoots; two or three on middling; and one or two on the weaker shoots; and never leaving more than one peach at the same eye.

SUPPRESSION OF INSECTS.—Sometimes Peach-trees are attacked with a sort of blight, caused by small insects, very pernicious both to the trees and fruit in their growth: this is apparent by the leaves curling up, and often by the end of the shoots being bunched and clammy, which retards their shooting. In this case, it is advisable to pick off the infected leaves, and cut away the distempered part of the shoots. Further to check the mischief, if the weather be hot and dry, give the trees a smart watering all over the branches. A garden-engine will perform the watering much more effectually than a common watering-pot, as it discharges the water in a full stream against the trees. Apply it two or three times a week: the best time of the day is the afternoon, when the power of the sun is declining. These waterings will clear the leaves, branches, and fruit, from any contracted foulness; refresh and revive the whole considerably; and conduce greatly to exterminate vermin.

Forcing.—Ripe peaches and nectarines are obtained in May and June, by having trees advanced to a bearing stage permanently growing in the borders of a forcing-house; or boxes or large pots are frequently used for growing dwarf peach and nectarine trees, which being placed in a hot-house will, under proper care, produce considerable crops of fruit.

In a house of sufficient width, that is between ten and fifteen feet across, another row of principals may be planted in front, for training as espaliers.

In a regular Peach-house, vegetation is excited by fire-heat, communicated by flues ranging internally along the front and back and both end walls. See HOT-HOUSE, *Introduction*, '*Principles in Construction of Hot-houses.*'

TO PROCEED BY FIRE-HEAT.—No proper command over the temperature can be had without fire-heat, or the economic frame system (p. 10). For the minimum degree at which to begin, and the progressive rise to a climax of ripening heat, under daily admissions of fresh air, see HOT-HOUSE AND FORCING GARDEN, PEACH-HOUSE.

Make the fires every evening, beginning an hour before sunset; support them till nine or ten o'clock, to continue a proper degree of warmth in the house till morning: when also make a moderate fire, and maintain it through the day at a gentle degree, when the day is fair and mild, yet not equal to the requisite temperature; and increase it in frosty, or very cold and cloudy weather.

The buds will not break strong without daily admissions of fresh air in the middle of fine sunny days, and even of clear frosty days, when let the temperature be kept up by the flues. While the plant is in flower, and till the fruit is set, be particularly circumspect in managing the necessary interchange of air, confining it to the ventilators, unless the weather be very mild and auspicious.

Give occasional waterings to the borders, to keep the mould moist; reducing the quantity from the time of flowering until the fruit be set. And, excepting at the same periods, and also from the time the fruit begins to ripen off, syringe the branches every two or three days with water. These circumstances, with the due portion of temperate heat at the season of stoning, are the grand objects for regard in forcing peaches and nectarines: it is really astonishing to contemplate the great heat these fruits may be subjected to, after this particular period of maturation.

The following journal of the process of growing as fine a crop of this fruit as ever was produced, was kept by Mr. William Rivers, who, with the Editor, sojourned some time at Woodhall, Hertfordshire, for the purpose of obtaining a knowledge of this practice of their profession. It will also shew the Philo-horticulturist, that his business is not to be acquired without due application and industry.

N B.—*H* denotes the hour, *m* morning, *n* noon, *e* afternoon or evening, and *Deg.* degrees by Fahrenheit's Thermometer.

* *JANUARY.*

Day.	H.	Deg.
4	—	—
5	—	—
6	—	—
7	—	—
8	9 *even.*	47
9	7 *morn.*	45
	12 *noon.*	48
	9 *e*	50
10	7 *m*	46
	11 *m*	52
	10 *n*	53
11	8 *m*	50
	11 *e*	48
12	9 *m*	54
	8 *e*	55
13	7 *m*	48
	11 *m*	57
	10 *e*	54
14	10 *m*	58
	3 *e*	46
15	8 *m*	54
	4 *e*	57
	9 *e*	
16	8 *m*	46
	1 *e*	58
17	7 *m*	49
	9 *m*	53
	3 *e*	56
18	11 *m*	49
	5 *e*	47
	10 *e*	55
19	7 *m*	50
	1 *e*	57
	10 *e*	56
20	9 *m*	49
	2 *e*	57
	11 *e*	55
21	10 *m*	60
	12 *n*	58
22	9 *m*	61
23	9 *e*	55
	11 *e*	51
24	6 *m*	47
	11 *m*	54
25	8 *m*	50
	7 *e*	54
26	7 *m*	50
	9 *m*	49
	1 *e*	58
	5 *e*	50
27	7 *m*	49
	1 *e*	68
	7 *e*	52
	9 *e*	56
28	7 *m*	50
	9 *m*	50
	2 *e*	52
29	7 *m*	42
	9 *m*	57
	12 *n*	72
	9 *e*	56
30	9 *m*	51
	9 *n*	53
31	8 *m*	51
	FEBRUARY.	
1	9 *n*	55
2	1 *e*	73

* The glasses were put on Dec. 29, 1789. The heat from 40° to 45° by fire; the front flue only lit.

Day.	H.	Deg.
	2 *e*	.. 66
	9 *e*	.. 54
3	9 *m*	.. 57
	2 *e*	.. 61
	7 *e*	.. 56
	9 *e*	.. 55
4	12 *n*	.. 57
	9 *e*	.. 54
5	11 *m*	.. 64
	4 *e*	.. 56
6	7 *m*	.. 57
	3 *e*	.. 59
	9 *e*	.. 65
7	9 *m*	.. 52
	1 *e*	.. 60
	10 *e*	.. 56
8	11 *m*	.. 60
	11 *e*	.. 53
9	7 *m*	.. 50
	10 *e*	.. 56
10	11 *m*	.. 60
	5 *e*	.. 58
11	12 *n*	.. 64
	9 *e*	.. 57
12	9 *m*	.. 55
	12 *n*	.. 60
	8 *e*	.. 57
13	11 *m*	.. 67
	8 *e*	.. 59
	9 *e*	..*60
14	11 *m*	.. 62
	1 *e*	.. 64
15	4 *e*	.. 60
	5 *e*	.. 59
16	9 *m*	.. 53
	1 *e*	.. 55
	9 *e*	.. 59
17	9 *m*	.. 66
	2 *e*	.. 74
	7 *e*	.. 57
18	9 *m*	.. 52
	2 *e*	.. 60
	9 *e*	.. 59
19	7 *m*	.. 54
	9 *e*	.. 57
20	7 *m*	.. 55
	9 *m*	.. 56
21	1 *m*	.. 55
	9 *m*	.. 54
22	1 *e*	.. 75
23	7 *m*	.. 59
	9 *m*	.. 60
	9 *e*	.. 58
24	7 *m*	.. 58
	1 *e*	.. 61
	10 *e*	.. 59
25	7 *m*	.. 51
	2 *e*	.. 71
	10 *e*	.. 60
26	6 *m*	.. 53
	1 *e*	.. 56
27	6 *m*	.. 54
	9 *m*	.. 64
	1 *e*	.. 70
	10 *e*	.. 60
28	8 *m*	.. 59
	9 *e*	.. 59

MARCH.

Day.	H.	Deg.
1	6 *m*	.. 57
	9 *m*	.. 59
	11 *m*	.. 66
	2 *e*	.. 66
	10 *e*	.. 60
2	6 *m*	.. 58
	12 *n*	.. 62
3	9 *m*	.. 62
	12 *n*	.. 72
	10 *e*	.. 60
4	6 *m*	.. 54
	2 *e*	.. 77
	4 *e*	.. 68
	11 *e*	.. 58
5	6 *m*	.. 57
	2 *e*	.. 81
	6 *e*	.. 58
6	2 *e*	.. 60
	7 *e*	.. 56
	11 *e*	.. 58
7	6 *m*	.. 58
	12 *n*	.. 62
	7 *e*	.. 58
8	6 *m*	.. 53
	10 *e*	.. 68
9	6 M	.. 57
	2 *e*	.. 62
	11 *e*	.. 58
10	7 *m*	.. 59
	2 *e*	.. 62
	11 *e*	.. 58
11	6 *m*	.. 53
	9 *e*	.. 72
12	6 *m*	.. 57
	2 *e*	.. 76
	6 *e*	.. 63
13	6 *m*	.. 57
	2 *e*	.. 67
	9 *e*	.. 58
14	6 *m*	.. 52
	12 *n*	.. 76
	10 *e*	.. 57
15	6 *m*	.. 49
	2 *e*	.. 63
	10 *e*	.. 57
16	6 *m*	.. 48
	9 *m*	.. 74
	2 *e*	.. 71
	10 *e*	.. 57
17	6 *m*	.. 55
	12 *n*	.. 77
	10 *e*	.. 58
18	6 *m*	.. 59
	1 *e*	.. 77
	11 *e*	.. 56
19	6 *m*	.. 58
	10 *e*	.. 57
20	6 *m*	.. 50
	8 *e*	.. 57
21	10 *e*	.. 58
22	5 *m*	.. 52
	10 *e*	.. 54
23	11 *e*	.. 57
24	6 *m*	.. 61
	10 *e*	.. 58
25	6 *m*	.. 57
	6 *e*	.. 60
	11 *e*	.. 59
26	1 *e*	.. 70
	10 *e*	.. 60
27	9 *m*	.. 57
	1 *e*	.. 66
	10 *e*	.. 60
28	6 *m*	.. 58
	12 *n*	.. 78
	5 *e*	.. 69
29	1 *e*	.. 63
	11 *e*	.. 63
30	11 *e*	.. 62
31	1 *e*	.. 79
	10 *e*	.. 62

APRIL.

Day.	H.	Deg.
1	6 *m*	.. 56
	1 *e*	.. 74
	12 *nt.*	.. 57
2	9 *m*	.. 72
	1 *e*	.. 69
	10 *e*	.. 60
3	6 *m*	.. 52
	10 *e*	.. 59
	11 *e*	.. 60
4	11 *e*	.. 59
	11 *m*	.. 64
	6 *e*	.. 57
	10 *e*	.. 60
5	11 *e*	.. 64
	10 *e*	.. 60
6	11 *m*	.. 64
	10 *e*	.. 59
8	2 *e*	.. 76
	6 *e*	.. 58
	11 *e*	.. 58
9	6 *m*	.. 55
	10 *e*	.. 60
10	11 *e*	.. 57
11	6 *m*	.. 55
	10 *e*	.. 60
12	6 *m*	.. 56
	10 *e*	.. 60
13	6 *m*	.. 56
	3 *e*	.. 65
	5 *e*	.. 60
	11 *e*	.. 61
14	10 *m*	.. 66
	7 *e*	.. 63
15	6 *m*	.. 57
	2 *e*	.. 61
	11 *e*	.. 61
16	6 *m*	.. 59
	1 *e*	.. 75
	12 *nt*	.. 60
17	6 *m*	..†58
	1 *e*	.. 82
	10 *e*	.. 60
18	11 *m*	.. 61
19	6 *m*	.. 58
	11 *e*	.. 64
20	6 *m*	.. 58
	2 *e*	.. 79
	10 *e*	.. 61
21	11 *e*	.. 64

* The fruit were set.

† The stones of the fruit were hard at this time, and out of danger.

Day.	H.	Deg.
23	6 *m*	.. 59
	9 *e*	.. 63
24	5 *m*	.. 59
25	10 *e*	.. 62
26	10 *e*	.. 68
27	5 *m*	.. 57
28	1 *e*	.. 76
	9 *e*	.. 69
29	1 *e*	.. 71
	10 *e*	.. 67
30	6 *m*	.. 60
	10 *e*	.. 70
	MAY.	
1	10 *m*	.. 72
	1 *e*	.. 67
	10 *e*	.. 70
2	6 *m*	.. 62
	12 *n*	.. 83
	10 *e*	.. 70
3	5 *m*	.. 61
	1 *e*	.. 66
4	4 *m*	.. 59
	10 *m*	.. 85
	10 *e*	.. 68
5	12 *n*	.. 75
	10 *e*	.. 69
6	6 *m*	.. 63
	12 *n*	.. 80
	10 *e*	.. 68
7	1 *e*	.. 90
	10 *e*	.. 72
8	5 *m*	.. 65
	10 *e*	.. 71
9	5 *m*	.. 64
	10 *e*	. 69
10	10 *e*	.. 70
11	5 *m*	.. 66
	12 *n*	.. 94
	1 *e*	.. 91
	10 *e*	.. 70
12	10 *m*	.. 97
	4 *e*	.. 86
	10 *e*	.. 69
13	5 *m*	.. 67
	11 *m*	.. 94
14	5 *m*	.. 67
	12 *n*	.. 94
	10 *e*	.. 70
15	11 *m*	.. 93
	10 *e*	.. 69
16	12 *n*	.. 94
17	10 *e*	.. 68
18	6 *m*	.. 75
	10 *e*	.. 70
19	2 *e*	.. 85
20	6 *m*	.. 57
	4 *e*	.. 80
21	12 *n*	.. 85
	11 *e*	.. 69
22	6 *m*	.. 67
	10 *e*	.. 70
24	12 *n*	.. 85
	9 *e*	.. 69
25	1 *e*	.. 86
	10 *e*	.. 73
26	4 *m*	.. 69
	12 *n*	.. 87
	10 *e*	.. 73
	JUNE.	
1	6 *m*	.. 67
	11 *m*	.. 86
	7 *e*	.. 73
4	1 *e*	.. 86
	3 *e*	.. 85
	9 *e*	.. 60
	The fruit ripe.	

The trees in the houses were planted ten feet asunder in the front, against a treilage six feet high: that in the back thirteen feet and a half high; the trees against it ten feet asunder, with standards between them.

Peach and nectarine trees in houses should be frequently sprinkled with water, about the same heat as the air of the house, before they are in flower; also after the fruit are set, but not while the trees are in flower.

PEAR. *Pyrus communis.* (*Many varieties.*)

The Pear comprises many varieties. The superior sorts, tender and delicious, are good dessert fruit: there are also particular kinds, with a firm pulp, for culinary purposes, and for preserving; also others for making perry. The pear is a native of Britain: flowers in April. It has given birth to innumerable varieties: many varieties have also been introduced from abroad, some of which will not ripen in perfection without a wall. The following list comprises some of the principal sorts. Those marked *W.* require a wall to ripen in perfection, or a fine situation in a warm exposure. The letters *E.* and *D.* indicate such as are fit for espaliers and dwarf-standards.

SUMMER PEARS.

Green Chissal. W.
Primitive.
Little Musk.
Red Muscadine.
August Muscat.
Catherine.
Jargonelle. W. E. & D.
Cuissemadame.
Windsor.
Blanquette.
Summer Bergamot. E. & D.

Orange Bergamot.
Summer Bon-chrétien.
Musk Blanquette.
Great Rousselet.
Orange Muscat.
Prince.
Rose Water.

AUTUMN PEARS

Autumn Bergamot. W.
Hamden's Bergamot.
Green Sugar.
Brown Beuré. W.
Red Beuré.
Gansel's Bergamot. W.
Verte Longue.
Marquis.
Grey Beuré.
Auchen. W.
Grey Good-wife.
Swan-Egg. E & D.
Monsieur Jean.
Brocas's Bergamot.
Swiss Bergamot. W.
Longueville. E. & D.
Paddington.
Ampthill Bon-chrêtien.*

WINTER PEARS.

Cressane. W.
Chaumontelle. W.
Colmar. Sup. cli. or W.
Echasserie.
Grosse Blanquette.
Winter Bon-chrêtien.
Besi Chaumontelle.
Musk Robinet.
Holland Bergamot.
Citron des Carmes.
St. Germain. Sup. cli. or W.
Martin Sec, or *Dry Martin.*
Winter Rousselet.
Virgouleuse.
Huntingdon.
Portugal, Seven-elbowed.
Beuré du Roi.
Royol d'Hiver.
St. Michael.
Louise Bonne.
Winter Bergamot.
Ambrette.
Bergamot de Pasque.

BAKING PEARS.

Cadilac.
Black Worcester, or *Pound Pear.*
Parkinson's Warden. E. & D.
Double-flowered.
Uvedale's St. Germain.
The hard late autumn, and common Winter Pears, use for baking and stewing.

SORTS FOR PERRY.

Barland. *Horse.* *Bosbury.*

[* Besides the above, there have been, of late, a considerable increase to the list from the Continent, and some of them remarkably fine; amongst which, one cultivated at Mr. Gibbs's Nursery at *Ampthill* is superlatively fine; and it being really worth a distinction, the Editor has, consequently, introduced it under the above name.]

Estimate of sorts.—Those marked for wall-trees, espaliers, and dwarf-standards, rank among the first as dessert fruit. The following are also choice sorts, and will acquire their perfect flavour on standards.

The summer and early autumn sorts ripen for immediate eating, as gathered from the trees, in July, Aug., and Sept. The late autumn and winter Pears acquire full growth for gathering towards the end of Sept. and in Oct. to be then housed for keeping; these will ripen as they lie, and continue good until late in the following spring; for example, the Cressane,

Colmar, Winter Bon-chrêtien, Besi Chaumontelle, and Winter St. Germain, come in for eating from Jan. until the end of May.

The varieties which, according to the experience of many generations, are the fittest for making perry, are so excessively tart and austere, that they cannot be eaten as fruit. Those which form the short list above are the most valued for the Perry-press in Worcestershire, where they are planted in the hedge-rows and most common fields. Some of these grow to such a size, that a single tree has been known to yield, in one season, from one to four hogsheads of perry. The juice of the Bosbury is reputed to be most vinous, and to keep best. The Squash Pear formerly rivalled it in Gloucestershire; but it is reported to be in the last stage of decay.

Nursery culture.—Approved varieties of the Pear-tree are continued by grafting and budding, in the first place, upon Pear-stocks, which are raised from seeds. Secondly, the grafts and buds are inserted upon Quince-stocks, to dwarf the plants for low standards, espaliers, and wall-trees, and to produce early bearers. The young trees are fit for final planting at two years old, and thence to the sixth year, or older; that is, with only the maiden shoot, or furnished with heads, or for particular vacancies, advanced to bearing; according as they are designed for principal wall-trees or standards; and as the sort is known to fruit soon, or to be a reluctant bearer.

Soil and site.—A dry deep loam is accounted the best soil for the Pear-tree, when the stock is of its own species; for example, two-thirds loam, and one-third flinty or calcareous sand, with a mixture of black vegetable remains, will require no preparation but trenching. A Pear-tree on a Quince-stock wants a moist soil, without which it will not prosper. Clay or gravel should be partly dug out, and the residue divided and enriched; the clay, by sand and suitable manure; the gravel, by black loam, pond mud, or other soft earth or manure; easily wrought, and not binding. Gravel is a good sub-soil, where the incumbent mould is suitable. Cold clay is a bad sub-soil: to prevent fruitless trees from striking into it, slates may be laid just under the roots. For wall-trees, the soil should be made good to the depth of three feet; for orchard-trees, eighteen inches may do. Pear-trees on their own stocks will thrive on land where apples will not even live.

Final planting.—The season for planting is, any time from the end of Oct., during open weather in winter, till March or the beginning of April.

Allow dwarfs, in borders, a distance of fifteen or twenty feet from stem to stem.

Those grafted on strong Pear-stocks often extend their branches thirty feet or more: those on quince-stocks are of moderate growth; hence the planting must be at distances accordingly, from twelve to thirty feet. Train the branches and shoots horizontally, from three to six inches asunder, mostly at their full length. If the tree be already furnished with a head, shorten only particular shoots to a few eyes, where necessary to obtain laterals for filling a vacant space. The knife should be used with caution, for the fruit-spurs come first at the ends of the bearers: if the branches were cut in after the figure is complete, the tree would become a thicket of useless wood.

Mode of bearing.—In all the varieties, the mode of bearing is the same as on the Apple-tree, that is, upon small natural spurs, from half an inch to two inches long. These arise at the ends and sides of the branches, when from two to six years' growth, on a new plant: but after a tree is come to fruiting, the younger fruit-branches will, on some sorts, bear in one year; on others, not till the fruit-shoots are two or three years old. The same branches continue many years productive of bearers, and the bearers many years fruitful.

Pruning.—The mode of bearing and the situation of the tree will dictate to the pruner when to interfere. Several years may elapse before any cross-placed, very irregular, or crowded branches, dead-wood, or worn-out bearers, require occasional pruning; which give in winter or spring. Keep the head moderately open in the middle.

WALL-TREES AND ESPALIERS will require a summer and winter pruning.

Summer Pruning.—While the shoots are young and soft, but not until the wood-shoots can be distinguished from spurs, rub off the foreright, the disorderly, spongy and superfluous shoots of the year; rather than let them grow woody, so as to require the knife. Retain some of the most promising well-placed lateral and terminal shoots; always keeping a leader to each main branch, where the space will permit. Leave the greater number on young trees not fully supplied with branches. Train-in these at their full length, all summer, in order to have a choice of young wood in the winter-pruning. Occasionally on old trees, or others where any considerable vacancy occurs, some principal contiguous shoot may be shortened in

June to a few eyes, for a supply of several new shoots the same season.

The *Winter Pruning* may be performed any time from the beginning of Nov. until the beginning of April.

If on young trees, or others, a further increase of branches is necessary to fill up either the prescribed space, or any casual vacuity, retain some principal shoots of last summer, to be trained for that purpose.

As, however, many young shoots will have arisen on the wood-branches and bearers, of which a great part are redundant and disorderly, but which have received some regulation in the summer pruning, we must now cut these out close to the mother-branches; while we are preserving the best in the more open parts.

Examine the parent-branches; and if any are very irregular, or defective in growth, either cut them out close, or prune them to some eligible lateral to supply the place: or if any branches be over-extended, they may be pruned-in to such a lateral, or to a good fruit-bud. Cut out the least regular of the too crowded; also any casually declined bearers; with decayed, cankery, and dead wood. The retained supply of laterals and terminals should be laid as much at length as the limits allow, in order to furnish a more abundant quantity of fruit-buds.

During both courses of pruning, be particularly careful to preserve all the orderly fruit-spurs emitted at the sides and ends of the bearers: if, however, any large rugged projecting spurs and woody barren stumps or snags occur, cut them clean away close to the branches, which will render the bearers more productive of fruit-buds, and regular in appearance. As each tree is pruned, nail or tie the branches and shoots to the wall or trellis. If afterwards, in consequence of either pruning out improper or decayed wood, or of former insufficient training, there are any material vacuities or irregularities in the arrangement, unnail the misplaced and contiguous branches, and lay them in order.

Gathering the fruit.—According to the nature of the varieties, the fruit attains maturity from July till the end of Oct.; the early for present use, the late for keeping. The latest deposited for winter will ripen as they lie.

The summer and early autumn Pears should be gathered before they become too ripe and mealy, as they will not keep long after being gathered; some sorts only a few days, and others not above a week or a fortnight.

The period of maturity, in the summer and early autumn kinds, is very obvious, as well from their changing either yellowish, yellow and reddish, or yellow and russety, as from their often falling from the trees naturally. The proper time for gathering the late Pears may also be known, in some kinds, by their changing a little, as above, and by a few dropping promiscuously; and, in general, by their easily quitting, when plucked or turned gently upwards. Observe to gather the keeping Pears always by the hand, to preserve them sound and free from bruises: choose a time when the trees and fruit are quite dry, let them be directly housed for keeping, and managed as advised for apples. Cover them close with clean loose straw, mats, &c. to exclude frost and damps; and examine them occasionally, drawing out such as decay, that they may not affect the sound fruit.

PLUM. *(Many species and varieties.)*

The Cultivated Plum, *Prunus domestica*, is a native plant: flowers in April. It has given birth to many varieties; and the same species, in other countries, has produced varieties which have been imported.—The following are the principal:

Early Damask, or *Morocco.*
Little Black Damask.
Jaune Hative, or *Early White Primordian.*
Azure Hative.
Early Tours, or *Précoce de Tours.*
Great Blue Damask.
Orleans. W.
Green Gage; different varieties. W. E. and D.
Yellow Gage. W.
White Perdrigon.
Blue Perdrigon. W.
Early Blue Primordian.
Early Red Primordian.
Fotheringham. W. E. and D.
La Royale. W.
Blue Gage. W.
White Bonum Magnum, or *Egg Plum.* W. E. and D.
Red Bonum Magnum, or *Great Imperial Plum.*
Queen Claudia.
Little Queen Claudia.
Prune Damson.
Impératrice blue.
Ditto, white.
Goliath.
Coe's Golden Drop.
Maître Claude.
White Matchless.
Blue Matchless.
White Prunella.
La Mirabelle.
Brignole.
Drap d'Or.
Monsieur, or *Wentworth Plum.*
Apricot Plum.
Violet.
Roche Courbon.
Damas Noir de Tours, or *Late Damask.*
Cheston.
Turkey.
Semiana.
Large Red Diaper.
St. Catherine.
Wine Sour.
Muscle Plum.

Black Damson.
White Damson.
Striped-leaved Damson.
The Myrobalan Plum. Prunus cerasifera, is a native of North America: flowers in April and May:
Myrobalan, or *Cherry-Plum.*
The Bullace Plum, Prunus insititia, is a native plant: flowers in April:
White Bullace. W.
The Sloe, Prunus spinosa, is a native plant: flowers in April and May:
Sloe, or *Small Black Plum.*

Estimate of sorts.—The above list embraces a great variety, as to the size, the shape, and the colour of the fruit; small plums, middle-sized and large; round, oval, oblong, black, white, red, yellow, green, blue, amber, and violet-coloured; nor differing less in flavour; and respectively desirable, according to the object of the cultivator.

The Jaune Hative comes in at the beginning of July. This, with the first four or five plums, is valued chiefly for its earliness. The White and Red Magnum Bonum, the Muscle, the Wine Sour, and the Wentworth, are chiefly used in tarts.

The Blue Impératrice is the finest late plum, and an excellent bearer, not coming in till October. Those marked *W. E.* and *D.* are respectively fit for the wall, espaliers, and dwarf-standards.

Nursery culture.—Good varieties are perpetuated by grafting or budding upon plum-stocks, which are raised chiefly by layering in the country nurseries, whence the large cultivators of nursery stock are annually supplied.

Soil and site.—The Plum-tree will in general prosper in any mellow fertile garden or orchard-ground. Where a soil is made for it, a half-part fresh loam, one-fourth sharp sand, one-sixth road-stuff, and one-twelfth vegetable remains or decomposed dung or animal matter, form a good compost. The plant will flourish in a moist soil; and the fruit be larger than in a dry one, but not so well-flavoured.

For the full and half-standards, in the orchard, set out at square distances of forty or thirty, twenty-five or twenty feet. Set dwarfs twenty feet apart.

Have some choice sorts against south-walls for earlier and superior fruit; others on east and west walls, and espaliers, to ripen in succession. Allow wall-trees and espaliers fifteen, twenty, or twenty-five feet, from stem to stem. Of plants furnished with heads from the branches and shoots, at four, five, or six inches asunder, laid mostly at their full length, that they may furnish fruit-spurs to their extremities. In young trees under training, continue to increase the number of branches annually, to cover the wall from the bottom upwards.

Mode of bearing.—All the sorts produce their fruit on small natural spurs, rising at the ends and along the sides of the bearing shoots of one, two, or three years' growth. In most sorts, new fruit-branches are two years old before the spurs bear. The same branches and spurs continue fruitful, in proportion to the time which they take to come in to bearing.

Pruning.—It is plain, from the mode of bearing, that when the head of a tree is fully furnished, the fruitful branches must not be shortened in the general course of pruning.

STANDARDS.—Let them mostly expand in free growth; occasionally pruning long ramblers, and cross-placed or other irregular branches. Thin crowded parts: cut away worn-out bearers; also decayed and cankery wood.

WALL-TREES AND ESPALIERS.—Begin the summer pruning in May or June. Pinch off the fore-right and other ill-placed shoots of the same year, also the superfluous. If a tree grows too freely, let some of the strong luxuriants proceed till the wood is hardened; then shorten them, leaving them to be finally cut out in winter. Retain well-placed shoots of regular growth in vacant parts, or where vacancies may be expected, to be trained-in at full length.

The winter pruning may be performed any time, in moderate weather, from Nov. till March. If any of the parent branches have grown into disorder, or have become unfruitful of proper fruit-spurs, prune them short accordingly; and retain some contiguous young wood of last year in their places.

Also cut out such as are wholly defective, or in a declining or cankery state; reserving a proportionate succession of young shoots. But now cut out close all remaining superfluous and other improper shoots of last season. Finally, manage the new and old wood, trained-in, by the rules suggested for the *Cherry* wall-trees.

Observe—Both in the summer and winter prunings, if any vacancy occurs, requiring a larger supply of wood than the spontaneous shoots afford, proceed as follows:—If the deficiency be seen in summer, pinch or cut, in June, some good contiguous shoot to four or five eyes, which will put forth several laterals the some season to supply the vacancy. If this was then neglected, in winter, or towards the spring, prune the proper contiguous young shoot; which will furnish laterals the summer following. Or if any strong luxuriant branch of false wood occurs in a large vacancy, it may be pruned as above, which will cause the exuberant sap to divide into several moderate laterals, to supply the vacant space.

Remedy for the gum with canker—Where any old plum-trees have the branches much overrun with gum, in a cankery state, and are defective bearers, they may be headed in the spring, to some of the lower forks: after which they will shoot out afresh, and renew the head in summer with young wood that will bear in two or three years.

Gathering the crop.—The different sorts of the Plum ripen in succession for about three months in summer and autumn. Some early sorts begin to ripen in July: the main varieties reach full maturity in August and Sept.; late sorts continue ripening till the end of Oct. or beginning of Nov. Each kind should be brought to table presently after being gathered, as they will not keep long in a natural state. They make a fine preserve for winter use.

Forcing.—Let some dwarf trees, of the choicest early sorts, be either planted in the borders of a fruit-forcing stove, or introduced in boxes, and managed as Cherry or Peach plants of the same class.

DIRECTIONS FOF FORCING PLUMS OR CHERRIES.

The third year after planting, let the glasses be put on about the middle of January: they should have plenty of air through the day, and be shut up at night. On the first of January light the fires: Fahrenheit's thermometer must not be above 40°, at which keep it till the 20th of the month, and then increase the heat gradually to 45°, at which point endeavour to keep it till the fruit is fairly set; afterwards increase the heat gradually to 50°, but not more till the stoning is over, and the fruit have begun their second swelling; when it may be raised to 60°, the fruit being out of danger.

QUINCE. *Pyrus Cydonia.*

This fruit has a mixed resemblance to the pear and apple; ripening with a yellow tint and remarkably high fragrance. It is in demand for marmalade, preserves, and syrup; also for slicing among apples in pies and puddings, to quicken and improve the flavour; but is too hard, astringent, and austere, to eat, till mellowed by some culinary preparation. It is a native of Austria: flowers in May and June.

Pear-shaped.

Soil and site.—The Quince being supposed to delight in moist places, is often planted by the sides of ponds and watery ditches: but it may be planted in any convenient situation.

For a general garden, small standards are suitable; and the plant, being of moderate growth, is easily kept within limits.

Quince-trees are also occasionally planted in shrubberies for variety and ornament: the blossoms in April and May, and the yellow ripe fruit in autumn, make a beautiful appearance.

Nursery culture.—The Quince will grow well on the Pear-stock; and whenever a tree may be wanted, it may be convenient to graft an old Pear-tree for the purpose.

The Quince, when on its own stock, succeeds remarkably well near water.

Final planting.—This may be performed from the fall of the leaf till the beginning of April. Insert standards at fifteen or twenty feet distance. Train espaliers with the branches from four to six inches asunder. If you have any plants or Pear-stocks, allow them a greater distance.

Mode of bearing.—The Quince-tree produces its fruit upon small natural spurs which rise at the ends and sides of the two-year, three-year, and older branches, in a way similar to the Apple and Pear.

Pruning.—Train and prune the plants as directed for Pear-trees of the same class.

Gathering the crop.—The fruit ripens, with a high colour and remarkable fragrance, in Sept. and the course of Oct., to gather partially as wanted. Having obtained full maturity in Oct. or the beginning of Nov. the entire crop should be gathered and housed for keeping. Let the fruit sweat a few days: then lay them up singly.

RASPBERRY. *Rubus idæus.* (*Several varieties.*)

This is a desirable small fruit, as well for eating in the dessert, as for making jam, tarts, sauces, &c. It is also much used by them who compound spiritous cordials. It is a native plant: flowers in May and June. The following are esteemed varieties:

Early Small White.
Large White.
Large Red.
White Antwerp.
Cane or Smooth-Stalked.
Double-bearing White.
Double-bearing Red.
Woodward's.

Description of the plant.—The raspberry-bush is a half-shrubby plant, of many years' duration in the root, but biennial in the stems. New stems rise successively from the root in spring, several together on each stool: these shoots, long and slender, grow four, five, six, and in moist seasons eight or ten feet high; and, when a year old, next summer produce

their first and final crops of fruit: they wholly decay the second winter, becoming dead stems, to be cut clean out to the bottom in the winter-pruning. The Raspberry thus produces its fruit on small lateral shoots of the current year, springing from the upright stems of last year; and sometimes the stems of the same season afford a little fruit. Hence the Raspberry is in its mode of growth an exception to all other fruits; and, like any herbaceous plant, is raised by parting the various clusters of roots.

Estimate of sorts.—With respect to the varieties of fruit: The first in the above list is a small fruit, but esteemed for its early bearing. The second and third, the common Large White and Red sorts, are cultivated in fuller crops, as plentiful bearers of larger berries. The White Antwerp is still superior in yielding fine large fruit, and deserves a wall or espalier. The Cane Raspberry is a good sort for the main crop. The Twice or Double-bearers are esteemed for their singular property of producing two crops of fruit the same year, of which the first commonly ripens in July, and the second in Sept. or Oct.; and in fine dry seasons, the plants will afford some production from the second crop till Nov.

Soil and site.—All the varieties will succeed in any common mould, trenched about two feet deep, and sufficiently manured. But the soil in which the raspberry-bush most prospers, and bears the finest fruit, is a light rich loam. Allot the main crop a free exposure to the sun, that the berries may ripen in perfection. Be careful to favour the Twice-bearers with a dry soil, and a sheltered sunny situation, to give the second crop every aid in coming to maturity. When raspberries are cultivated on a large scale, it is best to keep them in plantations by themselves. Set these in rows from four to six feet asunder, as the bushes are of the smaller or larger kinds, by three or four feet in each row. Select sorts are frequently trained against walls, stakes, or espaliers, from the most sunny to the most shady aspect, for early and late fruit of improved growth and flavour.

New plantation.—Raspberry-bushes, if carefully taken off the old roots and planted in beds, will, after the first year's growth, be fitting for planting out, and, if well managed, continue in perfection five or six years; after which, they are apt to decline in growth, and the fruit to become small, so that a successive plantation should be provided in time.

Process in planting.—Selecting the strongest outward shoots, dig them up with as full roots as possible; from which cut off

any hard woody part adhering at bottom: shorten long straggling roots, and trim the small loose fibrous roots moderately. Afterwards prune the stem a little, cutting off the weak bending part at top, more or less, according to the vigour of the shoot, leaving a slender stem two or three feet long, and a stronger four or five.

Having prepared a compartment of good ground, enriched with a portion of mellow dung digged in regularly one full spade deep, proceed to the planting. With the spade, either open a small continued trench by line, or only a cavity for each plant. Plant them in rows, in beds about one foot apart; and at the proper season plant them out in rows of five or six feet apart, and two feet distance in the rows.

Under this management, the plants, if tolerably strong, will both yield a moderate crop the first summer, and supply young stems for bearing in greater plenty and perfection the following season; and so, from year to year, the summer culture should be repeated. As the plants get established, let all straggling suckers between the rows, or from the extreme roots of single stools, be cleared out; as these are what the new head for the nursery is established from.

Pruning, and Winter-dressing.—It is requisite every winter or spring to cut out the dead stems, and to thin and regulate the successional young shoots.

This annual pruning may be performed any time, during open weather, from Nov. till the beginning of April. When kitchen-garden crops are cultivated between the rows, it is most convenient to do this as soon as the old bearers begin to decay. Cut out all the old dead stems clean to the bottom; and having selected from the strongest young shoots on each main stool, three, four, or five, to be preserved for a succession of bearers, cut away the superabundant close to the ground. Let each of the shoots retained be pruned at top, below the weak bending part; cutting them, in the smaller plants, to about three or four feet in length, and, in the large sorts, to the length of five or six feet. If any of the stems diverge irregularly, or straggle much asunder, they may be tied together at top, and thus the strong ones will support each other; or the taller varieties may have the support of stakes.

After pruning, having cleared away the cuttings, dig the ground between and about the plants. To turn in a little rich compost every year, will conduce to plentiful and fine returns: lay it at the extremities of the roots, and deeper as the plantation gets older. Eradicate all straggling suckers.

Taking the crop.—The fruit on the varieties of the plant comes in from the end of June or July till Oct. or later.

SORB *or* SERVICE.

Like the Medlar, this fruit never ripens on the tree; but being gathered when full grown, and stored about a month, it loses its austerity, and becomes mellow. There are two species; but the Sweet Sorb is superior to cultivate for fruit. The wild kind, however, affords berries which become eatable from keeping.

True Service (*Sorbus domestica*): in the work entitled "English Botany," classed as *Pyrus domestica*: is a native of Britain; but only one tree in its wild state is now known to exist; it grows in Wittlebury Forest. Flowers in May and June. Has produced several capital varieties.

Wild Service, (*Cratægus torminalis*): in "English Botany," *Pyrus torminalis*: a native: flowers in May and June.

Estimate of sorts. — The first sort produces green fruit about the size of a small pear; which having been gathered when of a full size in autumn, and lain up to become mellow, has a peculiarly agreeable flavour. The Wild Sorb grows wild in woods and hedges in different parts of this country: it produces large bunches of brown berries, which attain full growth in Oct. and Nov.; and being then gathered in the bunches, and deposited in any dry apartment, will keep during winter: when become sufficiently soft for eating, they have a pleasant tartish taste. These ripen after being gathered from the trees, as medlars.

Nursery culture.—Varieties of the Sorb are perpetuated either by layers of the young wood, in autumn or spring; or by grafting upon seedling-stocks of their own family.

Plants may be raised from seed; but these are not to be depended on for producing the desired sort of fruit, in the Sweet Services particularly; nor will they bear so early and abundantly as plants obtained from grafts.

Final planting.—The trees are eligibly assigned to the pleasure-ground: large standards may form varied clumps in ornamental tree-plantations, or stand singly on lawns; both kinds forming a pleasing variety of foliage.

Mode of bearing.—The Sorb bears its fruit in the same manner as the Medlar and Apple-tree.

Pruning.—In the fruit-bearing standards, keep the branches of the head moderately thin and open; and the fruit produced will be the larger and finer.

Gathering the crop.—It is late in autumn before any of the sorts are full grown.—See the List, and Estimate of Sorts. Lay the fruit on wheat straw, to mellow.

STRAWBERRY. *Fragaria.* (*Including Eight profitable fruit-bearing species.*)

Vesca, Wood Strawberry, with oval serrated leaves; the fruit round and small, red. A native of Britain.

White. *Green.*

Virginiana, Scarlet, with leaves like the preceding; the fruit roundish and scarlet-coloured. A native of Virginia.

Caroliensis, Large Carolina; red. North America.

Elatior, Musky Strawberry, or Hautbois, with oval rough javelin-edged leaves; the fruit large, pale red colour. Native of Britain. *Black.*

Chiloensis, Chili Strawberry, with large oval thick hairy leaves and large flowers; the fruit large and very firm. A native of South America.

Grandiflora, Pine Strawberry; the leaves small and delicate: there are two sorts, the Red, and the White or Greenish-tinted, of this most rich-flavoured fruit. Native of South America.

Collina, Alpine Prolific, or Everlasting; so called from its long bearing, which commonly lasts from June till November, and, in a mild season, till near Christmas: two sorts of the fruit, the Red and the White. Native of the Alps of Europe.

Monophylla, One-leaved; the pulp of the fruit pink-coloured. Native of South America.

The above eight sorts of this delicious fruit comprised the whole that were known to the previous Editor of the present work, and the whole that were known but a few years since. At this time the English grower can produce, according to the different names that are inserted, sixty-two different kinds; and without waiting to inquire if it be possible, in the short season the Strawberry lasts in perfection, for an amateur to become acquainted with the flavour and properties of so many, it is a fact, that a greater and more interesting improvement never was made in the science of horticulture than is to be seen in the great variety of this fruit. When the designer of a garden has fixed on the kinds (for he probably cannot have them all), he must give each kind room to grow, according to the size of the fruit; as it will be found that the plants are of robust growth in proportion thereto.

All these species are hardy perennials, durable in the root, by the vigour of which the leaves and fruit-stalks are renewed annually in spring. They blossom in May and June; and the fruit attains maturity in June, July, and August; and then, in all but the Alpine sort, the season of bearing terminates.

Modes of propagation.—The plants multiply spontaneously every summer, as well by suckers from the parent stem as by the numerous runners; all of which, rooting and forming a plant at every joint, require only removal to a bed where there is room for them to flourish. Each of these, separately planted, bears a few fruit the following season, and will bear in full perfection the second summer.

Making plantations.—The best time for removing plants is the middle or end of Aug. The plants put into the ground within that period will bear well the summer after. There is a preparatory method of nursing offsets not generally practised, which will bring them to a much finer and more vigorous state than they would be in if procured at once from the old beds; and they will sooner be fully productive. Accordingly, about the end of June, provide for the intended plantation; have recourse to a bed which bears well, and produces large fruit: select the runners issuing from the parent stems: take these carefully up: trim the roots a little, and cut off the runners: then plant them in a nursery bed; a shady border will be a proper place: put in the plants six inches asunder. There let them remain in growth till Aug., by which time they will be strong.

The criterion for the width of a strawberry-bed is four feet; so that all the necessary work attending cultivation, as well as gathering the crop, may be performed by a person standing in the alley, and reaching one half the beds each way. To give the plants proper room therefore, if the common kinds be planted four rows in the bed, sufficient space is left for hoeing, digging, &c. and for gathering the produce.

If our old favourite Hautbois, or Pine, be cultivated in these rows, the strength of the plants in growth will not admit of greater vacancy between the extremity of each plant. But if the large growing varieties, resembling Keen's Seedling, and others of the same robust growth, it will be best to plant these plants together, at angles, nine inches apart, and allow twenty inches clear between the rows.

When a sufficient plantation has not been made from Aug.

to Oct., offsets a little advanced in growth may be removed in Feb., or even in March and April, and will succeed as plants; but some of the species, when planted in spring, do not bear any fruit to signify till the second summer after. The Alpine and Wood sorts may be planted from Feb. even till May; and will bear at the close of summer, if kept well watered.

Soil and site.—A cool rich loam suits the strawberry. As this creeping plant requires a different course of culture from the fruit-bearing plants with lofty stems, the main crops are usually assigned to the Kitchen Garden; while rows or patches, of varieties of the plant, may be inserted round the borders of any horticultural grounds. The showy blossom of the Hautbois particularly fits it for edgings in a pleasure-garden. All the strawberries, except the Wood kind and others of tasteless notoriety, to reach the utmost excellence, require open situations: but a few small plantations, in spots shaded during part of the day, contribute to prolong the succession. The Wood strawberries will succeed both in shady situations and in a free exposure. The Alpine and Scarlet deserve a warm situation, where that advantage can be given.

Prepare a piece of good ground; and although the plants will succeed in any fair garden earth, the produce from such as can be assigned to a loamy soil will be superior.

In preparing mould for the Alpine, it is proper to make it somewhat lighter and drier than would answer for the other sorts. Lay some good rotten dung on the compartment for the plants; dig the ground neatly to its full natural depth, and bury the dung regularly at the bottom. Tread the surface, and smooth it with a rake, and put in the plants according to the aforementioned rules.

The Alpine likewise requires a large interval, that the runners may have room to spread and take root: the manner of bearing in this species is peculiarly expeditious; for the runners which the plant emits in summer take root at every joint, and each rooting-joint blossoms and ripens fruit the same season, and the fruit from these runners is often the finest. This variety is best renewed by seeds. The beds will last good two years, but after that they will generally require to be renewed.

In the course of Feb. or March, clear away the runner-strings and other litter. Hoe, dig, or loosen the ground between such plants as are in beds; at the same time some earth may be dug up from the alleys, and spread between the rows and close round every plant; or rotten dung may with propriety

be dug into the ground: this will strengthen them, and promote the production of fine fruit.

Summer culture.—Towards the end of April, when the established fruiting plants begin to advance in bloom, if it be dry weather, be careful to water them frequently: the neglect of this may prove fatal to the crop.

About the beginning or middle of June, the main crop of most of the sorts will be setting and swelling. If, in this stage, the earth of the beds be kept moist in a middling degree, the advantage of it will be evident in the size and quality of the fruit. But when the fruit is turning colour, desist from watering; as water given afterwards hurts the flavour of the fruit, and disposes it to get mouldy.

When continued rains have made the ground wetter than is desirable, choice large ripening fruit, deemed worth the trouble, may be kept from getting dirty and mouldy by tyeing the stems to little dry twigs set up for that purpose, or by laying slates under the fruit, or short grass, as is usual in pleasure-grounds; or moss may be used to advantage.

"Depth of soil," observes Mr. GARNIER, "I have found absolutely necessary for the growth and production of fine strawberries. In preparing the ground for my crops, I trench it all over, two spades deep; and then lay upon the surface a dressing, about two inches thick, of rich yellow loam, rotten dung, and bog earth, mixed together in equal proportions, and which is afterwards well dug in with a fork. I then form the beds four feet four inches wide, with alleys at least two feet wide between them. I never suffer any of the varieties to remain in the ground more than one year. Early in Aug., or as soon as the gatherings are over, I destroy all my beds; and proceed immediately to trench, form, and manure them in the manner before directed, to receive the plants for the crops of the succeeding year; taking care to select, for that purpose, the strongest and best-rooted runners. If the weather should be unfavourable I defer the operation of planting till the ground is moistened by rain.—I have invariably obtained upon the same spot a great produce of beautiful fruit."

Taking the crop.—The strawberry, according to the kind and situation, ripens in June, July, and Aug.; the main crop is usually over in July. When gathered, this delicate fruit cannot be too soon carried to the table, as its fine flavour is presently dissipated.

The fruit from the after-runners of the Alpine sort is in perfection in August and Sept., and the plant commonly remains

in bearing till the middle of Oct. without artificial assistance: if sheltered with a common frame and glasses, it may be expected, in a mild season, to yield a small production till near Christmas. To ensure this, the flowers that are produced in the spring should be carefully eradicated, by which means the crop at the late season, which renders this variety of strawberry alone desirable, will be greatly promoted.

Saving seeds.—When the fruit is perfectly ripe, wash the pulp from the seeds in clean water; and this, when separated, spread out in an airy room, till it is quite dry; after which preserve it in paper.

Forcing.—The Scarlet is the best for forcing; although some other kinds are occasionally brought forward, as the Pines and other larger varieties; but for continual bearing, and goodness of flavour, the only qualities worth forcing for, there is none so applicable. The plants selected should be two years old, having attained a full bearing state. It conduces to the perfection of the fruit to put as many plants as are intended to be forced into pots, and encourage such to grow for one season previously to their being put into the forcing-house.

New runners of the present summer may be potted in July and August, having the blossoms pinched off, should any appear. This course of preparation is attended with most trouble; but the crop repays it. Three offsets may be planted in one large pot.

Begin to force strawberries about nine weeks before you want to gather fruit. Plants excited before the first of Jan. seldom repay the trouble; and in proportion as the time of beginning to force approaches the vernal equinox, the returns are more abundant. To have a succession, reserve sets of potted plants for removal into a house, or frame, every three weeks, till the middle of March.

The strawberry is most successfully forced in a house, where the progressive temperature would suit the constitution of the Cherry or Peach; but it may be excited in any stove, except the Pine-apple fruiting-house, the heat of which is too high for the strawberry plant to break its buds under, though that might be safely used to manure the fruit when it shall be set and swelling. See HOT-HOUSE, *Miscellanies.*—Place the plants in the houses anywhere near the glasses. Conduct the admissions of air as in the CHERRY-HOUSE. Give frequent light waterings; bnt when the strawberries are in blossom, forbear to water too freely over the flowers, applying it chiefly to the earth in the pots.

Mr. Lindley says, "The Roseberry Strawberry is undoubtedly the most valuable variety for forcing the first in the season, as it succeeds with less light than any other sort." If it was not for the beautiful tint of colour exhibited by this fruit, and in some measure justifying its enchanting name, its flavour would be more assimilated in idea, by being called *Blackberry Strawberry*, than which certainly there is none so vapid. It grows, it is true, in any shady place: even under the stage of greenhouses it will flourish: but the common plant, *Fragaria Bengalensis*, produces still more beautiful fruit. If flavour, then, is not an object, why is not that cultivated? or if show is the order of the day, let the Ladies make them in wax, now a fashionable employment; when a basket of strawberries, equally as eatable, may be produced from the cupboard at any time when the table requires such decorations.

OBSERVATIONS RELATIVE TO THE HAUTBOIS STRAWBERRY.

This plant, from some natural cause not formerly understood, but agreeably to Nature's invariable rule, often becomes sterile. (See § 48. p. 25.) As there are none of the increased number of kinds half so much esteemed for flavour as this, it is a pity persons should run away with the idea that it is no longer of use to grow them. Let the gardener, therefore, diligently examine a bed of this variety; and having found a few plants that are fertile, let him mark them, and clearly remove at once from the bed all the others. Select these stools, and treat them as above described; and if he attends to the one thing needful, *i.e.* to let no more runners exhaust his plants in future than is necessary for the purpose of further propagation, he will produce Hautbois as plentiful as his forefathers did.

VINE, *or* GRAPE. *Vitis Vinifera.* (*Many fine varieties.*)

This valuable fruit is indigenous to so many climes, that no precise country can be marked as its habitat. It may be considered a native of a wide belt of region near the middle of the globe, stretching from about the twentieth to forty degrees of the line. Cultivated as an exotic, local varieties of it will ripen fruit well in vineyards to the fiftieth degree of latitude, or a little farther north on a very fortunate site, without more expense in attendance, dressing, and manure, or risk from bad seasons, than makes it a profitable branch of rural economy. Flowers in June and July. The varieties are

innumerable: the following are some of the best for culture in this country:

Early July (so called, though seldom ripe before Aug. or Sept.); small black.
White Sweet-water.
White Muscadine (Chasselas).
Lord King's Early; an excellent variety of the Chasselas.
Black Muscadine.
Royal Muscadine, white amber.
Black Frontignac.
Grizly Frontignac.
Small Blk. Cluster, leaves hoary.
Large Black Cluster.
Black Hamburgh.
Black Sweet-water.
Chasselas Grape, red, white.
White Frontignac.
Red Frontignac.
Lombardy, large red.
White Corinth, small berries.
Black Corinth, ditto.
Muscadel, black, red.
Morocco, Le Cœur, tawny-red.
Damson Grape, large, purple.
White Hamburgh.
Black Damascus.
Smyrna, large red.
Alexandrian White Muscat.
Red Alexandrian Muscat.
Raisin Grape, black and white.
Syrian, white.
St. Peter's, large, black.
Tokay, white.

Estimate of sorts.—The above are the varieties most generally known in the British gardens. As our immediate business is with the open garden, the first thing is to single out those sorts which are most likely to ripen their fruit with no other assistance than a south or south-east wall. These are, the early July, Black Muscadine, White Sweet-water, White Muscadine or Chasselas, and Lord King's Early. To these might be added the Black Cluster, but the rough and harsh taste of the juice pleases few palates. Nor in situations much north of 51° can even these early sorts be expected to ripen against walls out of doors in common seasons, at least as they are usually trained very high upon the wall. But the same sorts might do well in some of the southern counties on low espaliers, or trained to stakes in the vineyard order; and the benefits of reflected heat and shelter from proximity to the ground, and of growing in a warm, rich, congenial, deep soil, unlimited in superficial extent, and on a site inclining to the south in a warm valley, may probably anywhere outweigh the partial advantage of a wall, where that aid is counteracted by a shallow, binding, poor, uncongenial and unrecruited soil. The failure of the Vine, in its returns as a fruit-tree, is not owing to any tenderness in the plant, but to the natural growing season of the tree, in most of the varieties known, exceeding in duration the natural growing season of this climate; so that the fruit and the new shoots have not time to ripen before the heat of autumn declines far below the

degree requisite for perfecting the productions of the year. Thus the fruit, to ripen in perfection, wants a minimum heat of 75°, which only very early sorts can obtain in the open garden, under a combination of favourable circumstances, which do not often meet. Thus, should the fruit ripen one year, and the average heat of the season decline much below 65° before the young wood is ripened, the crop next year may be affected by this circumstance, however favourable the following season may of itself be for the growth of the fruit. Hence, even with the assistance of the best walls and good training, in unfavourable seasons, and cold wet autumns, the grapes sometimes ripen but indifferently, and have an inferior flavour.

Most of the other varieties are naturally so late as to require at least the aid of glass to mature the fruit before the decline of autumn, and protect them meanwhile from rough vicissitudes; and a good number in the list, being still later in their productions, and bearing large and delicate fruit, need the further assistance of artificial heat in a hot-house or vinery, to ripen in full size and perfect flavour; such as the Syrian, Alexandrian, Hamburgh, Muscadel.—See *Forcing.*

The different colours of the varieties are specified in the above list. In the ordinary crops of the respective sorts, the weight of the bunches may be estimated at from a quarter of a pound to a pound. On the varieties remarked for large fruit, bunches are frequently met with which are much heavier. Some vines, in forcing-houses, have been brought to yield bunches of three, four, or five pounds each; and where the object has been to cultivate one select bunch to an immense size, such a bunch has sometimes been nurtured to the weight of ten or fifteen pounds, by leaving few others on the vine.

Nursery Culture.—The eligible methods of propagating the vine are by layers and cuttings of the young wood, and from single buds. If a bud be taken from a last year's shoot and placed in a sixty-sized pot, and plunged into the usual heat of a cucumber-frame, it will readily put forth the roots: the bud may have attached to it the wood on which it is affixed, but not more than half an inch in length above or below it, when prepared for planting. As the young plants thus raised increase in growth, give the roots more pot room; and thus, if encouraged with due attention, plants twenty or more feet high may be produced in a single season's growth.

Laying may be performed in large deep pots, which is very convenient for transplanting. For this purpose, fill the pots with suitable earth or compost; into which bend the layer a

proper depth, with the top above the surface. Bury the pots in the ground: shade from the meridian sun, and water frequently. When the layer is fit to sever, be careful, in transplanting, to preserve the earth in the pot, which must accompany the root as entire as possible; in which case the plant, feeling little or no check by transplanting, will grow freely, and probably bear fruit the same season, if permitted.

By CUTTINGS.—This is performed most successfully in the spring, the last fortnight of March, or the beginning of April. Make choice of some of the strongest shoots of last summer, well ripened, and with short joints; which may be collected in the winter-pruning, about Feb., not later than March, and preserved for planting, by laying the lower ends in a border of dry earth, covered from frost. Choose principally the firm lower parts of the shoots, cut to short lengths, comprising three joints to each cutting. With it, take off an inch or two of the old wood attached to the knot at the lower joint. Cuttings taken higher up will strike; but they do not form such well-rooted and fruitful plants. Set them about a foot asunder, to be thinned in a year or two; inserting each the depth of one or two joints or three eyes into the ground, leaving one good joint or bud above. Give frequent waterings; and they will root and shoot in summer of the same year, forming good-rooted young plants by next autumn.

Final planting—Soil and site.—Vines may be planted any time in open weather, from Nov. till March; though, if the autumn and winter seasons be unfavourable, a spring planting is advisable, as more likely to prove successful. The plants selected should have strong full shoots, and be removed with entire roots. Such as may be transplanted from pots with the ball of earth entire, are particularly eligible.

Although vines will succeed as plants in any common garden earth, it is advisable to allot them a dryish, warm, mellow, unexhausted soil, rich in good loam, or improved with suitable manure, to the depth of three or four feet. A dry bottom is particularly requisite to keep the fruit from degenerating in flavour. Therefore, if the subsoil be rather wet, or of a cold temperature, it is advisable, in preparing the border, to apply some dry light compost at bottom. For the principal plantation, assign some of the best south walls or close palings.

Plant the wall-vines ten, twelve, or fifteen feet asunder, when ranged in the same border; and some in vacant spaces between other wall-trees, or against any void part of a building, in the full sun. When planted, proceed to prune and train

the shoots: selecting the strongest well-placed to remain for training, cut such out as are improper or irregularly situated.

To strengthen young vines newly planted, it is advisable to pinch off the blossoms the first season, and to prune the branches quite short for two or three years. Prune the retained shoots to two, three, four, or five buds, according to their strength and situation, and nail them in order to the wall, either horizontally, or in an ascending direction, as the scope of walling admits; arranged eight or ten, if weak; and if strong, twelve inches asunder, or as the size of the fruit may require.

Mode of bearing.—All sorts of the common grape bear upon shoots of the last year's spring. As the fruit-buds unfold, the grapes shew themselves in small clusters of minute green blossoms, which become large bunches of berries.

Summer Pruning.—This commences towards the end of April or in May. It extends to a regulation of the numerous young shoots of the same year; of which a competent number of the most promising and best placed are selected for training in, either as bearers the present year, or as mother-bearers for next year. It is desirable to keep some that grow nearest to the origin of the branch, that the whole figure may be kept furnished each succeeding season with fertile shoots, instead of becoming annually more and more barren about the bottom and in the centre; to which all trees have a natural tendency, and which can be corrected in the vine by pruning, better than in any other tree, because repeated cutting neither hurts the plant in its growth nor bearing.

The young shoots which are not fit for present or future bearers, from being ill-placed, weak, irregular, or superfluous, cannot be too soon displaced; provided the plant be not too vigorous and disposed to run too much to wood; in which case, a part of those to be rejected may be left for a while to exhaust the redundant sap.

There is an advantage in beginning to prune in April and May, before the numerous young shoots run considerably and entangle together, and while they are tender; for then the useless shoots can be rubbed off without using the knife. Rub them off close to their origin.

The first object of careful preservation is as many strong, well-placed fruitful shoots, distinguishable by the minute clusters of blossoms, as there is room to lay in conveniently. The second, to retain some of the barren shoots which are well-placed for mother-bearers next year.

If two shoots proceed from one eye, displace one, except for the sake of fruit.

Rub off all shoots from old wood, unless a pretty good one arise in a naked part where wood is wanting.

General summer culture.—Do not permit a greater number of bunches to swell on the plant, than it may be expected to bring to perfection. Be careful also to disengage any bunches which may become entangled with the branches or with one another. When the fruit is set and beginning to swell, if dry weather follow and continue long, the grapes will not attain their full size in time to ripen off, unless copious waterings are given to the root every two or three days. Once a week, drainings of the dunghill may be mixed with the water.

In this country, no part of the horticulturist's attendance on the Vine will more conduce to the fineness of the fruit, than keeping the main shoots regularly trained, and divested of useless laterals, so that the grapes may enjoy a free circulation of air and the full influence of the sun. When the fruit has attained its full size, and requires only heat to colour and ripen it, wherever the leaves hang too thick, and shade it injuriously, gradually thin off the superfluous, a few at a time; not pulling, but pinching the leaf just above the foot-stalk. Thus large bunches and berries may be expected, with that peculiarly rich flavour which depends much on their reaching maturity in the warm genial part of autumn; whereas when the fruit has to finish ripening in the decline of the season, often retarded by wet and cold vicissitudes, it has little chance of coming to perfection.

When the grapes are beginning to ripen, to divert the flies and wasps from them, hang up, in different parts of the vine, some phials half filled with beer, a little sweetened; in which many of the insects will be drowned.

Grapes should not be gathered for the table until fully ripe, otherwise they will be of very inferior flavour. They never can be too ripe in this country.

As the ripened bunches are often attacked by birds, wasps, and flies, it is advisable to protect them, with suspended nets; or the finest bunches may be bagged separately, in a covering of paper, gauze, or crape, which will effectually preserve them.

In respect to such grapes as ripen towards the end of Oct. or in the beginning of Nov., when you gather and house them, cut off, with the bunches, part of the shoots on which they grow. Hung across a line in some dry warm apartment, the fruit will thus keep a month or six weeks in a pretty good state.

Winter pruning.—This comprises a general regulation of the young and old wood: it may be performed at the fall of the leaf, if that happen from the plant's having perfected its growth for the season, and is not the premature effect of deficient heat in the weather; and thence, at any time, when it is not too cold for the pruner to work, until just before the sap rises. If a severe frost set in early in winter, and the young wood be not well hardened, it is the safest course to defer the pruning till towards the spring, the last fortnight of Feb. or the course of March, but not later than the beginning of April; as when vines are cut later than that, they are apt to bleed much in the flowing sap, which is injurious to the young wood.

In this pruning, we must keep in mind, that the mode of bearing requires us to retain a general supply of the last year's shoots, comprising the strongest, and best-placed for producing immediate bearers in the ensuing season. As to the proportion, keep as many as can be laid in, from eight to twelve inches distant. To leave space for training the adopted wood, prune out such new shoots as are disorderly, ill-placed, very weak, spongy, superfluous, or otherwise improper to be cultivated in the succession; also cut in part of the former year's mother-bearers to some proper lateral: every year remove a portion of old wood as it extends too far from the centre, cutting some of the excessively-long naked branches, either to their origin, or to some strong young lateral shoot, or to any competent lower branch furnished with such a shoot.

An entirely new era has arrived relative to pruning the Vine, especially under glass. It is observed above, that the fruit is produced on the buds formed of the last season's wood. Now, in the above methods of pruning, it seldom occurs that more than three or four buds, when broken, shew fair clusters of embryo blossom; and these invariably at the upper ends of the leading-shoots left after the usual pruning: and the same will take place if the shoot be left four feet long, or only nine inches. The shorter, therefore, the shoots are cut down, the stronger will the buds break; and this having become noticed, some gardeners have taken advantage of this, and proceeded to stump their vines, *i. e.* to cut down every autumn the whole of the wood made during the summer's growth; and thus causing the lowest buds only to break, by which means the Vine is kept at once to the same size, or nearly, for many years: all superfluous branches being removed, fruit is produced in every part of the plant. The finest early grapes produced at this period in Covent Garden is from Mr. Andrews's forcing-

houses at South Lambeth, who has the merit of having practised this method for several years past.

The Editor cannot help observing, that he, last spring, saw this method of pruning practised in the most successful way, by Mr. Brown, Gardener to Chandos Leigh, Esq. at Stonely Abbey, near Leamington. This method is not only practised on vines, but on every other fruit-bearing tree: apples, and even filberts, are thus treated with great success. The readers of this work would thence enjoy a great treat, should opportunity afford them the means, of seeing this practice in full effect; and, at the same time, hearing the reasons for it, from a most intelligent horticulturist.

It has been represented to the Editor, by some travellers who pay attention to this subject, that the best vineyards on the Continent are formed in a way analogous to the above-described mode.

Having finished the pruning, proceed to nail the branches to the wall, either in an horizontal order, or ascending diagonally, or in part perpendicular, as the allotted space of walling admits. If trained to the right and left, for the bearers to which they will give birth to run parallel between them, let them lie from eight to twelve inches apart. Whatever form a confined space imposes, keep them as regular as possible.

After pruning vines, trained in espaliers, or to stakes in the vineyard order, let the shoots be tied-in to the trellis or stakes horizontally, at from six to twelve inches distance.

If the lower part of a vine be destitute of proper bearing wood, or in case it be wished to extend the vine further along any vacant part, some of the lower younger branches or strong shoots may, in autumn or spring, be laid down into the earth, in the common mode of making a layer, with the extremity a foot or two above ground. These will strike root, and, in due course, produce shoots. In this manner, young wood advancing from the bottom may be procured; and the vine may be extended sideways along any vacant space required.

Dressing the soil.—The vine out of doors would not so often make poor returns in fruit, were the soil kept warm and rich by an annual dressing when the plant is at rest. Among the manures found of great avail in supporting, or recovering the fertility of vines, may be reckoned rabbits' dung, ducks' dung, sheeps' dung, sheeps' urine, drainings of a common dunghill, vegetable mould, a compost in which warm dry elements rather preponderate, a little hogs' blood, or bullocks' blood, or the general offal of a slaughter-house, with a qualifying por-

tion of lime or shell-marl, fresh loam, and sharp sand. Whether it be a fluid manure, or part of the old earth be dug out and a compost substituted, the application is chiefly to be made at the extremity of the roots. A vigorous vine is said to extend its roots from one to three feet every year: the roots of old plants in a yielding soil are sometimes found to have travelled to a wonderful distance, in quest of nourishment.

Glass-case.—Vines may be planted in a glazed unflued house, or any glass-case in which green-house plants are wintered, or may be brought from the wall and trained into a common garden frame with good effect, having upright glass-work in front, and sloping top-glasses: thus aided, they will ripen grapes sooner, by a month or more, than those on the open walls, and with a superior flavour; the mode of treatment being the same as on the walls; at all times carefully admitting plenty of fresh air.

WALNUT. *Juglans Regia.* (*Several varieties.*)

The Walnut ranks as a principal kernel fruit of the nut kind. In its young green state, before it stones or hardens internally, it is valuable for pickling. The tree is well deserving of culture, particularly in extensive gardens, orchards, and parks. It is a native of Persia; flowers in April and May. Of the following sorts, the first is accounted the species; and the others seminal varieties.

Round (Royal).	*Double.*
Oval (Early).	*Large French.*
Large.	*Tender-shelled.*

Description of the plant.—The walnut-tree has been long naturalized in England, the period of its introduction being uncertain. It is very hardy, of large and lofty growth. This tree is always planted as standards, and seldom produces fruit until about eighteen or twenty years of age; but yields vast quantities when furnished with a large spreading head. Its mode of bearing the fruit is mostly on the young wood, towards the extreme parts of the branches; two, three or more nuts together, in a close bunch.

Nursery culture.—The walnut-tree is propagated, in general, by sowing well-ripened nuts of the finest varieties: but as seedlings are apt to vary, new plants are occasionally raised by layers and inarching (see § 25, p.13). The nuts may be sown in autumn; or in the spring (which is rather to be preferred), in Feb. or in the beginning of March: for the latter purpose, preserve them from the weather and vermin, in dry sand.

Sow in the nursery bed (see § 20. p. 11), two or three inches deep, and place the nuts two inches asunder: having covered the bed, smooth the surface. They will come up in the spring. When of one year's growth, set out the plants in autumn or spring, in nursery-rows a foot asunder, by six inches in the rows, to remain two years, then to be transplanted (doubling the distance) into other nursery lines. Train each with a single stem of six or seven feet high: then to be permitted to branch out above, and form a spreading head.

The young wood of the walnut is remarkably pithy; and from that and other causes, it does not readily take by grafting in the usual way. The only way to proceed therefore with success, is to inarch them; which may be performed in Feb. or Mar. upon the seedling walnut-stocks, advanced to proper heights.

When the young trees are of six or seven feet growth, some may be planted out, at places within the reach of the lower branches of a tree of a good variety of walnut, and the union formed *secundum artem.* (See § 25.)

The Editor raised a number of trees in this way, which produced fruit the second year: these were planted in Petworth Park, by desire of the Earl of Egremont. In a Letter from that Nobleman lately received, he speaks highly in commendation of their progress, now after nearly twenty years growth.

Final planting—Soil and site.—The walnut-tree may be planted any time, in open weather, from the fall of the leaf till March.

It will succeed in any common fertile soil, a light or a clayey loam, so as the sub-soil be dry, and the site a little sheltered; but it thrives best where there is a good depth of loam, mixed with sand or gravel rather than clay.

As the plant is so long before it bears fruit, there is a particular inducement for procuring trees from the nursery in as advanced a stage as it will be safe to remove them. This may be when they are from eight to twelve years old, as they have been prepared by repeated transplantations. Lift them with entire roots. There is a method described under NURSERY, by which trees much older may be removed in winter without check.

Walnut-trees may be planted in orchards or small paddocks, in a row, towards the boundaries; or in parallel double rows in a quincunx order, in extensive grounds, but detached from fruit-trees of more contracted growth. The line of walnut-trees, when fully grown, will serve as a screen to the fruit-trees occupying the interior ground. The plant should stand at twenty-five and thence to fifty feet distance.

Pruning.—Walnut-trees, when finally planted, may be permitted to branch out in their natural order; with the exception of a little occasional pruning, to regulate any casual disorderly growth, to reduce over-extending branches, and to prune up low stragglers. Small standards may be pruned like the Mulberry-tree.

Gathering the crop.—Walnuts should be gathered for pickling while the internal parts remain tender and fleshy, which may be ascertained by piercing them with a pin or needle. Select those of plump and regular growth, and gather by the hand.

The Walnut commonly attains a proper growth for pickling towards the end of July or beginning of Aug.; for eating in its natural state, in Sept. and Oct. In the latter month, the trees should be cleared, and the fruit housed for keeping.

In trees of a moderate size, the nuts may be gathered by hand, or shook from the branches: but as the fruit grows principally near the extremities, it is commonly thrashed from the branches of a large tree with long poles; in doing which, be careful not to damage the fruitful parts.

When gathered, clear the nuts from the husks: if any at first adhere closely to the shell, lay them in a heap, under cover, a few days, and they will then readily detach. Wipe the nuts clean and dry; house them in some dry apartment; and cover them close with clean dry straw, &c. to exclude the air; or deposit some in boxes or casks, between alternate layers of fine dry sand, which will preserve them the longer in good condition.

Culture for timber.—The Walnut-tree attains to a considerable bulk in the trunk and branches: its timber fetches a great price. It has become too costly for the joiner, except in buildings reviving the feudal style of grandeur: it is much used by the cabinet-maker; and is preferred to any other wood for gun-stocks: it is therefore highly deserving of culture in timber plantations. For this purpose the plants should be raised from seed.—See Nursery.

Although many years elapse before the Walnut arrives at a state of perfection, yet both the wood and the fruit of this tree are so valuable, as to make ample compensation by their returns. The fruit while immature is not only applicable to culinary purposes, but is important also as a medicine. From the *putamen* or green rind of the walnut is prepared a catsup but little inferior to that procured from mushrooms; nothing more being required for this purpose, than to boil it gently in a saucepan with salt and appropriate spices, and to filter off the clear liquor, which, if too thin, should then be simmered down

to a proper consistence, and preserved in small bottles closely corked. This same green rind is also a powerful tonic remedy, and, in decoction, is administered with great advantage to patients who labour under imbecility arising from a deranged state of the digestive organs.

Where delicate flower-beds, gravel-walks, &c. are infested with worms, an infusion of the green coating of the capsules of walnuts, bruised in water, if poured on the place in sufficient quantity, will cause them to rise above ground; whence they may be destroyed.

FLOWER GARDEN, SHRUBBERY, AND PLEASURE GROUND.

In the Kitchen Garden, and the Fruit Garden, utility is the first object; and the cultivator looks directly to a profitable return. The beauty of the scene, as affected by the distribution of the plants, is, in those departments, to be considered only in subservience to such an arrangement as allows convenient access, and is fitted for raising in perfection the utmost quantity of edible produce, or as much as will fully answer the demands of the family or market. But in the Pleasure Ground, the gardener's professed object is elegance; and the stores of vegetation, from the stage of flowers in the foreground to the hanging grove in the distance, are scattered about to augment the beauty of the landscape.

The lines of distinction between the Flower Garden, the Shrubbery, and the Pleasure Ground, can neither be positively marked, nor constantly observed, in treating the subjects which may seem to fall under one of these heads more properly than under either of the others. The flowering shrubs connect the two former. For instance, Can there be such an exact partition between the Flower Garden and the Shrubbery as would destroy their communication, while the plant which bears the beautiful rose belongs, in a catalogue of names, to the latter department? or can we prevent the Pleasure Ground from running into the Flower Garden and Shrubbery, so as scarcely to know where one begins and the other ends, as long as a Pleasure Ground, with the most happy diversity of lawns, wood, and water, would be incomplete without flowers and shrubs?

The substantial difference between the two former lies in

the proportion in which the two classes of plants are cultivated: hence, where a great preponderance of plants without woody stems display their bloom, the characteristics of a Flower Garden seem obvious enough: if another spot is almost covered with clumps of shrubs, and merely dotted with a few creeping flowers, it will be termed, without hesitation, a Shrubbery.

The most essential point of separation between a Flower Garden and a Pleasure Ground seems to turn on the extent of the place. To cover twenty acres with mere flowering plants, producing nothing esculent in the root, leaves, or fruit, would be puerile and ridiculous, as it would exceed the moderation with which Nature scatters her ornaments: hence, as the surface to be dressed, even for pleasure, widens, plots of grass are interposed, with clumps of shrubs, and other circumstances of relief; and if the limits of the ground are yet farther removed, pastured lawns and groves of timber shew that utility and beauty of effect may harmonize. On the other hand, if a circumscribed garden were occupied by mown grass, so as to leave but a few feet for the florist, it would not be a Pleasure Ground.

In this point of view, we propose to begin with the *Flower Garden;* because, whether the surface to be ornamented be a distinct piece of ground dedicated to the florist, or one of the subdivisions comprehended within an extensive Pleasure Ground, a treatise on the nature and culture of the different classes of HERBACEOUS FLOWERS will be equally useful.

Although even a small piece of ground cannot be tastefully adorned without an intermixture of flowering shrubs, some in the same beds with the more showy herbaceous flowers, and others in small clumps of varied proportions, yet it is requisite to confine whatever relates to the planting of shrubs to a separate article, as they require a course of culture exclusively adapted to their distinct nature. Hence, while general observations on the introduction of that class of plants occur in the FLOWER GARDEN, every technical particular respecting them must be sought in the SHRUBBERY.

Soil, Situation, and Ground Plan.—Most of the hardy herbaceous flowers, and the deciduous and evergreen ornamental shrubs, will succeed in a soil of common good qualities, moderately light and mellow. Negatively, the ground should not be excessively strong and clayey, and mere gravel is very intractable; nor should the situation be so low as to be damp and wet. The surface may be level or moderately sloping; and if very unequal, parts of it may be transposed, so as to

make the inclinations gentle. With regard to the form, either a square or an oblong ground-plan is eligible; and although the shape must be often adapted to local circumstances, yet, when a garden is so circumscribed that the eye at once embraces the whole, it is desirable that it should be of some regular figure.

Fences.—The Flower Garden, which is not an appendage to ornamented grounds, will require a fence, wherever the domestic buildings do not serve as a boundary. For the inclosure, a wall or close paling is to be preferred: when one of those is not adopted, recourse may be had to a good hedge-fence, planted on a bank, and defended by an outward ditch. The best outer hedge-fence is formed of whitethorn and holly. The ha-ha, or sunk-fence in a fosse, is a happy contrivance for preserving a distant prospect; but this is seldom adopted when the adjoining land belongs to another occupier: the best places for introducing it are detailed in the PLEASURE GROUND, where it is perfectly in character.

For internal fences, to afford shade or shelter to particular compartments, yew, holly, laurel, and some of the other evergreens are occasionally used: the laurel forms a lofty hedge, and is well adapted to veil any naked wood-fence, or unsightly object, either trained hedge-wise or unconfined in growth: the Alaternus, the Phillyrea, and the Pyracantha, three pretty evergreens, are altogether suitable for the same purpose; and the red berries which the last bears in autumn and winter are very ornamental. Of the deciduous kinds, the Hornbeam and the Beech are rarely used (except in Holland) in the fences of gardens; but the privet forms a close neat garden-hedge.

Style of laying out a flower department.—If a piece of ground be set apart for the cultivation of flowers, in what style should it be laid out? This may vary with the quantity of surface and the object of the cultivator. In the first place, carry a border round the garden, nowhere narrower than three or four feet, unless it may be proper to contract its breadth under the windows of the house; or unless there be a green hedge, on any side, rooted in the level of the garden, which might be expected either to draw the earth, or to encroach on the small plants; in which case flowering shrubs in little slips of mould would do better than dwarf-stemmed flowers. In contact with the surrounding border, may be either a grass-plat or a gravel-walk. The latter is most convenient for approach, at all seasons. If the ground be at all dilated, handsome walks, crossing or leading to the centre, will be also requisite: let the principal walks be five or six feet in breadth. The interior

of the garden is usually laid out in oblong beds three or four feet wide, with intervening alleys two feet wide, or from that down to twelve inches, when it is intended to abstract as little space as possible from the cultivation of the flowers; or, the same end may be attained by circular or oval beds, with smaller compartments between, of such a form as will leave the alleys of one regular width. The alleys, as well as the main walks, should be laid with gravel or some dry binding material, and the beds edged with box or thrift: box is to be preferred. Keep the edgings neat and regular, about two inches in height and breadth, by clipping them once or twice a year, in the interval from April to September. See also SHRUBBERY, *Planting Box-Edgings;* and *Edgings of Borders* and *Gravel-walks*, under the head PLEASURE GROUND.

Ground worked on the above plan may have regular divisions, without being formal. The apology for beds and walks varying in shape and direction, but finished in minute detail, must be, that the process of Nature herself, in the small efflorescent plants, is delicate; the consummation of the process exquisite; and that the beauties of a flower can only be discerned on a near view. The more concentrated the beds in relation to the house, and the easier the approach, the greater will be the entertainment derived from those plants which, in the mode of germination or foliation, or coming into flower, or shewing and maturing fruit or seed-vessels, offer subjects for curious observation.

Quadrangular and circular patches on the side next the house may be laid with turf, which will have a good effect from the windows: besides, if the domestics have a passage through that quarter, flower-beds would be constantly exposed to casual injury.

Where grass cornices, or connected frames of turf, are desired in a Flower Garden, to prevent too monotonous an appearance, the sward may be laid down in the method detailed in the subdivision PLEASURE GROUND, under the article *Laying-down Turf.*—A free interspersion of ornamental shrubs is another resource for diversity of effect.

For the regular beds of a professed Flower Department, choice and curious species should be chiefly selected; comprehending prime varieties of the Tulip, Hyacinth, and Jonquil, the Polyanthus-narcissus, and other esteemed kinds of the Narcissus, the Fritillaria, Crown-imperial, Bulbous Iris, Persian Iris, Amaryllis, Ranunculus, Anemone, with such other BULBOUS and TUBEROUS-ROOTED FLOWERS as are chiefly prized: likewise, of the FIBROUS-ROOTED TRIBE, admit

the capital sorts of the Auricula, Polyanthus, Carnation, and Pink, with the beautiful or extraordinary among the other kinds enumerated in the respective tables of *Annuals*, *Biennials*, and *Perennials*.

HERBACEOUS FLOWERING PLANTS.

Of the numerous nation of flowering plants, we have at present only to do with the Herbaceous tribes, or plants of an herb-like nature, differing from the woody kinds in producing soft stems which decay annually, after having borne the flower. The Annuals die wholly, stem and root, the same year that they are raised. The Biennials mostly decay in the stem the first year, emit a new stem the subsequent spring, and perish altogether the second year. The Perennials are renewed in successive young stems, by the vigour of the durable root, for many years.

The Herbaceous Flowering Plants are divided into the *Fibrous-rooted* and the *Bulbous*, with the *Tuberous-rooted*.

In conformity with this classification, we proceed first to the culture of

ANNUAL FLOWERS.

These fading chaplets of the year are sown, come into flower, and die, within the space of nine months; and must be reproduced from seed at the anniversary of the sowing season. The seed is put into the ground in the spring, for the main bloom: and proportionally later, for successions within the year. Some of these beautiful ornaments of the garden flourish but two or three months, and pass away before the summer; and those of the strongest stamina do not last beyond autumn. The times of sowing the different kinds, which may be extended from February till June or later, will be afterwards specified. If their periodical decay requires the process for raising them to be constantly repeated, they are attended with the peculiar advantage of flowering the same year.

As the Annuals are of different temperaments, they are divided into *Hardy*, *Half-hardy*, and *Tender*.

The Hardy are sown and raised in the natural ground; the *Half-hardy*, or Comparatively Tender, are sown in a temporary hot-bed, to be transplanted; and the positively tender require to pass through two nursery-beds, and some of them cannot be raised in perfection without the influence of stoves. The plant of each temperament will be found under separate Tables; with the course of culture annexed to each Table, which long professional experience has confirmed to be right; and of which, attention to the original climate of the plant,

compared with ours, and to the naturalized habits of the plant where it has acquired any, suggested the principle.—The first class is that of

HARDY ANNUALS.

This numerous tribe of flowering plants comprehends several that are beautiful and fragrant in the highest degree; and some that are merely picturesque, from interesting peculiarities in their mode of growth.

In this Table, as in the others, the Genera are arranged alphabetically, with Species under their respective genus, and varieties under the parent species. The *Botanical names* are first given; then the trivial *English names* most generally received; the *time of flowering;* the *colour;* and the appropriate *soil* and *situation.*

N.B. In this department of ornamental gardening, the amateur will find a great accession of objects of singular interest and beauty, lately introduced from the various climates in South America, many of which have no appropriate English names; and as the Botanical names are now known to most gardeners, &c. to attempt to Anglicise the latter would be useless.

There are many others that might have been placed in the list; but as they do not possess so much interest, they are omitted; our limits not allowing us the means of describing every plant, but, on the contrary, to hold up to notice those possessing most interest, either for beauty or perfume.

Many in the catalogue have a character of positive beauty, exhibiting blossoms exquisite in form, and rendered conspicuous by the most delightful colours. These are, in the first degree, eligible for ornamenting a garden designed to entertain the eye. But other sorts are esteemed for some singularity in their figure, foliage, seed-pots, or fruit, or for their fragrance, rather than for the beauty of their flower; such as, the Belvidere, for its close pyramidical growth; Atriplex or Red Spinach, for the colour of its leaves; Strawberry-blite, for its strawberry-like fruit; Yellow Balsam or Touch-me-not, for the elastic spurting seed-pods; the Caterpillar plant, Hedge-hog, and Snail plants, for the singular forms which the seed-pods display; the Gourds, Pumpkins, and Squashes, as well for their extended running growth, ample foliage, and flowers, as for the great variety of shape, sizes, and colours in the fruit; the Palma Christi, for its large palmated leaves; and the Mignonette, for its eminently grateful odour.

SCALE OF COMPARATIVE SIZES IN THE FOLLOWING TABLE.

I Sunflower. II French Marigold. III Virginia Stock.

TABLE I.—HARDY ANNUALS.

		Months of Flowering.	Comparative Size.	Colour.	Soil and Situation.
Adonis autumnalis	*Flos Adonis*	6 to 10	II	crimson	common mould
Agrostemma, Cœli rosa	*Rose of Heaven*	5 to 8	II	scarlet	loam, pots
Githago	*Corn Cockle*	8 to 10	I	red	common mould
Alyssum, halimifolium	*Sweet Alysson*	5 to 10	III	white	ditto
Amaranthus caudatus	*Love lies Bleeding*	5 to 10	II	scarlet	ditto
hyponchondriacus	*Prince's Feather*	6 to 9	II	red	ditto
Amethystea, cerulea	*Blue Amethyst*	4 to 6	II	blue	loam and bog
Antirrhinum, bipunctatum	*Spotted Calves'-snout*	4 to 8	I	yellow	common mould
speciosum	*Large flowered ditto*	8	II	variegated	loam, pots
sparteum	*Yellow Snap-dragon*	4 to 8	III	yellow	ditto
latifolium	*Broad-leaved ditto*	6 to 10	II	purple	common mould
tripartitum	*Three-leaved ditto*	6 to 10	II	yellow	ditto
viscosum	*Glutinous ditto*	6 to 10	II	purple	ditto
triphyllum	*Three-leaved ditto*	4	II	blue & yellow	ditto
versicolor	*Venetian Calves'-snout*	8	II	variegated	ditto
Anthericum annuum	*Yellow Anthericum*	6	III	yellow	ditto
Androsace lactiflora	*White Androsace*	6	III	white	pots
Arctotis, tristis	*Green Arctotis*	8	III	green	ditto
anthemoides	*Yellow ditto*	6	III	yellow	pots, loam
Argemone, mexicana	*Devil's Fig*	6 to 8	II	yellow	common mould
grandiflora	*Large-flowered ditto*	6 to 10	I	white	ditto
Aster, tenellus	*Dwarf Starwort*	5 to 7	III	white	ditto
chinensis	*China Aster*	5 to 10	II	blue	ditto
Blitum, virgatum	*Upright Strawberry Blite*	6	II	red	ditto
capitatum	*Round-headed ditto*	6	III	red	pots, loam
Briza maxima	*Great Quaking Grass*	5 to 10	III	green	common mould

pluvialis	*Lesser ditto*	6	11	white	common mould
stellata	*Starry ditto*	6	11	grey	ditto
sancta	*Scarlet ditto*	6	111	scarlet	ditto
Campanula, pentagonia	*Gt. flow. Venus's Looking-glass*	6	111	blue	ditto
speculum	*Lesser ditto ditto*	6	111	blue	ditto
dichotoma	*Branching Campanula*	6	11	blue	ditto
Catananche lutea	*Yellow Catananche*	6	11	yellow	ditto
Centaurea, cyanus	*Common Blue-bottle*	5	11	various	ditto
crupina	*Black-seeded ditto*	6	111	blue	ditto
Crocodilium	*Rough-seeded ditto*	6	111	blue, blush	ditto
elongata	*Elongated ditto*	6	111	light purple	ditto
Cerinthe, aspera	*Great Honeywort*	6 to 10	11	purple	ditto
major	*Hairy ditto*	6 to 10	11	purple	ditto
minor	*Small ditto*	6 to 10	11	purple	ditto
Cheiranthus, annuus	*Ten-week Stock*	6 to 9	11	scarlet	ditto
maritimus	*Virginian ditto*	6 to 9	111	purple	ditto
Chenopodium Botrys	*Green*	6 to 9	11	green	pots
Chrysanthemum, tricolor	*Three-col. Chrysanthemum*	6 to 9	11	white	ditto
coronaria	*Common Chrysanthemum*	6 to 9	11	various	ditto
Claytonia perfoliata	*Perfoliate Claytonia*	6	111	white	sand
Convolvulus, minor or tricolor	*Small Convolvulus*	6 to 10	11	blue & white	common mould
major	*Large Convolvulus*	6 to 10	climber	various	ditto
Commelina, dentata	*Blue Commelina*	8	11	blue	ditto
Coreopsis, tinctoria	*Yellow Coreopsis*	6	11	orange	ditto
Atkinsonia	*Straw-coloured*	6	111	straw-col.	ditto
Coronilla, securidaca	*Hatchet Nettle*	6	111	yellow	ditto
cretica	*Cretan ditto*	7	11	yell. & white	ditto
Crepis, barbata	*Yellow Hawkweed*	6 to 10	111	yellow	ditto
rubra	*Red ditto*	6 to 10	111	crimson	ditto
Delphinium consolida	*Rocket Larkspur*	6	11	various	ditto

		Months of Flowering.	Comparative Size.	Colour.	Soil and Situation.
Delphinium Ajacis	*Branching Larkspur*	6	11	blue &c.	common mould
Datura Metel	*Purple Stramonium*	7	1	purple	ditto
Dracocephalum canescens	*Grey Moldavian Balm*	6	111	blue & white	loam
Dianthus, prolifer	*Proliferous Pink*	5	111	red	loam and pot
armeria	*Deptford ditto*	5	111	white	ditto
Elscholtzia cristata	*Barbed Elscholtzia*	5 to 10	11	yellow	common mould
Echium, violaceum	*Violet Bugloss*	6 to 10	1	blue	ditto
plantagineum	*Broad-leaved Bugloss*	6 to 10	1	blue	ditto
australe	*Austrian ditto*	6 to 10	1	blue	ditto
Gypsophila elegans	*Purple Gypsophila*	7 to 9	11	purple	loam
Helianthus annuus	*Sun-flower*	7	1	yellow	com. ground
Hibiscus trionum	*Bladder Ketmia*	6	11	yellow	ditto
Hyoscyamus pictus	*Painted Henbane*	8	11	various	loam
Iberis, odorata	*Sweet-scented Candy-tuft*	6	111	white	com. borders
amara	*Bitter ditto*	6	111	white	ditto
umbellata	*Purple ditto*	6	111	purple	ditto
Knautia orientalis	*Purple Knautia*	8 to 10	11	purple	ditto
Kaulfussia amelloides	*Blue Kaulfussia*	8	1	blue	ditto
Lathyrus, odoratus	*Sweet-Pea*	6	1	various	ditto
tingitanus	*Tangier ditto*	6	1	red	ditto
magellanus	*Lord Anson's ditto*	6	1	blue	ditto
articulatus	*Jointed-podded ditto*	6	1	red	ditto
sativus	*Blue-flowered ditto*	6	1	blue	ditto
annuus	*Red-flowered ditto*	6	1	various	com. borders
longe pedunculatus	*Large purple*	6	1	purple	ditto
Lavatera trimestris	*Common Lavatera*	7	1	various	common mould
Lotus tetragonolobus	*Winged Pea*	6	111	red	ditto
Lobelia, erinoides	*Small blue Lobelia*	7	111	blue	ditto
gracilis	*Creeping ditto*	7	111	blue	ditto

Lupinus, bicolor	*Two-coloured Lupine*	6	11	white & blue	common mould
hirsutus	*Large blue ditto*	6	11	blue	ditto
varius	*Small hairy ditto*	6	11	blue	ditto
pilosus	*Rose Lupine*	6	11	rose	ditto
luteus	*Yellow ditto*	7	11	yellow	ditto
albus	*Large Blue Lupine*	8	11	white	ditto
angustifolius	*Blue Dutch Lupine*	6	1	blue	ditto
Malcomia, chia	*Dwarf*	7	1	purple	ditto
africana	*African ditto*	7	1	purple	ditto
arenaria	*Sand ditto*	7	1	purple	ditto
Malope trifida	*Crimson Malope*	8	1	crimson	ditto
Malva, mauritiana	*Tall crimson Mallow*	8	1	crimson	ditto
crispa	*Curled ditto*	8	1	green	ditto
Medicago, scutellata	*Snails*	6	111	yellow	ditto
var.	*Porcupines*	6	111	yellow	ditto
var.	*Hedgehogs*	6	111	yellow	loam
Nigella, romana	*Roman Nigilla*	6	11	blue	common mould
damascena	*Devil in the Bush*	6	11	blue	ditto
Nolana, prostrata	*Purple Nolana*	6	111	purple	ditto
paradoxa	*Large ditto*	6	111	purple	ditto
Œnothera, purpurea	*Purple Evening Primrose*	6 to 10	111	purple	ditto
sinuata	*Notched-leaved ditto*	6 to 9	11	yellow	l. b.
tetraptera	*Square-podded ditto*	5 to 8	1	white	common mould
tenuifolia	*Fine-leaved ditto*	5 to 9	11	purple	b. l.
linearis	*Slender-branched ditto*	4 to 9	11	cream	common mould
salicifolia	*Willow-leaved ditto*	6	11	yellow	ditto
viminea	*Twiggy ditto*	6	11	purple	ditto
decumbens	*Trailing ditto*	6	11	purple	ditto
micrantha	*Small-flowered ditto*	. . . . .	111	yellow	ditto
molissima	*Soft-leaved Evening Primrose*	. . . . .	. . . .	yellow	ditto

		Months of Flowering.	Comparative Size.	Colour.	Soil and Situation.
Œnothera grandiflora	*Great-flowered Primrose*	8	11	yellow	common mould
striata	*Striped-seeded ditto*	8 to 10	11	yellow	loam and pots
rosea alba	*Rose-coloured ditto*	8 to 10	11	rose	ditto
stricta	*Upright ditto*	6 to 10	11	yellow	common mould
Romanzovii	*Romanzof's ditto*	8	11	purple	ditto
tenella	*Small ditto*	8	1	purple	ditto
Lindleyana	*Lindley's ditto*	6 to 10	11	blue & white	ditto
quadrivulnera	*Spotted-flowered ditto*	8	11	purple	ditto
bifrons	*Cluster-flowered ditto*	8	11	purple & white	ditto
Polygonum Persicaria	*Common Persicaria*	8	1	red & white	ditto
Reseda odorata	*Mignonette*	8	111	green	ditto
Rœmeria hybrida	*Red-flowered Rœmeria*	6 to 10	1	red	ditto
Rudbeckia amplexicaulis	*Annual Budbeckia*	6 to 10	11	orange	pots, loam
Scabiosa, stellata	*Starry Scabious*	6 to 10	11	yellow	common mould
prolifera	*Proliferous ditto*	7	11	purple	ditto
Salvia prismatica	*Upright Sage*	7	11	blue	ditto
Silene, Atocion	*Orchis-flowered Silene*	7	11	purple	ditto
Armeria	*Lobel's Catchfly*	7	11	red	ditto
cretica	*Cretan ditto*	7	11	white	ditto
conoidea	*Conoied ditto*	7	11	purple	ditto
picta	*Painted ditto*	7	11	striped	ditto
pendula	*Trailing*	7	111	crimson	ditto
rubella	*Scarlet ditto*	6	11	scarlet	ditto
vespertina	*Striped-flower ditto*	6	11	red & white	ditto
nyctantha	*Scarlet ditto*	6	11	scarlet	ditto
noctiflora	*Night-flowered ditto*	6	11	white	ditto
reticulata	*Net-flowered*	6	11	red	ditto
colorata	*Coloured*	6	111	striped	ditto
Trifolium, incarnatum	*Scarlet Trefoil*	6	11	red	ditto
cœruleum	*Blue Melilot*	6	11	blue	ditto

Seasons for Sowing.—For sowing the various sorts of Hardy Annuals, the principal season is the spring, March or April; or, if the weather should happen to be mild and temperate, you may begin sowing a few of the hardiest about the middle of February; such as, the Larkspur, Candytuft, Yellow Lupine, and Sweet-pea: though, for the greater proportion of the kinds, and to raise the principal show of flowers, March and April is the season for sowing with success.

The Hardy Annuals which are but of short duration in full flower, such as the Candytuft, the Lupine, the Poppy, the Sweet-pea, and the Virgin-stock, may be raised to bloom in succession, by sowing some every month from March or April till the end of summer. If it be desired to have the Mignonette, Ten-week Stock, and other flowers which individually endure longer, continue blowing throughout summer and autumn, till November or later, make successive sowings every six weeks or two months; having, to follow the unprotected successions, some raised in pots placed under a glass-frame, or in a green-house, to continue flowering in winter. As a prelude to this, in addition to the spring sowing, make one in May and another in June.

For a chance of obtaining some particular hardy kinds in flower earlier in summer, you may, independently of the intended spring sowings for the main summer bloom, sow a small allotment in autumn, about September or October; such as, the Larkspur, the Adonis, and the Persicaria. For this object, generally scatter them promiscuously about the borders, to take their chance like self-own seeds: having remained dormant all winter, a straggling portion will sometimes come up in the spring, sooner than the spring-sown plants, and more vigorous: thinned to some regularity, or transplanted, they will flower first in order, by two or three weeks more.

Distribution in the garden.—As to the distribution of these hardy sorts in the garden, it is principally in small patches in the borders or beds, or separately in pots, to remain where sown for flowering. Observe, in placing the seeds in the compartments, to dispose the lower-stemmed plants towards the front. With this view, the tables of the heights and sizes are here displayed: the Roman letter I denoting the highest; the two II's, the second; and III, those that should be so disposed as to be nearest to the eye. The larger in the next degree may stand proportionally more inward or retiring. The blossoms borne on the tallest stems will sufficiently strike the eye, in stations still farther removed from the front, near the back-part of borders, or the centre of circular beds; and thus will

not exclude the smallest from their share of attention. Be careful so to distribute the patches, that each sort in full growth may stand separate, and distinct to view. Confine the seeds to the principal sorts, and sow a smaller number, rather than crowd the borders confusedly.

A few sorts of Hardy Annuals are occasionally sown in drills, along the front or back-edge of a border, such as the Scarlet and Painted-lady Peas, the Upright Lackspur, Yellow Lupine, Candytuft, Mignonette, and Virgin-stock. Of these, the Virgin-stock, a small delicate plant, very floriferous, is the best adapted for a temporary summer edging: it is, however, but of short duration in full bloom, and may be continued in succession, by sowing every month, from March or April to June or July. The Ten-week Stock is sometimes sown to serve as a flowering edging to particular borders. It is proper in such case for the gardener to sow a double row: as, for instance, sow early the Venus's Looking-glass, and, close beside it, the Aster tenella; and a succession of bloom will be had for the whole season, with no further trouble than clearing away the first when out of bloom.

Some sorts in the Table, particularly many of the Gourds, are of such strong rambling growth, that, if planted in borders, they should be but thinly distributed; or, it would be more eligible to have them assigned in some open spaces, distinct from the general border plants. Several of this family may be trained to a wall or fence, in an ascending direction; but, on account of the magnitude of the fruit, to train them along the surface is rather to be preferred. Some of the Orange, and the smaller Gourds, may be stationed distinctly in the borders, where, trained each round a tall stake, they will have an agreeable effect, coming into leaf, flowering, and fruiting. So, the Touch-me-not, which spreads in a somewhat less degree, should be allotted either some individual situation, or the end or other conspicuous part of a border; being cultivated principally for the curiosity of the elastic seed-pods, which burst when touched, discharging their contents, with force, to some distance.

Select kinds in pots.—Flowers in pots, both ornamental and curious kinds, are often desired for a fore-court or balcony, or to place between the grass-plat and the house, or other parts of a garden. For this purpose, select kinds may be sown; such as, the Sweet and Scarlet Peas, Candytuft, Larkspur, Lupine, Venus's Looking-glass, Ten-week Stock, Mignonette, Virgin-stock, Convolvulus, Heart's-ease, Jacobæa, Indian-pink, Belvidere, Nasturtium, Sultan-flower, and the Orange-

gourd. Allot them middling-sized pots, filled with light earth; and sow each sort in a separate pot. To these may be added the Silene picta, and many of the newer kinds of Annuals of the Catalogue; which, if treated as cuttings, will become particularly strong in the early spring season.

Manual process in sowing.—In proceeding to sow, trace, with the hand or garden-trowel, small circular patches on the surface of the mould, from six to ten inches in diameter, loosening and breaking the earth fine; which patches may be from two to five feet distant. In general, sow each patch as formed; drawing some of the finer top-earth to one side, a quarter of an inch or thence to an inch deep, in proportion to the size of the seed. Sow a number of one sort together in the same patch; and directly cover them in with the earth, to a proportionate depth as above.

Assign to each sort a separate patch, regulating the quantity of seeds by the space which the various plants will occupy. If, in sowing, a small stick be placed to each spot, it will distinguish it till the plants appear; or a small label, in the cleft of such stick, may notify the name of any particular sort.

Progressive culture.—After sowing the seeds, both in the full ground and in pots, if the season prove dry and warm in March, April, May, and subsequently, give occasional watering both before and after the plants are come up; applying the water lightly, with a small watering-pot, having the rose on the spout.

Plants from the earliest sowing will come up in April and May. As they are generally to remain where sown, when a little advanced in growth, thin those of larger compass two or three in each patch; for instance, the Lavatera, the Large Poppy, the Scabious, Oriental Mallow, Hollyhock, Large Nigella, &c. Of the kinds growing largest, leave but one good plant in a place; as the Sunflower, Persicaria, the Large Gourds; and, in a word, flowers of the class for which an interior situation has been recommended, when they are sown. Peculiar plants should be allowed to stand alone on another account: the Belvidere, though not considerable in growth, yet, as curious in its upright close pyramidal form, deserves to be shewn thus distinctly. Having thinned out the inferior plants, give a gentle watering, to settle the loosened earth about the roots of such as are retained.

Be careful to keep the rising plants, whether in borders or pots, well cleared from weeds; and, in dry warm weather, to give occasional watering. In their advanced growth, some of the taller sorts will need the support of stakes or sticks; such as, the Persicaria, the Tobacco-plant, the Oriental and Curled

Mallow, and several other lofty flowers. The climbing and trailing plants, including the Convolvulus, the flowering Peas, and a long list which it is not necessary to enumerate, will also require support. Place the stake or sticks in due time, before the plants take a disorderly growth, one or more to each patch; nearly suiting the strength of the support to the magnitude of the stems. Branchy sticks afford the best aid to the climbers and trailers.

Mostly to remain where sown.—The Hardy Annuals are to be sown, for the most part, in the beds or pots where you design they shall flower: not to be transplanted, except on particular occasions. When requisite to transplant them, let it be in their young growth, during moist weather; or if in dry weather, water the ground to receive them, and give occasional waterings afterwards.

Methods of obtaining an early show.—As the Ten-week Stock and Mignonette can be flowered, as above, in uninterrupted succession through summer, autumn, and part of winter; so plants of both may be brought to blow early in spring, lasting till summer. Sow in August: and in September, remove the plants into pretty small pots, three or four in each. In October, let them be placed either in a glass-pit, or under a good frame, or in a green-house, for winter protection; where admit free air to them in every interval of mild weather. They will flower at the opening of spring, and successively till summer.

If the preparatory potting has been omitted, a portion may be sown in the spring in pots placed in a hot-bed, or other place of warm influence; which will forward them to early summer flowering. This practice may be extended to the flowering Peas, Yellow Lupine, Virgin-stock, Candytuft, Dwarf Larkspur, Small Convolvulus, and similar early flowers.

To save seed.—Most of the Hardy Annuals produce it in tolerable plenty: gather the heads, or spikes, or pods respectively, as they ripen in July, August, September, or later; spread them out to harden the seed, which then beat or rub out; and having cleaned it from the husks, put up each sort separate in packets or bags, to be deposited in a dry apartment.

We proceed now to an intermediate class:

HALF-HARDY ANNUALS.

There are many beautiful and curious flowers which are neither endued with the full hardiness of the more common plants, nor the extreme tenderness of the more delicate exotics; which should be sown in March, under hand-glasses, or on a very moderate hot-bed, and transplanted into the borders in the middle of April or beginning of May.

TABLE II.—HALF-HARDY ANNUALS.

		Months of Flowering.	Comparative Size.	Colour.	Soil and Situation.
Adlumia cirrhosa	*Tendrilled Adlumia*	6 to 9	11	blush	common mould
Ageratum, mexicanum	*Mexican Ageratum*	7	11	light blue	ditto
odoratum	*Sweet-scented ditto*	7	11	blue	ditto
Ampherephis intermedia	*Intermediate Ampherephis*	7 to 9	111	blue	ditto
Anagallis, indica	*Indian Pimpernel*	6	111	blue	ditto
arvense	*British ditto*	6	111	scarlet	ditto
Argemone, mexicana	*Devil's Fig*	6	11	yellow	ditto
alba	*White ditto*	7	11	white	ditto
ochroleuca	*Tall ditto*	7	11	straw	ditto
Aster chinensis	*Chinese Aster*	6	11	various	ditto
Blumenbachia insignis	*Yellow Blumenbach*	7	11	yellow	ditto
Caccalia coccinea	*Scarlet Caccalia*	6	1	scarlet	ditto
Calceolaria pinnata	*Annual Lady's Slipper*	8	11	yellow	ditto
Cardiospermum halicacaba	*Heart-seed*	7	11	white	ditto
Carthamus tinctoria	*Safflower*	7	1	orange	ditto
Centaurea americana	*Great Centaurea*	8	1	blue	ditto
Cistus, guttatus	*Small Rock-rose*	6	111	yellow	ditto
salicifolia	*Willow-leaved ditto*	6	11	yellow	ditto
Cladanthus arabicus	*Arabian Cladanthus*	6 to 9	111	straw	ditto
Clarkia pulchella	*Purple Clarkia*	7	111	rose	ditto
Claytonia alsinoides	*Alsinoe-leaved Claytonia*	6	111	white	ditto
Coix Lachryma Jobi	*Job's Tears*	7	11	green	pots, loam
Collinsia, verna	*Blue Collinsia*	7	111	purple	common mould
parviflora	*Small-flowered ditto*	7	111	blue	ditto
Collomia, grandiflora	*Great-flowered Collomia*	6	11	buff	ditto
linearis	*Hair-leaved ditto*	6	11	blue	ditto
pinnatifida	*Cut-leaved ditto*	6	11	rose	ditto
Cuphea viscocissima	*Viscous Cuphea*	6 to 9	11	lilac	ditto
Datura, ceratocaula	*Indian Thorn Apple*	7	11	white	ditto
guayaquilensis	*American ditto*	6	11	white	ditto
tatula	*Purple Thorn ditto*	5	11	blue	ditto
quercifolia	*Oak-leaved ditto*	6	11	lilac	ditto

		Months of Flowering.	Comparativ Size.	Colour.	Soil and Situation.
lichos, lablab	*Egyptian Bean*	6 to 9	creeper	blue	common mould
purpurea	*Purple ditto*	6 to 9	ditto	purple	ditto
Erodium, gruinum	*House-leek Cranes-bill*	7	111	red	ditto
moschatum	*Musk ditto*	7	111	red	ditto
Galinsogea trilobata	*Three-lobed Galinsogea*	. . . . .	11	yellow	ditto
Gaura tripetala	*Three-petalled Gaura*	8	1	blush	ditto
Gilia, capitata	*Blue Gilia*	8	11	blue	ditto
pulchella	*Large ditto*	8	11	blue	ditto
Helenium, mexicanum	*American Sunflower*	8	11	yellow	ditto
autumnale	*Smooth ditto*	8	111	yellow	ditto
Helianthus, lenticularis	*Freckled Sunflower*		1	yellow	ditto
pubescens	*Pubescent ditto*	8	111	yellow	ditto
annuus	*Common Sunflower*	7	1	yellow	ditto
Heliophila araboides	*Hairy Heliophila*	6	1	blue	ditto
Hibiscus, africanus	*African Bladder Ketmia*	8	11	purple	ditto
vesicarius	*Striped-flowered ditto*	8	11	striped	ditto
trionum	*Bladder Ketmia*	6	11	purple	ditto
Hypecoum procumbens	*Yellow Hypecoum*	8	111	yellow	pots
Impatiens noli tangere	*Touch me not*	7	11	yellow	common ground
Ipomœa, barbigera	*Bearded Coccinea*	7	creeper	blue	rich mould in pots
hederacea	*Ivy-leaved ditto*	7	ditto	blue	ditto
Michauxii	*Michaux ditto*	7	ditto	white	ditto
hepaticæfolia	*Hepatica-leaved ditto*	7	ditto	blue	ditto
striata	*Striped-flowered ditto*	7	ditto	blue & white	ditto
Leonurus heterophyllus	*Various-leaved Lion's-tail*	6 to 10	11	scarle	common mould
Lopezia, coronata	*Coronet-flowered Lopezia*	6 to 10	11	red	ditto
racemosa	*Branching ditto*	6 to 10	11	crimson	ditto
Loasa, nitida	*Shining-leaved Loasa*	7	11	yellow	ditto
acanthifolia	*Acanthus-leaved ditto*	7	11	yellow	ditto
bryonifolia	*Bryonia-leaved ditto*	7	11	yellow	ditto
Mesembryanthemum, crystalium	*Ice-plant*	6	111	white	ditto
					pots

Mimulus moschatus	*Many-flowered Mimulus*	6 to 10	111	yellow	
Molucella lævis	*Smooth Molucella*	8	1	blue	common mould
Nicotiana, angustifolia	*Narrow-leaved Tobacco*	8	1	red	ditto
glutinosa	*Glutinous ditto*	8	1	red	ditto
quadrivalvis	*Four-valved ditto*	8	1	white	ditto
rustica	*Maryland ditto*	8	1	white	ditto
Tabacum	*Common ditto*	8	1	red	ditto
undulata	*Waved-leaved ditto*	8	1	white	ditto
latissima	*Large-leaved ditto*	8	1	red	ditto
paniculata	*Panicled ditto*	8	1	white	open ground
Petunia nyctagyniflora	*Large-flowered Petunia*	8	11	white	ditto
Plumbago micrantha	*Annual Lead-wort*	8	11	purple	ditto
Podolepis gracilis	*Slender Podolepis*	6	11	lilac	ditto
Prunella laciniata	*Cut-leaved Self-heal*	6	1	yellow	loam, in pots
Pyrethrum indicum	*Indian Pyrethrum*	6	11	yellow	ditto
Ricinus, Palma Christi	*Palma Christi*	8	11	green	common ground
v. major	*Greater ditto*	8	1	green	ditto, ditto
Schizanthus, pinnatus	*Pinnated Schizanthus*	4 to 10	1	purple	rich loam, in pots or
porrigens	*Painted ditto*	4 to 10	1	purple	in common ground
Tagetes, corymbosa	*Corymbous Marigold*	6	11	yellow	common mould
tenuifolia	*Fine-leaved ditto*	6	11	orange	ditto
erecta	*African ditto*	6	11	yellow	ditto
patula	*French ditto*	6	11	various	ditto
Talinum lineare	*Fine-leaved Talinum*	7	11	yellow	ditto
Xeranthemum, annuum	*Annual Eternal Flower*	8	11	various	ditto
Lucidum	*Shining-leaved ditto*	8	11	orange	ditto
Zinnia, violacea or elegans	*Crimson Zinnia*	8	11	crimson	ditto
multiflora	*Many-flowered ditto*	8	11	crimson	ditto
revoluta	*Small-flowered Zinnia*	7	11	red	com. ground, good soil
tenuiflora	*Fine-leaved ditto*	7	11	purple	ditto
verticillata	*Verticillated ditto*	7	11	red	ditto

If some of the above are rather less hardy than such as are exclusively found in Table I. and participate, with the Comparatively Tender, in the advantage of a moderate hot-bed, it will mature them sooner. Of this description are the Ten-week Stock, Indian Pink, the Gourds, and the Yellow Sultan. Hence, although, upon occasion, they may be raised without the assistance of artificial heat, yet it is desirable to give them the general culture of the most tender sorts; by which they can be sooner brought to flower in perfection.

A number of the Exotic Annuals from warm climates, which are distributed to different Tables, are in reality of the same temperament, that is, all positively tender, although there are grounds for treating them as distinct in constitution. Thus, if the life of a tender exotic is so short that it will reach perfection in our summer, it may be cultivated without artificial heat, and in that sense is hardy. The remark made, under "*Miscellanies in the Hot-house*," on the *Kidney Bean*, will apply to several exotics from warm climates, in common cultivation. If the life of a naturalized annual, impatient of cold, is a little more extended, so that it must be sown before our spring is confirmed, to have it forward enough to flower well in the summer, it is necessarily raised in a hot-bed, and is but Half-hardy in a practical sense: so, if it can be raised in the open garden, and yet requires either protection or heat to ripen its seed or fruit, it is but Half-hardy. Many exotic plants are quite hardy in respect to the single object of the show from their flowers, although they will not ripen seed without artificial assistance. Some of the tender exotic annuals, which require to be nursed in a frame at both ends of their existence, when the double object of having them flower in perfection and ripen seed is aimed at, may be treated as Half-hardy, when a moderately fine flower will satisfy the cultivator.

General instructions for raising Seedlings.—With regard to plants that are found ONLY IN THIS TABLE, as properly of a middle temperament: When sown early in the spring, they require to be cherished, in the first stage, by the influence of a hot-bed: but they may be raised by a less degree of heat than will suffice for the Tender Annuals. When a moderate hot-bed is employed, they should be sown in March or April, and continued upon a slight heat, or under glass, till May or June, and then transplanted into the open borders, beds, or pots for flowering.

In the deficiency of a hot-bed, the sowing, if deferred to the middle of April, may be made in a bed, or in pots, of natural

earth, under a frame or hand-glass. If these commodious means of shelter are in use for something more urgent, the plants must, as long as the nights continue cold, be defended with an awning of mats till sun-rise. It often happens, that plants thus treated rise very strong, from having the benefit of the free air constantly in the day-time.

When there is nothing but a bed of mould to receive the seed, and no facilities for sheltering the rising plant from the nocturnal air, such species as are only in Table II. may be sown in a warm border, when the second or third week in April has arrived and brought with it good spring weather: but the plants thus raised will not be so soon fit to transplant nor flower equally early with the other, nor generally in full perfection.

All the sorts to be transplanted.—In whichever method raised, all the Annual Flowers, of the second class, are to be transplanted in May, or the beginning of June, into beds, borders, or pots, in the open garden, finally to remain: and the successive varieties will flower, or set and swell their curious fruit, very ornamentally, from June till October.

Best raised in a hot-bed. PROCESS.—Where the gardener has the convenience of hot-beds, it is always advisable to raise, by that means, the intended show of Comparatively Tender Annuals. In March, or the beginning of April, build a hot-bed, full two feet high in dung. When the heat is moderated, earth the bed with light dry good mould, five or six inches thick, and set on the frame or hand-glasses; or let the want of these be compensated by an awning at night, spread on hoops. In the bed thus tempered, sow the seeds, each sort separate, in small drills, and cover-in lightly with fine earth. Some may be sown in small pots, to be placed in any vacant part of a hot-bed at work in the Melonry, either within or outside the frame, just to forward the plants a little for pricking out.

When the plants are come up, allow them proper admission of fresh air daily, by raising or drawing open the glasses one, two, or three inches, and more as they advance in growth, to strengthen and harden them by degrees for planting out. Observe, if any stand too thick, to thin them accordingly, that they may not render each other weak and crooked, by a greater number drawing than the surface of earth can nourish. Give gentle waterings.

Second stage of Nursery Culture.—When the plants are grown one, two, three, or four inches high, according to the sort, or in one month from sowing, proceed to prick a part of them out

four inches apart, either into a second hot-bed of similar moderate heat, but two or three times larger in superficial dimensions; or, where they cannot be longer nursed on heat, into a bed of natural earth, under a frame, or large hand-glass, or oiled-paper cover; and if no transparent roof is ready for the new bed, protect it with mats at night, and in unfavourable weather. Let the remainder be pricked out in May into open beds six inches asunder, to be prepared by a second nursery stage for final planting.

In the want both of a second hot-bed with a frame, and of a glass-case, either the whole may be pricked out in May, when warm settled weather, into beds in the open garden; or a part may be planted at once in the compartments, or pots, where they are to flower.

Provide scoop-trowels, adapted to the size of the pot or ball of earth, to use in shifting the plants.

Give all the plants water as they are planted out. Over those pricked closely in beds you may the more easily extend mats during the mid-day sun; thus shading them daily till they take fresh root, and shew signs of renewed growth. Refresh them all with repeated waterings, from the time of transplanting till they again vegetate.

Permit those pricked out into beds to proceed in growth; such as are in the second or slender hot-bed, three or four weeks, or till the middle of May; and such as are in the protected bed of natural earth, an equal time, or till the beginning or middle of June.

A selection in the pots.—It is eligible to have a portion of the eminently desirable sorts in pots, in order that they may be removable at pleasure, to ornament any particular spot. A selection from the following may be potted either at once from the seed-bed, or transplanted from the second nursery-bed, with balls of earth to the root, viz. the Mignonette, Indian-pink, Ten-week Stock, Double-balsams, Globe-Amaranthus, Cock's-comb, Capiscum, Egg-plant, Yellow Sultan, Marvel-of-Peru, Scarlet Convolvulus, Jacobæa, China-aster, Chrysanthemum, the African and French Marigolds, the Orange and other small varieties of the Gourd, the Tree and Lesser Amaranthus, and the Chinese Hollyhock. This list may be enlarged, according to the taste of the florist, or the demand to be provided for. Of these, except the first, allot generally but one plant to a pot.

Seed should be saved.—The successive varieties of this class will flower from June till Oct., and ripen seed accordingly;

and the bulk of them will then wholly perish; on which account be careful to save seed sufficient for next year, as the respective kinds ripen. Any tender sorts may be protected at the time of seeding, as in the next class.

Tuberous-roots of the Marvel-of-Peru, Dahlias, &c., taken up in Oct., and preserved from the frost and wet of winter, under fine sand, within a dry apartment, and planted in March or April, in a pot plunged into a hot bed, will shoot strongly in a renewed growth, and flower earlier than in the previous season, in such excellence as to shew that the plant from seed wanted something of perfection; for this Peruvian stranger, although considered as Annual in our gardens, is always Perennial in its native climate.

We come now to the Third Class; *i. e.*

TENDER ANNUALS.

The flowering plants comprehended under this title are all exotic species and varieties. Some of them are prized for the eminent beauty of their flowers; others, for their fine tri-coloured and bi-coloured leaves: a third description are cultivated for the curiosity of the fruit, or for striking peculiarities in the figure of the plant. The whole form desirable ornaments for the Flower Garden and Pleasure Ground. They are positively tender in constitution, and require the assistance of hot-beds and glass in a greater degree than those of the Second Class, in order to flower in perfection; and live usually green the whole season in pots.

Sow in March or April, in a hot-bed under frames and glasses: when the young plants are about an inch or two high, thin them, and prick such as are taken out either into the same bed, if there be room at the extremities, or into a larger new hot-bed, which is preferable, as specified below. Let them be thus forwarded till the middle of May or beginning of June; at which time all the sorts, except the Mimosa, may be removed into the open air. Some of the principal sorts having been set in pots, transplant the others into the flower-borders.

TABLE III.—TENDER ANNUALS.

		Month of Flowering.	Comparative Size.	Colour.	Soil and Situation.
Amaranthus, gangeticus	*Tall Feathered Cockscomb*	6 . . .	11	scarlet	rich soil, in pots.
spinosus	*Thorny Cockscomb*	6 . . .	11	red & yellow	ditto.
tricolor	*Tricoloured Amaranthus*	6 . . .	11	yell. green, & red	ditto.
bicolor	*Bicoloured*	6 . . .	11	green & red	ditto
Browallia, elata	*Blue Browallia*	6 . . .	11	blue	ditto
var. alba	*White ditto*	6 . . .	11	white	ditto
Cleome, pentaphylla	*White Cleoma*	6 . . .	1	white	ditto
rosea	*Rose ditto*	6 . . .	1	red	ditto
spinosa	*Thorny ditto*	6 . . .	11	pink	ditto
Cosmos bipinnatus	*Purple Cosmos*	6 . . .	1	purple	ditto
Canna, angustifolia	*Indian Shot*	8 . . .	11	scarlet	ditto
Indica	*Scarlet ditto*	8 . . .	11	scarlet	ditto
lutea	*Yellow ditto*	8 . . .	1	yellow	ditto
flaccida	*Large Yellow ditto*	8 . . .	1	cream col.	ditto
Celosia, castrensis	*Branching Cockscomb*	8 . . .	11	red	ditto
cristata	*Tall ditto*	8 . . .	11	crimson	ditto
var. pumila	*Dwarf ditto*	8 . . .	11	crimson	ditto
Capsicum, longum	*Common Capsicum*	8 . . .	11	scarlet & white	ditto
sphærium	*Round fruited ditto*	8 . . .	11	white	ditto
Datura fastuosa	*Double Thorn Apple*	6 . . .	1	purple	ditto
Gomphrena globosa	*Globe Amaranthus*	6 . . .	11	crimson	ditto
Heliotropium Indicum	*Annual Heliotrope*	8 . . .	11	purple	ditto
Impatiens Balsamina	*Double Balsam*	8 . . .	11	various	ditto
Ipomea, coccinea	*Scarlet Ipomea*	6 . . .	creeper	scarlet	ditto
quamoclit	*Quamoclit*	7 . . .	creeper	crimson	ditto
Martynia, annua	*Purple Martynia*	7 . . .	11	purple	ditto
proboscidea	*Thorny fruited ditto*	7 . . .	11	blue	ditto
Mimosa, pudica	*Humble Plant*	7 . . .	111	green	ditto
sensitiva	*Sensitive Plant*	7 . . .	111	yellow	ditto
Pentapetes Phœnicea	*Phœnician Pentapetes*	7 . . .	111	scarlet	ditto
Solanum Melongena	*Egg Plant*	7 . . .	11	purple	ditto

Complete Nursery Course.—In order, therefore, to raise flowers of this class in perfection, begin in one of the following ways: 1. To save time and materials—if about the end of Feb. and thence to the end of March, you have any Cucumber or Melon-bed at work, in which there is any vacancy for pots—sow, in pots plunged therein, the sorts desired; and let the plants be raised by such assistance an inch or two in growth, for pricking into a second nursery-bed. 2. A bed, however, formed on purpose to raise the plants in the first stage of growth, will be more commodious. Having some well-prepared warm stable-dung, pile it, for the intended bed, to the height of two feet and a half or three feet; and proportion its length to a one-, two- or three-light frame, according to the quantity of plants to be raised: when the heat is moderated, earth the surface within the frame with light fine mould to the depth of five or six inches. Then sow each sort separate, either in the mould of the bed in small cross drills, and covered-in about a quarter or half an inch or more, according to the size of the seed; or sow in pots plunged a little into the bed.

When the plants have come up, admit fresh air every mild day, at the upper end of the glasses, raised an inch or two; shut down the glasses towards evening, or whenever the air becomes sharply cold; and cover the glasses with garden-mats, or something equivalent, every night during the cold season, and uncover timely in the morning. Give occasionally very light waterings.

Meanwhile prepare a larger bed. When the plants are advanced an inch or two in growth, draw up the strongest; prick some of these into the same bed, as far as there may be any unoccupied space, and the principal portion into the new larger bed; setting each sort separate, and the plants four, five, or six inches distant individually. Some may be pricked singly into small pots, or two or three of the smaller sorts may be admitted into the same pot, till more advanced. Give water to the whole at planting. Shut down the glasses; and interpose a slight shade from the full sun till they take good root, shewing a renewed growth. Continue them in this bed, two, three, or four weeks, or till, from their enlarging progress, they require more room; then, some might be thinned out with a small ball of earth to the roots, and planted in a fresh hot-bed, from six inches to a foot asunder, according to the sorts; and some in pots singly, plunged in the same new bed; which will forward the whole considerably. Such as remain in the bed which was thinned will also advance freely;

the cavities, occasioned by removing some of the earth with the plants taken away, being made good, and linings of hot dung applied to the sides of the bed to renew the heat. Supply the whole with fresh air daily, in the gradual manner before advised, admitting it more fully as the warm season advances. Continue also necessary waterings, according as the earth becomes dry, or as it may suit plants of different temperament.

Observe: As soon as the larger-growing kinds have advanced in the stem so as to touch the glasses, the entire frame must be raised from three to six inches, to afford additional room for the plants to increase in height: but the vacancy thereby made at the bottom of the frame should be closed, especially if cold weather.

Where it is designed to draw any of the loftier kinds to a tall growth, such as the Large Cockscomb, Tricolor and Bicolor Amaranthus, Egg-plant, Balsam, Stramonium, some strong plants should be previously transplanted, each with a ball of earth, into pretty large pots, one plant in each, and plunged into a strong new hot-bed; and as their stems ascend so as to touch the glasses, the frame should be raised, either by means of a post at each corner of the bed, or by convenient props underneath the frame, and the vacancy at bottom closed with garden mats.

Drawing Frame.—For drawing the above kinds tall, a deep frame is occasionally provided, three or four feet high in the back, and two or three in the front; in order, as soon as the plants in the common frames are advanced to the glasses, that either the deep frame may be substituted for the present frame on the same bed, or that the plants growing in the pots may be plunged into a new hot-bed, and the deep frame put over accordingly. Or, sometimes a sort of multiplying drawing-frame is formed, in two or three moveable divisions, to be placed one under the other, as the plants shoot in height; one division being fitted for the glasses, and always continued uppermost.

But for drawing the lofty-stemmed Tender Annuals to full stature and perfection of flowering, a glass-case would be more commodious, on the following construction:—Form it with upright glasses in front, four, five, or six feet high, and with inclined sashes above, sloping to the top of the upright back wall, which should be six or eight feet from the ground: let the end-glasses be of corresponding dimensions. Make a hot-bed in a proper pit within, either of hot dung or tan-bark: if

of the former, lay at top four, five, or six inches of dry earth, or old tan, to keep down the rank steam of the dung; and form a layer, in which the pots of plants may be plunged. If the latter material be employed, no top-earth is necessary, but plunge the pots fully into the tan-bark. Receiving, at proper times, moderate admissions of free air, and necessary waterings, the plants will grow prosperously, and run up tall and strong, in full stem and leaf; without dropping their leaves, as sometimes happens when the plants are drawn within close deep wooden frames.

The drawing of these large sorts into very tall growth is not now so generally practised as formerly, on account of the considerable care and trouble which attends it. When that is the aim of the florist, it is attained with the least degree of trouble by recourse, in the final stage, to the glass-case and pit just described. By such an apparatus, the large Cockscombs the Tricolors, and plants of similar capability, have been run up five or six feet high; the Cockscombs, with their cristated flower-heads, so enlarged as to measure from ten to eighteen inches across, lengthwise over the crown of the comb, consisting of innumerable minute florets. Nevertheless, when those sorts which are naturally the largest are drawn no higher than two or three feet, strong and well-leaved, the moderate influence of the final bed not being continued after they show well for full flowering, they are of more general service in ornamenting the Flower Garden or the domestic court.

With regard to the Dwarf Cockscombs and Tricolors, and the bulk of the varieties transplanted into hot-beds under common frames, continue to manage them in their advancing growth as above particularly directed. And thus let the plants of all sizes be accelerated by a suitable nursery course, till they are pretty well advanced towards perfection, and till the warm season, at the close of May or in June, admits of their being removed into the full air.

Meanwhile supply the whole, in their progressive stages, with admissions of fresh air daily, regulated by the temperature of the season. Give also proper watering: and as the warm season increases, in May and June, give air more freely, inuring the plants by degrees to the full air by raising, or drawing open, the glasses considerably, and sometimes fully in fine days, preparatory to their removal out of the frames.

Removal into the open garden.—Then, towards the end of May, if fine warm weather, otherwise not before the beginning or middle of June, the plants, as they have advanced to the

requisite stage, should be removed out of the frames into the open garden. The select sorts, in pots, may ornament the chief walks, or conspicuous compartments between the house and the extremities of the dressed grounds: the others take up with balls of earth, and plant either in the common flower borders, or in pots one plant in each, as required. Give water in general at planting, and afterwards occasionally in dry weather.

Observe, as a subject of peculiar treatment, that the Sensitive Plant should be removed where the protection of glass can be continued: it is not material to nurture them by a hot-bed after May, but keep them either in a glass-case or green-house, or within the windows of a dwelling-house, chiefly where the sun can reach them; for if fully exposed to the weather, their leaves lose the sensitive property.

Curious sorts raised in a stove.—The more curious of the Tender Annuals may be also raised to a flowering state by introducing them into some of the forcing departments described under HOT-HOUSE.

Subsequent Culture in the open air.—Continue, to such sorts as require it, the support of handsome straight sticks. Repeat the occasional waterings; which to all the plants in pots will be necessary almost every day in dry hot weather, and to the others as circumstances may indicate. Apply the water either in a morning or towards evening, that the moisture may reach the roots, before it is much exhaled by the heat of the day.

Thus cherished, the tribe of Tender Annuals will yield a successive display of ornamental flowers, or of peculiar characters in leafing or fructification, from May or June till the end of Sept. Soon after the individual sorts have ripened seed, each plant entirely perishes in Oct.; so that we must be careful to save proper supplies of seed for raising a succession next spring

To save Seed.—Our climate is generally warm enough to ripen it in Aug. and Sept.: but should the autumn prove cold and wet, the extremely tender sorts, such as the Cockscombs, Tricolors, Double Balsams, Globe Amaranthus, and Double Stramoniums, will produce seed very scantily, if left exposed:—in such a season, therefore, place some pots of these either in a single deep frame, or one formed of two or more common frames, in order to be defended above constantly with the glasses, especially at night, and in rainy or cold weather; allowing, however, a good admission of air: or place a set of pots in a glass-case, or a pit protected with glasses. Under either course, the plants will ripen seed effectually.

BIENNIALS, AND IMPERFECT PERENNIALS.

THE true Biennial Flowering Plants, or such as do not flower till the second year, and then, after producing seed, die wholly root and stem, are not very numerous. Raised from seed in the spring, they shoot up in a tufty head of leaves the first year; and into flower-stalks the year following, shew their bloom, ripen seed, and perish. There are, however, several families treated as Biennials, although they may be termed Imperfect Perennials: these have vigour enough in the root to survive the second winter; but the flower of the third summer is inferior to that of the preceding, and the plants appear to dwindle in the stem. To have a succession of these in perfection, it is therefore requisite to raise some sorts annually from seed; and to continue others in perennial reproduction, by layers, by pipings, by cuttings, or by slips of the young shoots of the year in summer. On the other hand, a few Biennials have a slender affinity with the Annuals, by flowering the same year in which they are sown; but these few bear a finer bloom the second year, and then perish, which makes them true Biennials. The varieties of the Imperfect Perennials will be found repeated and more fully described in the Fifth Table.

TABLE IV.—*Biennials, and Imperfect Perennials.*

AGROSTEMMA. *Corn Cockle.*
Githargo. Raised from seed. Red-flowered, white ditto.

ALTHÆA.
rosea. *Chinese Hollyhock.* July—Sept. Flowers the first year, but if protected in winter, shews the finest bloom in the second.

ALYSSUM. *Madwort.*
maritimum. *Sweet-scented.* S. Europe. June—Nov.

ANTHYLLIS.
vulneraria. *Lady's-finger.* Brit. Yellow, purple. May--Aug.

ANTIRRHINUM. *Snap-dragon.*
majus. *Greater.* Blows the second; dwindles, cultivated as a perennial. June, July.

CAMPANULA. *Bell-flower.*
Medium. Bell-shaped, blue.

CATANANCHE.
cœrulea. *Candy Lion's-foot.*

CHEIRANTHUS. *Stock.*
incanus. *Biennial.*
Brompton Stock; tall and upright. Red, scarlet, purple, white: double-flowered of each.
Queen Stock; lower, branching. Purple, white, red.
[Twickenham Stock; larger branching. Common purple.
Absolute precision in classing flowering plants according to their relative permanence, is impossible; because the reputed periods at which a plant blooms and decays are not always constant in the same climate. Transferred to warm

regions, some plants that are even annual with us have become perennial or arborescent: an inverse change of constitution has been noticed under annuals, to which class a cold sky not unfrequently reduces a perennial exotic. The above specified varieties of the Stock are raised constantly from seed as mere biennials, because they rarely flower at all after the second year, and cannot be propagated by cuttings and layers.]

CHELIDONIUM.
Glaucium. *Horned Poppy.* Yellow.
GLAUCIUM luteum. July, Aug.
CYNOGLOSSUM. *Hounds tongue.*
sylvaticum. Brit. May.
DIANTHUS. *Pink.*
Chinensis. *Indian.* July-Sept. Purple. If treated as half-tender, by being sheltered in severe weather, it will send up a new stem the second year, and blow finer than in the first. Red, white, red and white striped, variegated, imperial large, double.
deltoides. *Maiden Pink.* Brit. It will, in some plants, flower as strongly the third season as the second; dwindles afterwards; the fine varieties are continued by pipings, slips, &c. July-Oct.
barbatus. *Sweet William.* Brit. Mostly biennial, or sometimes continued after the second year, by propagating the double or fine kinds by layers. June.
DIGITALIS. *Foxglove.*
purpurea. Brit. June, July. Purple, white.
HEDYSARUM.
coronarium. *French Honeysuckle.* Red, white.
HESPERIS. *Rocket.*
inodora. *Dame's Violet.* May, June.
LAVATERA.
arborea. *Tree Mallow.*
LUNARIA. *Honesty. Satinflower.*
annua. Blows the first and second year. Purple, white.
ŒNOTHERA. *Tree Primrose.*
biennis. *Tall yellow.* Virginia. N. Amer.
parviflora. *Small-flowered.* N. Amer.
longiflora. *Long-flowered.* Buenos Ayres.
RESEDA. *Bastard Rocket.*
Luteola. *Weld.* Used for dyeing yellow.
SALVIA. *Sage.*
Sclarea. *Clary.* Syria. Italy.
Horminum. *Seedling Clary.* Greece. Blows the first and second year. Varieties of both, purple-topped, red-topped. July, Aug.
SCABIOSA. *Scabious.*
atropurpurea. *Sweet.* Habitat unknown. July--Sept. Dark purple.
ochroleuca. *Pale-white.* Germany. July, Aug.
TRAGOPOGON. *Goat's Beard.*
pratensis. *Yellow* or *Meadow; Go-to-bed at Noon.*
porrifolium. *Purple; Salsafy.*
VERBASCUM. *Mullein.*
Thapsus. *Great White.*
Thapsoides. *Bastard.*
Lychnitis. *Hoary.*
All natives of Britain.

THE following Catalogue comprises **FOREIGN HARDY HERBACEOUS PLANTS** usually grown in this department of the garden; for which reason they are arranged according to the system of Linnæus. The Numbers attached to each species will assist persons in numbering their plants for future reference. This List does not contain all that are to be met with in this country, but is sufficient for selection. Our limits will not admit of any particular description of each; but as persons are always desirous of knowing what soil each is known to thrive in best, we have endeavoured to supply that information; which will be understood by applying to the following

ABBREVIATED CHARACTERS.

c. m. *for* common garden mould.
b. m. — bog mould.
l. — loam.
b. l. — bog and loam, the greater part bog.
l. b. — loam and bog, the greater part loam.
s. — sheltered situation.

As the soils recommended may not be generally understood; a little attention to the following rules will enable persons to discover what is *fit* for the intended purposes.

LOAM—The kind best adapted to the purpose of growing plants, is of a moderately close texture, between clay and sand, differing from the former in want of tenacity when wet, and not becoming hard when dry; nor is it loose and dusty like the latter, but in both states possesses somewhat of a saponaceous quality. It varies in colour from yellow to brown, and is commonly found in old pastures: it may also be remarked, that where any perennial species of Clover (Trifolium) are found wild, it is almost a certain indication of a fertile loam, and such as contains the proper food of plants in abundance.

BOG MOULD—is frequently found on waste lands, where Heaths (Ericæ) are produced: it is composed of decayed vegetable matter and white sand. The best sort is light when dry, of a black colour, and easily reduced to a powder. Care should be taken to distinguish it from *Peat*, which is hard when dry, destitute in a great measure of the sand, and mostly of a red or ferrugineous colour. This contains, largely, sulphureous particles and mineral oil, iron &c.; all of which are, when in too great abundance, destructive to vegetation.

The gardener may grow the most of these plants in the common borders; as all the smaller growing ones will be fonnd in the next arrangement, where those best adapted to cultivation in pots &c. are also described; for which it will be best to consult

the nature of the plant, and apply such means as the system of physiology will suggest: (see § 22, p. 12.)

TABLE V.—*Foreign Hardy Herbaceous Plants.*

DIANDRIA MONOGYNIA.

1	Veronica sibirica	Siberian Speedwell	c. m.
2	virginica	Viginian ditto	c. m.
3	spuria	Bastard ditto	c. m.
4	maritima	Blue-flowered Sea ditto	c. m.
5	longifolia	Long-leaved ditto	c. m.
6	incana	Hoary ditto	c. m.
7	incisa	Cut-leaved ditto	c. m.
8	Allioni	Creeping ditto	c. m.
9	Teucrium	Hungarian ditto	c. m.
10	urticæfolia	Nettle-leaved ditto	c. m.
11	orientalis	Oriental ditto	c. m.
12	candida	White-leaved ditto	c. m.
13	multifida	Multifid ditto	c. m.
14	latifolia	Broad-leaved ditto	c. m.
15	prostrata	Trailing Sea Speedwell	c. m.
16	austrica	Austrian ditto	c. m.
17	pinnata	Wing'd-leaved ditto	c. m.
18	paniculata	Panicled ditto	c. m.
19	gentianoides	Gentian-leaved ditto	c. m.
20	Gratiola officinalis	Hedge-Hyssop	c. m.
21	Verbena urticæfolia	Nettled-leaved Vervain	c. m.
22	Lycopus virginicus	Virginian Lycopus	c. m.
23	Monarda fistulosa	Hollow-stalked Monarda	l.
24	didyma	Scarlet ditto	l.
25	purpurea	Purple ditto	l.
26	Salvia lyrata	Lyre-leaved Sage	l. b.
27	virgata	Twiggy-branched ditto	c. m.
28	sylvestris	Spotted-stalked ditto	c. m.
29	nemorosa	Spear-leaved ditto	c. m.
30	austriaca	Austrian ditto	c. m.
31	Disermas	Long-spiked ditto	c. m.
32	verticillata	Whorl-flowered ditto	c. m.
33	glutinosa	Yellow-flowered ditto	c. m.
34	lineata	Flax-leaved ditto	l. b.
35	Collinsonia canadensis	Nettled-leaved Collinsonia	c. m.

TRIANDRIA MONOGYNIA.

36	Valeriana Phu	Garden Valerian	c. m.
37	Ixia chinensis	Chinese Ixia	l. b.
38	Gladiolus communis	Common red Corn-flag	c. m.
39	byzantinus	Larger ditto	c. m.
40	Iris susiana	Chalcedonian Iris	l. b.
41	florentina	Florentine ditto	c. m
42	germanica	German ditto	c. m

44	Iris sambucina	Elder-scented ditto	c. m.
45	dalmatica	Dalmatian ditto	c. m.
46	variegata	Variegated-flowered ditto	c. m.
47	biflora	Two-flowered ditto	l. b.
48	pumila	Dwarf ditto	c. m.
49	sibirica	Siberian ditto	c. m.
50	squalens	Brown-flowered ditto	c. m.
51	versicolor	Various-coloured ditto	c. m.
52	spuria	Spurious ditto	c. m.
53	ochroleuca	Pale Yellow ditto	c. m.
54	graminea	Grass-leaved ditto	c. m.
55	xiphium	Spanish Bulbous ditto	c. m.
56	xiphioides	English Bulbous ditto	c. m.
57	persica	Persian ditto	l. b.
58	halophila	Long-leaved ditto	c. m.
59	subbiflora	One- and Two-flowered ditto	c. m.
60	virginica	Virginian ditto	c. m.
61	aphylla	Naked-stalked Iris	c. m.
62	flexuosa	Bending-stalked ditto	c. m.
63	Commelina erecta	Upright Commelina	c. m.

TETRANDRIA MONOGYNIA.

64	Scabiosa alpina	Alpine Scabious	c. m.
65	leucantha	Snowy ditto	c. m.
66	sylvatica	Broad-leaved ditto	c. m.
67	ochroleuca	Pale white ditto	c. m.
68	Crucianella anomala	Anomalous Crucianella	c. m.
69	Asperula taurina	Broad-leaved Woodroof	c. m.
70	Plantago maxima	Broad-leaved Plantain	c. m.
71	v. *rosea*	Rose ditto	c. m.
72	altissima	Tall ditto	c. m.
73	asiatica	Asiatic ditto	c. m.
74	Sanguisorba media	Short spiked Burnet-saxifrage,	c. m.
75	canadensis	Canadian ditto	c. m.

PENTANDRIA MONOGYNIA.

76	Anchusa angustifolia	Narrow-leaved Bugloss	c. m.
77	Pulmonaria angustifolia	Narrow-leaved Lungwort	l. b.
78	virginica	Virginian ditto	l. b.
79	Borago orientalis	Eastern Borage	l. b.
80	Symphytum orientale	Eastern Comfrey	l. b.
81	asperrimum	Siberian ditto	c. m.
82	Hydrophyllum virginicum,	Virginian Water-leaf	l. b.
83	canadense	Canadian ditto	l. b.
84	Lysimachia Ephemeron	Willow-leaved Loose-strife	l.
85	stricta	Bulb-bearing ditto	b. s.
86	ciliata	Ciliated ditto	c. m.
87	Plumbago europæa	European Lead-wort	c. m.
88	Phlox paniculata	Panicled Lychnidea	c. m.
89	undulata	Wave-leaved ditto	c. m.
90	suaveolens	White-flowered ditto	c. m.

91	Phlox carolina	Carolina ditto	c. m.
92	maculata	Spotted-stalked ditto	c. m.
93	glaberrima	Smooth-stalked ditto	c. m.
94	Convolvulus americanus,	American Bind-weed	c. m.
95	Polemonium reptans	Creeping Greek Valerian	c. m.
96	Campanula persicifolia,	Peach-leaved Campanula	l.
97	pyramidalis	Pyramidal ditto	l.
98	lilifolia	Lily ditto	c. m.
99	rapunculoides	Nettle-leaved ditto	c. m.
100	americana	American ditto	l.
101	versicolor	Various-coloured ditto	l. b.
102	sibirica	Siberian ditto	l. b.
103	Phyteuma spicata	SpikefloweredHorn-Rampion,	c. m.
104	Triosteum perfoliatum	Fever Wort	l. b.
105	Verbascum ferrugineum,	Rusty-leaved Mullein	l.
106	phœniceum	Purple-flowered ditto	l.
107	Hyoscyamus Scopolia	Nightshade-leaved Henbane	b.
108	Physalis alkakengi	Winter Cherry	c. m.
109	Atropa Mandragora	Mandrake	l. s.
110	Viola montana	Mountain Violet	c. m.
111	Tabernamonta Amsonia,	Alternate-leaved Tabernamontana	
112	angustifolia	Narrow-leaved ditto	l. s.

PENTANDRIA DIGYNIA.

113	Apocynum venetum	Spear-leaved Dog's-bane	c. m.
114	androsæmifolium	Fly-catching ditto	l. b.
115	cannabinum	Hemp-leaved ditto	c. m.
116	Asclepias syriaca	Syrian Swallow-wort	c. m.
117	amœna	Oval-leaved ditto	c. m.
118	incarnata	Flesh-coloured ditto	c. m.
119	sibirica	Siberian ditto	l. b.
120	vincetoxicum	Officinal ditto	c. m.
121	exaltata	Tall ditto	l. b.
122	tuberosa	Orange Apocynum, or ditto	l. b.
123	nigra	Black ditto	c. m.
124	Heuchera americana	American Sanicle	c. m.
125	Gentiana lutea	Yellow Gentian	l. b.
126	saponaria	Soapwort-leaved ditto	l. b.
127	cruciata	Cross-wort ditto	l. b.
128	Eryngium planum	Flat-leaved Eryngo	l.
129	amethystinum	Amethystian ditto	l.
130	Bourgati	Cut-leaved ditto	l.
131	alpinum	Alpine ditto	l.
132	Astrantia major	Great Black Master-wort	c. m.
133	Ferrula communis	Gigantic Fennel	l.
134	nodiflora	Knotted ditto	l.
135	Laserpitium latifolium	Broad-leaved Laser-wort	l.
136	Heracleum elegans	Elegant Cow Parsnep	c. m.
137	Ligusticum lævisticum	Common Lovage	c. m.
138	peloponnense	Hemlock-leaved ditto	c. m.

139	Angelica archangelica	Garden Angelica	c. m.
140	Sium Falcaria	Creeping-rooted Skirret	l. b.
141	Phellandrium mutellina,	Mountain Phellandrium	l. b.
142	Chærophyllum bulbosum,	Bulbous-root Chærophyllum,	c. m.
143	hirsutum	Hairy ditto	c. m.
144	aromaticum	Sweet-scented ditto	c. m.
145	Sesseli montanum	Long-leaved Meadow-saxifrage,	c. m.
146	Thapsia villosa	Deadly Carrot	c. m.
147	Smyrnium aureum	Golden Alexanders	l. b.

PENTANDRIA PENTAGYNIA.

148	Aralia racemosa	Berry-bearing Aralia	c. m.
149	nudicaulis	Naked-stalked Aralia	l. b.
150	Statice Cephalotes	Large single-stalked Statice	l.
151	speciosa	Plantain-leaved ditto	l.
152	tatarica	Tartarian ditto	l.

HEXANDRIA MONOGYNIA.

153	Tradescantia virginica	Virginian Spider-wort	c. m.
154	Narcissus angustifolius,	Narrow-leaved Narcissus	c. m.
155	biflorus	Two-flowered ditto	c. m.
156	majalis	Late-flowering white ditto	c. m.
157	Narcissus incomparabilis,	Peerless Daffodil	c. m.
158	major	Large ditto	c. m.
159	orientalis	Oriental ditto	c. m.
160	Tazetta	Polyanthus Narcissus	c. m.
161	odorus	Sweet-scented ditto	c. m.
162	Jonquilla	Jonquil	c. m.
163	hispanicus	Spanish white ditto	c. m.
164	Bulbocodium	Hoop Petticoat ditto	l. b.
165	minor	Lesser Daffodil	c. m.
166	Amaryllis lutea	Yellow Amaryllis	l.
167	Allium victorialis	Long-rooted Garlic	c. m.
168	sphærocephalon	Small round-headed ditto	c. m.
169	descendens	Purple-headed ditto	c. m.
170	nutans	Nodding ditto	c. m.
171	senescens	Narcissus-leaved Garlick	c. m.
172	multibulbosum	Broad-leaved ditto	c. m.
173	flavum	Yellow Garlick	c. m.
174	Moly	Yellow Moly	c. m.
175	tataricum	Tartarian Garlick	c. m.
176	subhirsutum	Hairy ditto	c. m.
177	pallens	Pale-flowered ditto	c. m.
178	Lilium candidum	White Lily	c. m.
179	bulbiferum	Orange ditto	c. m.
180	pomponium	Pomponian ditto	b. m.
181	chalcedonicum	Scarlet Martagon ditto	c. m.
182	superbum	Superb ditto	b. m.
183	Martagon	Common-Martagon ditto	c. m.
184	canadense	Canada-Martagon ditto	b. m.
185	tigrinum	Tiger Lily	l. b.

186	Lilium philadelphicum	Philadelphia Lily	b.m.s.
187	Catesbæi	Catesby's Lily	b.m.s.
188	Fritillaria imperialis	Crown Imperial	c.m.
189	persica	Persian Fritillary	l.
190	pyrenaica	Pyrenean ditto	c.m.
191	Uvularia perfoliata	Perfoliate Uvularia	l.b.
192	amplexifolia	Heart-leaved ditto	l.b.
193	grandiflora	Large-flowered ditto	c.m.
194	ErythroniumDensCanis,	Dog's-tooth Violet	c.m.
195	Tulipa sylvestris	Italian Yellow Tulip	c.m.
196	Gesneriana	Common Garden ditto	c.m.
197	Hypoxis erecta	Upright Hypoxis	c.m.
198	Ornithogalum nutans	Nodding Star of Bethlehem	c.m.
199	pyrenaicum	Pyrenean ditto	c.m.
200	latifolium	Broad-leaved ditto	c.m.
201	Scilla peruviana	Peruvian Hyacinth	c.m.
202	campanulata	Spanish Squill	c.m.
203	bifolia	Two-leaved ditto	l.b.
204	præcox	Siberian ditto	l.b.
205	italica	Italian ditto	c.m.
206	amœna	Early-flowering ditto	c.m.
207	Asphodelus luteus	Yellow Asphodel	c.m.
208	ramosus	Branching ditto	c.m.
209	Anthericum ramosum	Branching Anthericum	c.m.
210	Liliago	Grass-leaved ditto	c.m.
211	Liliastrum	St. Bruno's Lily	c.m.
212	Convallaria verticillata,	Verticillate Solomon's Seal	l.
213	racemosa	Branching ditto	l.
214	stellata	Starry ditto	l.
215	Hyacinthus orientalis	Garden Hyacinth	c.m.
216	romanus	Roman ditto	l.
217	cernuus	Nodding ditto	c.m.
218	Muscaria	Musk ditto	c.m.
219	monstrosus	Feathered ditto	c.m.
220	comosus	Purple-Grape, or Tassel ditto,	c.m.
221	botryoides	Blue Grape ditto	c.m.
222	racemosus	Starch ditto	c.m.
223	Aletris Uvaria	Orange-flowered Aletris	l.s.
224	Yucca gloriosa	Superb Adam's Needle	l.s.
225	filamentosa	Thready ditto	c.m.
226	Hemerocallis flava	Yellow Day Lily	c.m.
227	cœrulea	Blue ditto	l.s.
228	alba	White ditto	l.s.
229	fulva	Tawny ditto	c.m.
230	graminea	Grass-leaved ditto	c.m.

HEXANDRIA TRYGYNIA.

231	Rumex Patientia	Patience Dock	c.m.
232	italicus	Italian ditto	c.m.
233	alpinus	Alpine ditto	c.m.

HEPTANDRIA TETRAGYNIA.

234	Saururus cernus	Lizard's Tail	c. m.
235	lucidus	Shining-leaved ditto	c. m.

OCTANDRIA MONOGYNIA.

236	Œnothera fruticosa	Shrubby Œnothera	c. m.
237	misouriensis	Misouri ditto	l. b.
238	Fraseri	Fraser's ditto	l. b.
239	angustifolia	Narrow-leaved Shrubby ditto,	c. m.
240	Epilobium angustissim.	Narrowest-leav'd Willow-herb,	c. m.
241	Dodonæi	Dodonæus' ditto	l. b.

OCTANDRIA TRIGYNIA.

242	Polygonum divaricatum,	Divaricated Polygonum	c. m.
243	scandens	Climbing ditto	c. m.
244	undulatum	Waved-leaved ditto	c. m.
245	ochreatum	Spur-leaved ditto	c. m.
246	virginicum	Virginian ditto	c. m.

ENNEANDRIA TETRAGYNIA.

247	Rheum rhaponticum	Rhapontic Rhubarb	c. m.
248	undulatum	Waved-leaved ditto	c. m.
249	palmatum	Palmated-leaved ditto	c. m.
250	tataricum	Tartarian ditto	c. m.
251	hybridum	Bastard ditto	c. m.
252	compactum	Compact ditto	c. m.

DECANDRIA MONOGYNIA.

253	Sophora flavescens	Siberian Sophora	l. b.
254	alopecuroides	Fox-tail ditto	l. b.
255	australis	Blue Austrian ditto	l. b.
256	alba	White ditto	l. b.
257	Cassia marilandica	Maryland Cassia	l.
258	Dictamnus rubra	Fraxinella	c. m.

DECANDRIA DIGYNIA.

259	Saxifraga crassifolia	Oval-leaved Saxifrage	c. m.
260	cordifolia	Heart-leaved ditto	c. m.
261	Geum	Kidney-leaved ditto	c. m.
262	geranoides	Crane's-bill-leaved ditto	c. m.
263	pennsylvanica	Pennsylvanian ditto	l. b.
264	hieracifolia	Hawkweed-leaved ditto	c. m.
265	Gypsophila paniculata	Panicled Gypsophila	c. m.
266	altissima	Tall ditto	c. m.
267	Dianthus barbatus	Common Sweet William	c. m.
268	hybridus	Mule Pink	c. m.
269	superbus	Superb ditto	l. b.

DECANDRIA TRIGYNIA.

270	Cucubalus viscosus	Clammy Bladder Campion	c. m.
271	tataricus	Tartarian ditto	c. m.
272	stellatus	Starry ditto	l. b.
273	Silene longiflora	Long-flowered Catchfly	c. m.

DECANDRIA PENTAGYNIA.

274	Sedum majus	Great Stonecrop	c. m.
275	Aizoon	Yellow ditto	c. m.
276	Agrostemma coronaria	Common Rose Campion	c. m.
277	Flos Jovis	Umbelled ditto	c. m.
278	Lychnis chalcedonica	Scarlet Lychnis	c. m.
279	Cerastium repens	Creeping Mouse-ear Chickweed,	c. m.
280	dioicum	Spanish ditto	c. m.
281	tomentosum	Woolly-leaved ditto	c. m.
282	suffruticosum	Shrubby ditto	c. m.
283	strictum	Upright ditto	c. m.

DECANDRIA DECAGYNIA.

284	Phytolacca decandra	Branching Phytolacca	l. b.

DODECANDRIA MONOGYNIA.

285	Lythrum virgatum	Fine-branched Willow-herb	c. m.

DODECANDRIA DIGYNIA.

286	Agrimonia odorata	Sweet-scented Agrimony	c. m.
287	repens	Creeping ditto	c. m.
288	Agrimonoides	Three-leaved ditto	c. m.

DODECANDRIA TRIGYNIA.

289	Euphorbia coralloides	Coral-stalked Spurge	l.
290	pilosa	Hairy ditto	l.
291	Esula	Gromwell-leaved ditto	l.
292	falcata	Sickle-leaved ditto	l.
293	Cyparissias	Cypress ditto	c. m.
294	palustris	Marsh ditto	l. b.
295	verrucosa	Warted ditto	l.
296	multicorymbosa	Flax-leaved ditto	c. m.

DODECANDRIA PENTAGYNIA.

297	Spiræa Aruncus	Goat's-beard Meadow Sweet	c. m.
298	lobata	Lobe-leaved ditto	l.
299	trifoliata	Three-leaved ditto	l. b.

ICOSANDRIA POLYGYNIA.

300	Fragaria monophylla	One-leaved Strawberry	c. m.
301	virginiana	Virginian ditto	c. m.
302	grandiflora	Pine ditto	c. m.
303	chiliensis	Chili or White ditto	c. m.
304	Potentilla Pennsylvanica,	Pennsylvanian Cinquefoil	c. m.
305	recta	Upright ditto	c. m.
306	hirta	Hairy ditto	c. m.
307	multifida	Cut-leaved ditto	c. m.
308	norwegica	Norway ditto	c. m.
309	grandiflora	Great-flowered Cinquefoil	c. m.
310	monspeliensis	Montpelier ditto	c. m.
311	Geum Virginicum	Virginian Avens	c. m.
312	strictum	Upright ditto	c. m.
313	potentilloides	Cinquefoil ditto	c. m.
314	montanum	Mountain ditto	c. m.

POLYANDRIA MONOGYNIA.

315	Actea racemosa	American Herb-Christopher	c. m.
316	Podophyllum peltatum,	Duck's-foot, or May-apple	c. m.
317	Chelidonium laciniatum,	Cut-leaved Celandine	c. m.
318	Papaver orientale	Oriental Poppy	c. m.

POLYANDRIA DIGYNIA.

319	Pæonia coralloides	Female Pæony	l.
320	humilis	Dwarf ditto	l.
321	albiflora	White-flowered ditto	l.
322	officinalis	Common or Male ditto	c. m.
323	tenuifolia	Fine-leaved ditto	c. m.
324	fimbriata	Fringed-flowered ditto	c. m.
325	anomala	Siberian ditto	c. m.

POLYANDRIA TRIGYNIA.

326	Delphinium intermedium	Palmate-leaved Bee Larkspur,	c. m.
327	hybridum	Bastard ditto	l.
328	elatum	Common ditto	c. m.
329	exaltatum	American ditto	c. m.
330	grandiflorum	Large-flowered ditto	c. m.
331	Aconitum Lycoctonum	Great Yellow Wolf's-bane	c. m.
332	Napellus	Common Blue Wolf's-bane	c. m.
333	pyrenaicum	Pyrenean ditto	c. m.
334	japonicum	Japan ditto	l. b.
335	Anthora	Wholesome ditto	c. m.
336	variegatum	Variegated ditto	c. m.
337	ochroleucum	Tall ditto	c. m.
338	album	White-flowered ditto	l.
339	volubile	Twining ditto	l. b.
340	uncinatum	Hook-seeded ditto	c. m.
341	cammarum	Purple ditto	c. m.

POLYANDRIA PENTAGYNIA.

342	Aquilegia canadensis	Canadian Columbine	c. m.
343	montana	Mountain ditto	l.
344	sibirica	Siberian ditto	l.
345	viridiflora	Green-flowered ditto	l.

POLYANDRIA POLYGYNIA.

346	Anemone pratensis	Meadow Anemone	l. b.
347	coronaria	Common garden ditto	l.
348	sylvestris	Snow-drop ditto	c. m.
349	virginiana	Virginian ditto	c. m.
350	pennsylvanica	Pennsylvanian ditto	c. m.
351	Clematis recta	Upright Virgin's-bower	c. m.
352	ochroleuca	Yellow ditto	l.
353	viorna	Leathery-flowered ditto	l.
354	integrifolia	Entire-leaved ditto	c. m.
355	Thalictrum aquilegifolium,	Feathered Columbine	c. m.
356	simplex	Simple-stalked ditto	c. m.
357	lucidum	Shining-leaved Meadow Rue,	c. m.

358	Thalictrum nigricans	Black-flowered ditto	c. m.
359	elatum	Tall ditto	c. m.
360	fœtidum	Stinking ditto	c. m.
361	purpurascens	Purple-stalked ditto	c. m.
362	medium	German ditto	c. m.
363	atropurpureum	Dark-purple-flowered ditto	c. m.
364	rugosum	Rough-leaved ditto	c. m.
365	dioicum	Dioicous ditto	c. m.
366	sibiricum	Siberian ditto	c. m.
367	tuberosum	Tuberous-rooted ditto	c. m.
368	angustifolium	Narrow-leaved ditto	c. m.
369	contortum	Twisted-stalked ditto	c. m.
370	cornuti	Canadian ditto	c. m.
371	speciosum	Glaucous-leaved Meadow Rue	c. m.
372	Ranunculus aconitifolius,	Fair Maids of France	c. m.
373	platanifolius	Plane-leaved Ranunculus	c. m.
374	illyricus	Illyrian ditto	l. b.
375	asiaticus	Common Persian ditto	c. m.
376	Trollius asiaticus	Asiatic Globe-flower	l. b. s.
377	americanus	American ditto	l. b. s.
378	Helleborus niger	Christmas Rose	l. s.
379	lividus	Livid Hellebore	l. b. s.

DIDYNAMIA GYMNOSPERMA.

380	Teucrium lucidum	Shining-leaved Germander	c. m.
381	multiflorum	Many-flowered ditto	c. m.
382	Hyssopus nepetoides	Square-stalked Hyssop	l.
383	Nepeta pannonica	Hungarian Cat-Mint	c. m.
384	incana	Hoary ditto	c. m.
385	violacea	Violet-flowered ditto	c. m.
386	nepetella	Small ditto	c. m.
387	nuda	Spanish ditto	c. m.
388	tuberosa	Tuberous-rooted ditto	c. m.
389	Sideritis hyssopifolia	Hyssop-leaved Iron-wort	l.
390	scordioides	Crenated ditto	l.
391	hirsuta	Hairy ditto	
392	Mentha crispa	Curled-leaved Mint	c. m.
393	niliaca	White Mint	c. m.
394	auriculata	Ear-leaved ditto	c. m.
395	Lamium Orvala	Balm-leaved Archangel	l.
396	rugosum	Wrinkled-leaved ditto	c. m.
397	garganicum	Woolly ditto	c. m.
398	molle	Pellitory-leaved ditto	c. m.
399	Betonica stricta	Danish Betony	c. m.
400	incana	Hoary ditto	c. m.
401	orientalis	Oriental ditto	c. m.
402	hirsuta	Hairy ditto	c. m.
403	Stachys circinata	Blunt-leaved Stachys	c. m.
404	lanata	Woolly-leaved ditto	c. m.
405	cretica	Cretan ditto	c. m.

406	Stachys recta	Upright ditto	c. m.
407	Marrubium supinum	Procumbent Base Horehound,	c. m.
408	hispanicum	Spanish ditto	c. m.
409	peregrinum	Saw-leaved ditto	c. m.
410	Phlomis tuberosa	Tuberous-rooted Phlomis	c. m.
411	Herba venti	Rough-leaved ditto	l. b.
412	Origanum hybridum	Bastard ditto	l. b.
413	heracleoticum	Winter ditto	c. m.
414	Thymus virginicus	Virginian Thyme	l.
415	Melissa grandiflora	Great-flowered Balm	c. m.
416	græca	Grecian ditto	c. m.
417	Dracocephalum Virginic.	Virginian Dragon's-head	l.
418	ruyschianum	Hyssop-leaved ditto	c. m.
419	sibiricum	Siberian ditto	c. m.
420	Scutellaria albida	Hairy Scull-cap	c. m.
421	integrifolia	Entire-leaved ditto	l. b.
422	lupulina	Great-flowered ditto	l. b.

DIDYNAMIA ANGIOSPERMIA.

423	Chelone glabra	White-flowered Chelone	l. b.
424	obliqua	Red ditto	l. b.
425	ruelloides	Scarlet ditto	l. b.
426	formosa	Tall ditto	l. b.
427	Antirrhinum purpureum,	Purple Toad-flax	c. m.
428	genistifolium	Broom-leaved ditto	l.
429	triornithophorum	Whorl-leaved ditto	l. b.
430	Scrophularia betonicæ f.	Betony-leaved Figwort	l.
431	orientalis	Oriental ditto	l.
432	Digitalis lutea	Yellow Foxglove	c. m.
433	ambigua	Great ditto	c. m.
434	ferruginea	Iron-coloured ditto	c. m.
435	Dodartia orientalis	Eastern Dodartia	l.
436	Penstemon pubescens	American Penstemon	l. b.
437	lævigatum	Smooth-leaved ditto	l. b.
438	Mimulus ringens	Oblong-leaved Monkey-flower,	l.
439	guttatus	Yellow Monkey-flower	l. b.
440	Acanthus mollis	Smooth Bear's-Breech	c. m.
441	spinosa	Prickly ditto	c. m.

TETRADYNAMIA SILICULOSA.

442	Myagrum perenne	Perennial Gold-of-Pleasure	c. m.
443	Cochlearia Draba	Draba-leaved Scurvy-Grass	c. m.
444	Iberis sempervirens	Evergreen Candy-Tuft	c. m.
445	Alyssum saxatile	Shrubby Madwort	c. m.
446	Lunaria rediviva	Perennial Honesty	c. m.

TETRADYNAMIA SILAQUOSA.

447	Sisymbrium strictissim.	Spear-leaved Sisymbrium	c. m.
448	Hesperis matronalis	Single Garden Rocket	c. m.
449	Bunias orientalis	Oriental Bunias	c. m.

MONADELPHIA DECANDRIA.

450	Geranium aconitifolium,	Aconite-leaved Crane's-bill	c.m.
451	angulosum	Angular-stalked ditto	c.m.
452	maculatum	Spotted ditto	c.m.
453	macrorhizum	Long-rooted ditto	c.m.
454	palustre	Marsh ditto	l.
455	reflexum	Reflexed-flowered ditto	c.m.
456	striatum	Striped-flowered ditto	c.m.
457	lividum	Wrinkled ditto	c.m.

MONADELPHIA POLYANDRIA.

458	Althæa cannabina	Hemp-leaved Marsh-mallow	c.m.
459	Lavatera thuringiaca	Large-flowered Lavatera	c.m.
460	Alcea rosea	Common Holyoak	c.m.
461	Hibiscus palustris	Marsh Hibiscus	l.b.
462	Kitiabella vitifolia	Vine-leaved Kitiabella	c.m.

DIADELPHIA DECANDRIA.

463	Ononis antiquorum	Tall Rest-Harrow	l.
464	Lupinis perennis	Perennial Lupine	l.b.
465	Glycine Apios	Tuberous-rooted Glycine	l.
466	Orobus Lathyroides	Upright Bitter-Vetch	c.m.
467	angustifolius	Narrow-leaved ditto	l.b.
468	niger	Black-flowered ditto	c.m.
469	vernus	Spring ditto	l.
470	Lathyrus tuberosus	Tuberous-rooted Lathyrus	c.m.
471	heterophyllus	Various-leaved ditto	c.m.
472	pisiformis	Siberian ditto	c.m.
473	Vicia pisiformis	Pale-flowered Vetch	c.m.
474	Glycyrrhiza echinata	Prickly-headed Liquorice	c.m.
475	glabra	Common ditto	c.m.
476	Coronilla varia	Purple Coronilla	c.m.
477	Hedysarum canadense	Canada Saintfoin	c.m.
478	Galega officinalis	Officinal Goat's-rue	c.m.
479	montana	Mountain ditto	l.b.
480	Phaca alpina	Alpine Phaca, or Bastard Vetch	l.b.
481	Astragalus alopecuroides,	Foxtail Milk Vetch	l.b.
482	virescens	Green-flowered ditto	l.b.
483	galegiformis	Goat's-rue-leaved ditto	c.m.
484	Cicer	Bladder-podded ditto	l.b.
485	Onobrichis	Purple-spiked ditto	c.m.
486	Trifolium hybridum	Bastard Trefoil, or Clover	c.m.
487	rubens	Long-spiked ditto	c.m.
488	alpestre	Oval-spiked ditto	c.m.
489	Lupinaster	Bastard Lupine	c.m.
490	Lotus maritimus	Sea Bird's-foot Trefoil	c.m.
491	Medicago Karstiensis	Creeping-rooted Medick	c.m.
492	prostrata	Procumbent ditto	c.m.

POLYADELPHIA POLYANDRIA.

493	Hypericum calycinum	Gt.-flowered St.John's-wort,	c.m.s.
494	perfoliatum	Perfoliate ditto	c.m.s.
495	Ascyron	Red-leaved ditto	c.m.s.

SYNGENESIA POLYGAMIA ÆQUALIS.

496	Scorzonera hispanica	Spanish Viper's-grass	c. m.
497	Sonchus sibiricus	Siberian Sow-thistle	c. m.
498	Prenanthes purpurea	Purple Prenanthes	l.
499	Hieracium amplexicaule,	Heart-leaved Hawkweed	c. m.
500	pyrenaicum	Pyrenean ditto	c. m.
501	Crepis pontica	Roman Crepis	c. m.
502	Catananche cœrulea	Blue Catananche	c. m.
503	Serratula prælta	Tall Saw-wort	c. m.
504	coronata	Lyre-leaved ditto	c. m.
505	spicata	Spike-flowered ditto	b. l.
506	Carduus canus	Hoary Thistle	c. m.
507	ciliatus	Ciliated ditto	c. m.
508	tuberosus	Tuberous-rooted ditto	c. m.
509	serratuloides	Saw-wort ditto	c. m.
510	Cnicus oleraceus	Pale-flowered Cnicus	c. m.
511	ferox	Prickly ditto	c. m.
512	centaurioides	Centaury ditto	c. m.
513	Cynara Scolymus	French Artichoke	c. m.
514	Carthamus corymbosus	Umbelled Carthamus	l. b.
515	Carline acaulis	Stemless Carline	l.b.s.
516	Cacalia hastata	Spear-leaved Cacalia	c. m.
517	suaveolens	Sweet-scented ditto	c. m.
518	Saracenica	Creeping-rooted ditto	c. m.
519	Eupatorium maculatum,	Spotted Eupatorium	c. m.
520	altissimum	Tall ditto	c. m.
521	trifoliatum	Three-leaved Eupatorium	c. m.
522	perfoliatum	Perfoliate ditto	l. b.
523	ageratoides	Nettle-leaved ditto	b. l.
524	Chrysocoma Linosyris	German Goldy-locks	c. m.
525	biflora	Two-flowered ditto	c. m.

SYNGENESIA POLYGAMIA SUPERFLUA.

526	Tanacetum macrophyllum,	Various-leaved Tansy	c. m.
527	Balsamita	Cost-Mary	c. m.
528	Artemisia Abrotanum	Common Southernwood	c. m.
529	santonicum	Tartarian ditto, or Wormseed,	c. m.
530	pontica	Roman ditto	c. m.
531	Dracunculus	Tarragon	c. m.
532	Conyza linifolia	Flax-leaved Flea-bane	c. m.
533	Tussilago paradoxa	Downy-leaved Colt's-foot	c. m.
534	lobata	Lobated ditto	c. m.
535	alba	White ditto	c. m.
536	Senecio luridus	Dingy-coloured Groundsel	c. m.
537	coriaceus	Thick-leaved ditto	c. m.

538	Dahlia superflua	Purple Dahlia	c. m.
539	v. *rosea*		
540	frustanea	Red ditto	c. m.
541	v. *lutea*	Yellow ditto	c. m.
542	v. *violacea*	Violet ditto	c. m.
543	Boltonia asteroides	Aster-leaved Boltonia	c. m.
544	Aster hyssopifolius	Hyssop-leaved Aster	c. m.
545	dumosus	Purple-flowered ditto	c. m.
546	ericoides	Heath-leaved ditto	c. m.
547	multiflorus	Many-flowered ditto	c. m.
548	linearifolius	Linear-leaved ditto	c. m.
549	foliolosus	Many-leaved ditto	c. m.
550	salicifolius	Willow-leaved ditto	c. m.
551	linifolius	Flax-leaved ditto	c. m.
552	rigidus	Rough-leaved ditto	c. m.
553	acris	Biting ditto	c. m.
554	umbellatus	Umbelled ditto	c. m.
555	novæ Angliæ	New England ditto	c. m.
556	grandiflorus	Great-flowered ditto	c. m.
557	patens	Spreading ditto	c. m.
558	æstivus	Labrador ditto	c. m.
559	undulatus	Wave-leaved ditto	c. m.
560	concolor	Woolly ditto	c. m.
561	Amellus	Italian ditto	c. m.
562	sibiricus	Siberian ditto	c. m.
563	flexuosus	Bending-stalked ditto	c. m.
564	divaricatus	Divaricated ditto	c. m.
565	longifolius	Long-leaved ditto	c. m.
566	cordifolius	Heart-leaved ditto	c. m.
567	corymbosus	Purple-stalk Aster	c. m.
568	paniculatus	Smooth-stalked panicled ditto,	c. m.
569	puniceus	Small Purple-stalked ditto	c. m.
570	lævis	Smooth ditto	c. m.
571	novi Belgii	New Holland ditto	c. m.
572	Tradescanti	Tradescant's ditto	c. m.
573	pendulus	Pendulous ditto	c. m.
574	diffusus	Diffuse red-flowered ditto	c. m.
575	divergens	Spreading downy-leaved ditto,	c. m.
576	tardiflorus	Spear-leaved ditto	c. m.
577	spectabilis	Showy ditto	c. m.
578	mutabilis	Variable ditto	c. m.
579	macrophyllus	Broad-leaved white ditto	c. m.
580	fragilis	Brittle ditto	c. m.
581	junceus	Slender-stalked ditto	c. m.
582	elegans	Elegant ditto	c. m.
583	glaberrimus	Smooth ditto	c. m.
584	lucidus	Shining ditto	c. m.
585	sessiliflorus	Sessile-flowered ditto	c. m.
586	altissimus	Tallest ditto	c. m.

587	Solidago viminea	Twiggy Golden Rod	c. m.
588	mexicana	Mexican ditto	c. m.
589	sempervirens	Narrow-leaved Evergreen do.	c. m.
580	elliptica	Oval-leaved ditto	c. m.
591	stricta	Willow-leaved ditto	c. m.
592	latifolia	Broad-leaved ditto	c. m.
593	lævigata	Fleshy-leaved ditto	c. m.
594	cæsia	Maryland ditto	c. m.
595	lateriflora	Red-stalked ditto	c. m.
596	altissima	Tall ditto	c. m.
597	arguta	Sharp notched ditto	c. m.
598	canadensis	Canadian ditto	c. m.
599	procera	Great ditto	c. m.
600	reflexa	Reflexed ditto	c. m.
601	lanceolata	Grass-leaved ditto	c. m.
602	serotina	Upright ditto	c. m.
603	nemoralis	Woolly-stalked ditto	c. m.
604	bicolor	Two-coloured ditto	c. m.
605	aspera	Rough-leaved ditto	c. m.
606	flexicaulis	Crooked-stalked ditto	c. m.
607	ambigua	Angular-stalked ditto	c. m.
608	rigida	Hard-leaved ditto	c. m.
609	Cineraria sibirica	Heart-leaved Cineraria	c. m.
610	Inula squarrosa	Net-leaved Inula	c. m.
611	salicina	Willow-leaved ditto	l. b.
612	ensifolia	Sword-leaved ditto	c. m.
613	Helenium autumnale	Smooth Helenium	c. m.
614	Chrysanthem. corymbos.	Large White Chrysanthemum	c. m.
615	indicum	Purple Indian ditto	c. m.
616	millefoliatum	Tansy-leaved ditto	c. m.
617	v. ditto	*α Quilled White.*	
618	v. ditto	*β Double White.*	
619	v. ditto	*γ Bright Yellow.*	
620	v. ditto	*δ Straw-coloured.*	
621	v. ditto	*ε Quilled straw-coloured.*	
622	v. ditto	*ξ Purple quilled.*	
623	v. ditto	*η Lilac-coloured.*	
624	v. ditto	*σ Spanish brown.*	
625	v. ditto	*κ Copper-coloured.*	
626	v. ditto	*μ Quilled Lilac.*	
627	Achillea alpina	Alpine Milfoil, or Maudlin	c. m.
628	cristata	Slender-branched ditto	c. m.
629	serrata	Sawed-leaved ditto	c. m.
630	impatiens	Impatient ditto	c. m.
631	santolina	Lavender Cotton-leaved ditto,	l. b.
632	tanacetifolia	Tansy-leaved ditto	c. m.
633	nobilis	Showy ditto	c. m.
634	abrotanifolia	Southernwood-leaved ditto	c. m.

635	Buphthalmum grandifl.	Great-flowered Ox-eye	l.
636	salicifolium	Willow-leaved ditto	l.

SYNGENESIA POLYGAMIA FRUSTRANEA.

637	Helianthus multiflorus,	Perennial Sunflower	c. m.
638	tuberosus	Jerusalem Artichoke	c. m.
639	divaricatus	Rough-leaved Sunflower	c. m.
640	decapetalus	Ten-petalled ditto	c. m.
641	altissimus	Tall ditto	c. m.
642	giganteus	Gigantic ditto	c. m.
643	Rudbeckia laciniata	Broad jagged-leaf Rudbeckia,	c. m.
644	digitata	Narrow jagged-leaved ditto	c. m.
645	fulgida	Bright purple ditto	l. b.
646	purpurea	Common purple ditto	l. b.
647	Coreopsis verticillata	Whorl-leaved Coreopsis	c. m.
648	tripteris	Three-leaved ditto	c. m.
649	aurea	Hemp-leaved ditto	c. m.
650	procera	Tall ditto	c. m.
651	alternifolia	Alternate-leaved ditto	c. m.
652	auriculata	Ear-leaved ditto	c. m.
653	minima	Least ditto	l. b.
654	Centaurea Centaureum,	Great Centaury	c. m.
655	alpina	Alpine ditto	l. b.
656	montana	Mountain ditto	c. m.
657	sempervirens	Evergreen ditto	c. m.
658	sibirica	Siberian ditto	c. m.
659	phrygia	Austrian ditto	c. m.
660	glastifolia	Woad-leaved Centaury	l. b.
661	rhapontica	Swiss ditto	l. b.
662	sonchifolia	Sow-thistle-leaved ditto	l. b.
663	aurea	Great yellow ditto	l. b.

SYNGENESIA POLYGAMIA NECESSARIA.

664	Silphium scabrum	Rough-leaved Silphium	c. m.
665	terebinthinum	Broad-leaved ditto	c. m.
666	perfoliatum	Perfoliate ditto	c. m.
667	connatum	Round-stalked ditto	c. m.
668	Asteriscus	Hairy-stalked ditto	c. m.
669	trifoliatum	Three-leaved ditto	c. m.

SYNGENESIA POLYGAMIA SEGREGATA.

670	Echinops Ritro	Small Globe Thistle	c. m.
671	sphærocephalus	Great ditto	c. m.

SYNGENESIA MONOGAMIA.

672	Lobelia Cardinalis	Scarlet Cardinal flower	l.
673	siphylitica	Blue ditto	l.

GYNANDRIA TRIANDRIA.

674	Sisyrinchium striatum,	Striated Sisyrinchium	l.

GYNANDRIA POLYANDRIA.

675	Arum Dracunculus	Long-sheathed Arum	c. m.
676	venosum	Varied ditto	c. m.

MONŒCIA PENTANDRIA.

677	Parthenium integrifol.	Entire-leaved Parthenium	c. m.
678	Urtica nivea	Snowy Nettle	c. m.

DIŒCIA HEXANDRIA.

679	Smilax herbacea	Herbaceous Smilax	b.l.s.

DIŒCIA DODECANDRIA.

680	Datisca cannabina	Bastard Hemp	c. m.

DIŒCIA MONADELPHIA.

681	Napæa lævis	Smooth Napæa	l. b.
682	scabra	Rough ditto	l. b.

POLYGAMIA MONŒCIA.

683	Veratrum album	White Hellebore	l.b.s.
684	nigrum	Dark-flowered Veratum	l.b.s.

METHODS OF PROPAGATION.

General Observations. — Many imperfect Perennials, from their declension in strength and beauty, after the first time of flowering, must be treated as Biennials, and raised from seed every year, or every alternate year. Some species do not propagate freely by off-sets or similar derivations from the old plants, and are therefore renewed by seed. The same method is occasionally adopted, to obtain a larger supply of particular kinds, especially of such as are not liable to vary much in the seedling plants. Again, though experience may have shewn that the colour or variegation of a flower is continually fugitive as often as it is multiplied from seed, the florist sometimes employs this method partially, for the chance of new varieties; of which if any are approved, he can render them permanent by derivations from the root or stalk, as explained below.

As the numerous tribe of Perennials continue many years by the roots, most sorts can be multiplied from that origin. Several kinds can be propagated by slips and cuttings of the top-shoots and flower-stalks. These and similar derivations from the old plant may be divided into off-set suckers from the root, off-set divisions of the root, cuttings of the root, off-sets and slips including part of the root and part of the herb, cuttings of the stalks, layers of the young shoots, and cuttings of the young shoots; to be planted as specified below.

As to the time which must elapse before plants thus derived come into flower: Those rising from strong full-rooted slips, detached and planted in the spring, when taken from vigorous stools, will flower the same year: but those commenced in summer by slips, cuttings of top-shoots, or by layers, will not generally flower till the year after.

Many double-flowered plants never furnish seed: to propagate such, it is essential to employ that one of the other modes which the species will best admit. Some, as the Double Wall-flower, are continued by cuttings or slips of the top-shoots, in summer; and others, as the Double Carnation, the Double Pink, the Mule and Double Sweet-William, by layers and pipings. Some of the double Biennials are also kept up by the same means; for whether a plant of any curious description furnishes seed or not, there is no certainty of continuing it permanent by seed.

After these observations, pointing to the general uses and advantages of each method of propagation, we proceed to detail the particular steps belonging to each course.

1. *By seed.*—The general directions given under this head must be controlled by the notices of particular habits annexed to some of the plants in the Table.

The general season for sowing is the spring. Many sorts are occasionally sown in autumn, about August and September. A few, specified in their places, should be sown only in autumn: but the spring months, March and April, with the beginning of May, is a good season for sowing most sorts. The seed may be deposited in any beds of mellow light earth.

Sow each sort separate, either broad-cast and raked in lightly, or in small drills. Or, another course may be occasionally pursued. First rake the bed into a fine smooth state: then, with the back of the rake, trim off the surface-earth, half an inch to an inch in depth, evenly in the alley on one side of the bed, leaving it in a temporary ridge along the edge. In the uncovered level sow the seed; press it nicely down with the spade; and, with the rake in the common position, draw the earth evenly back from the alley, spreading it over the seed to a uniform height; then trim the surface smooth. Or, for small portions of any curious sorts of small seeds, having raked the mould of the bed fine, sow the seed, and cover it in by a light sifting of fine earth. By either of the last two courses, some may be sown in pots or boxes. When particular sorts are committed to beds, large seeds are commonly sown in flat shallow drills.

If it be dry warm weather, moderate waterings, both before and after the plants are up, will be essentially necessary.

When the advancing young plants, in June, July, or later, are two, three, four, or five inches high, according to the full stature of the different sorts, or when they have six or eight leaves, they should be pricked out from the seed-bed.—It will be observed, that these directions do not relate to any species with tuberous or knobbed roots.

Prick each sort separate into nursery-beds, in rows, from four to nine inches asunder. Water them at planting, and occasionally afterwards, till they have struck root effectually. It will be proper for them to continue in the second beds; the major part till October, November, December, and some till the spring following. At one of these periods, in mild weather, as many as will answer the demand may be finally transplanted into the general flower-borders, or into select compartments, or pots, to remain for flowering. A portion, however, may be left to flower in the second nursery-bed, especially of the variable kinds, as carnations, polyanthuses, auriculas; in order that if any new valuable varieties are wished, such as offer may be the better marked.

Or, in transplanting peculiar sorts from the seed-beds, some plants of strong growth may be removed at once into the beds or pots where it is designed they should flower, that they may fix themselves effectually without receiving any check from a second transplanting, which, in the Lupine, Biennial Stock, and a few similar sorts, it is essential to avoid; for having long naked woody roots, they succeed best, and strike most effectually, if finally transplanted while young; and should they have been pricked out into second nursery-beds, it is advisable, on the same account, to remove them finally while in moderate young growth.

Most of the Fibrous-rooted Perennials, raised from seed as above, will flower the second year; and the roots, continuing perennial in different degrees of duration, will produce new flowering-stalks annually. Meanwhile, by the increase of the root, and by shoots from the herb, the plants furnish several means of propagation, independent of that by seed.

2. *By off-sets of the root.*—Numerous species in the tribe of Perennials can be propagated abundantly by this method; some bearing off-sets and suckers around the main root; and in others, off-set suckers arise from the crown of the radix, as in the Auricula and several stocky plants: another description produces creeping shoots, rooting as they grow, with side-heads:

all which extensions of the herb may be slipped off, for the purpose of propagation, either with roots, or near to the bottom, with as much rooty part as will presently emit root-fibres when planted. The separation may be made either in the spring, February, March, or April, before the plants shoot much into flower-stalks, which is the more general time; or in the autumn, as the sorts respectively have done flowering, in August or September, and thence through October, and sometimes later. Detach the off-sets neatly; some consisting only of a rooty part, others of root and top together: they will mostly be found fibrous-rooted, and a few swelling into fleshy fangs and tubers. Trim off any damaged and irregular part; and plant them in nursery-beds, with a trowel or dibble, six inches asunder, to have a summer's growth, for final transplanting; or some strong full-rooted off-sets may be planted at once where they are to flower.

3. *By parting the roots.*—A considerable number of Perennials admit of this mode of multiplying the species; they are such plants as increase by the root into radicating bunches: it is effected either by taking up the whole root, and dividing it into several rooted slips, or occasionally by parting the outward off-sets without removing the mother-root. As this, or that, is most proper, it may be done in the spring or autumn, as advised above, in propagating from off-sets.

Observe, that in the kinds with fleshy tubers, as particular varieties of the Monk's-hood and Solomon's Seal, it may sometimes be proper to take up and part the roots into several separate off-sets, either in spring before they shoot, or after the flowering is past and the leaves have decayed. These derivations may be planted, some in nursery-beds, and some at once in the flower-borders.

4. *By cuttings of the roots.*—By this means are propagated several of the thick knotty-rooted Perennials.—Species of this peculiar constitution would rather belong to the next class; but the varieties possessing such a nature are mostly related to species with fibrous roots, such as the Polygonatum (Solomon's Seal), and the Tuberous Helianthus. On roots thus constituted, you may effect this during any of the spring months, or occasionally in autumn, October, or November; cutting the root into smaller or larger parts, as required; and leaving two or three joints or eyes to each cutting. Plant the pieces in a nursery-bed, or some at once into compartments at the distance at which they may remain.

5. *By connected off-sets and rootless slips.*—Various sorts of

Perennials can be perpetuated by these derivations. In many families, the off-set slips, to be detached, spring from the sides and head of the root: in others, the slips to be taken are composed of the root and the continuous leafy top-part together; each slip forming a distinct plant. The principal seasons for effecting the separation are spring and autumn.

Other kinds are so constituted, that they may be multiplied by unrooted slips of the young shoots of the head, as the Pink, and some of the stalky kinds.—Adopt the outward shoots of the same year, in plants of the Pink family, and set them in April or May and June: so in some branchy-headed sorts, as the Double Wall-flower, young shoots, chiefly of the year, may be taken for new plants, in May and June; slipped or cut off, three, four, five, or six inches long, and planted in a shady border: give water at the time, and till the slips vegetate. A few other species of a later season will admit the young side-shoots from the stalks to be thus detached and planted, in June or July: they will soon emit roots, and grow in the herb, and will form proper plants by the ensuing autumn.

6. *By cuttings of the stalks.*—This is adopted in some valuable sorts of Perennials, as well as in some curious Double-flowered Biennials, that do not admit of being propagated by other means; as the best varieties of Double Dahlias, Chrysanthemum Indicum, &c. &c. To raise plants thus, select principally young stalks of the year in June or early in July.

This is a good resource for propagating the double Scarlet Lychnis, Lychnidea, Double Rocket, Variegated Snap-dragon, Cardinal-flower, Double Feverfew, Lion's-tail, German Goldy-locks, Alpine Scabious, any superior Asters, and the Double variegated Chinese Hollyhock, when made Biennial by careful protection.

Observe to adopt, for this purpose, young stalks of the same summer, in proper time, as above, before they harden much, cutting them off close: afterwards cut them into short lengths of three or four joints, less or more as the different sorts admit. Plant them in a shady border, two joints in the ground, and give water. If some of the principal sorts are covered with hand-glasses, it will facilitate their rooting and top-growth.

By a similar course may be propagated various other species, both of upright-stemmed and small trailing plants, in May or June, and July, as flower-stalks occur of proper growth, divided into cuttings from two to six inches, and planted as above.—The Dahlias may be raised by grafting a young shoot of the kind required on a tuber of any single kind, early in the season.

7. *By layers of young shoots.*—This is a curious and effectual mode of propagation; applicable, however, in a much greater degree to the tree and shrub kind than the herbaceous tribe, in which it is practised only on some principal sorts of peculiar constitution; for example, Double Carnations and Clove Gilliflowers, Double red and variegated Sweet-Williams, and occasionally on curious varieties of Pinks. It is performed on the young bottom-shoots of the year, in June and July, when advanced to proper length, and of firmish substance, so as to admit of being laid down into the earth as they remain in growth on the mother-plant.

For this operation, provide, first, a quantity of small hooked twigs (pieces of thin dry birch are very suitable), about three inches long, for pegging the layers down in the earth; and have some light fine earth ready in a hod. Then proceed to the laying. Adopt the outward stronger shoots; strip off the under-leaves, and, with the knife, shorten the top ones even; and then, applying it at a joint, about the middle of the underside of the shoot, cut nearly half through, in a somewhat slanting direction, making an upward slit towards the next joint, about half an inch or near an inch in extent: and, loosening the earth, make a small oblong cavity, one or two inches deep, or more, according to the length of the intended layer; of which lay the stem part, where slit, into the earth, keeping the cut part open, and the head of the layer upright an inch and a half or two inches out of the earth; and in that position peg down the layer with one of the hooked twigs, and earth over the inserted part, to the depth specified above, with some of the finest earth, pressing it gently down. In this manner proceed to lay all the proper shoots of each plant. As all those of each plant are layed, level the surface neatly between and about the diverging layers, keeping the earth a little full, round the edge, for the advantage of retaining longer the water, which may be applied. (See § 22. p. 12.)

Being thus planted out, let them remain till October, or the beginning of November, to increase in a stocky growth, preparatory to being finally transplanted in some mild interval of the winter; or the whole may remain till the following spring, those in pots being removed to a warm sunny situation for the winter; or let some pots be placed in a frame, so as to have protection from severe frost, but to enjoy the air in open mild weather.

Then, in February or March, or early in April, those remaining in small pots or nursery beds should receive their final

transplanting; those in small pots into larger (24s, or 16s), at most two plants in each; and some of those in beds may be transplanted into the principal flower-borders, or into pots, as wanted; the rest being allowed to continue in the beds, at proper distances, twelve or fifteen inches, for flowering and future propagation.

They will mostly flower in perfection the ensuing summer after laying; and, in the same year of flowering, furnish plenty of new layer-shoots, for propagation the some season, to flower the year following: for as the plants which admit of laying are principally of an imperfect perennial nature, it is proper to raise successive supplies by this process year after year.

8. *By pipings*—A gardening term, signifying taking cuttings of the branches of Pinks, and causing them to strike root. It is effected on the young bottom shoots of the year, in June and July, when advanced from three to six inches in length: these, detached and planted, soon form rooted plants, and will flower the year following. It is probably called Piping, because sometimes the shoot for planting is detached by drawing the upper part out of the pipy socket; though the shoots are more usually cut, or pulled off, at a joint, and trimmed for planting. Under either course, they are generally denominated pipings.

In proceeding to the business, select the strongest young shoots of competent length, not under three or four inches; beginning and resuming the work in May, June, or July, as the shoots may occur. Take them off at a middle joint, or just below one: pull away the under-leaves, cut the top leaves short, and the bottom part of the piping even: then, having prepared a bed, or some large pots of light fine earth, smoothing the surface, prick in the pipings, either with a small stick, or push them in gently, about an inch and a half or two inches asunder, and half way into the earth: give directly a light watering out of a rose-pan; and shade from the sun, till they are well-rooted.—Or, to cover them close down with hand-glasses would facilitate their vegetation, both in the root and herb; the glasses being kept close, to exclude the outward air; under which course they will not want much watering or shading;—or the watering necessary may be applied to the earth close round the outside of the glasses. Or those in pots might be plunged to their rims in the ground: or a portion, whether in beds or pots, might be covered with oiled-paper-frames, which will both exclude the full air, and afford a

constant slight shade peculiarly congenial with the nature of various young plants.

The pipings will, however, root tolerably free in beds, or pots, without the aid of glasses or paper-frames, if they receive the shade of mats from the mid-day sun; with occasional watering. —They will be pretty well rooted in a month or six weeks, and shoot freely at top, so as in two months, at farthest, to be of proper growth for planting out. Meanwhile observe: As those covered down with glasses appear to be growing freely, give the plants air, by tilting up the glasses; and soon after let them be taken off finally, that the plants may acquire full strength. When the increased plants are of promising strength, in five, six, or seven weeks after planting, they should be removed with full roots and with a little adhering earth. Cut the straggling tops even: transfer them into nursery beds six to nine inches apart, and water at planting. In these beds let them remain till October, or still later, or till the following spring. At either period, such as are intended for specific compartments, or pots, may be finally transplanted with small balls of earth. The others may continue in the beds, either as stocks for propagation, or for flowering.

The major part will flower the ensuing summer, but their bloom the year following will generally be finer.

Note.—Sometimes the Carnation and Double Sweet-William are also propagated by pipings; the same care being necessary, to cause them to grow.

FINAL PLANTING.

Season for planting.—Where no specific season for planting out is marked in the Table, as alone suitable, or most eligible, for some individual kind; or where a similar intimation is not given under one of the *Methods of Propagation;* the most general season for planting out, is the spring; and the occasional, sometimes scarcely in a lower degree, autumn: though the spring is rather to be preferred for removing the rising supply into fresh ground; taking up the plants in February or March and April, or before the plants advance much in top-growth. The autumn planting may be effected after the flowering is done, and the stalks decaying, from about the middle of September to the end of October, or thence throughout November, in a mild season.

Manual process.—In setting the plants: for each of those removed with a ball of earth to the root, open a round cavity with a trowel; and so for those without balls, having large or

full roots. The smaller-rooted kinds may be planted either in the same way, or with a dibble, as may seem convenient. After inserting the root, close the earth fully round it; and if dry weather, especially in late spring planting, give a moderate watering to settle the earth close, and to forward the fresh rooting. Repeat the watering occasionally, till the root has struck effectually.

Compost for the Choicer Plants.—As observed in p. 227, the hardy herbaceous flowers in general require only a soil of common good qualities, moderately light and mellow. But in the annexed Table will be seen the compost in which each plant is found to thrive best.

Distribution in the Garden—The same rules, according to the several heights observed in the Annual Flowers, should be here attended to, so as to plant the highest plants in the more distant situations.

Some plants are Rock-plants, natives of rugged cliffs and eminences, and therefore well fitted to introduce into artificial rock-work, and among massy ruins; and their vegetation between blocks of stone will be in character, appear natural, and have a picturesque effect: these form the subject of the next department. Another description consists of Aquatic or Water-plants—the Nymphæa or Water-lily, for example: these will only flourish in floated compartments, which may be regular basins, or more rudely formed, and without smooth margins: here these plants, introduced by seed or the roots, will be singularly pleasing: they mostly flower in June, July, and Aug.

The plants in pots must be often watered in a dry warm season, whether spring or summer, at least two or three times a week; and in the height of a hot summer the mould in the pots will want to be moistened almost daily. Apply this refreshment also sometimes over the head of the plants, in an evening watering.

FOREIGN ALPINE PLANTS:

i.e. HERBACEOUS PLANTS OF MORE HUMBLE GROWTH, ADAPTED TO THE DECORATION OF ROCK-WORK &c.

The following List comprises a number of plants of great beauty and interest; but being, in general, too small for the open borders, are only to be preserved in pots planted in rock-work, or in such other places where they are not overgrown by plants of larger size. There are many others of a similar kind that are grown in gardens, but which, being difficult to keep, we have thought fit not to insert; as persons who try to cultivate such in the open ground have in general

the mortification to find that they do not compensate for the care and trouble necessary for preserving them.

TABLE VI.—*Foreign Alpine Plants.*

DECANDRIA MONOGYNIA.

1	Ancistrum, lucidum	Shining Ancistrum	b. l.
2	lævigatum	Smooth ditto	b. l.
3	latebrosum	Hairy ditto	b. l.
4	Veronica, aphylla	Naked-stalked Speedwell	b. l.
5	bellidioides	Daisy-leaved ditto	b. l.

TRIANDRIA MONOGYNIA.

6	Trichonema Bulbocodium,	Crocus-leaved Trichonema	b. l.

TETANDRIA MONOGYNIA.

7	Asperula crassifolia	Thick-leaved Woodroof	b. l.
8	Houstonia cœrulea	Blue Houstonia	l.
9	Mitchella repens	Creeping Mitchella	l.
10	Plantago, alpina	Alpine Plantain	l.
11	subulata	Awl-leaved ditto	l.
12	Cornus canadensis	Herbaceous Dog-wood	b.
13	Alchemilla, pentaphylla,	Five-leaved Lady's Mantle	b. l.
14	argentata	Silvery-leaved ditto	b. l.

PENTANDRIA MONOGYNIA.

15	Cynoglossum Omphaloides,	Blue Venus's Navelwort	b. l.
16	Aretia vitaliana	Primrose Aretia	l.
17	Androsace villosa	Hairy Androsace	l.
18	Primula, cortusoides	Bear's-ear Primrose	b. l.
19	villosa	Hairy Primula	b. l.
20	nivea	Snowy ditto	b. l.
21	marginata	Margined ditto	b. l.
22	auricula	Common Yellow Auricula	b. l.
23	longifolia	Long-leaved ditto	b. l.
24	helvetica	Swiss ditto	b. l.
25	integrifolia	Entire-leaved Auricula	b. l.
26	Cortusa Mathioli	Siberian Bear's-ear Sanicle	b.
27	Soldanella alpina	Alpine Soldanella	b. l.
28	Dodecatheon Meadia	American Cowslip	b. l.
29	Cyclamen, Coum	Round-leaved Cyclamen	l.
30	hederæfolium	Ivy-leaved ditto	l.
31	Lysimachia dubia	Purple Loosestrife	l.
32	Phlox, pilosa	Hairy Lychnidea	l.
33	ovata	Oval-leaved ditto	l.
34	suffruticosa	Shrubby ditto	l.
35	stolonifera	Creeping ditto	l.
36	subulata	Awl-leaved ditto	l.
37	setacea	Bristly ditto	l.
38	Convolvulus lineatus	Dwarf Bindweed	l.
39	Campanula, pulla	Dark-flowered Bell-flower	b. l.
40	carpatica	Carpasian ditto	b. l.
41	pumila	Purple-dwarf ditto	b. l.

42	Campanula, v. *alba*	White-dwarf ditto	b. l.
43	nitida	Shining-leaved ditto	b. l.
44	barbata	Bearded ditto	b. l.
45	azurea	Azure-coloured ditto	b. l.
46	Phyteuma hemisphærica,	Small Rampion	b. l.
47	Verbascum Myconi	Borage-leaved Mullein	l.

PENTANDRIA DIGYNIA.

48	Gentiana, acaulis	Gentianella	l.
49	asclepiadea	Swallow-wort Gentian	l.
50	Bupleurum petræum	Rock Thorough-wax	l.

PENTANDRIA TRIGYNIA.

51	Telephium Imperati	True Orpine	l.

PENTANDRIA PENTAGYNIA.

52	Statice, cordata	Heart-leaved Thrift	l.
53	flexuosa	Zigzag ditto	l.
54	Linum, flavum	Yellow Flax	l.
55	austriacum	Austrian ditto	l.

HEXANDRIA MONOGYNIA.

56	Convallaria bifolia	Two-leaved Lily of the Valley,	l. b.

HEXANDRIA TRIGYNIA.

57	Trillium, cernuum	Drooping-flowered Trillium	b.
58	sessile	Sessile-flowered ditto	b.
59	Helonias, bullata	Spear-leaved Helonias	b.
60	asphodeloides	Grass-leaved ditto	b.

OCTANDRIA MONOGYNIA.

61	Rhexia mariana	Hairy Rhexia	b.
62	Œnothera, rosea	Rose-flowered Tree Primrose	l. b.
63	pumila	Dwarf Yellow ditto	l. b.
64	Epilobium cordifolium	Heart-leaved Willow-herb	b. l.

OCTANDRIA DIGYNIA.

65	Mœhringia muscosa	Mossy Mœhringia	l.

DECANDRIA DIGYNIA.

66	Saxifraga, Cotyledon	Pyramidal Saxifrage	l.
67	Aizoon	Margined ditto	c. m.
68	ligulata	Strap-leaved ditto	c. m.
69	rosularis	Rose-leaved ditto	c. m.
70	mutata	House-leek ditto	c. m.
71	Androsace	Blunt-leaved ditto	c. m.
72	cæsia	Gray ditto	c. m.
73	pilosa	Hairy ditto	c. m.
74	sarmentosa	Creeping ditto	c. m.
75	cuneifolia	Wedge-leaved ditto	c. m.
76	aspera	Rough-leaved ditto	c. m.
77	rotundifolia	Round-leaved ditto	c. m.
78	ajugæfolia	Ground Pine-leaved ditto	c. m.
79	sibirica	Siberian Pine-leaved ditto	c. m.
80	ascendens	Ascending Saxifrage	c. m.

81	Saxifraga viscosa	Clammy Saxifraga	c. m.
82	Tiarella cordifolia	Heart-leaved Tiarella	c. m.
83	Mitella diphylla	Two-leaved Mitella	c. m.
84	Gypsophila, repens	Creeping Gypsophila	l. b.
85	prostrata	Trailing ditto	l. b.
86	Saponaria ocymoides	Basil-leaved Soap-wort	l.
86*	Dianthus, carthusianorum,	Carthusian Pink	l.
87	superbus	Feathered ditto	l.
88	pungens	Pungent ditto	l.
89	alpinus	Alpine ditto	l.
90	capitatus	Headed-flowered ditto	l.
91	glaucus	Glaucous ditto	l.
92	virgineus	Maiden ditto	l.

DECANDRIA TRIGYNIA.

93	Silene, amœna	Siberian Catchfly	l.
94	alpestris	Mountain ditto	l.
95	rupestris	Rock ditto	l.
96	saxifraga	Saxifrage ditto	l.
97	vallesia	Downy ditto	l.
98	Stellaria scapigera	Naked-stalk'd Stitch-wort	l.
99	Arenaria, tetraquetra,	Square Sand-wort	l.
100	balearica	Small ditto	l.
101	saxatilis	Rock ditto	l.
102	striata	Striated ditto	l.
103	grandiflora	Great-flowered ditto	l.
104	liniflora	Flax-flowered ditto	l.

DECANDRIA PENTAGYNIA.

105	Sedum, Aizoon	Yellow Stonecrop	c. m.
106	Anacampseros	Evergreen Orpine	c. m.
107	hybridum	Bastard Sedum	c. m.
108	populifolium	Poplar-leaved ditto	c. m.
109	virens	Green ditto	c. m.
110	glaucum	Glaucous ditto	c. m.
111	deficiens	Round-leaved ditto	c. m.
112	hispanicum	Spanish ditto	l.
113	Lychnis quadridentata,	Small-flowering Lychnis	l. b.

DODECANDRIA MONOGYNIA.

114	Asarum canadense	Canadian Asarabacca	l. b.

DODECANDRIA DIGYNIA.

115	Sempervivum globiferum,	Globular house-leek	l.
116	arachnoideum	Cobweb ditto	l.
117	hirtum	Hairy ditto	l.
118	montanum	Mountain ditto	l.
119	cuspidatum	Prickly-leaved ditto	l.
120	sediforme	Stonecrop-leaved ditto	l.

ICOSANDRIA POLYGYNIA.

121	Rubus arcticus	Dwarf Bramble	l. b.
122	Potentilla, sericea	Silky Cinquefoil	l. b.

123	Potentilla multifida	Multifid Cinquefoil	l.
124	bifuca	Bifid ditto	l.
125	tridentata	Trifid-leaved ditto	l.
126	Geum, potentilloides	Cinquefoil Avens	l.
127	reptans	Creeping ditto	l.

POLYANDRIA MONOGYNIA.

128	Sanguinaria canadensis,	Canada Puccoon	l. b.
129	Papaver nudicaule	Naked-stalked Poppy	l.
130	Cistus grandiflorus	Great-flowered Cistus	l.

POLYANDRIA POLYGYNIA.

131	Anemone Hepatica	Common Liverwort	c. m.
132	hortensis	Star Anemone	l. b.
133	dichotoma	Forked ditto	l. b.
134	Adonis vernalis	Spring Adonis Flower	c. m.
135	Ranunculus, amplexicaulis,	Plantain-leaved Crow-foot,	l. b.
136	alpestris	Alpine ditto	l. b.
137	glacialis	Two-flowered ditto	l. b.
138	Isopyrum thalictroides	Thalictrum-leaved Isopyrum,	c. m.

DIDYNAMIA GYMNOSPERMIA.

139	Teucrium, multiflorum,	Many-flowered Germander	c. m.
140	pyrenaicum	Pyrenean ditto	c. m.
141	Dracocephalum, denticulatum	Tooth-leaved Dragon's-head	c. m.
142	austriacum	Austrian ditto	b. l.
143	grandiflorum	Great-flowered ditto	l.
144	Scutellaria, alpina	Alpine Scull-cap	l.
145	grandiflora	Large-flowered ditto	l.
146	Prunella, laciniata	Cut-leaved Self-heal	c. m.
147	grandiflora	Great-flowered ditto	c. m.
148	hyssopifolia	Hyssop-leaved ditto	c. m.
149	latifolia	Broad-leaved ditto	c. m.

DIDYNAMIA ANGIOSPERMIA.

150	Erinus alpinus	Alpine Erinus	l. b.

TETRADYNAMIA SILICULOSA.

151	Draba aizoides	Hairy-leaved Willow-grass	l. b.
152	Lepidium alpinum	Mountain Pepper-wort	l. b.
153	Iberis saxatilis	Rock Candytuft	l. b.
154	Alyssum, montanum	Mountain Madwort	l.
155	utriculatum	Bladder-podded ditto	l.
156	deltoideum	Purple-flowered ditto	l.
157	campestre	Small Yellow ditto	l.

TETRADYNAMIA SILIQUOSA.

158	Cardamine, asarifolia	Heart-leaved Lady's Smock	l.
159	bellidifolia	Daisy-leaved ditto	l.
160	trifolia	Three-leaved ditto	l. b.
161	Cheiranthus alpinus	Alpine Stock	l.
162	Arabis, alpina	Alpine Wall-Cress	l.

163	Arabis, lucida	Shining-leaved Wall-Cress	l.
164	bellidifolia	Daisy-leaved ditto	l.
165	sibirica	Siberian ditto	l. b.

MONADELPHIA PENTANDRIA.

166	Erodium Reichardi	Dwarf Erodium	c. m.

DIADELPHIA HEXANDRIA.

167	Fumaria, cucullaria	Naked-stalked Fumitory	l.
168	nobilis	Great-flowered ditto	l.
169	cava	Hollow-rooted ditto	l.
170	solida	Solid-rooted ditto	l.
171	spectabilis	Scarlet ditto	l.

DIADELPHIA DECANDRIA.

172	Hedysarum obscurum	Creeping-rooted Hedysarum	l. b.
173	Astragalus, pilosus	Hairy Milk-vetch	l.
174	falcatus	Sickle-podded ditto	l.
175	uliginosus	Marsh ditto	l.
176	monspessulanus	Montpelier ditto	l.
176	exscapus	Stalkless ditto	l.
178	campestris	Field ditto	l.

SYGENESIA POLYGAMIA ÆQUALIS.

179	Leontodon aureum	Golden Dandelion	l.

POLYGAMIA SUPERFLUA.

180	Artemisia glacialis	Creeping Wormwood	c. m.
181	Gnaphalium plantagineum,	Plantain-leaved Everlasting,	l.
182	Erigeron, philadelphicum,	Philadelphia Erigeron	l.
183	purpureum	Purple ditto	l. b.

SYNGENESIA MONOGAMIA.

184	Lobelia minuta	Least Cardinal Flower	
185	Viola, palmata	Palmated Violet	b.
186	cucullata	Hollow-leaved ditto	l.
187	canadensis	Canadian ditto	l. b.
188	striata	Striated ditto	l. b.
189	pubescens	Downy ditto	l. b.
190	biflora	Two-flowered ditto	l. b.
101	grandiflora	Great-flowered ditto	l. b.
192	calcarata	Alpine ditto	l. b.
193	cornuta	Pyrenean ditto	l. b.
194	obliqua	Oblique-leaved ditto	l. b.
195	Tussilago alpina	Alpine Colt's foot	c. m.
196	Senecio abrotanifolia	Soutbernwood-leaved Grounsel,	c. m.
197	Aster alpinus	Alpine Star-wort	l. b.
198	Doronicum bellidiastrum,	Daisy-leaved Leopard's-bane,	l. b.
199	Bellis lusitanica	Portugal Daisy	l. b.
200	Bellium minutum	Bastard Daisy	l. b.
201	Anthemis Pyrethrum	Pellitory of Spain	l. b.
202	Achillea, tomentosa	Woolly Milfoil	l. b.
203	Clavannæ	Sivery-leaved ditto	l. b.

GYNANDRIA DIANDRIA.

204	Cypripedium album	White Ladies-Slipper	b.

GYNANDRIA TRIANDRIA.

205	Sisyrinchium anceps	Small Sisyrinchium	c. m.
206	Arum tenuifolium	Fine-leaved Arum	c. m.

CRYPTOGAMIA FILICES.

207	Polypodium marginale	Margin-flowered Polypody	b. l.
208	auriculatum	Eared ditto	b. l.
209	Onoclea sensibilis	Sensitive Fern	b.
210	Equisetum filiforme	Fine Horse-tail	l.

BULBOUS AND TUBEROUS-ROOTED FLOWERS.

THE Perennial Herbaceous Flowering Plants which remain to be treated of, consist of those with *Bulbous*, and those with *Tuberous* roots.

Bulbous and Tuberous-rooted Flowers defined.—Regarding those distinctions alone on which something practical depends, we do not find any thing in the nature of Bulbous-rooted flowers, compared with the Tuberous, which should divide one from the other in a catalogue for horticultural purposes. Further, we consider the distinction between these and the class of Fibrous-rooted Perennials to turn on this question: Can the root, whatever be its shape, be treated like the well-known bulbs? As soon as the herb, or extant part of the plant, decays, can the root be taken up, and, during a considerable interval, be kept out of the ground in a dry state, as though it were a large seed, without destroying or affecting the dormant principle of vegetation and the power of regermination? If it can, it is not of the nature technically intended by *fibrous-rooted*; and, if not bulbous in shape, is connected in constitution with the *bulbous* tribe.

In conformity with the definition of Linnæus, a bulb may be explained to be an embryo plant, enclosed within an hybernaculum or winter-lodge, produced upon the root by the descent of the stem, carrying down with it vegetable rudiments derived from the dissolved herb. The bulb is therefore a species of bud under ground; and as the *gemmæ*, or proper buds on trees, consist, in the exterior part, of a number of small imbricated scales, to defend the embryo vegetable from cold and adverse weather till spring, so the outer part of the bulb, or bud on the root, is merely a coat to the rudiment of a future shoot. Underneath this is found an alburnous substance, which forms

the greatest part of the future stem. The bulb also performs the office of a true root, as the receptacle in which concrete sap is hoarded up for the nourishment of the embryo germ during winter. At the lower part of the bulb, may be observed a fleshy knob, whence proceed a number of fibres. This knob, with the pendent fibres, is the true root or vehicle of nourishment to the plant; the part above being only the cradle of a new stem. After the bulb has repaired the loss of the stem a limited number of times, it perishes; but not till it has produced at its side several off-sets, or smaller bulbs, for perpetuating the species. Bulbous-roots are termed Solid, when composed of one uniform mass, as those of the Tulip; Tunicated, when formed of continuous coats, one enveloping the other, as in the Hyacinth; Squamose, when constituted of minute flakes or scales, as in the Martagon, Crown-imperial, White and Orange Lily. They are also said to be Duplicate, when there are two to a plant; and Aggregate, when there is a congeries of them to one root. Bulbs are mostly round or oval at the bottom, with a turbinated point upward.

As *tuber* signifies a knob or swelling, so the distinguishing marks of a tuberous root, compared with a bulb, reside in little irregular protuberances. The mass of which the tubers are a continuation, is generally solid and fleshy, though some tuberous roots are tunicated. In some species, the principal knobbed mass is small and irregular, as the root of the Anemone: other roots consist of many small oblong tubers, connecting into a head at top, and diverging below, as in the Ranunculus: another sort are small, oblong, and pointed, as the tubers of the *Dens canis*, or Dog's-tooth: those of a fourth description are larger and less irregular—oblong—roundish—the shape of a few approaching to that of a bulb, as in the bulbo-tuberous varieties of the Iris: some plants have single large bulbo-tubers; in others, a number are found adhering to one root.

The plants comprehended in the Table, flower in succession, from an early stage in spring to a late period in autumn: the bulbs especially will contribute to maintain a successive blow from January or February to October, and not unfrequently till November.

A part or the whole of the roots may be occasionally replanted in new-prepared beds, soon in the same season;—or the planting may be deferred three months or more; as, in the dormant state which follows the decay of the stem, they admit of being kept several months out of the ground; and, having been dried and cleaned, may be housed accordingly, till the planting season

in autumn, which extends from the middle of September to the middle of November: this is the season in which these roots should be planted, when intended for full flowering the following year;—or, a portion may be retained for early spring planting, in February or beginning of March, either with the design of having a larger bloom of particular sorts for succession, or because there may not be beds ready in autumn to receive them: but these should be planted early in spring, that they may flower the same year in tolerable vigour.—See these general intimations, qualified by particular directions, under the article *Seasons for Planting*, p. 289.

Bulbous and Tuberous-rooted flowers require the particular attention of the gardener; as, in general, they are valuable, and are only to be grown with proper effect by being every season taken up, dried, and placed carefully in some dry place;—such as the different kinds of

Anemone,	Crocus,	Tuberous Iris,
Amaryllis,	Galenthus,	Lilium,
Bulbocodium,	Gladiolus,	Narcissus, Tulips,
Colchicum,	Hyacinthus,	Ranunculus, &c.

To which we may add the varieties of Double Dahlias, that form so great an addition to our gardens.

In the year 1812, the Editor published a List of Exotic Herbaceous Plants; at which time the few kinds of Dahlias there described were just sent, from the Botanic Garden at Madrid, to Lord Holland. A friend of the Editor, who resided then in Spain, recollecting the circumstance, was requested by his old friends to renew the same garden with Dahlias, as they were lost; and great wonder was expressed when he sent over more than fifty of our finest varieties.

Autumnal Bulbs described.—There is a small tribe denominated Autumnal Bulbs, from their flowering only in autumn, about September and October, or later; rising with a naked or leafless stem. When the flowers decline, the leaves in most sorts spring, and these will flourish till April, May, or June following: then decay; and, conformably to the directions for the general bulbs, the fall of the leaf in these is the proper time for removing these sorts; when it is necessary either to separate the off-sets, or to replant the parent bulb in a new-prepared bed, in June, July, or August, for flowering the same year in autumn. These peculiar sorts, besides being included in the Table which follows, are classed distinctly at the end of it.

TABLE VII.—*Bulbous and Tuberous-rooted Flowers.*

[The Plants marked *F.* should be placed for the Winter in a Frame or Green-house.]

ALLIUM.

Moly. *Flowering Garlic.*

senescens. *Narcissus-leaved.* Germany. June, July.

roseum. *Starry.* S. Europe. June, July.

oleraceum. *Purple-striped.* Britain.

AMARYLLIS.

Atamasco. *Atamasco Lily.* Virginia. May, June.

lutea. *Yellow.* S. Europe. September, October.

Belladonna. *Belladonna Lily.* W. Indies. August, September. Purple. *F.*

sarniensis. *Guernsey Lily.* Japan. Sept., Oct. *F.*—The flower has no scent, but is admired for the rich colour, commonly red. The root, like many other bulbs, does not bear a flower regularly the succeeding year; but if the bulb contains two buds in the centre, it flowers twice in three years; after which, no flower is produced from the main root for several years, but the off-sets from it bear immediate flowers.

ANEMONE. *Wind-flower;* tuberous-rooted.

Coronaria. *Poppy (Narrow-leaved).* Levant. March, May. Red.

ASPHODELUS. *Asphodel.*

ramosus. *King's-spear.* Great White. S. Eur. May, July.

altaïcus. *Channel-leaved.* Siberia. May, June.

These must not be planted in small borders among tender flowers, as they draw to themselves all aliment in the mould nigh at hand.

BULBOCODIUM.

vernum. Spain. Feb. March. The bulb shaped like that of a Snowdrop.

ASCLEPIAS. *Swallow-wort.*

tuberosa. *Tuberous-rooted.* N. America. July—Sept.

COLCHICUM. *Meadow-saffron.*

autumnale. *Common.* Britain. Sept. Pale Purple. The bulbs should be taken up at the decay of the leaf in summer, and planted again before the middle of August. Used as a remedy for the Gout, and, like the seeds, powerfully diuretic.

variegatum. *Eastern-Spotted.* Levant. Sept.

byzantinum. *Broad-leaved.* Constantinople. May.

CONVALLARIA.

Polygonatum. *Odorous Solomon's Seal.* Britain. May, June. Tuberous-rooted.

CROCUS. Root compressed at bottom.

vernus. *Spring-flowering.* Britain. March. Common yellow, easily propagated by seeds; great yellow, deep blue, white blue-striped, blue white-striped, white with purple-bottom, cream-coloured.

biflorus. *Scotch.* Britain. Mar. Black and white-striped, large-flowered.

usianus. *Cloth of gold.*

officinalis. *Saffron.* With bluish flower, and golden stigma, which is the saffron. Brit. Sept. Oct. Does not ripen seed in this country.

albus. flavus.

nudiflorus. pallidus.

CYCLAMEN. *Sow-bread;* with a bulbo-tuberous-root.
europæum. *European.* Austria. April. Autumn-flowering; purple, white, black, red, marble-leaved.
Coum. *Round-leaved.* S. Europe. Feb. March.
Hederæfolium. *Ivy-leaved.* Britain. Aug. Sept.
persicum. *Persian.* Cyprus. Feb. March. *F.*
CYPRIPEDIUM. *Lady's-slipper.*
calceolus. *Com.* Brit. May, Ju.
spectabile. *White petalled.* N. America. June, July.
pubescens. *Downy yellow.* N. America. May, June.
parviflorum. *Small-flowered.* North America. June.
humile. *Dwarf.* N. America. June, July.
DAHLIA. GEORGINA. Root tuberous. Mexico.
superflua. *Fertile rayed.*
frustanea. *Barren rayed.*
crocata. *Crocate.*
ERYTHRONIUM.
Dens canis. *Dog's-tooth Violet.* Europe. March. Root tuberous and pointed. White flowered, purple, red.
FRITILLARIA. bulbous-rooted.
Meleagris. *chequered.* Brit. Ap. Purple, chequered with white, yellow with purple, black with yellow, dark-purple with yellow.
pyrenaica. *Pyrenean.* May.
persica. *Persian.* April, May.
imperialis. *Crown imperial.* Persia. April, May. Yellow, orange, red, double of each; crown-upon-crown, with two tiers of flowers; triple-crown, with 3 tiers; silver-striped leaf; gold-striped leaf.
latifolia. *Broad-leaved.*
FUMARIA. *Fumitory.*
cava. *Hollow-rooted.* Siberia. May. Purple, white.
solida. *Solid-rooted.* Britain. March, April. Purple.
GALANTHUS. *Snow-drop.* Bulbous-rooted.
nivalis. *Common.* Brit. Jan.--March.
plicatus. *Plaited.* Jan.--Mar. White, semi-double, double.
GERANIUM. *Crane's-bill.*
tuberosum. *Tuberous-rooted.* Italy. May.
GLADIOLUS. *Corn-flag* or *Sword-lily.* Round flattened tuberous root.
communis. *Common.* S. Eur. June, July. Red, wh., purple.
imbricatus. *Round-seeded.* Greece. June, July.
byzantinus. *Turkish.* Ju. Jul.
HELIANTHUS. *Sunflower.*
tuberosus. *Jerusalem Artichoke.* Brasil. Sept. Oct.
HELLEBORUS. *Hellebore.*
hyemalis. *Winter Aconite.* Austria. Jan.--Mar. Yellow. Bulbo-tuberous root.
HYACINTHUS. *Hyacinth.* Large purplish bulb. Flower-stalk robust and upright, from 10 to 15 inches in height.
orientalis. *Common.* Levant. Mar. Apr. Blue, white, blush, red, purple, dark-purple, yellow, white with yellow eyes, white with red eyes, white with purple eyes, white with rose-col. eyes; Semi-double and double varieties of each.
Muscari. *Musk.* Levant. Apr. May. Purple, ash-coloured, grey, white, yellow.
ciliatus. *ciliated.* Tartary. Ap.
comosus. *Purple-grape.* S. Europe. Apr. May. [Apr.
botryoides. *Blue-grape.* Italy.
monstrosus. *Feathered.* S. Europe. May, June.

amethystinus. *Amethyst-coloured.* S. Europe. Ap. May.
cernuus. *Nodding-spiked.* Spain. April, May. Red.
racemosus. *Cluster-flowered.* S. Europe. April.
non-scriptus. *Hare-bells.* Brit. Mar. Apr. Blue, white, red.
romanus. *Roman.* Italy. May.
corymbosus. *Corymbose.* Cape. July--Nov. *F.*

IRIS. *Fleur de lis.* comprising bulbous and tuberous-rooted kinds.
English Bulbous; blue, blue purple-streaked, wh. & purple, broad-leaved deep-blue.
Persian Bulbous; variegated, blue, white.
Xiphium or Spanish Bulbous.
Tuberous or Snake's-head, with a black flower.
Chalcedonian, one-flowered; has a bulbo-tuberous root. The large flowers singularly spotted with black & white.
Florentine, white.
Dwarf Austrian; blue, purple-blue, red, pale-red and white.
Virginian Dwarf, blue.
Siberian.

IXIA.
Bulbocodium. *Crocus-leaved.* Italy. Alps. March, April. Large white flower.
chinensis. *Sword-leav'd.* China. June, July. Yellow & red.

LATHYRUS.
tuberosus. *Tuberous-rooted Pea.* July, August.

LEONTICE.
Leontopetalum. *Lion's-leaf;* tuberous-rooted. Archipelago.

LEUCOJUM. *Snowflake;* with an oblong bulbous root.
vernum. March, April.
æstivum. May, June.
autumnale. Sept.

LILIUM. *Lily.* With a bulbous root.
candidum. *Common* (*Large White*). Levant. June, July. Many-flowered, striped-ditto, dependent, double, striped-leaved; ornamental in winter.
bulbiferum. *Bulb-bearing,* (*Fiery Lily*). Italy. June, July. Producing bulbs on the stem.
chalcedonicum. *Great Scarlet Martagon* or *Turk's-cap.* Levant. June, July.—Scarlet, red, white, spotted, double.
Martagon. *Purple Martagon.* Europe. June, July.
canadense. *Canadian Martagon.* N. America. July, Aug.
pomponium. *Pomponian.* Pyrenees. May, June. Purple, bright red.
philadelphicum. *Philadelphian Lily.* N. America. July.
superbum. *Superb Pyramidal Martagon.* N. America. June. Variegated yellow & orange, yellow-spotted, purple with dark spots.
camschatcense. *Bell-shaped Martagon.* Kamschatka.
tigrinum. *Tiger-spotted.* China. June, July. Superb.
Catesbæi. *Catesby's.*
concolor. *One coloured.*
tenuifolium.

NARCISSUS. Bulbous-rooted.
poeticus. *Common White.* Single, double.
bicolor. *Butter and Eggs.*
Bulbocodium. *Hoop-petticoat.* The large nectarium, narrow at bottom, widens gradually to the brim.
odorus. *Sweet-scented*
major. *Great Daffodil.*
minor. *Small.*
Tazetta. *Polyanthus.* Several flowers in a cluster, from

same sheath. Yellow, White, Golden, Sulphur-coloured. White, with orange middle cups. Yellow, with orange cups. Several varieties.

Pseudo-narcissus. *Daffodil.* Double yellow, cup-in-cup—Single, with nectarium as long as the petals—White, with yellow cups—Yellow, with white cups—White, reflex petals, golden cups.

Jonquilla. *Jonquil.* Many flowers from same sheath—Common yellow, White, Yellow and white, Large Dutch, Starry-flowered, Double, Large inodorous, Double.

serotinus. *Late Uniflorus*—White; flowers in autumn.

OPHRYS.

ovata. *Tway-blade*, with bulbous fibrated root — spiralis, *Lady's Traces*—lilifolia, *Lily-leaved*—cordata, *Cordate-ditto* montorchis, *Musk*, yellowish.

In following species, the shape of flower corresponds with name:

antropophora. *Green Man.* Brit. May, June. Roundish bulbous root. — Nidus-avis, *Bird's-nest.* Brit. May. Root bulbous, fibrated, clustered —mucifera, *Fly.* May, June —spifera, *Bee.* June—aranifera, *Spider.* April, May. Bulbs roundish.

ORCHIS. May, June, & July: a bulbous fleshy root—mascula, *Male.* Root has two bulbs — Morio, *Female* or *Meadow*, with a double bulbous root—Militaris, *Man*; similar root—bifolia, *Butterfly* — pyramidalis, *pyramidal* —conopsea, *aromatic*—maculata, *spotted*—latifolia, *broad-leaved:* bulbs, of three last, shaped like a hand—ciliaris, *ciliate* or *fringed*, N. A.—ustulata, *dwarf.*

ORNITHOGALUM, *Star of Bethlehem*; bulbous-rooted—Pyramidal, or *Great White:* many flowers in an erect pyramid—Pyrenean, spiked—Stachyoides, or close-spiked —Umbellate—One-flowered —Striped — Yellow — Nodding Neapolitan, or Star of Naples—Arabian, or Star of Alexandria. *F.*

OROBUS. *Bitter Vetch.*

tuberosus. *Heath Pea.* Brit. April, June. The tuberous root, when boiled, is savoury and nutritious.

PÆONIA. *Peony.* Root tuberous—officinalis, *Common red* —corallina, *Broad-leaved* — peregrina, *Crimson* — albiflora, *White*—humilis, *Dwarf* —sibirica, *Siberian* — tenuifolia, *Fine-leaved* — decora, *Comely* — pubens, *Downy* — double of each.

PANCRATIUM. *Sea Daffodil,* bulbous — maritinum, *Common*; many elegant white flowers in a sheath—illyricum, *Illyrian*; tall stem.

PHLOMIS. tuberosa.

POLYANTHUS. *Tuberose.* tuberosa, a bulb-like tuberous root. The bloom beautiful, and delightfully fragrant. Single; blows the most freely, and has the finest fragrance. Double; eminently beautiful.

RANUNCULUS. *Crow-foot.* tuberous-rooted—asiaticus, *Garden.* Levant. Persian Asiatic; red, purple, rosy, crimson, flame-colour, black, violet-colour, coffee-colour, white, olive, straw-colour, yellow, golden, rosy with gold stripes, white, red and crimson striped, yellow,

& red striped, white spotted. Semi-doubles and doubles of each, most beautiful.

Turkish Asiatic or Turban Ranunculus; with large double flowers. Deep red, scarlet, yellow, white.

The more common species and varieties of Ranunculus are,

Acris, *Upright;* common yellow double flowered—auricomus, *Golden locks*—gramineus, *Grassy-leaved* — illiricus, *Illyrian*—amplexicaulis, with leaves embracing the stem — Ficaria, *Pile-wort;* double-flowered — Lingua, *Great Spear-wort*—Flammula, *Small Spear-wort*—Thora, *Kidney-leaved* — Platanifolius, *Plane-tree leaved*—Parnassifolius, *Parnassia-leaved*—Aconitifolius, *Fair Maid of France;* aconite-leaved, with a double white flower.

SATYRIUM. *Satyrion*-hircinum, *Lizard*—viride, *Frog*—albidum, *White*--repens, *Creeping.*

SAXIFRAGA. *Saxifrage:* granulata, granulous rooted; a native of meadows in England. Common white, double.

SCILLA. *Squill*—maritima, *Sea-onion;* officinal, with large bulbous root & white flower—autumnalis, large root and blue flower — Lilio-hyacinthus, *Lily-rooted,* blue—Peruviana, *Starry Hyacinth;* broad-leaved, purple, white—verna, *vernal* — Lusitanica, *Portugal*--bifolia, *two-leaved;* cœrulea, rubra, alba — præcox, *Early;* white, starry—Italica, *Italian;* blue-spiked—campanulata, *Bell-flowered,* wh.&pur.--nutans, *Hare-bell.*

SPIRÆA. Filipendula, *Drop-wort.* Double white.

SYMPHYTUM. *Comfrey.*

tuberosum, *Tuberous-rooted.*

THALICTRUM. *Meadow-rue.*

tuberosum, *Tuberous-rooted.*

TULIPA. *Tulip* — Gesneriana. *Garden.* Levant.

Varieties innumerable: from inconstancy of flowers in seedlings, divided into two principal classes: *Præcox* or Early, also called Dwarf Tulip; and *Serotina* or Late-flowering, taller in stem.

Præcox, Early Dwarf; flowers a month or more before the *Serotina.* Some of them shew gay lively single colours, but the more admired sorts are broken into flaked variegations; others are edged with one tint and flaked with several, so as to present the most pleasing diversity.

Serotina, Tall Late-flowering: the lateness is merely comparative; for, rising from the bulb early in spring, flowers April, May. The principal are those shewing a white ground, striped with different colours—a yellow ground variously striped—white bottoms and yellow bottoms, each of one colour above, for breeders to break into stripes and variegations by degrees:

Double Tulip; a variety of the single; the flower, from doubling, has nearly the form of a rose.

Oculus Solis, *Sun's-eye.* May.

cornuta. *Horned.* May.

Celsiana. *Cels's.* June, July.

biflora. *Two-flowered.* April.

breyniana. *Cape.* Stem many flowered—suaveolens, *Sweet-smelling.* May.—sylvestris, *Wild European,* or *Italian Yellow Tulip:* bears a small yellow flower, nodding on one side. April.

Recapitulation of Autumnal Bulbs.

AMARYLLIS;
Yellow Autumnal.
Guernsey Lily.
Belladonna Lily.
COLCHICUM.
CROCUS;
The Autumnal varieties.
CYCLAMEN; Autumnal.
LEUCOJUM; Autumnal.
PANCRATIUM.

Seasons for Planting.—As both the bulbous and tuberous plants have done flowering in their respective seasons, the leaves and stalks decay, as also the fibres of the bulbs and tubers; and their course of vegetation for that year being terminated, they remain for some time in a dormant state. This interval of suspended vegetation, before any fresh fibres begin to push, is the most proper season for transplanting such as it is requisite to remove: this is also the right time to propagate the species, by detaching the progeny of small off-sets from the sides of the main roots, as directed under the article "MODES OF PROPAGATION."

The principal season for planting bulbous and tuberous roots is, an interval of autumn from about the middle of September till December, if the weather should be mild: within these extremes, October and November is a successful time for planting, to provide the chief bloom for the following year: or most of the sorts will also succeed by early spring planting, not being kept out of the ground beyond the middle of March; but these will seldom flower so strong as those planted in autumn, especially when bulbs have been so reserved. In most of the scaly bulbous tribe, such as the Crown-imperial, the White-Lily, and some other Lily kinds, the fleshy scales composing the bulb are succulent: if the root is kept long out of the ground, these are liable to shrink and waste: it is therefore advisable to plant them timely in autumn; or, if not planted at that season, to lay them in a little dry sand.

Of some tuberous sorts, as the Anemone and Ranunculus, it is eligible to plant a portion in autumn, for early spring-flowering; and to reserve a principal supply to be planted in February or March, for both a successive and a principal blow in May. A smaller portion may also be planted in April, for late flowering in June.

Of bulbous kinds, generally complete the apportioned spring-planting in February or March.—See the article, *Period of being out of the ground.*

The Autumnal Bulbs should be planted in July or August, or early in September, to flower the same year.

The domestic florist may be supplied with roots for planting, at the nurseries, during the proper season, from August or September to February or March; and having been obtained, each will soon multiply by off-sets, to increase the stock.

SOIL—PREPARATION OF BEDS—METHOD OF PLANTING.

In relation to the soil in which they will prosper, the various sorts, both of bulbs and tuberous-roots, differ less than almost any other promiscuous collection of plants brought into a Table, as the subject of general directions. The soil should be rather light and free, because the roots are not strong and ligneous, so as to overcome the obstacles of stiff land: it should be dry; because bulbs, in a bed constantly penetrated by moisture, are apt to rot in winter. With respect to richness, as the body of vegetable produce to be sustained by the earth, in an herbaceous flowering plant, is not great, compared with the substance of trees and the heavy esculent crops of ordinary consumption, the quantity of manure first applied is not so important as the quality: this should be fine and mellow. In a soil rendered excessively strong and rank by a copious application of uncorrected manure, the beauty of the flower in some sorts previously celebrated has been found to decline.

When beds for the choicer roots are to be formed, such an improvement of the soil as meets the nature of the plant may be made, by using the following compost. Having recourse to some upland pastured field, of which the surface is a light sandy loam or hazel-coloured mould, take, as a basis for the intended compost, a sufficient quantity of the upper layer, one spit in depth. Retain the turf, if there be time for it to rot before the mould is wanted; if not, pare it away. With the earth, mix a third part of rotten dung; and, if the earth be stiff and loamy, add a little sea-sand. Let the whole lay in a heap for twelve months, to be thoroughly mixed; meanwhile, turn it over at least once a month. When turning it, break the clods, and rake out the great stones: it is better not to sift the earth, a practice which has been found to injure some kinds of roots. If you cannot let it lie so long to mix, turn it oftener in proportion; and the last time, rake out all the filaments of turf which are rotten. The beginning of September is a proper season for preparing the beds. Having excavated the ground, spread over the bottom some rotten ground from an old melon-bed, about five inches deep. Lay the compost thereon from two and a half to three feet in thickness. If the soil to be improved be naturally dry, it will

suffice to raise the top of the bed three or four inches higher than the general surface. Where, on account of the land being wet, the beds are raised considerably above the surface, fill up the intervening alleys with rotten tan or dung, to protect the roots from being penetrated with frost in winter.

The compost, without the dung at bottom, may be employed in pots.

If the soil is naturally so good that the aid of such a compost can be spared, being light, mellow, and moderately dry, let it be at once neatly digged, broken fine, and formed into beds three or four feet wide, with alleys half that width between.

The ground may be pierced either with a thick round-ended dibble, or, having traced drills with the corner of a hoe the depths specified above, insert the roots with the bottom downward, pressed a little to the earth, and cover them evenly with the excavated earth of the drills. Or, for the principal sorts, you may, with the rake or spade, trim the earth evenly off the bed, three or four inches deep, into the alley; then set the roots on the surface, at assigned distances, pressing the bottom a little into the ground: this completed, with a spade spread the earth out of the alley over the roots, uniformly to the proper level. After planting, rake the beds lightly, drawing off any hard clods and stones, and forming a smooth regular surface: then trim the alleys clean and orderly.

The root of the Ranunculus will not begin to vegetate till it has lain several days in the ground; during which time it swells very much, and is easily hurt by frost: to protect it, therefore, it is necessary to cover the bed with fern or straw.

The beds prepared for fine Hyacinths and Tulips should be in a dry situation, with a southern exposure, sheltered on the north and east by some screen, distant six or eight feet, and not subject to drips.

GENERAL CULTURE OF GROWING PLANTS.

In the first stage of the herb, as it advances into the flower-bud, during its increase, and while in flower, the principal care is, to keep the plants clear from weeds, and the surface of the bed clean and neat. When flowering, if any feeble stalks or tall stems are bowing under the weight of full heads, give support, with a small neat stick, to each plant; being careful to place the staff a little on one side, not to wound the root; and tie up the flower-stalk neatly to the stick.

When the flowers of choice Tulips are going off, detach the seed-pods, to prevent the seeds from ripening, which would weaken the root.

Tulip roots are of great interest to all persons; and those who cultivate the finer kinds, take great pains in preserving the roots during their remaining out of ground. Paper bags are generally had recourse to, where persons have not cases made to receive them.

To the choice sorts, in separate beds, give occasional protection, by covering in winter and early in spring, during severe frost and other inclement weather; and this will be of much advantage, as well before as after the flower-buds swell. When the plants are advanced to flowering, an awning of mats would prolong their continuance in full beauty.

This occasional protection is best effected by arching the beds over either with hoop-bends, pliant rods, or moveable arched frames;—low for winter defence, to bring the covering of mats nearer to the beds. But when the plants are in flower, the awning should be four feet high; or sometimes florists have the beds of capital Tulips and Anemones arched over, wide and high enough to admit a spectator to walk under the awning; and during the bloom, the covering of mats, canvas, or strong oiled paper, constantly remains, with side-screens to let down occasionally.

Season of Removal—Period of being kept out of the Ground.—At periodical stages, in summer and autumn, the respective kinds will have ceased flowering; after which the stalk and leaves of the plant decay, and likewise the radical fibres, while the principle of vegetation in the bulb is dormant, and so remains for a short time. This interval, before they make fresh fibres, has been already described as the season alone strictly proper for removing them.

Fine varieties of the Hyacinth, Tulip, Anemone, Ranunculus, Polyanthus-Narcissus, and most sorts which are prized in the first degree, are taken up and replanted annually. Bulbs of ordinary value should be removed at least once in two or three years, or whenever much increased in off-sets.

It is necessary to observe, as a qualification to the above general directions, that the White and Orange Lily, and other large scaly bulbs, will need removal only once in three or four years, to separate the off-sets when grown into large bunches; especially the White Lily, which should seldom be taken up but for that purpose, as frequent removal prevents it from flowering in perfection.

The roots of the Anemone and Ranunculus require particular care in taking up. To get all the tubers and off-sets, it is sometimes necessary to sift the mould as low as they were

planted, and to search the lumps of earth retained in the sieve.

Dig up each sort in a dry day. Lay the roots of the Jonquil, Tulip, and Narcissus, in a dry shady place, till the roots are completely dried.

As in the autumnal bulbs the leaves come up after the flower, and continue till April, May, or later, the decay of the leaf in them equally marks the proper time for taking them up, either to be inserted in fresh beds, or to have the off-sets detached.

ON THE CULTIVATION OF OTHER FLOWERING PLANTS.

In addition to the list of Flowers known as bulbous and tuberous, the amateur has much to amuse him in the finer varieties raised by art from the following Two Genera, indigenous to Britain: Primula—*Polyanthuses* and *Auriculas*.

Dianthus—*Pinks* and *Carnations*.

The limits to which this work is proscribed will not admit of a full description of this department of our subject; but it is due to the reader to be informed, that the science of Horticulture naturally divides itself into three branches, each of which differs; and it is seldom that any two are pursued with the same avidity.

That of the *Botanist*, who studies the natural habits, the growth, and the various uses that Providence has assigned to vegetables, for food, physic, and the arts.

The *Gardener*, whose fort is the cultivation of Plants in the highest state of perfection.

The other, that of the *Florist*, is a branch equally as distinct. Our Physiological description (pp. 18, 19) will have instructed the reader in the principles; and those who wish to study the practice, will be rewarded in reading Maddocks's Florist's Directory, and Curtis's Lectures on Botany.

The history of Flowers contains some striking examples of the pains taken in procuring the finer varieties, and their estimated value, particularly of such as once prevailed in Holland. A fine flower is seldom known to become plentiful. The Tulip called *Louis Sieze*, which sold forty years since for 20 guineas per root, maintains at this day a price equal to its superior beauty. The beautiful Auricula named *Cockup's Eclipse*, which sold for 7*s*. 6*d*. per plant forty years since, cannot now be purchased for much less. The culture of Flowers has greatly diminished among the Spital-fields Weavers, who were once our best productors of all the most valuable of these kinds.

The Dutch florists are said to manage the bulbs of Hyacinths, when the bloom is over, as follows. They cut away the flower-stem, but do not at present meddle with the fibres: they next

place the bulbs on the side of the bed, in rows, with their points toward the north, and cover them an inch deep with small ridges of dry sand. As the design is to dry them gradually, during three weeks the bed is protected from rain, or from fierce sunshine; at the end of which, in about a month altogether after the bloom is over, they are taken up, and their fibres rubbed off: they are then placed for a few days in a dry apartment, and treated according to the common practice. It is supposed there is something particularly congenial in the climate of Holland, that enables the Dutch cultivators to produce finer bulbs of those flowers than have been found to grow in this country: but, may it not probably arise from the previous care of the bulbs, and especially from the nature of their soil, which is an alluvial sandy deposit? The flower-beds at Haarlem are raised some inches, surrounded with a frame; and the compost evidently formed of the silt of the canals, combined with peat-ashes and vegetable fibre; rendering the flower-beds so porous as not to retain or be injured by the rains and constant humidity of their spring. Every care should be taken of bulbs and their progeny, by the gardener who emulates the making an early show in the spring.

The common way of drying bulbs is, to lay them first in the open air, and then to harden them moderately by spreading them in an airy room. Afterwards, clear the bulb from any adhering earth, the loose skin, the decayed stalk, and the radical fibres. Lastly, let all the off-sets be detached from the main bulb; and generally separate the smaller off-sets from the larger, for planting in a nursery order. See *Propagation by Off-sets.*—Meanwhile, till the season of planting, deposit each sort separate, in a dry apartment, under sand, or without, according to the time they are intended to lie.

Having prepared the beds and pots, plant the principal portion in September, October, and November, for the early and main bloom in the following spring and summer.

It is proper to retain a competent part, especially of the tuberous-roots, for spring planting;—in January, to afford a successive summer bloom; and in February, or early in March, for a late display.

The sorts which succeed best, when reserved for spring planting, are, the Anemone, Ranunculus, Crocus, Hyacinth, Jonquil, Narcissus, Persian-Iris, Snow-drop, and Fritillaria; and sometimes the Tulip and Crown-imperial; though these last, like the Lily, will not always flower in perfection, unless planted the preceding autumn.

To plant those reserved till spring as early as is consistent with having the intended succession will conduce to their flowering stronger the same year; while of such as may not flower effectually, it will preserve the roots in good condition for future flowering, and also afford an increase by off-sets.

To remove a bulb or tuberous-root when it is not in the dormant state above described, would, at best, greatly retard or weaken the bloom; and it would entirely prevent some sorts from flowering at the usual period. When, however, it is requisite to remove any growing root, it should be replanted as soon as it can be conveyed to the new bed.

MODES OF PROPAGATION.

The principal mode of multiplying bulbous and tuberous flower-roots is by off-sets. The other course, of raising plants from seed, is occasionally adopted, to obtain new varieties. A few tuberous roots, which contain more than one eye, may be cut, as mentioned under FIBROUS-ROOTED PERENNIALS.

1. *By Off-sets of the Root.*—These consist of the young off-set bulbs and tubers, emitted annually, in spring and summer, from the base of the bulb or tuber. By off-sets, any species or variety can be perpetuated; as every plant, so raised, produces invariably the same kind of flower as the parent root. These are generally detached every year, in cultivating the principal bulbs; as the prime sorts of the Hyacinth and Tulip; also in the chief tuberous-roots, such as the Anemone and Ranunculus; as well to increase the species, as that the off-sets may not remain, to impoverish the parent root.

It is expedient to take up the ordinary sorts once in two years, or three at most, when multiplied into large clusters, in order to part the off-sets, and allot the best for further increase.

Each sort of the parted off-sets should be kept separate; the smaller ones sorted from the larger, and a select supply preserved. They may be planted soon after being dried, or early in autumn, in beds separately, either by dibble, or in drilled rows, from three to six inches asunder, and two or three inches deep: or assortments of the most promising may be allotted separate beds. Let them remain in the nursery-bed one or two years, or till ready for full flowering. Or larger off-sets, sufficiently advanced to come into bloom next year, may be planted at once, in pots or ornamental compartments.

The young roots in nursery-beds, as they attain the competent size for full blowing, should be taken up at the decay of the leaf, and sorted.

Grafting Dahlias.—As striking the cuttings of Double Dahlias is a tedious process, Mr. Blake grafted them on single ones, in the following manner.

The scion, from the Double Dahlia, must be procured as soon in the season as possible: it should be strong and short-jointed, having two or more buds. Select a good tuber, of a single sort, taking especial care that it has no eyes: with a sharp knife cut off a slice from the upper part of the root, making, at the bottom of the part so cut, a ledge whereon to rest the graft. This is useful in keeping the cutting fixed, while you tie it: next cut the scion sloping, to fit, and so that a joint may be at the bottom of it, to rest on the aforesaid ledge. After the graft has been tied, a piece of clay must be placed around it: then put the root in fine mould, in a pot of such a size as will bury the graft half way in the mould. Place the pot on a little heat, as in the front of a cucumber or melon frame: shade and water, as required. A striking glass may be used or not. In about three weeks the root should be shifted into a larger pot, as it would probably be too soon to plant it in the border.

As Double Dahlias are now common and the tubers plentiful, they are usually propagated by taking the tubers and planting them thickly in a hot-bed, many of which will break into buds and make good plants, although they do not exhibit bulbs when taken off the mother root.

TO BLOW ROOTS IN WATER-GLASSES, &c.

In the course of winter and spring, you may obtain an early blow of some few sorts of bulbous roots in water-glasses, either in a green-house, or in a dwelling-house near the windows of a warm apartment, or on the chimney-piece of any light airy room; or, to blow as early as possible, some roots may be placed in a hot-house. The sorts best adapted for this are afterwards specified.

Procure the proper root glasses, which are of an upright tapering form, from six to nine inches high, with a concave turret-mouth, made each to support one root at the top of a column of water; the capacity of the mouth, and the contraction of the orifice to prevent the root from passing through, being proportioned to the bulb. Suitable kinds, put into these glasses any time from October to March, will flower with striking effect; and by having sets to vegetate every month, a successive blow may be maintained from January till May.

The kinds best adapted for blowing in glasses are, the varieties of Polyanthus-Narcissus, the Double Hyacinth, Early

Dwarf Tulip, the Large Dutch and Common Jonquil, the Persian and Bulbous Iris, the Scotch Crocus, and similar sorts. With regard to the Anemone and Ranunculus, they are not equally suitable for glasses; and it is preferable to force them in pots for an early blow, as directed under the last article.

For this purpose, select such bulbs or tuberous-roots as are rather large, as well as plump and sound. A very ingenious and successful grower of bulbs in water-glasses has remarked to the Editor, that experience has shewn the great advantages arising from keeping the glasses in the dark until the fibres are shot some considerable length.

Fill the glass with soft water, so that it may just float through the neck into the concave turret in which lay the bulb with the bottom immersed a little in the water. Then place the glasses either in a green-house, glass-case, or warm light airy apartment of a dwelling-house: it will be better for them to stand where the sun can reach. A selection designed to flower most early may be placed in a stove.

Observe to clear the bottom of the roots from dirt, or the least decay of the outer skin that may be attached, and to keep the water shifted whenever it becomes foul.

FORCING BULBS AND TUBEROUS-ROOTS.

Any of the plants in the Table may be flowered early in pots or boxes, either by the influence of a hot-bed or stove, for a very accelerated bloom; or under the protection of a green-house, glass-case, garden-frame, or warm light apartment of a dwelling-house, to come-in for a moderately early spring blow.

They may be planted in the pots any time from November to February, and placed accordingly, where intended. If one of the last-mentioned situations is to receive them, they should be placed where the benefits of day-light and sunshine can best reach them. According to the gradations of shelter and warmth afforded the plants, these will flower in some of the principal spring months.

A portion may be urged to a much earlier bloom, in a hot-bed under a frame and glasses: if the bed is in operation soon in winter, they will flower in February or March: or, introduced into a hot-house, any chosen number may be brought to blow in January.

For these purposes, adopt pots of a middle size (32s. or 24s.), each to contain one, two, or three bulbs; or more, for some sorts, such as the Crocus, Anemone, and Ranunculus. With the earth or compost proper for bulbous plants, fill about three-

fourths of the pot: insert the roots a little into the mould, and cover-in with as much additional mould as will raise it about an inch over the crown.

Or some may be planted in boxes, to admit a number of roots in each, for a fuller blow together. The boxes may be made fifteen or eighteen inches long, and about six inches deep: plant the roots in the manner directed for those in pots, at the distances which may seem eligible.

When the plants begin to shoot, it will be proper to give light waterings once or twice a week, or as may be requisite to keep the earth in a slight degree moist. Apply the water always moderately. Guarded admissions of fresh air, in mild days, will also be beneficial.

An early blow of bulbs is best attained by combining the aid of some artificial heat with the protection of glass. In the lowest forcing apparatus, a common frame hot-bed, plants will gain considerably upon those that are merely sheltered: but they will require much more culture and attendance than pots or boxes in a tan-bark hot-bed in a glazed pit: and the roots that are still more favoured, by introduction into any particular department where fire-heat is employed, or into a general hot-house, will shew a perfect bloom proportionally earlier.

When it is intended to force bulbs as early as possible in winter and spring, the roots should be planted in the pots so much the sooner in autumn, and placed in the house in October, November, or December; and they will blow accordingly about mid-winter, and the course of January and February.

SHRUBBERY.

THE distinction between a Flower Garden and a Shrubbery, as an ornamented portion of ground, has been loosely marked in the opening of the last division. One branch of the ancient system of gardening was, to make large plantations entirely of shrubs intersected by gravel-walks: but this is now almost universally exploded; and shrubs are usually distributed over the grounds, sometimes in association with flowers, and sometimes with trees, or for a short space in a continued line, as the object is ornament or shelter, or to form a side-screen. The pleasing diversity created by shrubs, in combination with flowers, has been glanced at in the FLOWER GARDEN. All that relates to the further improvement of the scene by the introduction of shrubs, is reserved for the PLEASURE GROUND.

The sense, however, in which we employ *Shrubbery*, as the

title of this article, is merely that of a treatise on the culture of shrubs.—Though the principles on which they should be employed cannot be reduced to mechanical rules, it is certain that the improver of grounds without this class of plants would be deprived of one of the most easily-disposed and most available materials.

TABLE VIII.—EXOTIC TREES AND SHRUBS,

Distinguished for their beauty;
and arranged according to the Linnæan System of Botany:

In which is marked the mould that each plant thrives best in; such as are adapted to cover walls; those that are Creepers or Climbing-Plants; those that are Evergreen in this climate; and those that are Timber-Trees, distinguished from Shrubs.*

DIANDRIA MONOGYNIA.

1	Jasminum officinale, w.	Common white Jasmine	c. m.
2	v. *argent. variegat.* w.	Silver-striped ditto	c. m.
3	v. *aureo variegat.* w.	Gold-striped ditto	c. m.
4	fruticans, w.	Yellow ditto	c. m.
5	humile, w.	Dwarf yellow ditto, s.	b. l.
6	Phillyrea media, e.	Privet-leaved Phillyrea, s.	c. m.
7	v. *virgata*, e.	Twiggy ditto, s.	c. m.
8	v. *pendula*, e.	Pendulous ditto, s.	c. m.
9	oleæfolia, e.	Olive-leaved ditto, s.	c. m.
10	buxifolia, e.	Box-leaved ditto, s.	c. m.
11	angustifolia, e.	Narrow-leaved ditto, s.	c. m.
12	v. *rosmarinifolia*, e.	Rosemary-leaved ditto, s.	c. m.
13	brachiata, e.	Dwarf ditto, s.	c. m.
14	v. *latifolia*, e.	Broad-leaved ditto, s.	c. m.
15	v. *lævis*, e.	Smooth broad-leaved ditto, s.	c. m.
16	v. *spinosa*, e.	Prickly broad-leaved ditto, s.	c. m.
17	v. *obliqua*, e.	Ilex-leaved ditto, s.	c. m.
18	Chionanthus virginicus,	Fringe Tree, s.	b. m.
19	Syringa vulgaris	Blue Lilac, s.	c. m.
20	v. *alba*	White ditto, s.	c. m.
21	persica	Persian ditto, s.	c. m.
22	v. *laciniata*	Cut-leaved ditto, s.	c. m.
23	*latifolia*	Broad-leaved ditto, s.	c. m.

TETRANDRIA MONOGYNIA.

24	Cephalanthus occidentalis,	Button-wood, s.	b. l.
25	Houstonia coccinea	Scarlet Houstonia, s.	b. l. s.

* Where *c.* occurs immediately after the Latin word, it denotes the plant to be a creeper; and *w.* such as are adapted to covering walls. *e.* denotes the plant to be evergreen; and *s.* after the English, denotes those as shrubs of more humble growth: the others are Timber-trees.

26	Buddlea globosa	Globe-flowered Buddlea, s.	b. l. s.
27	Cornus florida	Great-flowering Dog-wood, s.	c. m.
28	mascula	Cornelian Cherry, s.	c. m.
29	sericea	Blue-berried ditto, s.	c. m.
30	alba	White-berried ditto, s.	c. m.
31	stricta	Upright ditto, s.	c. m.
32	sibirica	Siberian ditto, s.	c. m.
33	paniculata	Panicled ditto, s.	c. m.
34	alternifolia	Alternate-leaved ditto, s.	c. m.
35	v. *virescens*	Green-twigged ditto, s.	c. m.
36	Ptelea trifoliata	Shrubby Bean-trefoil	c. m.
37	Elæagnus angustifolia	Narrow-leaved Oleaster	c. m.
38	v. *latifolia*	Broad-leaved ditto	c. m.

TETRANDRIA DIGYNIA.

39	Hamamelis virginica	Witch Hazel	c. m.

TETRANDRIA TETRAGYNIA.

40	Ilex opaca, e.	Carolina Holly, s.	b. l.
41	v. *angustifolia*, e.	Narrow-leaved ditto, s.	b. l.
42	prinoides, e.	Deciduous ditto	b. l.
43	Cassine, e. s.	Dahoon ditto	l.
44	vomitoria, e. s.	South-Sea Tea-Tree	l.

PENTANDRIA MONOGYNIA.

45	Azalea pontica	Yellow Azalea, s.	b. s.
46	nudiflora	Red ditto, s.	b. s.
47	v. *coccinea*	Scarlet ditto, s.	b. s.
48	v. *carnea*	Flesh-coloured ditto, s.	b. s.
49	v. *alba*	Early white ditto, s.	b. s.
50	v. *bicolor*	Red and white ditto, s.	b. s.
51	v. *papilionacea*	Variegated ditto, s.	b. s.
52	v. *partita*	Downy ditto, s.	b. s.
53	v. *aurantia*	Orange ditto, s.	b. s.
54	v. viscosa	Late white ditto, s.	b. s.
55	v. *vittata*	White striped ditto, s.	b. s.
56	v. *fissa*	Narrow petalled ditto, s.	b. s.
57	v. *floribunda*	Cluster-flowered ditto, s.	b. s.
58	v. *glauca*	Glaucous-leaved ditto, s.	b. s.
59	v. *scabra*	Rough-leaved ditto, s.	b. s.
60	Lonicera dioica, c.	Glaucous Honeysuckle, s.	c. m.
61	sempervirens, c. e.	Trumpet ditto, s.	l.
62	grata, c.	Evergreen Honeysuckle, s.	c. m.
63	implexa, c.	Minorca ditto, s.	l.
64	nigra	Black-berried ditto, s.	c. m.
65	tatarica	Tartarian ditto, s.	c. m.
66	pyrenaica	Pyrenean ditto, s.	c. m.
67	Alpigena	Red-berried ditto, s.	c. m.
68	cœrulea	Blue-berried ditto, s.	c. m.
69	Symphoricarpos	St. Peter's Wort, s.	c. m.
70	Diervilla	Yellow-flowered Honeysuckle,	c. m.
71	Caprifolium, c.	Italian white ditto, s.	c. m.

72	Lonicera, v. *rubra*, c.	Italian early red ditto, s.	c. m.
73	Periclym	Late red ditto, s.	c. m.
74	v. *quercifolia*	Oak-leaved ditto, s.	c. m.
75	v. belgica	Dutch ditto, s.	c. m.
76	Lycium barbarum, w.	Willow-leaved Boxthorn, s.	c. m
77	europæum, w.	European ditto, s.	c. m.
78	Sideroxylon lycioides	Willow-leaved Iron-wood, s.	b. l.
79	Rhamnus latifolius	Broad-leaved ditto, s.	c. m.
80	alpinus	Alpine ditto, s.	b. m.
81	theezans	Tea ditto, s.	c. m.
82	alnifolius	Alder-leaved ditto, s.	c. m.
83	Paliurus	Christ's Thorn, s.	c. m.
84	volubilis, c.	Supple-jack-Tree	c. m.
85	Ziziphus	Shining-leaved ditto, s.	c. m.
86	Alaternus, e. w.	Common Alaternus, s.	c. m.
87	*fol. argent. var.* e.	Silver-striped ditto, s.	c.m.s.
88	*fol. aureo var.* e.	Gold-striped ditto, s.	c.m.s.
89	v. *angustifolius*, e.	Jagged-leaved ditto, s.	c. m.
90	Celastrus scandens, c.	Climbing Staff-Tree, s.	c. m.
91	Ceanothus americanus,	New Jersey Tea-Tree, s.	c. m.
92	Euonymus latifolius	Broad-leaved Spindle-Tree, s.	c. m.
93	verrucosus	Warted ditto, s.	c. m.
94	atro-purpureus	Purple-flowered ditto, s.	c. m.
95	americanus	Evergreen ditto, s.	c. m.
96	Itea virginica	Virginian Itea, s.	b. l.
97	buxifolia	Box-leaved ditto, s.	b. l.
98	Ribes glandulosum	Glandulous Currant, s.	c. m.
99	petræum	Rock ditto, s.	c. m.
100	floridum	Large-flowered ditto, s.	c. m.
101	diacanthum	Two-spined Gooseberry, s.	c. m.
102	oxyacanthoides	Hawthorn-leaved ditto, s.	c. m.
103	canadense	Canadian ditto, s.	c. m.
104	Cynosbati	Prickly-fruited Currant, s.	c. m.
105	prostratum	Procumbent ditto, s.	c. m.
106	sanguineum	Scarlet-flowered ditto, s.	c. m.
107	Hedera quinquefolia, w.	Virginian Creeper	c. m.
108	Helix, v. *latifolia*, e.	Broad-leaved Ivy, c.	c. m.
109	Vitis vinifera, c.	Common Grape	c. m.
110	Labrusca, c.	Downy-leaved ditto	c. m.
111	vulpina, c.	Fox Grape	c. m.
112	laciniata, c.	Parley-leaved Vine	c. m.
113	arborea, c.	Pepper Vine	c. m.

PENTANDRIA DIGYNIA.

114	Periploca græca, c.	Virginian Silk-Tree	c. m.
115	Salsola prostrata	Trailing Saltwort, s.	c. m.
116	Ulmus americana	American Elm	c. m.
117	v. *alba*	White American ditto	c. m
118	v. *pendula*	Drooping ditto	c. m.

119	Ulmus nemoralis	Twiggy ditto	c. m.
120	pumila	Dwarf ditto, s.	c. m.
121	crispa	Curled-leaved ditto	c. m.
122	Bupleurum fruticosum,e.	Shrubby Hare's-ear, s.	c. m.

PENTANDRIA TRIGYNIA.

123	Rhus Typhinum	Virginian Sumach	c. m.
124	glabrum	Smooth ditto	c. m.
125	Vernix	Varnish-Tree, s.	c. m.
126	copallinum	Lentiscus-leaved Sumach, s.	c. m.
127	radicans, c.	Upright Poison Ash	c. m.
128	Toxicodendron, c.	Trailing or Officinal ditto, s.	o. m.
129	Cotinus	Venus's Sumach, s.	c. m.
130	Coriaria	Elm-leaved ditto, s.	c. m.
131	Viburnum Tinus, e.	Laurustinus, s.	c. m.
132	*fol. variegat,* e.	Striped-leaved ditto, s.	c. m.
133	*lucidum,* e.	Shining-leaved ditto, s.	c. m.
134	*strictum,* e.	Upright ditto, s.	c. m.
135	nudum	Oval-leaved Viburnum, s.	c. m.
136	cassinoides	Thick-leaved ditto, s.	l. s.
137	nitidum	Shining-leaved ditto, s.	b. l.
138	lævigatum	Cassioberry Bush, s.	b. l.
139	prunifolium	Plum-leaved Viburnum, s.	c. m.
140	Lentago	Pear-leaved ditto, s.	c. m.
141	dentatum	Tooth-leaved ditto, s.	c. m.
142	v. *pubescens*	Downy-leaved ditto, s.	c. m.
143	acerifolium	Maple-leaved ditto, s.	c. m.
144	Opulus,v. *americana,*	American Gelder Rose, s.	c. m.
145	v. *rosea*	Snow-ball ditto, s.	c. m.
146	alnifolium	Alder-leaved ditto, s.	c. m.
147	Sambucus canadensis,	Canadian Elder, s.	c. m.
148	nigra, v. *laciniata,*	Cut-leaved ditto, s.	c. m.
149	racemosa	Cluster-flowered ditto. s.	c. m.
150	Staphylea trifolia	Three-leaved Bladder-Nut, s.	c. m.
151	Tamarix germanica	German Tamarisk, s.	c. m.

PENTANDRIA PENTAGYNIA.

152	Aralia spinosa	Angelica-Tree, s.	b. l.

PENTANDRIA POLYGYNIA.

153	Zanthorhiza Apifolium,	Parsley-leaved Zanthorhiza, s.	b.

HEXANDRIA MONOGYNIA.

154	Prinos verticillatus	Whorl-leaved Winter-berry, s.	b. l.
155	glaber	Smooth ditto, s.	b. l.
156	lanceolatus	Lanceolate-leaved ditto, s.	b. l.
157	lævigatus	Spear-leaved ditto, s.	b. l.
158	Berberis canadensis	Canadian Barberry, s.	b. l.
159	cretica	Cretan ditto, s.	b. l.
160	sibirica	Siberian ditto, s.	b. l.

HEPTANDRIA MONOGYNIA.

161	Æsculus Hippocastanum,	Common Horse Chesnut	c. m.
162	flava	Yellow-flowered ditto	c. m.
163	Pavia	Scarlet-flowered ditto	c. m.
164	parviflora	Small-flowered ditto, s.	l.

OCTANDRIA MONOGYNIA.

165	Kœlreuteria paniculata,	Panicled Kœlreuteria, s.	b. l.
166	Vaccinium stamineum,	Green-twigged Bleaberry, s.	b. m.
167	diffusum	Shining-leaved ditto, s.	b. m.
168	fuscatum	Brown ditto, s.	b. m.
169	angustifolium	Narrow-leaved ditto, s.	b. m.
170	frondosum	Obtuse-leaved ditto, s.	b. m.
171	venustum	Red-twigged ditto, s.	b. m.
172	resinosum	Clammy ditto, s.	b. m.
173	amœnum	Broad-leaved ditto, s.	b. m.
174	virgatum	Twiggy-leaved ditto, s.	b. m.
175	tenellum	Gale-leaved ditto, s.	b. m.
176	macrocarpon	Large-fruited ditto, s.	b. m
177	nitidum	Shining-leaved ditto, s.	b. m.
178	ligustrinum	Privet-leaved ditto, s.	b. m.
179	pumilum	Dwarf ditto, s.	b. m.
180	Erica ciliaris, e.	Ciliated Heath, s.	b.m.s.
181	mediterranea, e.	Mediterranean ditto, s.	b.m.s.
182	australis, e.	Spanish ditto, s.	b.m.s.
183	herbacea, e.	Herbaceous ditto, s.	b. m.
184	arborea, e.	Tree ditto, s.	b.m.s.
185	Daphne alpina	Alpine Daphne, s.	b. l.
186	pontica	Two-flowered ditto, s.	b.l.s.
187	Cneorum, e.	Trailing ditto, s.	b. l.
188	Tarton-raira	Silvery-leaved Daphne, s.	b. l. s.
189	collina	Hairy ditto, s.	b.l. s.
190	Gnidinm	Flax-leaved, s.	b.l. s.
191	Dirca palustris	Marsh Leatherwood, s.	b. m.

OCTANDRIA DIGYNIA.

192	Polygonum frutescens,	Shrubby Polygonum, s.	b. s.

ENNEANDRIA MONOGYNIA.

193	Laurus Benzoin, e.	Benjamin-Tree, s.	c. m.
194	nobilis, e.	Sweet Bay, s.	c. m.
195	Sassafras	Sassafras-Tree, s.	b. l.

DECANDRIA MONOGYNIA.

196	Sophora japonica	Japan Sophora	c. m.
197	Cercis Siliquastrum	European Judas-Tree	c. m.
198	canadensis	American ditto	c. m.
199	Guilandina dioica	Canadian Bonduc	c. m.
200	Ruta graveolens	Common Rue, s.	c. m.
201	montana	Mountain ditto, s.	c. m.
202	Kalmia latifolia, e.	Broad-leaved Kalmia, s.	b. s.
203	angustifolia	Narrow-leaved ditto, s.	b. s.

204	Kalmia, v. *carnea*	Pale-flowered ditto, s.	b. s.
205	glauca, e.	Glaucous-leaved ditto, s.	b. s.
206	Ledum palustre, e.	Marsh Rosemary, s.	b. s.
207	v. *decumbens*, e.	Dwarf ditto, s.	b. s.
208	latifolium, e.	Labrador Tea, s.	b. s.
209	buxifolium, e.	Box-leaved Ledum, s.	b. s.
210	Rhodora canadensis	Canadian Rhodora, s.	b. m.
211	Rhododendron maximum, e.	Large-leaved ditto, s.	b. m.
212	dauricum, e.	Dauric ditto, s.	b. m.
213	hirsutum, e.	Hairy ditto, s.	b. m.
214	ponticum, e.	Pontic ditto, s.	b. m.
215	*fol. variegat.* e.	Striped-leaved ditto, s.	b. m.
216	catawbiense, e.	Large ditto, s.	b. m.
217	ferrugineum, e.	Rusty-leaved Rhododendron,	b. m.
218	punctatum, e.	Dotted ditto, s.	b. m.
219	Andromeda mariana	Maryland Andromeda, s.	b. m.
220	v. *oblonga*	Oval-leaved ditto, s.	b. m.
221	ferruginea	Rusty-leaved ditto, s.	b. m.
222	polifolia, v. *major*,	Broad-leaved rusty ditto, s.	b. m.
223	paniculata	Panicled ditto, s.	b. m.
224	arborea	Tree ditto, s.	b. m.
225	racemosa	Branching ditto, s.	b. m.
226	axillaris	Notch-leaved ditto, s.	b. m.
227	coriacea	Thick-leaved ditto, s.	b. m.
228	acuminata	Acute-leaved ditto, s.	b. m.
229	calyculata	Globe-flowered ditto, s.	b. m.
230	v. *latifolia*	Broad Box-leaved ditto, s.	b. m.
231	v. *angustifolia*	Narrow-leaved ditto, s.	b. m.
232	Catesbæi	Catesby's ditto, s.	b. m.
233	Epigæa repens, e.	Creeping Epigæa, s.	b. s.
234	Gualtheria procumbens, e.	Procumbent Gualtheria, s.	b. s.
235	Arbutus Unedo, e.	Common Strawberry-Tree, s.	b. l.
236	v. *fl. rubro*, e.	Scarlet-flowered ditto	b. l.
237	v. *flore pleno*, e.	Double-flowered ditto	b. l.
238	v. *angustifolia*, e.	Narrow-leaved ditto	b. l.
239	v. *crispa*, e.	Curled-leaved ditto	b. l.
240	Andrachne, e.	Eastern ditto, s.	b. l.
241	Clethra alnifolia	Alder-leaved Clethra, s.	b. l.
242	v. *pubescens*	Pubescent ditto, s.	b. l.
243	Styrax officinale	Officinal Styrax, s.	b. l.
244	grandifolium	Large-leaved ditto, s.	l.
245	lævigatum	Smooth-leaved ditto, s.	l.

DECANDRIA DIGYNIA.

246	Hydrangea arborescens,	Tree Hydrangea, s.	c. m.
247	hortensis	Changeable-flowered ditto, s.	c. m.
248	glauca	Glaucous-leaved ditto, s.	b. l.
249	radiata	Rayed-flowered ditto, s.	b. l.

DODECANDRIA MONOGYNIA.

250	Halesia tetraptera	Wing-seeded Snow-drop tree,	c. m.

DODECANDRIA TRIGYNIA.

251	Euphorbia spinosa	Shrubby Euphorbia, s.	b. l.
252	Aristotelia Macqui, e.	Shining-leaved Aristotelia, s.,	b. s.

ICOSANDRIA MONOGYNIA.

253	Philadelphus coronarius,	Common Syringa, s.	c. m.
254	nanus	Dwarf ditto, s.	c. m.
255	Punica Granatum, w.	Pomegranate, s.	l. w. s.
256	*flore pleno*, w.	Double-flowered ditto, s.	l. w. s.
257	*flore luteo*, w.	Yellow-flowered ditto, s.	l. w. s.
258	*flore albo*, w.	White-flowered ditto, s.	l. w. s.
259	nana, w.	Dwarf ditto, s.	l. w. s.
260	Amygdalus Persica	Peach Tree	c. m.
261	v. *flore pleno*	Double-flowering ditto	c. m.
262	v. *Nectarina*	Nectarine	c. m.
263	nana	Rough-leaved Almond, s.	c. m.
264	pumila	Dwarf ditto, s.	c. m.
265	communis	Common ditto	c. m.
266	*fol. variegat.*	Striped-leaved ditto	c. m.
267	chinensis	Chinese ditto	c. m.
268	orientalis	Silvery-leaved ditto	c. m.
269	sibirica	Siberian ditto	c. m.
270	Prunus virginiana	Virginian Bird-Cherry	c. m.
271	caroliniana	Carolinian ditto	c. m.
272	lusitanica, e.	Portugal Laurel	c. m.
273	Lauro-Cerasus, e.	Common Laurel, s.	c. m.
274	Maheleb	Perfumed Cherry	c. m.
275	Armeniaca	Apricot Tree	c. m.
276	pumila	Dwarf Bird-Cherry	c. m.
277	pendula	Weeping Cherry	c. m.
278	pennsylvanica	Pennsylvanian Bird-Cherry	c. m.
279	nigra	Black ditto, s.	c. m.
280	cerasifera	Mirobalum Plum Tree	c. m.
281	rubra	Cornish Bird-Cherry	c. m.
282	Cerasus, v. *flore pleno*,	Double-flowering ditto	c. m.
283	domestica	Common Plum	c. m.
284	v. *flore pleno*	Double-flowering ditto	c. m.
285	sibirica	Siberian ditto, s.	c. m.

ICOSANDRIA DIGYNIA.

286	Cratægus Crus galli	Cockspur Thorn	c. m.
287	v. *pyracanthifolia*	Pyracanthus-leaved ditto	c. m.
288	salicifolia	Willow-leaved ditto	c. m.
289	Aria, v. *suecica*	Swedish White Beam Tree	c. m.
290	coccinea	American Hawthorn	c. m.
291	sanguinea	Bloody ditto	c. m.
292	cordata	Maple-leaved ditto	c. m.
293	pyrifolia	Pear-leaved ditto	c. m.

294	Cratægus elliptica	Oval-leaved ditto	c. m.
295	glandulosa	Hollow-leaved ditto	c. m.
296	flava	Yellow-berried ditto	c. m.
297	parviflora	Gooseberry-leaved ditto	c. m.
298	punctata	Great-fruited ditto	c. m.
299	v. *aurea*	Great Yellow-fruited ditto,	c. m.
300	Azarolus	Parsley-leaved ditto	c. m.
301	monogynia, v. *coc.*	Scarlet Thorn	c. m.
302	tomentosa	Woolly-leaved ditto	c. m.
303	odoratissima	Sweet-scented ditto	c. m.

ICOSANDRIA PENTAGYNIA.

304	Mespilus Pyracantha, e.	Evergreen Thorn	c. m.
305	Chamæ Mespilus	Bastard Quince	c. m.
306	canadensis	Snowy Service	c. m.
307	Cotoneaster	Dwarf Mespilus	c. m.
308	arbutifolia	Arbutus-leaved ditto	c. m.
309	*fructu rubro*	Red-fruited ditto	c. m.
310	*fructu albo*	White-fruited ditto	c. m.
311	tomentosa	Wholly ditto	c. m.
312	Amelanchier	Alpine ditto, s.	c. m.
313	pennsylvanica	Pennsylvanian ditto	c. m.
314	Pyrus Pollveria	Woolly-leaved Pear-tree	c. m.
315	spectabilis	Chinese Apple-tree	c. m.
316	prunifolia	Large Siberian Crab	c. m.
317	baccata	Small Siberian Crab	c. m.
318	coronaria	Sweet-scented ditto	c. m.
319	angustifolia	Narrow-leaved ditto	c. m.
320	Cydonia	Common Quince	c. m.
321	salicifolia	Willow-leaved Crab	c. m.
322	præcox	Early-flowering ditto	c. m.
323	Spiræa lævigata	Smooth-leaved Spiræa, s.	b. l.
324	salicifolia	Willow-leaved ditto, s.	c. m.
325	v. *paniculata*	Panicled ditto, s.	c. m.
326	v. *latifolia*	Broad-leaved ditto, s.	c. m.
327	tomentosa	Woolly-leaved ditto, s.	c. m.
328	Hypericifolia	Hypericum-leaved ditto, s.	c. m.
329	crenata	Crenated ditto, s.	c. m.
330	chamædrifolia	Germander-leaved ditto, s.	c. m.
331	thalictroides	Meadow Rue-leaved ditto, s.,	l.
332	Opulifolia	Guelder Rose-leaved ditto, s.	c. m.
333	sorbifolia	Mountain Ash-leaved, s.	b. m.
334	sibirica	Siberian ditto, s.	c. m.

ICOSANDRIA POLYGYNIA.

335	Rosa lutea	Single Yellow Rose, s.	l.
336	bicolor	Red and Yellow Austrian do.	l.
337	sulphurea, w.	Double Yellow ditto	l. s.
338	blanda	Hudson's Bay ditto	l.
339	cinnamonea. *fl. pl.*	Double Cinnamon ditto	c. m.
340	pimpinellifolia	Small Burnet-leaved ditto	c. m.

341	Rosa spinosissima, v.	Striped-flowered Scotch Rose,	c. m.
342	v. *ruberrima*	Red Scotch ditto	c. m.
343	v. *flore pleno*	Double Scotch ditto	c. m.
344	v. *altissima*	Tall Scotch ditto	c. m.
345	v. *versicolor*	Marbled Scotch ditto	c. m.
346	carolina	Single Burnet-leaved ditto	c. m.
347	v. *flore pleno*	Double Burnet-leaved ditto	c. m.
348	v. *pimpinellifolia*	Single Pennsylvanian ditto	c. m.
349	v. *pimpinellifol. fl. pl.*	Double Pennsylvanian ditto,	b. m.
350	v. *diffusa*	Spreading Carolina ditto	c. m.
351	v. *stricta*	Upright Carolina Rose	c. m.
352	villosa, v. *flore pleno*,	Double Apple-bearing ditto,	c. m.
353	provincialis	Common Provence ditto	c. m.
354	v. *ruberrima*	Scarlet Provence ditto	c. m.
355	v. *pallida*	Blush Provence ditto	c. m.
356	v. *alba*	White Provence ditto	c. m.
357	v. *multiflora*	Rose de Meaux	c. m.
358	v. *bicolor*	Rose de Pompone	c. m.
359	v. *humilis*	Rose de Rheims	c. m.
360	v. *prolifera*	Childing's Provence ditto	c. m.
361	v. *lusitanica*	Blandford or Portugal ditto	c. m.
362	v. ——	Rose St. Francis	c. m.
363	provincialis, v. ——	Shailer's Provence ditto	c. m.
364	ferox	Hedgehog ditto	c. m.
365	bracteata	Ld. Macartney's White Rose	c. m.
366	centifolia	Dutch Hundred-leaved ditto	c. m.
367	v. *rubicans*	Blush Hundred-leaved ditto	c. m.
368	v. *Singletoniæ*	Singleton's hundred-leaved do.	c. m.
369	v. *holosericea*	Single Velvet ditto	c. m.
370	v. *holosericea fl. pl.*	Double Velvet ditto	c. m.
371	v. *sultana*	Sultan Rose	c. m.
372	v. *stebennensis*	Stepney ditto	c. m.
373	v. ——	Lisbon ditto	c. m.
374	v. ——	Bishop ditto	c. m.
375	v. ——	Cardinal ditto	c. m.
376	v. ——	Blush Royal ditto	c. m.
377	v. ——	Petit Hundred-leaved ditto	c. m.
378	v. ——	Pluto ditto	c. m.
379	v. ——	Monstrous hundred-leaved do.	c. m.
380	v. ——	Fringe ditto	c. m.
381	v. ——	Plicate ditto	c. m.
382	v. ——	Two-colour red hund.-leav'd do.	c. m.
383	v. ——	Shell Rose	c. m.
384	parvifolia	Burgundy Rose	b. m.
385	gallica	Red officinal Rose	c. m.
386	v. *versicolor*	Rosa mundi	c. m.
387	v. *marmorea*	Marbled Rose	c. m.
388	v.	Royal Virgin ditto	c. m.
389	v. *major*	Giant ditto	c. m.
390	damascena	Red Damask ditto	c. m.

391	Rosa v. *rubicans*	Blush Damask Rose	c. m.
392	v. *versicolor*	York and Lancaster ditto	c. m.
393	v. *menstrualis*	Red Monthly ditto	c. m.
394	v. *menstrualis alba*,	White Monthly ditto	c. m.
395	v. *Belgica*	Blush Belgic ditto	c. m.
396	v.	Great Royal ditto	c. m.
397	v.	Blush Monthly ditto	c. m.
398	v.	Red Belgic ditto	c. m.
399	v.	Goliah Rose	c. m.
400	v.	Imperial Blush ditto	c. m.
401	multiflora	Many-flowered ditto	c. m.
402	sempervirens, c. e.	Evergreen Rose	c. m.
403	turbinata	Frankfort ditto	c. m.
404	rubiginosa. v.	Semidouble Sweetbriar	c. m.
405	v. *muscosa*	Mossy ditto	c. m.
406	v. *sempervirens*	Manning's Blush ditto	c. m.
407	v. *flore pleno*	Double Red ditto	c. m.
408	v.	Royal red ditto	c. m.
409	muscosa	Moss Provence Rose	c. m.
410	moschata	Single Musk ditto	c. m.
411	v. *flore pleno*	Double Musk Rose	c. m.
412	alpina	Alpine Rose	c. m.
413	v. *rubro*	Red Alpine ditto	c. m.
414	canina, v. *flore pleno*,	Double Dog-rose	c. m.
415	pendulina	Rose without Thorns	c. m.
416	alba	Single White Rose	c. m.
417	v. *flore pleno*	Double White ditto	c. m.
418	v. *prolifera*	Cluster Maiden's-blush ditto	c. m.
419	chinensis *	Blush China Rose	c. m.
420	semperflorens	Red China ditto	c. m.
421	americana	American Yellow ditto	c. m.
422	Rubus occidentalis	American Bramble	c. m.
423	odoratus	Flowering ditto	c. m.
424	fruticosus *inermis*, c.	Bramble without Thorns	c. m.
425	v. *laciniata*, c.	Cut-leaved Bramble	c. m.
426	v. *flore pleno*, c.	Double-flowered ditto	c. m.
427	Calycanthus floridus	Carolina Allspice, s.	l.
428	v. *oblongus*	Long-leaved ditto, s.	l.
429	præcox, w.	Early-flowered Chinese ditto	l. s.

POLYANDRIA MONOGYNIA.

430	Tilia Americana	Broad-leaved American Lime, s.,	c. m.
431	v. *corallina*	Red-twigged ditto, s.	c. m.
432	pubescens	Pubescent ditto, s.	c. m.
433	alba	White-leaved ditto, s.	c. m.
434	Cistus populifolius, e.	Poplar-leaved Cistus, s.	l. s.
435	v. *minor*	Small Poplar-leaved ditto, s.	l. s.
436	laurifolius, e.	Laurel-leaved ditto, s.	l. s.

* This species of Rose readily produces fertile seeds, between which and the others, Sect. 41, p. 21,) a large addition has, of late years, been made to the List of the varieties.—Vide Note at the termination of this arrangement.

437	Cistus Ladaniferus, e.	Gum Cistus, s.	c. m.
438	monspeliensis, e.	Montpelier Cistus, s.	l. s.
439	laxus, e.	Waved-leaved ditto, s.	l. s.
440	salvifolius, e.	Sage-leaved ditto, s.	l. s.
441	incanus, e.	Hoary ditto, s.	l. s.
442	albidus, e.	White-leaved ditto, s.	l. s.
443	crispus, e.	Curled-leaved ditto	l. s.
444	halimifolius, e.	Sea Purslane-leaved ditto, s.,	l. s.
445	halimifol. v. *angustifol.*	Narrow-leaved Cistus, s.	l. s.
446	umbellatus, e.	Umbelled-flowered ditto, s.	l. s.
447	roseus, e.	Red-flowered ditto, s.	l. s.
448	marifolius, e.	Marum-leaved ditto, s.	l. s.
449	Tuberaria, e.	Plantain-leaved ditto, s.	l. s.
450	apenninus, e.	Apennine ditto, s.	c. m.
451	mutabilis, e.	Changeable ditto, s.	l. s.

POLYANDRIA DIGYNIA.

452	Fothergillia alnifolia	Alder-leaved Fothergillia, s.	b. s.

POLYANDRIA POLYGYNIA.

453	Liriodendron Tulipifera,	Common Tulip Tree	c. m.
454	Magnolia grandiflora, e.	Laurel-leaved Magnolia	b. l. s.
455	v. *obovata*, e.	Broad-leaved ditto	b. l. s.
456	v. *lanceolata*, e.	Long-leaved ditto	b. l. s.
457	v. *ferruginea*, e.	Ferrugineous ditto	b. l. s.
458	glauca, e.	Swamp ditto	b. l. s.
459	acuminata, e.	Blue-flowering ditto	b. l. s.
460	tripetala	Umbrella Tree	b. l. s.
461	auriculata	Large-leaved ditto	b. l. s.
462	purpurea	Purple Chinese ditto	b. l. s.
463	Annona triloba	Trifid-fruited Custard Apple,	b. l. s.
464	Atragena alpina, c.	Alpine Atragena	b. l.
465	austriaca, c.	Austrian ditto	b. l.
466	Clematis cirrhosa, c.	Evergreen Virgin's Bower	b. l.
467	florida, c.	Large-flowered ditto	b. l.
468	*flore pleno*	Double ditto	c. m.
469	viticella, c.	Purple-flowered ditto	b. l.
470	v. *flore pleno*, c.	Double Purple-flowered ditto,	c. m.
471	crispa, c.	Curled-flowered ditto	b. l.
472	orientalis, c.	Eastern ditto	b. l.
473	virginiana, c.	Virginian ditto	c. m.
474	flammula, c.	Sweet-scented ditto	c. m.

DIDYNAMIA GYMNOSPERMIA.

475	Teucrium flavum, e.	Yellow Teucrium, s.	l. s.
476	Satureja montana	Wintry Savory, s.	c. m.
477	Hyssopus officinalis	Common Hyssop, s.	c. m.
478	Lavandula Spica	Lavender, s.	c. m.
479	v. *flore albo*	White-flowered ditto, s.	c. m.
480	Stœchas	French ditto, s.	c. m. s.
481	Phlomis fruticosa, e.	Jerusalem Sage, s.	c. m.
482	Thymus vulgaris, e.	Common Thyme, s.	c. m.

483	Thymus, v. *fol. variegat.* e.	Silver Thyme, s.	c. m.
484	vulgaris, *latifolia*, e.	Broad-leaved Thyme, s.	c. m.
485	Zygis, e.	Linear-leaved ditto, s.	c. m.

DIDYNAMIA ANGIOSPERMIA.

486	Bignonia Catalpa	Common Catalpa	c. m.
487	radicans, c.	Great Trumpet Flower	c. m.
488	v. *minor*	Small ditto	c. m.
489	capreolata, c.	Four-leaved ditto	l. s.
490	Vitex Agnus Castus	Chaste Tree, s.	c. m.
491	v. *latifolia*	Broad-leaved ditto, s.	c. m.

TETRADYNAMIA SILICULOSA.

492	Vella Pseudo-cytisus, c.	Shrubby Vella, s.	l. s.

MONADELPHIA POLYANDRIA.

493	Hibiscus syriacus	Althæa Frutex, s.	c. m.
494	v. *ruber*	Red-flowered ditto, s.	c. m.
495	v. *albus*	White-flowered ditto, s.	c. m.
496	v. *fol. variegat.*	Striped-leaved ditto, s.	c. m.
497	v. *flore pleno*	Double white-flowered do., s.,	c. m.
498	Stuartia Malacodendron,	Common Stuartia, s.	b. l. s.
499	marilandica	Maryland ditto, s.	b. l. s.
500	Gordonia pubescens	Loblolly Bay, s.	b. l. s.

DIADELPHIA OCTANDRIA.

501	Polygala Chamæbuxus,	Box-leaved Milkwort, s.	b. m.

DIADELPHIA DECANDRIA.

502	Spartium Junceum	Spanish Broom, s.	c. m.
503	*flore pleno*	Double-flowered ditto, s.	l. s.
504	decumbens	Trailing Broom, s.	c. m.
505	Scorpius	Scorpion ditto, s.	c. m.
506	multiflorum	Portugal White ditto, s.	c. m.
507	patens	Woolly-podded ditto, s.	c. m.
508	purgans	Purging ditto, s.	c. m.
509	radiatum	Starry ditto, s.	b. m.
510	Genista candicans	Evergreen Genista, s.	c. m.
511	triquetra	Triangular ditto, s.	c. m.
512	sagittalis	Jointed ditto, s.	l.
513	sibirica	Siberian ditto, s.	c. m.
514	germanica	German ditto, s.	l.
515	hispanica	Spanish ditto, s.	l.
516	lusitanica	Portugal ditto, s.	l.
517	Amorpha fruticosa	Bastard Indigo, s.	c. m.
518	Ononis rotundifolia	Round-leaf Rest-Harrow, s.,	l.
519	fruticosa	Shrubby ditto, s.	l.
520	Glycine frutescens, w.	Shrubby Kidney-bean tree, s.,	c. m.
521	Cytisus Laburnum	Common Laburnum	c. m.
522	v. *latifolium*	Scotch ditto	c. m.
523	alpinus	Alpine Cytisus, s.	c. m.
524	nigricans	Black ditto, s.	c. m.
525	divaricatus	Divaricated ditto, s.	c. m.
526	Cytisus sessilifolius	Sessile-leaved ditto, s.	c. m.

527	Cytisus hirsutus	Hairy Evergreen Laburnum, s.,	c. m. s.
528	purpureus	Purple-flowered ditto, s.	b. l.
529	austriacus	Austrian ditto, s.	l.
530	supinus	Trailing ditto, s.	l.
531	capitatus	Large Yellow-flowered do., s.,	c. m.
532	biflorus	Two-flowered ditto, s.	c. m.
533	Robinia Pseudo-Acacia,	Common Acacia	c. m.
534	hispida	Rose Acacia, s.	c. m.
535	glutinosa	Glutinous Acacia	c. m.
536	Caragana	Caragana ditto, s.	c. m.
537	Altagana	Siberian ditto, s.	l.
538	Chamlagu	Shining-leaved ditto, s.	l.
539	spinosa	Thorny ditto, s.	l.
540	Halodendron	Salt Tree, s.	l.
541	frutescens	Shrubby Robinia, s.	l.
542	pygmea	Dwarf ditto, s.	l.
543	jubata	Bearded ditto, s.	l.
544	Colutea arborescens	Common Bladder Senna	c. m.
545	cruenta	Eastern ditto, s.	c. m.
546	Pocockii	Pocock's ditto, s.	c. m.
547	Coronilla Emeris	Scorpion Senna, s.	c. m.
548	Astragalus Tragacantha,	Goat's Thorn, s.	l.

POLYADELPHIA POLYANDRIA.

549	Hypericum calycinum,	Grt. flowered St. John's-wort,	c. m.
550	hircinum	Fœtid ditto, s.	c. m.
551	v. *minus*	Lesser Fœtid ditto, s.	c. m.
552	elatum	Tall ditto, s.	c. m.
553	prolificum	Proliferous ditto, s.	c. m.
554	olympicum	Olympian ditto, s.	l. s.
555	Kalmianum	Kalmia-leaved ditto, s.	c. m.

SYNGENESIA POLYGAMIA ÆQUALIS.

556	Santolina Chamæcyparissus,	Lavender Cotton, s.	c. m.
557	rosmarinifolius	Rosemary-leaved ditto, s.	c. m.

SYNGENESIA POLYGAMIA SUPERFLUA.

558	Gnaphalium Stœchas	Narrow-leaf Everlasting, s.,	l. s.
559	Baccharis halimifolia	Groundsel Tree, s.	c. m.
560	Cineraria maritima	Sea Rag-wort, s.	l. s.

GYNANDRIA PENTANDRIA.

561	Passiflora cœrulea, c.	Blue Passion Flower	c. m. s.

GYNANDRIA HEXANDRIA.

562	Aristolochia Sipho, c.	Tree Birthwort	l.

MONŒCIA TRIANDRIA.

563	Axyris Ceratoides	Shrubby Axyris, s.	l. s.
564	Comptonia asplenifolia,	Fern-leaved Gale, s.	b. s.

MONŒCIA TETRANDRIA.

565	Aucuba japonica, e.	Blotched-leaved Aucuba, s.	l. b. s.
566	Betula populifolia	Poplar-leaved Birch	c. m.
567	nigra	Black Birch	c. m.

568	Betula papyracea	Paper Birch	c. m.
569	pumila	Hairy-leaved Dwarf ditto, s.	b. m.
570	oblongata	Oblong-leaved ditto	c. m.
571	laciniata	Cut-leaved Alder	c. m.
572	incana	Glaucous-leaved ditto	c. m.
573	v. *angulata*	Elm-leaved ditto	c. m.
574	Buxus balearicus	Minorca Box, s.	l. s.
575	semperv.v. *variegat.* e.	Striped-leaved ditto, s.	c. m.
576	v. *angustifolia*, e.	Narrow-leaved ditto, s.	c. m.
577	Morus alba	White Mulberry	c. m.
578	nigra	Black ditto	c. m.
579	papyracea	Paper ditto	c. m.
580	rubra	Red ditto	c. m.

MONŒCIA PENTANDRIA.

581	Iva frutescens	Bastard Jesuit's-Bark Tree, s.,	c. m.

MONŒCIA POLYANDRIA.

582	Quercus Phellos	Willow-leaved Oak	l.
583	v. *sericea*	Dwarf Willow-leaved ditto	l.
584	Ilex, e.	Evergreen Oak	c. m.
585	v. *serrata*, e.	Sawed-leaved Evergreen ditto,	c. m.
586	v. *oblonga*, e.	Oblong-leaved Evergreen do.,	c. m.
587	Suber	Cork Tree	c. m.
588	virens	Live Oak	c. m.
589	Prinos	Chesnut-leaved Oak	l. s.
590	v. *oblonga*	Long-leaved ditto	l.
591	aquatica	Water Oak	l.
592	v. *heterophylla*	Various-leaved Water Oak	l.
593	v. *elongata*	Long-leaved Water ditto	l.
594	v. *indivisa*	Entire-leaved Water ditto	l.
595	v. *attenuata*	Narrow-leaved Water ditto	l.
596	nigra	Black Oak	c. m.
597	rubra	Red ditto	c. m.
598	v. *coccinea*	Scarlet ditto	c. m.
599	v. *montana*	Mountain Red ditto	c. m.
600	discolor	Downy-leaved ditto	c. m.
601	alba	White Oak	c. m.
602	Ægilops	Large prickly-cupped ditto	l.
603	Cerris	Turkey Oak	c. m.
604	Fagus pumila	Chinquapin Chesnut, s.	l. s.
605	ferruginea	Copper Beech	c. m.
606	sylvatica v. *purpurea*,	Purple ditto	c. m.
607	v. *asplenifolia*	Fern-leaved ditto	c. m.
608	Carpinus virginiana	Virginian Hornbeam	c. m.
609	Ostrya	Hop Hornbeam	c. m.
610	Corylus rostrata	American Cuckold Nut	c. m.
611	Colurna	Constantinople ditto	c. m.
612	Platanus orientalis	Palmated Plane Tree	c. m.
613	v. *acerifolia*	Maple-leaved ditto	c. m.
614	v. *undulata*	Waved-leaved ditto	c. m.

615	Platanus occidentalis	Lobed-leaved Plane Tree	c. m.
616	Liquidamber Styraciflua,	Maple-leaved Gum-tree	l.
		MONŒCIA MONADELPHIA.	
617	Pinus Pinaster, e.	Pinaster	c. m.
618	Inops, e.	Jersey Pine	l.
619	resinosa, e.	Pitch ditto	l.
620	halepensis, e.	Aleppo Pine	l.
621	Pinea, e.	Stone Pine	l.
622	Tæda, e.	Frankincense ditto	l.
623	v. *rigida*, e.	Three-leaved ditto	l.
624	v. *variabilis*, e.	Two and three-leaved ditto	l.
625	v. *alopecuroides*, e.	Fox-tail ditto	l.
626	v. Cembra, e.	Siberian Stone ditto	c. m.
627	Strobus, e.	Weymouth ditto	c. m.
628	Cedrus, e.	Cedar of Lebanon	c. m.
629	Larix	Red Larch	c. m.
630	v. *pendula*	Black Larch	c. m.
631	Picea, e.	Silver Fir	c. m.
632	Balsamea, e.	Balm-of-Gilead Fir	c. m.
633	canadensis, e.	Hemlock Spruce Fir	c. m.
634	nigra, e.	Black ditto	c. m.
635	alba, e.	White ditto	c. m.
636	Abies, e.	Red or Common ditto	c. m.
637	sylvestris	Scotch Fir	l.
638	v. *montana*, e.	Mountain Pine	l.
639	v. *divaricata*, e.	Hudson's-bay ditto	l.
640	v. *maritima*, e.	Sea ditto	l.
641	Thuja occidentalis, e.	American Arbor-vitæ	c. m.
642	orientalis, e.	Chinese ditto	c. m.
643	Cupressus sempervirens, e.	Upright Cypress, s.	c. m.
644	v. *horizontalis*, e.	Male Spreading ditto	c. m.
645	disticha	Deciduous ditto	c. m.
646	v. *nutans*	Long-leaved Deciduous ditto,	l.
647	thyoides, e.	Arbor-vitæ-leaved ditto, s.	c. m.
648	pendula, e.	Cedar of Goa, s.	l. s.
		DIŒCIA DIANDRIA.	
649	Salix phylicæfolia	Philica-leaved Willow	c. m.
650	babylonica	Weeping Willow	c. m.
651	retusa	Blunt-leaved ditto	c. m.
652	incubacea	Spreading Willow	c. m.
653	ulmifolia	Elm-leaved ditto	c. m.
654	hastata	Halbert-leaved ditto	c. m.
655	myrtilloides	Myrtle-leaved ditto	c. m.
656	Lapponum	Lapland ditto	c. m.
657	tristis	Narrow-leaf American ditto,	c. m.
		DIŒCIA TRIANDRIA.	
658	Empetrum rubrum, e.	Red Crow Berry, s.	b. m.
659	Hippophaë canadensis,	Canada Sea Buck-thorn	b. l. s.
660	Myrica cerifera	Candleberry Myrtle, s.	b. l.
661	v. *latifolia*	Broad-leaved ditto, s.	b. l.

DIŒCIA PENTANDRIA.

662 Pistachia Terebinthus, Pistachia Nut Tree l. s.
663 Xanthoxylum Clava Herculis, Tooth-ach Tree c. m.

DIŒCIA HEXANDRIA.

664 Smilax aspera, c. e. Rough Bindweed, s. l. b.
665 lanceolata, c. Spear-leaved ditto, s. l. b.
666 rotundifolia, c. Round-leaved ditto, s. l. b.
667 Bona Nox, c. Ciliated ditto, s. l. b.
668 laurifolia, c. e. Laurel-leaved ditto, s. l. b.
669 sarsaparilla, c. Sarsaparilla ditto, s. l. b.
670 tamnoides, c. Briony-leaved ditto, s. l. b.
671 caduca, c. Deciduous ditto, s. l. b.

DIŒCIA OCTANDRIA.

672 Populus dilatata Lombardy Poplar c. m.
673 balsamifera Tacamahac ditto c. m.
674 candicans White-leaved ditto c. m.
675 lævigata Smooth-leaved ditto c. m.
676 monilifera Canadian ditto c. m.
677 græca Athenian ditto c. m.
678 heterophylla Various-leaved ditto c. m.
679 angulata Carolina ditto c. m.

DIŒCIA DECANDRIA.

680 Coriaria myrtifolia Myrtle-leaved Sumach, s. c. m.

DIŒCIA DODECANDRIA.

681 Menispermum canadense, c. Canada Moon-seed l. b.
682 carolinianum Carolina ditto l. b.

DIŒCIA MONADELPHIA.

683 Juniperus thurifera, e. Spanish Juniper, s. c. m.
684 Sabina, e. Common Savin, s. c. m.
685 v. *tamariscifolia*, e. Tamarisk-leaved ditto, s. c. m.
686 Juniperus v. *fol. variegat.* e. Variegated Savin, s. c. m.
687 virginiana, e. Red Cedar, s. c. m.
688 repens, e. Creeping ditto, s. c. m.
689 Oxycedrus, e. Brown-berried ditto, s. l. b. s.
690 phœnicea, e. Phœnician ditto, s. l. b. s.
691 bermudiana, e. Bermudian ditto, s. l. b. s.
692 communis, v. *suecica*, e. Swedish ditto, s. c. m.
693 montana, e. Alpine ditto, s. l. b.
694 Ephedra monostachya, e. Shrubby Horse-tail, s. l. b.
695 distachya Greater ditto, s. l. b.
696 Cissampelos smilacina Smilax-leaved Cissampelos, s. l. b.

DIŒCIA SYNGENESIA.

697 Ruscus Hypoglossum, e. Bd-leaved Alexandrian laurel, c. m.
698 Hypophyllum, e. Double-leaved ditto, s. b. m.
699 racemosus, e. Common ditto, s. b. m.

POLYGAMIA MONŒCIA.

700 Atriplex Halimus Sea Purslane, s. c. m.
701 Acer tataricum Tartarian Maple c. m.

702	Acer rubrum	Scarlet Maple	c. m.
703	v. *pallidum*	Pale ditto	c. m.
704	saccharinum	Sugar Maple	c. m.
705	platanoides	Plane-leaved ditto	c. m.
706	v. *laciniatum*	Cut-leaved ditto	c. m.
707	montanum	Mountain ditto, s.	c. m.
708	pennsylvanicum	Pennsylvanian ditto	c. m.
709	monspessulanum	Montpelier ditto	c. m.
710	creticum	Cretan ditto, s.	c. m.
711	Negundo	Ash-leaved ditto	c. m.
712	Opalus	Italian ditto	c. m.

POLYGAMIA DIŒCIA.

713	Gleditsia triacanthos	Three-thorned Acacia	c. m.
714	v. *horrida*	Strong-spined ditto	c. m.
715	v. *monosperma*	Single-seeded ditto	c. m.
716	Fraxinus rotundifolia	Round-leaved Ash	c. m.
717	excelsior, v. *crispa*	Curled-leaved ditto	c. m.
718	v. *diversifolia*	Various-leaved ditto	c. m.
719	v. *pendula*	Weeping Ash	c. m.
720	v. *striata*	Striped-barked ditto	c. m.
721	v. *variegata*	Blotched-leaved ditto	c. m.
722	Ornus	Flowering ditto	c. m.
723	americana	American ditto	c. m.
724	chinensis	Chinese ditto	c. m.
725	rotundifolia	Round-leaved ditto	c. m.
726	Diospyrus Lotus	Date Plum Tree	c. m.

*** In drawing up the foregoing Catalogue, the Editor regrets that in this small compendium he cannot enumerate many beautiful varieties which have of late been introduced to our gardens: he alludes particularly to the great addition made to the genus Rosa. SWEET, in the last edition of his Catalogue, enumerates by name within a few of *fifteen hundred* species and varieties; some of the smaller kinds of which are readily propagated by budding on the larger, that are suffered to grow up to single stems.

The amateur gardener will be much gratified by observing this, with good effect, in the garden of Dr. GARLIKE, at Great Malvern; where some strong shoots of a Sweetbriar hedge have been allowed to grow standard high, on which the ingenious gardener has budded several varieties; whereby he converts what would otherwise appear a mere solitary pathway into an earthly paradise, all the summer season.

In a similar way will also be seen a numerous variety of these and other similar shrubs, metamorphosed, so as to become of esteemed value, in the Nursery and Botanic Garden of

Mr. JESSOP, at Cheltenham; as, for instance, the Cytisus purpureus *(Laburnum)* on the top of a high stem.

MODE AND TIME OF PLANTING.

In marking out tracts of ground to receive shrubs, and the distances at which they are to stand, regard should be had to the different heights and modes of growth of different sorts, and even to the gradations of colour in the tints of the leaves: but as this subject is enlarged upon in the PLEASURE GROUND, it may suffice to give here a simple rule, necessary to be observed that the plants may grow vigorously, by receiving the utmost benefit from the free access of air and the rays of the sun. The loftier the shrub, the more backward should its situation be in the border or clump; while, by keeping those with low heads in front, each kind will be conspicuous. The distance between the plants should be controlled not only by their general height, but by the direction of the branches: those which shoot horizontally require an additional space to expand in, that the branches of one may not interfere with those of another. In clumps or connected plantations, the smallest in the front may be from three to five feet apart, and the intervals between the plants behind may increase as they rise in height and recede in situation.

Further, by allowing a due distance between plant and plant, you have proper room to dig the ground, to hoe between the shrubs, and to do every thing else relating to their culture.

When it is desirable to hide the face of any rugged wall or unsightly building with evergreens, plants of the Phillyrea, Laurel, Laurustinus, Pyracantha, or other chosen sorts, full of spray and close in the foliage, should be disposed close to the object, three or four feet asunder, and their branches trained to it in the manner of wall-trees. The four sorts named are of quick growth; and their cheerful-looking leaves will effectually cover the surface intended to be concealed.

In the narrow borders of a flower-garden, the shrubs introduced should not generally be nearer together than six or eight feet; but their distribution must vary with the ground, and the design of the planter. The best shrubs for diversifying flower-borders are those of moderate growth, such as, the Rose, Syringa, Jasmine, Honeysuckle, Spiræa, Althæa, Cytisus, Hypericum, Guelder-rose, Dwarf Almond, Laurustinus, Arbutus, Mezereon, Cistus, and Rhododendron.

Some of the more ornamental sorts, to be the better disposable, may be planted in pots.

The seasons for planting fall in autumn and spring: in mild

years, the former is so prolonged, and the latter begins so early, that winter unaccompanied with frost is not regarded so as totally to suspend the plantation of hardy trees and shrubs: between September and April, some months, however, are preferable and safer for removing these than others.

Times for planting deciduous sorts.—The eligible time for removing these BEGINS with the fall of the leaf in each respective species: the time of which, though it varies a little according to the season and the constitution of the plant, is always near the middle of October: and thence, to the stage when the sap begins to rise in spring, about the middle of March, all kinds of hardy deciduous trees may be transplanted in open weather.

The end of October is a capital time: the whole of November is very good: for, in being transplanted soon after the leaf decays, the plant has the advantage of the considerable interval which usually elapses before the frost sets-in hard; and if the root strikes afresh before the winter, the plant will be so well established by the following summer that the drought in the hottest season will not hurt it.

In December, the general transplanting of the deciduous tribe may be continued in mild weather; but if the more tender and curious exotics are removed, the ground over the roots should be mulched, to keep out the frost that must be expected: this is done by laying some dryish dung or long litter to a good thickness on the surface, and as far round as the roots spread, or a little farther.

In the course of January, during settled open weather, any of the deciduous trees and flowering shrubs already enumerated as hardy may be also planted, the more delicate being treated as just recommended, to keep the frost from the roots. If the ground designed to receive the plants is apt to lodge wet, it is better to defer the removal of them till February.

In February they may be safely removed, if the weather be open; and most sorts will take root at that season very freely.

You may continue to transplant them without risk till the middle of the month of March; and if any occasion for new plants arises even when March is drawing to a close, most sorts will yet succeed. But the plantation of deciduous trees, when deliberately undertaken, should be finished about the middle of the month.

Roses planted in March will flower the same year: but the sooner they are planted, the better they will strike root, and the sooner flower.

Having specified the extremes within which it is advisable to keep, in planting deciduous ornamental trees for common purposes, it may be serviceable to state the latitude to which Early Transplanting, or Late Transplanting, for particular objects, may be ventured.

Early Transplanting.—If new trees in some particular place be wanted, you may remove the sorts in which the leaves fall the soonest, as soon as two-thirds of September are past. Give a good watering immediately after putting them in the ground; and, if the weather be dry, and the exposure warm, repeat the watering about twice; and they will strike the same season without requiring any more.

Late Transplanting.—If there be any vacuity in spots set apart for shrubs, plants may be removed pretty safely till the second week in April; but they must not only be watered well at planting, but refreshed with water constantly during the dry intervals of summer, to keep them alive. To provide a bloom of roses as late as July, August, and September, the transplanting of an assigned number is sometimes postponed till April or the beginning of May: plenty of water must be given them, till they are well rooted.

Transplanting Evergreens.—Towards the middle of August you may begin to transplant evergreens with safety, especially if the weather proves moist. If it be dry, they must be plentifully watered at planting, and once or twice afterwards. They will probably make new roots before the winter.

Hardy plants may be removed freely any time in October, the sooner the better, that they may take root before the setting-in of frost. Choose a time when the ground is in a moist state.

Throughout November, planting may be continued during open weather. By the end of this month it is desirable that the autumn-planting of evergreens should be finished.

When there is a necessity for removing ornamental shrubs in December, it will be advisable to mulch round the bottom of the stem, as soon as they are planted. The objection to the transplanting of evergreens in December or the end of November, however mild at the time, arises from the daily probability of sharp frost coming just afterwards; for the evergreens, being in a state of growth in the herb, are liable to be injured in the young shoots and leaves, if severe weather occurs soon after they are removed; and in this respect they are less hardy than the deciduous tribe.

Towards the end of January, hardy evergreens may be re-

moved, if frost do not forbid; but no general transplanting of them should be undertaken till February or March. Sometimes, when the weather is open in January, the ground may be too wet.

If February prove settled and mild, there will be no risk in transplanting: the latter part of that month approaches to the best time for removing evergreens.

When it is open weather in March, they will take root most freely in fresh earth: if it be a dry time, give water, and lay moist mulch round the stem, to prevent the sun and wind from drying the earth excessively.

Evergreens may be very successfully removed till the middle of April, at which period the general transplanting should be completed: guard the earth over the roots from the drying effects of the sun, as just directed.

The proper times for transplanting Box, and other evergreen edgings, are the same as for the larger plants.

Some few kinds of evergreens, the Arbutus for example, the Rhododendron, and the Cypress, may be transplanted even in May: but they will be lost if not well watered.

PREPARATION OF THE GROUND.

If you have any vacant piece of ground designed to receive plants from the nursery, you may begin in August to prepare it, that it may be in readiness when the season arrives. August is a good time to commence this work, unless a continuance of very dry weather should have made the ground too hard.

When the surface has been dug over, let it be trenched or laid up in ridges, in order that it may be ameliorated by the rains, sun, and dew, and by the frost if it lie till winter. To receive plants, it will only require to be levelled.

In November, December, and January, a similar course should be taken with ground designed for a new plantation in the following spring.

Unless the soil be poor, or exhausted by a previous plantation, manure may not be necessary. When dung is incorporated with the soil for trees, it should be only the well-reduced dung from an old heap. Fresh loam is better applied to the roots of woody plants than undigested litter. Having wheeled in the recruiting matter, spread it equally over the surface, three inches thick, or more; after which let it be regularly trenched-in, one spade deep.

From August to January is likewise a good time to get fresh earth from heaths, commons, and peat-bogs, for American and other curious exotic plants. To prepare this earth, lay it in

ridges, and let it be occasionally broken and turned in frosty weather.

Removal of Plants.—The least hardy plants, which as curious exotics are often the most valuable kinds, should be taken up with a ball of earth to the roots. Evergreens, as being always in a state of growth, it is desirable to have so dug up, on all occasions, that the old mould may adhere about the roots.

In order to convey curious shrubs to a considerable distance without damage, great care in packing them is necessary. Tie them in bundles, and protect the roots by a good wrapping of straw; then let every bundle be packed up in mats. See *Nursery.*

Plants of every kind procured from the nurseries should be immediately unpacked. To prevent their roots from being dried by the sun and wind, they should be then planted without delay; and if the allotted ground is not ready to receive them, the roots should be laid in a trench, and covered with earth, till the respective places are prepared, and the cavities dug.

Manual Process in Planting.—Dig a round cavity for each plant, capacious enough to receive the roots freely, from half a yard to a yard across, aud a spade or more in depth; and let the bottom be well loosened.

Having the plants at hand, prune the ends of long and straggling roots, and cut away such parts as are broken or decayed; also prune off strong lateral shoots springing low on the stem, and reduce any irregularity in the head: in the deciduous kinds, in particular, large and spreading heads may be safely pruned at planting, so as to bring them to symmetrize with the size of the stem and the compass of the roots: but the top leading-shoots must be preserved entire. In planting evergreens, however, after October, and thence at any time while very cold weather may prevail, it is proper to avoid clipping the shoots or leaves, as the sudden exposure to frost immediately afterwards would turn the foliage, in patches, to a rusty unsightly colour. Then set the plant in the hole upright. Break the excavated mould fine, lay some of it in among the fibres of the roots, and throw the rest in equally; shaking the plant gently, as the earth is filled in, to cause it to settle between the fibres. When all is covered, tread the earth gently round the stem.

To hold the water which is given in dry weather, especially in spring planting, make the top of the earth a little hollow round each shrub.

Fix stakes to such tall plants as require support: having twisted a piece of hay-band round the stem, to prevent its being

galled if agitated by the wind, tie the stem neatly to the stake. It is material not to omit this; because if a violent wind should disturb the roots, it will retard the plant in making new fibres.

In the section on the Times of Planting, it has been already recommended to mulch the stems of tender shrubs; in winter, to protect the roots from cold; and, equally in spring, to keep the earth from being dried by the wind. Delicate and curious sorts, planted when severe frosts may follow, should also be covered with mats; such as, the China Rose, and young plants of the Arbutus, Cypress, Kalmia, and Magnolia.

Planting Box-Edgings.—Procure some short bushy box. Divide the plants into rooted slips prune away the long woody roots; and trim the tops even.

Having prepared the edge of the border, stretch a line along it, to mark the direction of a small trench; tread that part lightly to settle it, and with the spade make it completely even with the line. On the verge of the line next the alley, cut a small neat trench about six inches deep, making the side next the line quite upright, and turning out the earth towards the walk. Set the plants in the trench just so thick that the roots may touch one another; the top of the plants even, about an inch above the surface: as you proceed, keep the plants from falling out of position, by drawing the earth up to the stems. When all the row is set, turn in the mould with the spade almost to the top of the plants, and tread it neatly level. Reduce any irregularities in the top with a pair of shears.

Dwarf box, and all hedges, may be clipped in September. If box receives its last trimming early in autumn, it has time to recover before the winter. The clipping of hedges should be finished before the shoots get too hard. Do not cut young hedges too close down.

Where edgings of box have grown too thick and out of shape, they ought to be taken up and replanted, either at the end of September, or early in October, waiting for moist weather. The other times for planting are specified above.

Saving Seed.—In the course of October, gather the seeds of such kinds of flowering shrubs and trees as ripen seed in this climate, and which are usually propagated by seed, or may be so occasionally with advantage. The diversified vehicles of seed, growing on woody plants, differing, according to the tribe, not more in shape than in the part of the herb which yields the seed, are particularly noticed under NURSERY.

Forcing Roses and other small Flowering Shrubs.—In order to prepare for forcing an early bloom of Roses, procure good

loamy earth from some of the cultivated grounds with which let some thoroughly rotten dung be well mixed; when it is so incorporated as to appear of one colour, it will be fit to use. With this compost, have also ready pots of a good size.

Take up from the open beds some strong plants: the Provence is a good species to force, or any exotic from the South of Europe: prune any straggling shoots, and trim the roots moderately. Lay a little mould at the bottom of the pots. Hold a plant upright in one of these, while you fill up with mould, taking care to let it fall in between the roots. It is well to cultivate select shrubs a year in pots before you introduce them into the house; but if wanted, they may be forced the subsequent spring.

There is no certainty of attaining a fine blow of Roses in the depth of winter, by the most expensive artifices of forcing; and yet fine flowers may be produced early in the spring by any ordinary stove, set into operation the beginning of December, and either with or without a bottom heat. When the potted plants are first introduced, keep the air of the house at about 55 degrees, never letting it fluctuate to more than two or three degrees below or above. In the second week aim at 60° as the standard; in the third week at 65°. When a month has nearly elapsed, begin to increase the heat gradually to 70°: having brought it to this standard, let it afterwards exceed it from three to five degrees, rather than sink below. Water the mould in the pots, when requisite. To keep the plants clean, sprinkle them with water warmed to about 60 degrees, and let the water be given a little before noon: but, after they show flower-buds, it is not advisable to do this unless the sun shine with some force. The methods for destroying insects, recommended under HOT-HOUSE, should not be neglected.

To have a succession, new sets should be introduced one week after another. Observe the rose-trees, while forcing. Destroy the insects that breed in the bud, by picking them off.

By similar management, having prepared plants in pots or boxes, other small flowering shrubs may be easily forced; such as, the Syringa, Hypericum, Honeysuckle, and Persian Lilac.

AMERICAN PLANTS.

The different culture requisite for American Plants principally consists in providing some imitation of the original soil, in order that they may flourish in full vigour; and, where there is no factitious soil provided, in making a compensation, during the dry part of summer, by plentiful waterings. A peculiar

treatment is also necessary to raise seedlings of such kinds of shrubs as are marked, in the tables, *American Plants.*

Most of the exotic shrubs brought from America were originally found growing on tracts of ground resembling beds of peat. The native plants found in these situations vegetate with the highest vigour and luxuriance. The soil in many parts is so pervaded by vegetable substances, that where, from any cause, a section of the solid ground occurs, as in the bank of a river or the shaft of a well, a layer of decayed logs, branches and leaves of trees, is uncovered to the spectator. The luxuriance of the vegetables may, however, partly be ascribed to the excessive moisture which is peculiar to the climate of America. In a few places, indeed, on the western coast, rain is not known; but the soil there is in general copiously watered by dew, so as to render it highly productive. In the season called *winter* by the natives of South America, lasting from May to November, a continued succession of impetuous rains give to the plains, in most places, the appearance of an ocean. When the rains have ceased, the humidity of the climate is kept up by a constant evaporation from swamps, rivers, and lakes.

As we cannot have the mitigated warmth of the climate of South America in plantations in the full ground, and as the temperature of our winter cannot be expected to coincide in its effects with the corresponding season even of North America, when so many local circumstances are different, it is neither indispensable, nor perhaps advisable, to create an artificial swamp for the cultivation of *many* American plants. It is mostly safer to confine the efforts of imitation to the kind of *earth*, unless the water can be carried off at any time; for the lodgment of wet might sour the land, and cause some kinds of roots to perish in cold weather. Thus the ANDROMEDA *arborea* would be injured by being floated in winter; and must be protected from frost, though it requires a deal of water in summer.

The first object is, to obtain true peat. This is a composition of the branches, twigs, leaves, and roots of trees, with small plants, grass, and weeds: by having lain immemorially in water, the whole is formed into a soft mass, and, when the materials are completely decayed aud blended so as to be homogeneous in appearance, the compound is the finest vegetable mould. Where peat in a fit state cannot be obtained, recourse must be had to common marshes or heathy commons for the light black mould which such places afford. To form the intended soil, let this be mixed with sand.

PLEASURE GROUND.

A PLEASURE GROUND is an extensive garden laid out in a liberal taste, and embellished after nature. At the sight of such a garden, fortunately placed and judiciously improved, in which the cultivator has availed himself of every advantage which the immediate site and surrounding landscape presents, almost every mind concurs in associating the idea of a garden with a seat of happiness. When the romantic illusions of a first view are dissolved, to enjoy the beauties of such a place is one of the purest gratifications.

The business of a rural improver comprehends *Ground-work* and *Design*. The field on which he is to operate is a portion of ground either with or without natural water. His materials for the interior are: 1. Ornamental Vegetables, of which the culture is described in the *Flower Garden*, the *Shrubbery*, and the *Nursery*; admitting a few from the *Kitchen Garden*, of which the appearance is picturesque; and many from the *Fruit Garden*, so as the form and limits of a common Orchard be avoided. Of vegetating ornaments, there remains only to give in this division the method of Laying-down Grass, which will be found under the section GROUND-WORK. 2. Gravel, as the most elegant material for walks: the method of employing this, also, comes under the same section. 3. Water: the introduction of this belongs to DESIGN: the business of making the embankment, to GROUND-WORK. 4. Although the distribution of Ornamental Buildings is commonly allowed to be within the province of a rural improver, the preceding things comprise all that properly relates to gardening, except the points at which Seats should be placed may require to be adverted to. The improver's materials for the exterior are, Views: the management of these belongs to DESIGN.

We shall detail the manual processes belonging to Ground-work, before we proceed to the higher department of Design.

GROUND-WORK.

Edgings of Borders.—In the Pleasure Ground, greater variety in the edgings of borders is requisite than in the Flower Garden. Although Box (the method of planting which is described under SHRUBBERY) is superior to every thing for borders where regularity is avowed, yet in extensive dressed grounds the edgings should be diversified by other dwarf plants, forming distinct lines. Thrift is the neatest small evergreen next to

Box. In other parts, the Daisy, Pink, London-pride, Primrose, Violet, and Periwinkle, may be employed as edgings. The Strawberry, with the runners cut-in close during summer, will also have a good effect: the Wood-strawberry is suitable under the spreading shade of trees. Lastly, the limits between the gravel-walks and the dug-work may sometimes be marked by running verges of grass kept close and neat. Whatever edgings are employed, they should be formed previous to laying the gravel.

Where round or oval parterres stand on a ground of lawn, it is a prevailing fashion to surround them with what are termed baskets. These are commonly made either of wood or cast-iron: those of the latter material of course are durable; and the others, if painted, and removed under shelter in winter, will last ten or twelve years. Novelty is all attractive; and when men have walked as far as they can in the path of nature for principles of embellishment, for the sake of novelty they will walk back again: a bed of flowers and shrubs within a basket looks very much like a large bouquet. What is artificial should have some use. Where cattle are to be kept off, a basket is serviceable.

Gravel-Walks.—In all work to be performed on gravel-walks, wait for dry weather. March, or April or May, is a good time to form them. Let the spaces marked for the walks be excavated so as to admit at least five inches depth of gravel, and about the same depth of dry hard rubbish as a foundation. As to the quality of the gravel; that kind of pit gravel which consists of the finest-coloured pebbles, mixed with a dry sandy binding loam, is preferable:—some places afford gravel consisting almost entirely of pebbles without any natural mixture of binding particles, in which case it is proper to add a small portion of light loose sandy loam, or any similar dry material that will bind tolerably firm. For considerable walks, it is not necessary to screen the gravel very fine: it will be sufficient to separate the small and middling-sized pebbles for this purpose, by raking out or drawing to the bottom those which are rough or very large.

Having prepared the excavation ten inches deep, or something deeper, lay the bottom with some stone rubble, fragments of lime and bricks, or other rough dry rubbish. This, laid four inches thick or more, prevents worm-cast on the walks, promotes the draining of wet from the surface, and checks the rising of damp from below. On this foundation spread the proper gravel, from four to six inches in depth, to admit of relaying or

turning every year in the spring, or every alternate year. In laying the gravel, to prevent the lodgment of water, finish the surface to a gradual gentle swell in the centre; letting the rise be three inches in a walk six feet wide, five inches in one of twelve feet, and eight inches in one of twenty-four, diminishing the proportionate elevation in walks still wider. Avoiding an abrupt rise, the sweep should be the segment of a circle. To lay gravel in a good style, the co-operation of two or three men is necessary. As you proceed, tread the work evenly every fifteen or twenty feet, and finish it off smooth with a light rake, teeth and back occasionally; then roll the surface regularly with an iron or stone roller: the iron roller is to be preferred for clean neat rolling. When a walk is finished, give a good general rolling three times along its whole length, to make it thoroughly firm and even.

Under a deficiency of gravel, sand of a binding nature, such as drift-sand, is occasionally used to form walks in the less-conspicuous parts of a garden; it binds more effectually when not laid very thick. The scrapings of a turnpike-road, having laid long enough to be thoroughly dry, are often adopted; a substitute which makes a neat firm walk.

New walks should be frequently rolled: and walks that are perfectly settled, require a routine of attendance to keep them in a commodious and ornamental state.

Rolling, besides rendering a walk firm, in some degree prevents the growth of moss and weeds; and should be repeated, at least once a week in dry weather in spring and autumn, and generally twice a week in summer, where gardens are kept in the highest order. After showers, waiting till the surface be dry, occasional heavy rollings will make the walks firm, close, and smooth. In winter, the weather, which is not often at once open and dry, will only admit the roller to be occasionally used with good effect.

At different seasons, as weeds and moss prevail, they should be picked out. Moss begins to spread abundantly in autumn; and should be destroyed by hand, or checked by the roller. Other weeds begin to spring rankly about May; and much care, all through the summer, will be requisite to keep them under. Loose litter should at all times be swept from the walks.

Once a year, or every alternate year, as the surface becomes dirty or foul with weeds, it will be proper to turn gravel-walks. March, or April or May, is a good time to do this. Prepare by trimming the edgings, and by dressing the beds where there is dug-work adjoining: grass edgings should be cut neatly

with an edging-iron. If the surface of the walk be very hard, loosen it with a pick-axe. Then dig the walk with a spade in a slanting direction, and, going just deep enough to change the surface, turn every flake of gravel neatly over. This will destroy the moss and weeds. Then tread and finish the surface, as directed above, in first forming a walk.

This turning in the spring will be quite sufficient, without deforming a garden by ridging up the walks in winter, and leaving them in that state two or three months, a practice which makes ornamented grounds nearly useless in the winter season.

Laying-down Turf.—Grass walks, distinct from lawns, are sometimes adopted, either for variety, or from a deficiency of gravel: in the latter case, the turf is laid over sand or some material that cannot otherwise be made to bind. These are not eligible for general walks, as they are not always in proper order for walking on, especially when wet or damp; besides, if much used, they are liable to become bare and unsightly; so that gravel-walks which can be kept in serviceable order at all seasons, are greatly to be preferred for connecting all the main points of communication; while stripes of lawn are pretty enough to be occasionally traversed in dry weather.

Lawns and patches of lawn may be quickly formed by laying the ground with turf; or such tracts as are too extensive for turfing may be sown with grass-seeds.

Prepare the piece of field marked out for lawn by levelling all rough inequalities; so that if there be any natural slopes, swells, or dips in the surface, the undulations may be gentle, and insensibly slide into the principal level. The characteristic beauty of a lawn is smoothness; and if the turns in the ground do not play closely about the horizontal line, the work necessary to give a face of polish to the sward cannot be performed. Having adjusted the ground-work of the intended lawn, tread the earth to keep it from settling unequally, and dress the surface with the hoe and rake. If the land be not poor, it is well to have two or three inches of light poor mould at top, that the grass may not grow rank; a poor soil conducing to give greensward a velvety appearance.

Turf may be laid almost any time, in open weather, from September to May: but some of the intervening months are to be preferred. January, when mild, is a good time. February is highly eligible; for turf will then grow freely. So it will in March, if it be laid down soon after it has been cut. The care to be taken of it increases as the year advances into April

and May: if laid so late as May, it must be well watered, should it be dry weather.—The finest turf is to be found on commons where sheep are pastured. The turf should be cut out in pieces of one size, generally about a yard long, a foot wide, and an inch thick. Get a well-constructed turfing-iron; and as the pieces are made out, roll them up compactly, the grass-side inwards. As soon as the turf is laid, let it be well beaten with a heavy flat wooden beater; then go over it with a heavy roller, to press it well down close, and even.

When turf cannot be procured in sufficient quantity, the intended lawn may be sown with grass-seeds, saved from some of the finest clean hay: Nonsuch and White Clover are also well suited to this purpose. The most eligible times for sowing are, autumn, not later than September; and spring, March or April. Sow thickly and regularly; and rake in the seed evenly. Wait for a dry day, and till the surface be dry, to run it over with a lightish wooden roller, to smooth and settle the surface close over the seed. Repeat this occasionally.

That tracts of lawn may be preserved in beautiful order, they must be rolled, to keep the ground even; mown close, to make the grass smooth and rich to the eye without being rank; swept, to clear them of worm-cast, or polled and rolled for the same purpose; swept also, to clear away litter; and trimmed at proper seasons with an edging-iron, to make the edges next the walks and borders even.

The large stone or iron roller, to keep the surface smooth, must be used at times, all the year, even in winter, when the weather is dry and open; and if horses are employed to draw the roller, their hoofs should be shod with leather boots. From March to September, it is proper to roll the sward after showers. Rolling, which, when performed a day or two before mowing, makes it easier to mow the grass with exactness, should be repeated during the mowing season, sometimes as often as every week, and never less than once in three weeks. —Begin to mow in February: if the grass be suffered to get too long, it will not look handsome till after two or three mowings: be careful to cut close and even. From February to April, once in three weeks may suffice. In April the grass will begin to grow apace; and the frequent use of the scythe, after the roller, is necessary to make a fine sward, and prevent worm-cast. Begin mowing early in dewy mornings, or take advantage of moist weather; for short grass in gardens, when dried by the sun, can scarcely be mown even. From May to September, mow once a week when the weather is showery;

and about every fortnight during dry periods. In October mow with exactness, to have a close regular bottom against winter, as it may be expected to prove the last mowing for the season: but if November should happen to be mild, a final mowing may then be wanted. After mowing, let the grass be invariably swept up clean, and carried away.—When worm-cast begins to disfigure the lawn, either sweep it off; or, to remove it, first break and scatter it about with a pliable ash or hazel rod, and then, before the scattered worm-cast is too dry, run over the lawn with a wooden roller, by adhering to which the lumps of earth will be carried off the short grass. Occasions for this will occur every month, or every alternate month, from March to December.—In November, the lawn will want to be cleared of fallen leaves.—The margins of the sward in contact with ornamental walks and borders should be trimmed with an edging-iron about four times a year, February, April, June or July, and in the general autumn dressing.

Making Excavations Water-tight.—If the supply of water, brought in to ornament the grounds, is not sufficiently copious to compensate the ordinary waste from oozing through the pores of the earth, let the bottom and sides of the excavated channel, or basin, be well rammed with clay, eight inches thick at least, to retain the water; and coarse gravel should be spread over the clay three inches thick or more, as well to preserve the claying as to render the water clear.

DESIGN.

THE FIELD.

Position.—If we suppose the garden not to be formed, and that a large unappropriated tract is contiguous to the cottage, villa, or mansion, from which a field for the ornamental gardener can be selected, it may be of use to consider the position; and, if the erection of a dwelling-house do not already confine the site of the Pleasure Ground to some part within a circle round it, deliberation in the choice of ground may combine greater advantages, in regard to soil, air, aspect, prospect, and other local circumstances.

The most eligible situation, as to aspect, is on the south or south-eastern side of a hill, especially if the slope be easy. In marking out the situation of a house, the good aspect ought to be preferred to the fine prospect, whenever they are not to be reconciled; because the fine prospect, if relinquished for substantial accommodations, may be recovered in walks leading

over the grounds. On the same principle of making ornament really subservient to enjoyment, where the Kitchen Garden, the Fruit Garden, and the Pleasure Ground, are all at once to be formed, the advantages of soil and exposure ought to be given to the two former; unless it be part of a plan to propagate and raise, in the ornamental garden, such exotic plants as will not thrive here in the full ground without every benefit that openness to the sun and shelter from cold winds can bestow; or unless the Pleasure Ground itself be, in a considerable degree, planted as a Fruit Garden.

While the Kitchen Garden is concealed by buildings or plantations, the Flower Garden and Pleasure Ground should stand conspicuously attached to the family-residence. When the horticultural establishment includes a Conservatory, it is proper to have it in sight, and connected with the ornamented grounds; because the style of such a building, the plants within, and the scene without, under a tasteful arrangement, harmonize in character and effect. The Botanic Garden, the range of stoves, and all the departments, a visit to which renders a walk about the grounds pleasing and interesting, should be at hand.

Improvement by altering the Level or Inclination of the Ground.—The landscape-engineer can effect little in this way, but at an enormous expense; and violent changes, which give the surface a character of disagreement with the surrounding country, have seldom a good effect. If, however, any excavation be made to drain a swamp, or to receive water artificially led into the grounds, the earth taken out may be either thrown on an entire flat to cause a gentle elevation, or used to round the sharp points of an acclivity naturally too abrupt. The natural landscape should be polished or chastened, not transformed. In creating a new inclination in ground, there are two important things to consider—the aspect of the slope to the sun, and the effect on the prospect. To look down a lawn, is to see it under a less pleasing view than to look up it, as it respects the lawn merely, because it is fore-shortened; but to look down a slope is, under ordinary circumstances, more delightful than the contrary, on account of the prospect beyond.

Form and Extent.—So long as the boundaries are not seen at once, the outline may be of any form, provided it neither include narrow slips, nor run into sharp angles, unless to seize some view that would otherwise be lost. As to extent, there is no danger in excess.

FENCES.

External Fences.—Fences of all kinds are rather necessary and useful, as instruments of shelter and security, than to be chosen as materials of ornament. Whether the view terminates on the fence, or is directed beyond it, the effect on the scene at best is negative: thus a fence is sometimes made higher than its proper use requires, merely to shut out something more unsightly; and, in judiciously employing that capital invention, the sunk fence, or *ha-ha*, the advantage, though great, is purely negative—some prospect worth retaining at considerable cost is not obstructed. Mr. Repton says, that a sunk fence must be straight and not curving, for the spectator to look across it, and not along it. A close high fence of wood-paling, from being so frequently the inclosure of parks, when carried to any length, contributes to give a place the air of a domain. The common green holly makes a fine close hedge for an exterior boundary, either planted alone or combined with white-thorn, as recommended in the introduction to the Flower Garden. For a deer-park, Lord Kames recommends a wall of stone, two feet and a half high, coped with turf, having the Laburnum planted close to it. The heads of the plants are to be lopped off, to make the branches extend laterally, and interweave in the form of a hedge. The wall will prevent the deer from breaking through; and if the hedge be trained eight feet high, they will not attempt to leap it. He prefers the Laburnum, because no beast will feed upon it but a hare, and that only when the plant is young and tender. In front of the Laburnum hedge may be placed a row of Alders, which neither the hare nor any other beast will touch.

"That the boundary-fence of a place should be concealed from the house, is among the few general principles," observes Mr. Repton, "admitted in modern gardening."

Internal Fences.—These must be lighter and more elegant: but the materials will equally vary with the local position and purpose. What has been said of shrubs for internal fences under *Flower Garden*, is applicable to the most extensive ornamented grounds; except that regularity is less requisite, if not out of place; and primness ought to be avoided. Posts, with a single chain, or a rope well pitched, are sometimes enough to keep cattle from a walk. When a stronger barrier is wanted against animals grazing the pasture near the house, so as not to intercept a distant view, one of the best devices is what is termed the *invisible fence*; which is composed of lines of elastic wire passed through upright iron stancheons, the whole painted

green: wire of diminished thickness may be worked so close at bottom as to exclude hares, when that is desirable. In divisions of lawn, the tract to be mown may thus be elegantly separated from the grounds to be pastured.

A professional improver of high celebrity recommends a light hurdle, in some cases, where a view is to be preserved near the house, because it appears to be only a temporary confinement: but unless it be proposed to have merely an ornamental farm, and to make a deliberate sacrifice of unity of design, a row of hurdles, however neat, must surely be more revolting than a transparent fence, in keeping with the polished scenes which ought to surround an elegant mansion, in order to smooth the transition to the negligence of natural pastures, and the rudeness of unreclaimed woods.

The same author throws out some other intimations on the subject of fences; the principal of one of which, in individual places, may have much relative propriety; and the others have been resorted to very generally since the improvement of rural scenery has been studied as a liberal art. Instead of the *ha-ha*, or the *invisible fence*, the landscape-gardener sometimes forms a terrace three feet high: at the verge of this, an iron rail, or a double rail, run along two feet high, is a sufficient fence. It is often necessary to adopt alternately all the expedients that have been devised to give to fences relief and variety, unobtrusiveness and concealment, that the dislike at seeing a fence, if diverted by some artifice, may not be revived by continued sameness. *Raised fences*, in straight lines, and meeting so as to form angles, are totally at variance with all ideas of picturesque beauty: but a perfectly straight fence, drawn across a valley, appears to the eye as though serpentine; and therefore, without controverting any assumed principle, fences may run in the shortest direction over unequal surfaces; a few trees or bushes may be planted where the straightness, in a coincident line of view from the garden, would be most visible.

WALKS AND ROADS—THE APPROACH.

To treat of the walks, before the subject of embellishing the ground has been touched, may appear like inverting the principles of order: but the natural beauties of many Seats are so great as neither to demand nor to admit fundamental alterations; and if the direction of a walk is governed by general principles, by a familiarity with the most pleasing internal scenes, and by an acquaintance with the best points for catching the beauties of external views, it is not likely to be mate-

rially disturbed by the interference of art, and the introduction of new embellishments.

The Walk.—A common principle is, especially where the field is small, to carry a gravel-walk completely round, so near the outward boundary as to leave only an intervening border for flowers and shrubs. As this method produces the longest tract without sharp returns, and admits many expedients for concealing the opposite boundaries, there seems no reason for departing from it, except to lead the spectator to some object that would otherwise escape him, or to keep some intractable deformity out of sight. Here and there, the boundary of the property may run out into angles:—it is better for the principal walk to avoid them, leaving the intervening space for a plantation; and if an alley, so narrow as to promise nothing, allows a passage round this, and a glance at any outward scene worth an opening, a stranger may explore it from curiosity, and be pleased with the variety. Where the walk diverges into two or more branches, I would give that course best calculated to gratify a visitor an air of higher pretension, and an inviting appearance, by its breadth and handsome finish, and by picturesque edgings.

If turns in the surface of the ground, the interspersion of wood or water, or other objects naturally placed, offer impediments to *straightness*, the walk, by curving round them, will take that variety of direction which essentially conduces to a series of interesting effects; allowing parts without any common relation, independent scenes, and fragments of scenes, to be seen only progressively; and disclosing entire prospects at the most advantageous station. But whether there be any superior beauty in a serpentine walk, when nothing is to be reached, nothing to be avoided by the several turns, and when the same views can be embraced from a straight one, perhaps the following case will help us to determine.—We will suppose some part of the line of walk to lie through a portion of ground perfectly level, free from water, morass, or natural obstacles of any kind: we will suppose also that the value of some fine prospect across this ground from another station forbids the creation of obstacles to a straight walk by trees, buildings, or any thing artificial. How ought the points of communication on each side of this level to be connected? A walk running in curves, palpably tortured out of its natural direction for the sake of the curves, would look most puerile. Hence, whenever a curve is made in a path, if there be nothing but *abhorrence from a straight line* to account for it, a clump of shrubs should

be planted in the concave of the turning, to conceal the points at which the lines of the path coincide; or *chevaux de frise* should be interposed, to confine a person to walk in a picturesque manner who might else take a fancy to go the nearest way. Tracks for the light footsteps of recreation should wind about with freedom: but the waving of the surface, some impediment apparently not created, or the inducement of a new scene, ought to offer an apology for every turn.

Road or Walk.—This enables us to perceive why Mr. Repton says, that, "in a road or walk, especially if it passes through a wood or plantation, a second bend should never be visible." He makes another observation, which can only apply to very large domains:—"It is a common error of improvers to mistake *extent* for *beauty*. Thus the longest circuit is frequently preferred to that which is most interesting."

The Walk or Drive ought to embrace as extensive a view of the estate united to it by proprietorship, as can be well disclosed.

Many things are recommended by different writers on landscape gardening, desirable enough, and beautiful in theory, but in practice rarely coming within the grasp of a designer; such as, to conduct a walk so that the richest scene of the distant view may be reserved, till the spectator shall have advanced to the extremity; and to allow the rudest waste to be sometimes seen behind a rich composition of the grand and beautiful in landscape.

The Approach.—In leading towards the house, the approach should not be fully in front, nor forming an angle, but should pass obliquely upon the house and its accompaniments, so that their position with respect to each other, as well as with the perspective of the house, may vary at every step. It is also recommended to conduct it under a side-screen, or by an avenue, up to a chosen point for an opening, that the striking beauties of the place may burst upon the eye at once.

SEATS.

Fine points of view claim, in the first place, to be distinguished by seats. Seats merely serving as places of rest might announce an intrinsic object, by some difference in their construction; and if there be no distant prospect to engage attention, greater elegance in the accompaniments may create a pleasant resting-place. As to the manner of finishing a seat; where the house is in sight, a correct taste will expect the bench or alcove to correspond with the style of the house, so far at least as to be avowedly artificial, neat in the work-

manship, and painted. In neglected or wild scenes, withdrawn from the polished lawn, pleasing illusions may be induced by a rough block of timber, the arms of a fantastic root, or forest-fagots romantically interwoven, offering a seat under the canopy of a tree, or within a cave or grotto. This is admissible on principle, in proportion as every thing surrounding is in character. Not that it can be denied, that whimsical seats at variance with the situation sometimes afford a degree of amusement, and may do no harm in little gardens, or in a scene too tame to be spoiled: but the effect terminates with the oddity; a place destitute of character can excite no romantic interest.

The following sketch exhibits a pretty Hermitage, where corresponding accompaniments conduce to unity of impression. The frame, or shell, consists of old oak, beech, or elm-pollards, cut into slabs, and so united as to have the appearance of one large hollow tree. The top is protected by clay and turf well beaten down. To exclude the wind, the inside is lined with lath and plaster; this may be ornamented with shells; and to paint the interstices pea-green will accord with the design, though a graver colour may be tried. To keep the place dry, a layer of chalk or sand should be laid at the bottom; and the floor may then be formed of pebbles, brick, or flag-stone. The attention of the gardener is next wanted, to train, around the outside, Irish (the broad-leaved) Ivy, which is of quickest growth, as well as other evergreens, intermixed with various flowering shrubs and herbaceous flowers, the Honeysuckle, the Rose, and the Convolvulus. The Periwinkle, growing on the roof of turf, and drooping over the front, has a beautiful effect; and in the holes of the pollard slabs numerous plants may be made to vegetate, so as to combine the characteristics of a complete Hermitage.

The art of Design is here dependent alone on innate taste, which may be improved, like the fine tone of the voice, by practice. Activity and taste, with a little experience, like the turns of the Kaleidoscope, give birth to a thousand beauties. When Nature directed man, in the first stages of society, he constructed his homely hut without square, plane, or compasses. And the boor still constructs the straightest, strongest, and handsomest hedges, of the most crooked underwood.

WATER.

No Landscape is complete without Water; and it produces more numerous effects, as an ornamental object in scenery, than can be easily analysed or accounted for.

Its various effects.—1. Water is a natural MIRROR; the reflection of something equal to the surface of the water is a necessary and uniform effect which attends it in all situations: as an object in a picture, however, to be merely clear and unagitated, is one of the least-interesting modes in which water can be exhibited; yet this has many beauties. The inverted images near the banks—the softened brilliancy of the lower sky—the incessant playfulness of atoms, and streams of reflected light, combine to render an ordinary surface of water capable of supplying a mass of picture, more in contrast with the density and immobility of ground than any other object, and yet in perfect harmony with every outline and every tone of colour that the face of earthly things can present;—

"Where trees in reflex clear are seen,
Boughs high o'er boughs, and greens on green;
While downward gleams the Tyrian hue
Of velvet iris merg'd in blue;
And o'er the margin's verdant gloom
The wilding's tinge of sweetest bloom;
Till frolic Zephyrs intervene,
And, ruffling, dash the pictur'd scene." HENLEY.

II. When, in addition to the capacity of reflecting images and returning to us softened light, we consider water as gliding down a gentle, or rushing down a steep descent, the idea of a *rill*, or *river*, or *cataract*, is presented to our minds; and we then see, in the MOTION of water, which no one can adequately paint, the cause of one other of its exquisite effects.

III. To the charms of a gliding mirror stealing from us, yet leaving the reflected images behind, to quiver in partial correspondence with substantial things, superadd the NOISE produced by the attrition of water running over an irregular bottom, or against projecting banks; and we have another source of interesting effects:—the fountain *gurgling* from a natural source, the *murmuring* rill, the *rippling* wave, the *roaring* fall, convey sensations, or impress emotions, in unison with sequestered places and astonishing scenes.

IV. We have hitherto supposed the water to be perfectly lucid, although the REFRESHING AND CHEERFUL INFLUENCE of a clear body of water in an open landscape has not been mentioned. This air of refreshment, and the beautiful effect of water as a mirror, are both alike diminished or lost, in proportion as turbidity clouds or pervades the basin or current. A stagnant lake dulled by turbidity, and without even water-fowl to disturb the settled crust of green may be tolerated in a

recess of wood intended to have the character of gloomy solitude.

V. The painter seldom displays the shoaling bottom of a lucid brook with distinctness and fidelity, lest his fore-ground should be broken into glaring parts: but the curious change made, in the appearance of the most common objects, by water, as a MEDIUM OF VISION, catches and entertains the eye that is not elevated, in pursuit of a fine composition, above simple beauties; and the poet often hangs over a romantic bridge, to gaze on the pebbles which the crystal stream has polished; while the leaves of aquatic plants, like floating pendants, mark all the eddies and whirlings of the transparent medium.

VI. The WINDING OF THE VOLUME of a stream seems so natural to water forcing its way where the obstacles are least and the soil yielding, that it can scarcely be separated from the ideas glanced at under the second source of beauty. As, however, sections of every rill, and every river, might be found, which would not include one graceful turn or one bold sweep, the serpentine line, though natural to every stream running at liberty, and though physically connected with the motion of water, is more nearly allied, as a feature in picturesque scenery, with the next subject for design.

VII. The designer of a landscape on canvas, aware that the rippling wave and the tumbling mill-stream cannot be heard in his picture, and that the best delineation of the cadences and conflicts of water is but arrested motion—aware also that the effect of water, even as a natural mirror, though it may be strikingly imitated, is diminished by confining agitated objects to one attitude, to be seized in one moment of time—therefore depends much on a rich composition of such accessory objects as fill a permanent position in the landscape, and will stand still to be drawn. The OUTLINE OF THE BANKS, in lakes and rivers, is a great contributor to picturesque beauty. How pleasing and infinite the variety to be produced by retiring *bays*, advancing *promontories*, and *islands* mediating between *shores* opposed in form and character! Curves and angles continually shifting in direction and degree may relieve each other. Bays seem most to affect the curve; and promontories, the angle. In strictness, this article belongs to the Management of Ground.

Application.—This imperfect analysis of the different effects of water, as a source of beauty and interest, is sufficient to shew—

1. That a painting cannot comprehend them all, and that a real landscape may.

2. That although a real scene may not possess them in the fullest degree, and even want several of them, yet that a spectator may be so engaged by the best which the natural capacity and resources of a place allow to be exhibited, as not to feel any deficiency.

3. That some of them are so far incompatible, that they cannot be perceived together; and that, in any given part of a bed of water, one must be diminished as the other prevails, although successive parts of the same volume, differently modified, may display them in great force and purity; or, when the face and depth of the water undergo no change, two incompatible effects may alternately vanish and appear, as the angle of view is altered. The first and the fifth, the effects of water as a picturesque MIRROR and as a MEDIUM OF VISION, entirely refuse to coalesce.

4. Some of them interfere only to make a picture more interesting, by one property being somewhat invaded or disturbed by the operation of a different source of interest. Thus the effect of water as a MIRROR is heightened, when the accident MOTION is superadded;—the inverted sky is ruffled by the stream; or images are cut in two by the parting of a wave, only to unite immediately, like Milton's wounded angels; while a thousand reflected lights seem conflicting for mastery.

5. The second and third effects are closely connected: and though the third is addressed to a different sense than that by which picturesque impressions are received, it must be assigned a great share in exciting the romantic pleasure with which particular water-scenes are contemplated.

6. The fourth is not at variance with any of the other effects or circumstances; and may attend them all.

7. The fifth source of interest is the most limited; and can only arrest the spectator who has leisure to be amused in detail.

8. The sixth is an accident; and the seventh a circumstance, without attention to which no fine landscape can be composed.

Management of Effect, I.—This alone, when there is no capacity in the ground for bringing the other sources of interest into activity, is often one of the chief constituents of a pretty scene.—If the water be already in the grounds, to give it full effect, the bank towards the intended point of view should slope under a low angle, to increase the quantity of reflected sky. But, that it may not reflect only the sky, let trees, singly or in groupes, adorn the opposite banks; and if any building,

agreeing in character with the scene, can be introduced without obstructing a distant view, its inverted image will be a picturesque addition. As neither rivulets, nor narrow rivers, look well from a point perpendicular to their direction at such a distance as materially foreshortens their breadth, plantations may alternately conceal, and display, an inferior stream; allowing the spectator every opportunity of seeing the line of water in perspective.—When the water is artificially introduced, the *place*, in respect to the house, and the *outline of the margin*, are to be considered. If the supply, or other circumstances, will not admit the water to assume the appearance of a stream, nor one extreme boundary to be concealed from a spectator stationed at the other; and if there be no valley-like dip in the ground, to disguise the interference of human art in the excavation; the figure of the basin had better be regular, round, or oval. In proportion as the surface of the water is contracted, it should be placed to catch the eye from the principal point of view, so as to be seen under a considerable angle: it will thus have more importance in the scene. The order of the banks should correspond with the style of the grounds.

Modification of the Accident, II.—The lowest degree of motion desirable for the water in an ornamental *basin*, is such a circulation among the particles, caused by an inlet for the supply and an outlet for the surplus, as shall be sufficient to keep the volume of water in a state of salutary purity, in regard to its effect on the air.—The motion of a *stream* may be modified by diminishing or enlarging the channel: chosen parts may be distinguished by an increased inclination, or by steep declivities, in the bed.—To give water a forced elevation, merely that it may descend in a cataract, seldom brings, in its influence on the landscape, a compensation for the expense; and if art, effort, and machinery, can be detected by the spectator, adieu to the picturesque!—Blocks of stone, if there be any pile of rock from which they may seem to have fallen, may contest the passage of a rivulet; trees and bushes may vegetate in the fissures; artificial channels may direct the labouring water where to foam; and a stranger may admire only natural beauties, or spontaneous greatness, in the romantic scene, if the face of the ground countenance the illusion.

Improvement of Effect, III.—This is the effect of an accident, and cannot be produced without some agitation occurs in the water: but, in a constant stream, this effect may be regulated, or in a manner created, by withdrawing or introducing

obstacles to the current: little cavities may be formed for the water to gurgle in, or stones scattered on a shoal for it to ripple against.

Preservation of Effect, IV.—A refreshing influence is so inherent in water, that it can only be diminished, or destroyed, by earthy particles floating in it, so as to discolour it perceptibly, or by the more offensive consequences of stagnation in a confined pool. More than one effect of water depends on its clearness—the accompaniments—and the season. Let a cheerful grove, which admits the light on all sides, while it spreads a magnificent canopy of foliage, stands just where a fine lucid stream laves the foot of a lawn. Caught from this grove, when the full dominion of the sun makes such a negative thing as shade attractive, the face of water will be felt as sweet, as the breath of it reviving.

Application of the Property, V.—Where the beauties depending on great expanse and breadth cannot be attained, opportunities for employing the fifth source of interest become of more importance. A clear brook with a shoaling bottom, running too low for a general landscape to embrace, is not therefore to be lost. Where the bed of sand, or gravel, or rock, is seen with most advantage through the water, a bridge, or pathway, may lead across or along its course.

Direction of the Characteristic, VI.—The winding river, or expatiating lake, is a favourite material in the composition of landscape: the freest pencil can scarcely trace, with adequate grace and majesty, the insinuating turns, or bold transitions, of water flowing in a large volume; vanishing among hills and woods, to return on the eye with glimpses of mazy brightness and intervals of full lustre. For an artificial river, or the conversion of a pool into an ornamental lake, the pictures formed by nature, in places of similar character with the ground, offer the designer the best models.

Track and Elevation of the Circumstance, VII.—The outline of the banks, though nearly allied with both divisions of the preceding subject, appear to be susceptible of diversity, on natural principles, to a greater degree, and with more effect, in contiguous winding lakes, than in rivers. In a river, one bank must, in a great degree, tally with the other;—the shores of a lake may shew all the force of contrast without violence; they may recede or approach at freedom, or run in independent directions. As to the elevation of the banks, both in a river and a lake, there is no occasion for correspondence: one may rise into steepness, while the other is sloping into the horizon.

TERRACES.

"The rage for destroying all that appeared artificial in the ancient style of Gardening," observes Mr. Repton, "has demolished some majestic terraces which separated the provinces of nature and art."

If flights of stone-stairs and balustrades are not the inseparable accompaniments, if the term 'terrace' is merely to designate a raised walk, many situations may be imagined, in which a terrace would both conduce to the accommodation of the proprietor of the grounds, and, *without dispute*, improve the view.

The view FROM the house, and TO the house, cannot always be consulted with mutual improvement. When a high terrace, with ornaments which appear to mark the boundary of the architect's province, is interposed between the house and the lawn, the view immediately under the windows cannot certainly be so pleasant as if the house stood in a verdant field: —but let the prospect be reversed, and every stranger will see more grandeur in the house connected by a terrace with the garden; and perhaps among the spectators under the influence of cultivated taste, a few may think such a gradation conduces to general harmony.

In a flat, or confined situation, a terrace with sloping grass-banks may create a prospect, or relieve the sameness of scenery.

VEGETATING MATERIALS.

When the limits are determined by a fence; and walks, with seats, have connected the favourite lines and points of distant view; when water has been introduced, or terraces have been raised; there will be, internally, only a naked waste, till the field be adorned with plants.

Grass.—Four properties conspire to make grass of extensive use in a Pleasure Ground:—1. The proverbial pleasantness of grass-green to the eye. 2. The constancy of the verdure of grass, at least in this climate. 3. The complete covering which it spreads on the ground. Perhaps the second and third properties constitute the cause why so simple a plant has, in some respects, the advantage over the most ornamental flowers. In beds of dug work, when the seasons favourable to vegetation are in progress, some part of the ground is necessarily left bare: and during the winter season, the whole surface of dug work occupied by deciduous plants is exposed to the eye, without even the relief of a partial robe. 4. Although a covering of grass leaves no void, it offers no obstruction; it entertains the eye while that is passing to more interesting objects, without intercepting it.

The commencement of the lawn should be wider than the front of the house; and the sides of it should diverge, so that if screens of plantation leave only a front view, the eye may not feel itself confined.

In proportion as the lawn is extensive or the surface uniform, it requires to be broken by groups of shrubs and trees. The principle on which variety, and some degree of intricacy, are essential, in the composition of a pleasing scene, may be illustrated by surveying an immense flat meadow. The eye could contemplate a definite portion of it with pleasure for an interval, and return to it after relief; but when the interest of that spot becomes exhausted—a consequence which, in glancing over uniform levels, is as rapid as thought—the eye turns, and, instead of an object of relief, meets with continuous portions of surface precisely similar. The consequence is, indifference, or disgust; and this sometimes in places where the accession of a single new object would reclaim the averted eye; and where a few touches of deliberate improvement would raise satisfaction to delight.

Flowers and Shrubs.—The borders of the lawn next to the boundary, and detached pieces of dug work in the angles of it contiguous to the house, are places eminently adapted for the promiscuous introduction of herbaceous flowers with ornamental shrubs, and such fruit-trees as are most picturesque.

In the distribution of plants over grounds dedicated to elegance, there are two rival systems, each of which has its practical followers and theoretical vindicators. One proposes the indiscriminate mixture of many different species: the other deliberately groupes those only which have some marks of affinity. It is still a question, Which order of planting is countenanced by the practice of nature in self-sown vegetables; and which will confer on a garden the stronger claims to character and beauty.

The advocates of the first rely much on employing in the same mass, sometimes in contrast and sometimes in gradation, the different tints of individual shrubs and trees; and this they term the landscape-gardener's light and shade. But the idea thus psesented as a principle is founded on a mistaken analogy. The painter, working on a plane, can represent projection, and distance, only by light and shadow, vanishing lines, and fading tints. The landscape-gardener has to frame a composition out of real materials;—his light is the prominence of objects; his shade, recess; and his distance, simple distance: the motion of the sun and of the spectator would confound all

attempts to frame a real scene on any other principle. As to a painting, whether it be in a strong light or in shadow, the relative light and shade of the piece is preserved. But in regard to the imitation of a painting by greens of one kind for shade, and greens of another kind for light; what if the sun, in his journey from east to west, should illuminate the shade, and leave the light in the obscurity of shadow?

This mixture of greens in the grouping of trees, when the tints are neither distinct enough for contrast, nor so closely related as to support the appearance of gradation and harmony, tends to destroy the unity of a planted spot, and to deprive it of character.

In a celebrated work *On the Picturesque*, by Uvedale Price, some pointed observations against indiscriminate diversity occur, the substance of which is:—Variety, of which the true end is to relieve the eye, not to perplex it, does not consist in the diversity of separate objects, but in the novel character which results from combining, in different proportions, such as are fit to enter into the same composition. Numbers think, however, they have obtained that grand object, *variety*, when they have exhibited in one body all the names of the Linnæan system: but when as many plants as can be well got together are crowded into one continuous shrubbery, the result is a sameness, or one tone of expression, although it is of a different cast from that which would arise from having all the plants alike; for without a certain distinctness, produced by marked features on which the eye can dwell, there can be no variety of character. In forests and woody commons, we sometimes come from a part where hollies had chiefly prevailed, to another where junipers or yews are the principal evergreens, and where perhaps there is a corresponding change in the deciduous underwood. This strikes us with a new impression: but mix them equally together in all parts, and diversity becomes a source of monotony. Thus, the greatest beauty is discerned in the starry heavens, yet the attentive observer discerns no particular uniformity in the picture.

Sir William Chambers has left a work *On Oriental Gardening*, which has a passage to this effect:—"The Chinese artists do not plant indiscriminately every thing that comes in their way, nor do they imagine that the whole perfection of plantations consists in the variety of trees and shrubs of which they are composed. On the contrary, the professional gardeners of China severely blame this excessive variety; observing, that a great diversity of colours and foliage, and clashing charac-

teristics in the direction of the branches, must create confusion, and destroy all the masses upon which effect and grandeur depend.

"The Chinese method of laying out garden-ground is extremely picturesque. The situation they delight in is the banks of a river: they choose an irregular piece of ground, on which are old trees, rocks, and rising hills. They form round it a boundary of rugged rocks, placed upon each other, so that their junctures cannot be perceived. Hereon grow clumps of Scolopendria, tendrils with blue and purple flowers, and borders of moss of different colours. A stream of water meanders among these vegetables, whence it escapes in cascades. Health and enjoyment are diffused over such a spot as this; while the European's garden too often presents no other view than that of a dreary brick-wall."

The Chinese do not scatter their flowers indiscriminately about the borders, as is usual in some parts of Europe, but dispose them with great circumspection, and, if the expression may be allowed, paint their way very artfully along the skirts of the plantations. They reject all that are of a straggling growth, of harsh colours, and poor foliage; choosing such only as are of some duration, grow large or in clusters, are of beautiful forms, well-leaved, and of tints that harmonize with the greens that surround them. They avoid all sudden transitions, both of dimension and colour; rising gradually from the smallest flowers to those of the boldest growth; and varying their tints by easy gradations from white, straw-colour, pale violet, and flesh-colour, to the deepest blues and most brilliant crimsons and scarlets. They frequently blend several roots together, whose leaves and flowers unite and compose one rich harmonious mass; such as, the white and purple Candytuft, the various-coloured Larkspur and Mallow, the Double Poppy, Lupin, Primrose, Pink, and Carnation, with many more of which the forms and colours accord.

With flowering shrubs they pursue the same method; blending white, red, and variegated Roses together; purple and white Lilacs; the yellow and white Jessamine: kindred varieties of the Althea; and such others as can be associated with propriety. Further, in distinct tracts of shrubbery, they exhibit the effect of two distinct methods: in some, they purposely plant all such shrubs as flourish at one time; and through other gardens, they take care to distribute such as succeed each other. The display from the first method is by far the most brilliant; but its duration is short; and the

appearance of the shrubbery is for the most part shabby, as soon as the bloom is off: they therefore seldom use it, except for scenes to be enjoyed at limited periods. For ordinary purposes they prefer the second method, on account of the continual succession.

With respect to *Trees:* they observe, that some are proper only for thickets; others only fit to be employed singly; and others equally adapted for either situation. The Mountain Cedar, the Spruce and Silver Firs, and all others of which the branches have a horizontal direction, they hold improper for thickets; because they indent into each other, and likewise cut disagreeably upon the plants which back them. They never mix these horizontal-branched trees with the Cypress, the Oriental Arbor-vitæ, or with any whose arms extend upward; nor with the Larch, the Weeping Willow, the Birch, the Laburnum, or any of a pendent nature; observing, that the intersection of their branches forms a very unpicturesque kind of net-work: neither do they employ together the Catalpa and the Acacia and the Sumach, nor any such heterogeneous sorts. In their large woods they assemble the Oak, the Elm, the Beech, the Tulip, the Sycamore, the Maple, the Indian Chesnut, the Occidental Walnut, and all whose luxuriant foliages hide the direction of their branches, and, growing in globular masses, assemble well together; forming, by the harmonious combination of their tints, one majestic group of rich verdure:

"With spreading Planes they make a cool retreat,
To shade good fellows from the summer heat."

To this sketch of the Chinese system of arranging plants for ornament and effect we shall subjoin a remark of Mr. Repton, the strain of which concurs with Mr. Price's reprehension of an indiscriminate mixture of all the trees in a catalogue. "There is more variety in passing from a grove of oaks to a grove of firs, than in passing through a wood composed of a hundred different species, as they are usually mixed together."

After all, the different natures of Herbaceous Flowers, Shrubs, and Trees, stand in the way of every attempt to govern their distribution or assemblage by a common principle. Prettiness is the characteristic of flowers; elegance, of shrubs; grandeur, of trees. The blossoms of herbaceous flowers are in general so considerable in proportion to the foliage, that their bloom displayed in masses, or unbroken lines, would look too gaudy: therefore, between the herbaceous patches, relief should be given, either by absolute intervals, or by very low shrubs;

and behind, by taller shrubs. If such shrubs are chosen as will flower either sooner or later than the herbaceous plants, there will be a more powerful relief while it is wanted, and a compensation in a show of bloom at other times. Flowering shrubs, by their large proportion of foliage, spread within themselves, under their gayest honours, a sufficient ground of relief. The elegance of shrubs, joined to the judicious arrangement of parts which is usually seen in ornamented grounds, leave the objections to a great variety of species nothing to operate upon; because when the plants stand either in isolated beds, or in detached clumps in a winding border, every distinguished individual, or every prominent group, may possess a character of its own. The order of TREES furnishes the peculiar ground on which the advocates for setting plants of the same species in considerable numbers together may challenge a comparison with the opposite method. Trees are calculated for grandeur of effect; and when one tree of the same majestic character succeeds to another, and the impression from kindred greatness is propagated in long lines of lofty grove, this effect is at the highest.

The introduction of foreign plants has contributed essentially to enrich and to beautify English landscape. In even planting lofty forest-trees, the principle of unity may be consulted without losing sight of the advantage of variety. Suppose the road through a plantation of wood to wind in curves, dissimilar in segment and direction, so as to have no appearance of being alternately measured out. On one side, as far as the eye can embrace from a given point, may be trees of the same kind, or at least of the same character; and as another bend is unfolded, a varied scene may open to the spectator. Between the divisions of distinct character may be recesses planted with species of other features, as a lateral source of variety; in the front of which, a noble tree, or a small group, worthy of distinction, may stand more prominent. To prevent formality, a few of promiscuous tints may appear at the bottom of some of the hollows, too remote to distract the eye: formality, however, is rather prevented by disorder in the distances, than by multiplying the transitions from one sort to another; for nature can sow an entire forest of one species without formality.—On the opposite line of wood, contrast may be avowed; either absolute, such as that between upright and pendent branches; or modified, such as that between the Northern and the West-Indian firs and pines. When single trees stand conspicuously, whether of the same or different kinds, there should be one

decidedly superior, to relieve the eye when fatigued with the rival attractions of the rest. For this end, inferior plants may be removed, to exhibit a spreading chesnut, a towering beech, or the honours of a venerable oak.

Plantations of trees may be divided into *Belts—Clumps—Thickets—Groves—Woods*—and *Forests*.

A *Belt* is a narrow continuous border of wood. Whether carried in a circular direction round an estate, or under the restraint of angles round a field, an inclosure of narrow wood is a belt. If often acquires interest from the vacancy of the scene which it limits; and frequently shuts out objects far superior to itself, and to the walk which attends it. But where a large domain is divided into farms, this is a profitable way of planting wood: it contributes to afford shelter to corn, to protect cattle grazing in any neighbouring pasture, and to make a cover for game.

A *Clump* is a group of timber-trees, too small to be called a grove. Mr. Price says, "that the clump is a union of two faulty extremes in the composition of a landscape: it is at once too crowded and too scattered: it is close and lumpish when considered by itself, and scattered in respect to the general composition." But if a majestic tree raise its head in the centre, and one end of the clump be comparatively open and scattering, and the other part narrow and dense, the independent defect will be removed: the relative defect may be avoided, by taking care to throw round every clump some circumstances to connect it with the principal surrounding objects. Clumps are of great use in breaking an extent of lawn, or relieving a line of plantation not sufficiently indented. To the sources of variety before noticed, may be added that of training some of the trees to feather down to the ground.

A *Thicket* differs from a *clump*, in comprising thorns and underwood as well as trees, while it is too small to be called a wood. It admits more variety and wildness than the clump; but should be farther removed from the polished lawn.

A *Grove* is distinguished from a *wood*, by being without underwood. Like the clump, it may be intersected by the garden-walks.

On an extensive domain, glades of grass between stripes of wood, in imitation of the *forest*, which comprehends alternate tracts of wood and pasture, are calculated to assist the illusions of a created sylvan scene.

"In woodland counties," observes Mr. Repton, "it often happens that the most beautiful scenes may be formed rather

by FELLING than by PLANTING trees." And in tracts which were not naturally woody, but which have been planted with shrubs and trees, the factitious wood, after a long course of time, if not retrenched, will outgrow its situation, and gloom and melancholy usurp the seats of remembered elegance and amenity. Where the features are most savage, new trees and shrubs should be substituted for the overgrown wood.

A Grove may have a fine effect on a level: but a grove rooted in unequal ground, gently curving along the side of a hill, is capable of more various beauty, by the views and openings from the interior.

A Wood cannot be too boldly indented, nor the outline too irregular. A close wood appears to most advantage on the brow of an upland, with the heads of tall trees spreading above the underwood, of every promiscuous height, relieved by the sky. A wood crowning a promontory, running with some declivity into an expanse of water, is highly picturesque.

Aggravated contrasts may be shewn in the distance, because every thing is softened.

In planting the skirts of the lawn, or of the grounds farther removed, but within the compass of the walk or drive laid out for pleasure, it will be proper to give those places most deficient in exterior views some compensation, by increased care to create or display interesting objects within.

A Seat designed for the residence of a family throughout the year would be very defective, were not some parts of the grounds directly adapted for the enjoyment of a fine day in winter. Evergreens will afford the shelter essential to such a spot: their verdure is then agreeable in an augmented degree. They may form thickets, and be multiplied into a wood; through which gravel walks may be led along openings wide enough to admit the oblique rays of the sun, and winding so as to avoid any exposure on those quarters from which come the most inclement winds. The earliest-blowing bulbs may be planted in south borders, under these coverts of evergreen.

NURSERY, & GENERAL TREE-PLANTATION.

THE propagation of timber or trees for building, of fruit-trees and ornamental shrubs, is comprehended in this department. While the *Fruit Garden* and *Shrubbery* exhibit the course of culture for keeping the plants introduced into each fertile and vigorous, they contain references to the *Nursery* for many particulars connected with the respective methods of raising young trees.

Large domains that have neither timber-groves nor forest-tree plantations, though they may comprise a fertile range of farms, appear naked and of diminished importance: they are destitute of a substantial basis of accumulating profit, which may be made subservient to ornament and local grandeur.

While trees afford shade and shelter to particular walks and districts, some species will grow in low and marshy places, others on the sides of dry hills, many on plots of waste not adapted for the cultivation of other vegetables. At the same time, it must be remembered, that most trees discover a preference for some specific kind of soil in which the species will best succeed; a few shew a remarkable repugnance to one peculiar sort of ground; and some trees require a fertile soil, in order to flourish. The various constitutions of the principal timber-trees in this respect are noticed in the preceding Catalogues, as well as the peculiar soil best suited to each kind.

The consumption of timber for the navy, and for other purposes, has so diminished the quantity of forest-trees in this country, that the cultivation of timber has become a national object. As the price of wood has risen in proportion to its diminution and the demand for it, the prospect of advantage from the nurture of large trees to a proper age for felling is augmented.

It will be seen that a description of the most economical mode of propagating each of our indigenous plants will be enumerated under the particular departments; as, where extensive plantations of forest-trees, for timber and underwood, are designed, it is of considerable importance to the landed proprietor to have timely supplies of young plants raised in nurseries of his own. A detail of the different methods of propagating plants will also be useful to gentlemen who may occasionally prefer to raise, in the domestic grounds, only select sorts, or a partial succession to some of the shrubs or fruit-trees already planted.

Soil and Situation.—It must be obvious, from the observations in the Tables of the peculiar soil each plant affects, in respect to different kinds of earth, that a complete nursery should either naturally comprise, or be made to comprise, soils of various qualities. The mould in the chief part of it should be light and pliable, with a large mixture of sand; a part of it should be a rich fine loam; there should be also a minor proportion of clayey land, and some peat-earth within its boundaries.

Negatively, a surface of chalk is very unfit for a nursery; so is a cold damp bottom: further, if a soil otherwise proper lodges any stagnant water, it is essential to have it drained.

The upper soil should be naturally good, or ameliorated to the depth of two feet.

As to aspect, the field should be open to the east, south, and west, and sheltered on the remaining quarter; so that if an exposure to one of these points, or to all of them, is wanted for any class of plants, it may be obtained by the interposition, or the absence, of screens. If there be a slight acclivity in the surface, so as not to interfere with the ready tillage of the ground, and if the inclination be to the south and east, it will be acceptable, as having some advantages over a level. For the outward fence, a wall, paling, or hedge, six feet high, will be sufficient; and this should be impenetrable to hares and rabbits.

Preparation of the Ground.—Little need be added to what has been given under this head in the *Shrubbery*, p. 319. For the work of trenching there recommended, the intervals chosen, if at the beginning of autumn, should be when the ground has been moderately moistened by showers; and if in the progress of winter, when the weather is open, and the ground nevertheless tolerably dry. It is mostly eligible to trench the good upper soil to its full depth; but be careful, in the preparation of the ground, not to trench up any portion of a crude, ungenerous, intractable under-soil.

Interior Fences and Mixed Culture.—If the field be of any extent, interior hedges or screens will be necessary to create more than one curtain of shelter on the north side of plants. It has been much recommended to have such a surplus of area within as will allow kitchen esculents to be cultivated in alternate spaces, as a means of compensation for keeping the soil in fine tillage, and of relieving it by a suspension, or change, of crops.

Methods of Propagation.—In numerous species of trees, it is highly eligible to use the most obvious means of multiplication the seed: many plants can also be propagated by layers, by

cuttings, or by suckers: further, many admit of increase by the artificial processes of grafting and budding. A few are capable of producing new plants by either of the above courses. But as some do not furnish seed sufficiently; as others are apt to vary when raised from seed; as peculiar kinds either do not admit all the methods, or propagate more reluctantly or with less advantage by one than by another; it will be proper to connect, with the detail of each method, examples of the sorts to which it is adapted. The general directions must also be controlled by the notices annexed, in the Tables of the *Shrubbery* and of this division, to plants of peculiar constitution, and by the particular instructions given in the *Fruit Garden*.

I. BY SEED.

Many of our most valued ornamental trees and shrubs are occasionally raised from seed; and it is the method for founding plantations of far the greater part of our principal forest-trees. Seeds of the several sorts are imported from the countries where the trees usually grow in abundance, and are to be obtained at the seed-shops. The following is a select List of plants commonly raised from seed. N.B. Those in Italics are Exotics: those in Roman type are indigenous to Great Britain.

DECIDUOUS.

Alder, *Alnus*.
Andromeda.
Annona.
Aralia.
Apple, *Pyrus Malus*.
Ash, *Fraxinus*, s.
Mountain Ash, *Sorbus*, s.
Almond, Amygdalus.
Azarole-thorn, Cratægus, s.
Benjamin, Laurus.
Beech, *Fagus*.
Berberry, *Berberis*, s.
Bignonia Catalpa.
Birch, *Betula*.
Bird-cherry, *Prunus Padus*.
Broom, *Spartium*.
Broom, Jointed, Genista.
Buckthorn, *Rhamnus*, s.
Candlebury Myrtle, Myrica.
Calycanthus.
Cassine.
Celtis, s.
Cephalanthus.
Cherry-tree, *Prunus Cerasus*.
Chesnut, Spanish, *Fagus*.
Chesnut, Horse, Æsculus.
Chionanthus.
Clethra.
Colutea.
Cornelian Cherry, Cornus, s.
Coronilla.
Crab, Siberian, *Pyrus*.
Crab, Sweet-scented American, Pyrus Coronaria.
Cypress, Cupressus.
Dirca.
Elder, *Sambucus*.
Elm, *Ulmus*. Some sorts.
Filbert, *Corylus*.
Gleditsia.
Glycine.
Gooseberry, *Ribes*.
Halesia.
Hamamelis.
Hawthorn, *Cratægus*, s.
Hazel-nut, *Corylus*.
Hibiscus.
Hiccory-nut, Juglans. Several sorts.

Honeysuckle, *Lonicera.*
Honeysuckle, American, Azalea.
Holly, American, Ilex Prinoides, s.
Hornbeam, *Carpinus,* s.
Hypericum.
Iva.
Ivy, Virginian, *Hedera.*
Judas Tree, Cercis.
Laburnum, Cytisus.
Larch, *Pinus Larix.*
Lime, *Tilia.*
Liquidambar.
Liriodendron.
Magnolia.
Maple, *Acer.* Common Norway — the Sycamore — and the Negundo.
Medlar, *Mespilus.*
Mezereon, *Daphne.*
Mulberry, Morus.
Oak, *Quercus.*
Pear, *Pyrus.*
Plane, Platanus.
Poison-tree, Rhus.
Pomegranate, Punica.
Poplar, *Populus.* Also by cuttings and layers.
Quince, *Pyrus Cydonia.*
Rest-harrow, *Ononis.*
Robinia.
Rose, *Rosa.*
Sassafras, Laurus.
Sweet Service, *Sorbus.*
Wild Service, *Cratægus.*
Spindle-tree, *Euonymus.*
Staphylæa.
Stuartia.
Sumach, Rhus.
Sweetbriar, *Rosa.* Common.
Tamarisk, *Tamarix.*
Toothache-tree, Zanthoxylum.
Tupelo, Nyssa aquatica.
Vaccinium.
Viburnum.
Vine, Vitis.
Walnut, Juglans.
Winterberry, Prinos.

EVERGREEN.

Arbor-vitæ.
Arbutus.
Bay, *Laurus.*
Broom, Butcher's, *Ruscus.*
Cedar of Lebanon, Pinus Cedrus.
Cedar, Juniperus. Red Virginian — White Carolina — Bermudian, and the Savin, if berries can be procured.
Cistus.
Cypress, Cupressus.
Cytisus.
Euonymus americanus.
Fir, Pinus Sylvestris.
Fir, Pinus. Many kinds.
Gordonia.
Holly, *Ilex,* s.
Hyssop, *Hyssopus.*
Ivy, *Hedera,* s.
Juniper, *Juniperus.*
Kalmia.
Laurel, Prunus Lauro-cerasus.
Spurge Laurel, *Daphne Laureola.*
Magnolia.
Oak, *Quercus.*
Phillyrea.
Pine, *Pinus.*
Pyracantha, Mespilus, s.
Rosebay, Rhododendron.
Rue, *Ruta.*
Thyme, *Thymus.*
Vaccinium.
Viburnum.
Yew, *Taxus.* Common.

Those plants which have the letter *s.* affixed will not vegetate the first year after they ripen: it is therefore customary, when first collected, to mix them with about an equal bulk of saw-dust, and bury them under ground, to be left in that state till the March or April twelvemonth; and then carefully taken

from their depository, and sown in beds. If the seeds were fertile, many will have begun to *chit;* a technical phrase for the radical protruded through the outer coat. If all tree-seeds are placed in a similar situation as soon as gathered, and not sown till they thus begin to chit, and then sown in the Nursery-bed (§ 20, 21, p. 11), the cultivator will find his account good in it.

The above List of Hardy Trees and Shrubs comprises the principal sorts which are generally raised from seed, and some which are occasionally so raised: many of the same names will also be found under the other methods of propagation. In the list of plants given with the detail of each method, will be found notices of particular inducements to that method, founded on its occasional convenience, its exclusive practicability, or its comparative advantages.

It is important to remark, that several principal fruit-trees, commonly propagated by grafting and budding, are inserted in the above list; because they are occasionally propagated by seed for three distinct purposes;—first, to raise stocks to receive grafts; secondly, to raise free-growing plants to be distributed in general plantations to increase the variety; and, thirdly, to obtain new varieties of fruit.

In addition to those enumerated, some others may be selected from the general Tables, which are occasionally raised in the same manner when the seeds can be obtained. Many of the exotics do not ripen their seed in this climate: it is, therefore, a branch of the business of the public Seedsman to import annual supplies.

Plants raised from seed are naturally disposed to reach the FULL STATURE of the species.

In the different genera and species of trees and shrubs, the vehicles of seed are of various conformation; such as, capsules—pods—pulpy pericarpia, inclosing either fruit-stones or small seeds—mast—keys—acorns—berries—and cones. The seeds of such sorts as ripen early may be procured in autumn; others, in the course of winter, or at the opening of spring.

Time of Sowing.—Witch Elm or Scotch Elm seed may be sown in June, because it ripens singularly early. The true *Ulmus Campestris*, or English Elm, does not perfect seeds. A portion of autumn, beginning two or three weeks before, and ending soon after October, is a period proper for sowing many families of tree-seeds. These belong to the hardier deciduous forest-trees and shrubs, and to fruit-trees; comprising seeds of two opposite natures, such as lie a long while in the ground

before they germinate, and such as would begin to sprout if detained out of the ground beyond November. Negatively, autumn is not the proper season for sowing either evergreens or tender deciduous sorts. The early months in the horticultural calendar usually referred to spring, the season from February to the beginning of April, is by many accounted the best time for sowing the seeds of tender trees and shrubs; but with respect to deciduous kinds, this business should be finished by the first or second week in April. The course of March and April offers an excellent period for sowing evergreens; and several kinds of American tree-seeds, if sown as late as May, will succeed if afterwards attentively watered: but April is in general the extreme limit for committing the seeds of evergreens to the ground. With these modifications, spring is a successful season for sowing any of the woody-stemmed plants. Many of the sorts proper to be sown in autumn would be injured or spoiled by the wet or frost of winter, if not favoured in the soil, which should be lightish and dry, sandy and mellow.—When it is designed to keep, for spring sowing, nuts, acorns, fruit-stones, and such vehicles of seed, it is expedient to have them closely covered with dry sand, or otherwise secured from the access of air, damp, and frost.

Perhaps the best time for sowing any *indigenous* species is to be ascertained from observing the seeds growing on trees in a state of nature; marking not so much the time at which the seeds are ripe enough to be sown, if taken out by hand, as the period (which in some kinds is close to the former, and in others is far postponed) at which the seeds would fall or be blown out, so as to be self-sown, if not gathered. We say, any *indigenous* species; for a rule drawn from similar indications, even for *naturalized exotics*, might lead to great danger from frost, on account of the artificial accommodations as to time which a change of soil and climate may demand.

Treatment of Seeds.—In reducing seeds to a state for sowing, observe that such as are contained in cones, capsules, pods, fruits, and other vessels, must be taken out: also where several seeds are contained in berries, these should be bruised or rubbed between the hands, to separate the seeds properly: but nuts, acorns, and fruit-stones, are to be sown whole.

Previously to sowing several seeds of the nut kinds, both Evelyn and Miller recommend that their soundness should be tried by putting them in water. With regard to CHESNUTS, the substance of Evelyn's directions for preparing them for sowing, is:—Spread them to sweat; after which, cover them

in sand: when a month has elapsed, plunge them in water, and reject the swimmers; reiterate the drying for thirty days more, and the water ordeal as before. In November, or in the beginning of spring, set the nuts, which have been thus treated, as you would beans: they need merely be put into the holes, with the point upwards. In winter or autumn, inter them in their husks, which, being armed on all sides, are a good protection against the mouse. When come up, they thrive best unremoved; and a pause of at least two years should intervene between each transplanting. Miller cautions against purchasing, for seed, foreign nuts that have been kiln-dried, which is done to prevent their sprouting in their passage. He adds: "If the foreign nuts cannot be procured fresh from the tree, it will be better to use seeds of the growth of England, which produce plants as good for timber or ornament as any foreign nuts, though the fruit is smaller."

ELM-SEED may be sown in summer, in autumn, or in spring. When first gathered, it is very liable to heat: that part which is not sown as it is taken from the tree should be spread thin on a dry floor, till all the moisture has exhaled.

If the treatment of a few is particularized, it will suggest rules for those of similar constitution.

To save seed of the BEECH.—Gather a sufficient quantity of masts about the beginning of September, when they begin to fall. Spread them upon a mat in an airy place, where let them remain six days to dry. They may be either sown immediately, or put up in bags till the approach of spring, as they will keep without sprouting: sown at the last-mentioned season, they are less liable to be devoured in the ground by vermin before they vegetate.

ASH-KEYS should be collected from October to December. The prolific trees are distinguishable by the bunches of keys which they display. Be careful to lay them in a heap of sand, to prevent them from heating.

The course to get the seeds of the PINE out of the hard woody cones, is, to lay them before a gentle fire, which will cause the cells to open; and then the seeds may be easily taken out. If the cones are kept entire, the seeds, according to some, will remain good for many years. At all events, it conduces to preserve them as long as possible, to let them remain in the cones till the time for sowing the seeds. But Hanbury regards it as a great mistake in Miller, to have stated that "seeds kept in the cones will be good, and grow, if they are sown ten or twelve years after the cones have been gathered:" whereas,

observes Hanbury, "the seeds of the *Pinus pinea*, in particular, whether kept in the cones or taken out, are never good after the first year." The other kinds will keep about two years. The cones of the Weymouth Pine, Silver Fir, and the Balm of Gilead Fir, if not gathered soon in autumn, and kept from severe drought, will divide spontaneously, and give out the seed. But the cones of the Scotch Fir, and the Spruce Fir, will not begin to ripen before November; and the Larch and the Cedar of Lebanon will seldom have ripened their cones till January. Their maturity may be ascertained, by cutting into the side of a cone, to the seat of the seeds, previously to gathering the intended quantity. Cedar-of-Lebanon cones should be kept one year before the seed be taken out. Such cones of the Cedar as are brought from the Levant are generally supposed to retain the power of vegetation if kept for several years.

It is further necessary to remark, that some descriptions of berry-seeds, being of a hard bony texture, such as haws, holly, and yewberries, seldom vegetate till the second spring after they have been sown; on which account, it is a common practice to deposit these seeds in a trench dug for this purpose, or in large garden-pots, plunged in the trench, and covered with a ridge of earth a foot thick. For such a trench, choose some dry elevated ground: having traced it out one or two feet wide, excavate it twelve inches deep at least, making the bottom level. Fill in about two-thirds of the trench with the loose mould: on this, raked level, deposit the berries; then cover them in with the remaining mould to the depth of five or six inches, raising the surface into a ridge, the better to throw off the wet. After they have lain in this situation a year, they may be taken up either in October or spring, and sown in the intended beds. If these sorts are sown at once in beds, they will come up the second spring. Most other sorts, however, come up the first season.

Seed-beds.—For the seed-beds, set apart a piece of the Nursery, where the soil is dry and rather loose, and the situation not too much exposed. This prepared ground should be perfectly clean. Having dug it over, let the earth be thoroughly broken, and the surface raked level. Divide this plot into beds three feet and a half wide, leaving intervals of a foot or eighteen inches for alleys.

The seed-beds marked out for evergreens should not by design be exposed to the power of the mid-day sun.

Defence of Seeds.—Many of these are the prey of mice: to

check and destroy these vermin, it will be advisable to use such a trap as is described in the APPENDIX, or some other of a simple and cheap construction.

To prevent birds from eating the seed before they germinate, it is a good precaution to lay thorny bushes or similar light fencible materials over the bed. Or if the seeds are valuable, and the beds small, it may be worth while to hoop and net them over.

Protection from the Frost of Seeds sown in Autumn.—To guard against the effects of frost, after the September or October sowing, on seeds which shoot soon after being committed to the earth, the beds which have received berries or acorns would be materially benefitted by being covered with peas-straw, fern, or any dry long litter, in the beginning of December, or at the first approach of rigorous weather, before the frost has penetrated into the ground. Germinating acorns, in particular, are susceptible of injury from frost.

Imported Exotic Seeds.—Imported seeds should in general be sown as soon as they arrive; but the temperament of evergreens must be consulted in keeping their seeds out of the ground till March or April, the safe season for sowing them already pointed out. The section in the *Shrubbery*, entitled "American Plants," describes the nature of the soil which it is necessary to provide for that class of exotics, in order to raise healthy and vigorous plants. Compost of a similar kind to that provided for the bed should be sifted over the seed.

Seed Pans and Boxes.—It is usual to provide shallow wide pans, for the purpose of sowing the more curious seeds that are procured of American and other plants. All the directions that can be given as to treatment, is, to observe that very small seeds be not buried too deep in sowing, and that care be taken in keeping the soil so sufficiently moist without endangering the seeds. These hints will be useful to those who may wish to raise the seeds of Heaths, Rhododendron, Azalia, Ketmia, &c.

Tender Exotics.—Some exotics from warmer climates, if sown in beds, require to be hooped and matted. The least tender, such as the Liriodendron, do not want shelter from frost, nor shade from heat, beyond the first spring and summer. Those which are tender or curious in an increased degree, the Bignonia Catalpa, for example, may be sown in pots, that the seedlings may be removed for alternate protection in winter, and shade in summer, till the plants are advanced in growth, one, two, or three seasons, or more. Further, some of the most tender or valued sorts, being sown in pots in the spring, might

be forwarded by being placed in a moderate hot-bed, just to bring up the plants to some degree of strength;—or they may be sown in a frame, and, after a year or two, transplanted into pots; when shelter, during winter only, may be requisite for two or three years, till they are gradually hardy enough to be planted out in the full ground. The *Juniperus bermudiana*, Bermuda Cedar, requires this course of tender treatment; from which something may be withdrawn every season, till at last the shelter of mats in winter may be dispensed with. The notices annexed to exotics, in the Tables, will assist to indicate the degrees in which the seedlings must be favoured, as to the aspect and temporary shelter.

Accelerated Germination.—Some kinds are sown in pots, and placed in a hot-bed, not because their constitutions absolutely require it, but because they are thus raised more certainly and expeditiously. The Arbutus is occasionally treated in this way with great success. Fill the pots with the common earth: as soon as they have received the seed, plunge them to their rims in a hot-bed; sprinkle the mould frequently with water; and when the plants appear, let them have copious supplies of free air.

Hardy Plants in Boxes.—The germination of all seeds, and the growth of all seedlings, are indeed promoted, when they can be removed to different situations, according to the season of the year. For this object, hardy cedars and pines are frequently sown in small boxes in light earth.

Culture of Seed-beds.—As the year advances into spring and summer, be careful to give the seed-beds some occasional light waterings. If a long continuance of dry weather occur in March, it will be proper to refresh the bed with water, whether the plants are coming up, or have already risen. In April, May, and the following months, as the power of the sun increases, still apply the watering moderately. Hasty and copious waterings would tend to wash the earth away from the tender roots, and to expose them to be scorched by the sun; therefore the applications of water should be gentle and frequent: every other evening will be sufficient; or the watering may be given early in the morning, if more convenient. Although the deciduous tribe must have their share of care, yet regularity in watering evergreens is peculiarly necessary.

Water also the pots and boxes, which must be regarded as smaller beds requiring additional attention.

Timely exertions must be used to eradicate weeds. Begin as early as March to remove them, carefully by hand, that

they may not grow into strength, and twine their roots into those of the seedlings. The prompt destruction of weeds will be easy and availing in a tenfold degree, compared with the work of reducing them if they are suffered to advance. As the plants increase in size, to clear beds where they do not stand in close growth, small-hoeing may be practised. By every hoeing, a fresh portion of the soil is exposed to the atmosphere, the action of which is a powerful contributor to fertility.

In the progress of summer, some of the tender and delicate seedlings newly come up, or just breaking ground, will be essentially benefitted by the shade of mats occasionally extended over them in the middle of hot days. At the same time, let plants in pots and boxes be removed to a shady situation.

Be careful to have any curious sorts which have been accelerated in a hot-bed carried into the full air in proper time.

Probably, some seeds of a hard stony constitution may not germinate till the second spring: do not disturb them under the supposition that they have perished: they will come up in their proper season. From the seeds, however, of most species which have been sown in the spring, the herb will be sent up in the same year; and the mass of those sown in autumn will rise the spring following, or in an early stage of summer.

Towards the end of September, pot young tender seedlings that require protection during winter, and begin to remove under shelter delicate and curious plants already in pots or boxes. Also, as autumn declines into winter, prepare, at the approach of the first hard frost, to shelter, by hoops and matting, tender seedlings in beds, particularly the Cypress, Arbutus, Cedar-of-Lebanon, Oriental Arborvitæ, and exotics which have come from warmer countries. At the same season, let such pots and boxes as are already under a garden-frame have the additional protection of glasses or matting; but keep both beds and frames constantly open in mild weather.

After the meridian of summer has arrived, if the seedling pines, or other resinous evergreens, which have been raised the same season, stand too thick in the seed-bed, the surplus number may be pricked out; for the double object of giving sufficient space to the plants left, and that those removed may make greater advances in growth by the end of summer. Having prepared a new bed about the ordinary width, and waited for showery weather, prick the young plants therein four or five inches asunder every way. At planting, let them

be gently watered. Give at the same time a copious watering to the seedlings left in the original bed, to settle the loosened earth about their roots. Over the new bed, hoops should be fixed, for the purpose of shading it with mats occasionally, till the plants have taken root. Be careful every forenoon, when the sun shines with power, to draw on the mats at ten o'clock, and let them remain till three or four. Regular attention will also be requisite, morning or evening, to water them moderately. If not duly shaded and watered, all the plants removed at the close of June, in July, or in August, will be lost: but, properly nurtured, they may be expected to be more capable of surmounting the rigour of winter than if they had remained in the original bed.

When the advancing seedlings are of one or two years' growth, according to the nature and destination of the different sorts, they should be planted out in the spring, in nursery lines, from twelve to fifteen inches asunder, or with greater intervals between the rows for the larger plants. A few kinds may be allowed to stand in the seed-beds for three years. Lift also some select kinds, to be determined by their constitution and value, into small pots, one plant in each, to be nursed therein till of three or four years' growth.

For the culture of plants transferred from seed-beds, or from other incipient stages, see the section NURSERY ROWS.

II. BY LAYERS.

The young shoots of the parent plant are the subject of this method of propagation. It is one of the resources to keep approved varieties permanent. In raising ornamental shrubs of which it is difficult to procure ripe seed in a good state, it is of extensive use. In regard to forest-trees, its use in multiplying underwood is not counteracted by any disadvantage: when the design is to raise the first order of timber-trees, it cannot be recommended, as the growth of the plants is found to stop at a lower size than those raised from seed:—the Elm and Lime are, nevertheless, often propagated by this method, because it is expeditious.

This being the main chance for the propagation of every plant that cannot be had to grow in quantity by other modes, it may be understood that it may be applied generally, taking care in the nursery quarters to procure the proper soil for each kind, and to give moisture and shelter congenial to the natural habits of each; and, although some trees will not strike root for two or more years, yet industry and patience, with proper

skill, will enable the gardener to increase his stock of almost any woody plant he may possess.

Times of Laying. — As the PERFECTION OF THE YEAR'S SHOOT is perceived in some kinds sooner than in others, towards the end of September commences the principal season for propagating by layers such deciduous kinds as are thus raised; and in pursuing this work through October, the gardener seizes the best interval of the year for it. The laying of hardy deciduous plants may, however, be continued with success, in open temperate weather, till Christmas: further, from Christmas till the end of February, if the pressure of other horticultural work has prevented this from being attended to before, layers from plants of the same description may still be made; and the difference will merely be, in their striking proportionally later; so that, instead of being rooted by autumn in the same year, some of them will not be fit to be severed from the stools till the second season. But March is a good time to lay shoots, if the cultivator does not want new plants till the following spring.

The laying of evergreens may commence in March; which month and April constitute an auspicious time for it. Such species as will not root freely, when the wood of the shoots is of any age, may even be laid in the course of the summer, by the process particularly described below. The general laying of evergreens may be resumed in the middle of August, and continue, by deliberate arrangement, till the end of October.

All plants which succeed by cuttings will succeed by layers; and many which will not strike from cuttings can be continued by layers, on account of the laid branch retaining the vital principle longer by its connexion with the parent plant: but as propagating by layers is attended with the most trouble, generally speaking, there is no occasion to employ this resource if cuttings from the species will strike readily.

Dig round the plant which furnishes the layers. Choose branches that will easily bend to the ground: to receive them, make grooves in the dug earth with the spade: bring down the last-year's shoots regularly; take each singly, and, pressing with one hand on the centre while the extremity is kept raised with the other, lay it along with the point standing out of the ground. Fasten them in this position with hooked pegs; and then let all the young wood on each branch be neatly laid: having confined each layer with a peg, if necessary, cover the body of it with earth two or three inches deep, letting the top project above the surface. When all the layers are adjusted,

prune the extant parts, so as to leave but one bud on each visible. In laying hard-wooded plants, it is necessary to make a gash with a knife on the under-side of the layer, slitting it an inch or more upward, and so disposing it in the earth as to keep the cut a little open, which will promote the emission of fibres. If the ground be not moist at the time of laying, some water should be given. Let the reader consult the Physiological Sections at the commencement of this book, where the rationale for these proceedings will be found.

This course is applicable to the bulk of woody-stemmed plants: though, in sorts of which the more-advanced shoots will strike freely, it is the preferable practice to lay at the principal seasons before pointed out.

Few, however, of the resinous or cone-bearing plants, such as the Pine, Cedar, Cypress, Juniper, will succeed, either by the last-described, or the common course of laying; and are therefore generally raised from seed.

The suitable shoots of curious or eminently-valuable plants may be occasionally laid in pots. The pot must be placed near the stool, in order to have the layer-shoot bent down into it, in conformity with the preceding directions. Or, the laying in a pot is sometimes effected by drawing a clean pliant shoot upward through the hole at the bottom of the pot, which is then to be filled up with earth. The former alternative, under this method, is also the speediest resource, when the branches of the original plant are not situated low enough to admit of being laid into the ground: the pot in this case is placed upon an elevated stand accommodated to the height at which the layer to be received springs.

Severing Layers.—The times of transplanting are Feb. or March, Sept. or Oct. The FITNESS of layers to be detached depends on their being well rooted. Those which have been planted in the preceding autumn will, in general, be sufficiently rooted by the anniversary season: many of those laid in spring and summer will equally have made new plants by the following autumn: others, which have been laid down at the same time, will not be rooted till the return of spring. Peculiar species which strike still more reluctantly will be two seasons before the basis of a distinct vegetation is effected. The PROPER TIME of taking off layers has also some relation to the season at which the plant, from being deciduous or evergreen, tender or hardy, can be safely or successfully transplanted. Controlled by the latter consideration, the rooting of the layer, indicated by the vegetation of the herb, is the criterion for severing it

from the stool.—The separation should immediately follow the concurrence of these two essential things; as the health of the rooted layer, and the future rooting of new shoots on the stool in preparation for being laid down, would be endangered by delaying the separation.

Cut off the principal layer-branch at the part where it enters the ground; leaving untouched all the shoots which have been sent out since the first operation, that they may be ready for future laying. Then, with the spade, carefully ease up the rooted shoots, so as to preserve every fibre of the roots entire: sever each layer from the unrooted origin of it, cutting close in to the new root, and the derivative plant will be completely disengaged.

Trim the layer as soon as it is taken off. Set the new plants in an open situation, in rows from twelve inches to two feet distant; and let there be intervals in each row of twelve of eighteen inches, according to the size of the plants. For their subsequent culture, see NURSERY ROWS.

Afterwards prepare the stools for relaying, by pruning away redundant twigs and shoots, and by removing all the chips and other litter. Finish by a dressing of fine rotten dung, digging it into the earth round the stool.

To obtain a tree from every bud of the layer.—By making incisions below the footstalk of each leaf, and extending a little above it, and by cutting off carefully the sharp spurs or ends of each tongue, so as to cause them to throw out a semicircle of fibres, instead of a few at the points only, Mr. Taylor procured a new tree from each individual footstalk. The layer was secured to the surface of the earth by pegs placed between each incision, and covered to the depth of about an inch only; the leader or end of the branch remaining exposed.

III. BY CUTTINGS.

The young shoots are equally the subjects of operation in this method of multiplying a plant; and these, too, are principally selected from the wood of one season's growth. The following comprises a few of the numerous species that are commonly raised by cuttings, exclusive of fruit-trees, which, having been treated of in another department, need not be recapitulated.

Note.—The propagation by cuttings has a tendency to dwarf plants, or to keep those low of which the species is naturally loftier than the parent plant.

DECIDUOUS.

Alder, *Betula Alnus*. Not with certainty: but, from young shoots well ripened, a great proportion of the cuttings which have been planted in October do pretty well.

Baccharis halimifolia.

Bupleurum.

Elder, *Sambucus*. So certainly and expeditiously, that it is seldom raised from seed.

Honeysuckle, *Lonicera.*

Ivy, *Hedera quinquefolia*. Also known by the names *Vitis hederacea*, and *Ampelopsis quinquefolia.*

Jasmine, *Jasminum.*

Plane, *Platanus*. Cuttings of the *occidentalis* will do pretty well, planted in autumn.

Poplar, *Populus*. All the species not exotics from a warmer climate. The native species are propagated so easily by cuttings, that truncheons two or three feet long readily strike: they will attain a great bulk in a few years.

Privet, *Ligustrum.*

Willow, *Salix*. Cuttings may be planted at once in the field. In this case, it is better to take them from the two-year old wood, as the new plant will be forward in proportion.

EVERGREEN.

Arbor-vitæ, *Thuja.*

Aucuba japonica.

Honeysuckle, *Lonicera.*

Ivy, *Hedera.*

Juniperus Sabina. Under a deficiency of seed.

Laurel, *Laurus* and *Prunus*. Chiefly by cuttings.

Phlomis.

Common Privet, *Ligustrum.*

Santolina.

Note.—Few of the resinous or cone-bearing trees will succeed by Cuttings any more than by Layers. All the kinds may be propagated by grafting on any kind that is suitable for a stock. (See § 23, p. 13.)

Seasons for planting Cuttings.—Those intervals of the year which are perfectly eligible for MAKING LAYERS are also opportune for planting Cuttings. A reference to the last article will therefore bring before the reader the principal seasons; which are, in gross: 1. A considerable interval about the commencement of autumn; the first part of which, the ultimate limit of summer, is proper for evergreens exclusively;—2. The mild vicissitudes of winter, in which alone some hardy deciduous plants are likely to succeed;—And, 3. A considerable period at the opening of spring, the latter half of which is more adapted to evergreens. With respect to Layers and Cuttings, there may be a slight difference caused by the IMMEDIATE SEPARATION OF CUTTINGS; and this, in the propagation of tender evergreens, may furnish a reason for contracting, rather than enlarging, the spring or autumn season for the plantation of Cuttings, as the early or late extremes border on winter. The last weeks of March and the first weeks of April form together the best spring months for evergreens. The close of Aug. is a proper time: then begins the true spring

of plants which vegetate throughout winter. Cuttings of evergreens should not be taken by deliberate management after Sept.

As in making Layers, so the common course is departed from in cuttings of hard-wooded evergreens of which the full year's shoots are tardy in striking, and on that account often fail. It is the more skilful practice to take cuttings of such about Midsummer, from the tender shoots sent out the preceding spring.

Plants readily increased by planting Cuttings of the Roots:

Populus Canadensis — alba — nigra.
Pyrus Japonica.
Most of the Plum species, especially the Muscle stock.
Apple and Pear stocks, and likewise Quicksets; and almost all plants that are accustomed to throw up suckers from roots, when spread at a distance from the stems of the tree.

In the Green-house there is also great room for the amateur gardener to try his skill in this ready mode of propagation. All the tribe of Pelargonium, of which the finer varieties are raised from seed, as cucullatum, scabrum, alnifolium, &c., grow most readily if about an inch in length of the solid root be put into a pot, with the upper end of the cutting just above the mould. But the Editor begs to remark, that the practice of the above can only be recommended as convenience may dictate.

Process. — By digging up a fallowed part of the nursery where the soil is mellow and suited to the constitution of the plants, prepare beds to receive the cuttings: let the earth be thoroughly broken with a spade, and the surface raked smooth. When the ground is otherwise ready, it is eligible to wait till showers have made it moist.

Except the species is known to make new plants from shafts of branches with peculiar facility, confine the young wood selected for cuttings to that of one season's growth. Take the outward shoots, such as are straight, of moderate size, and well ripened: reject luxuriant stems springing from the roots of the parent plant. Having separated them with a sharp knife, cut them into lengths of six or eight inches, and thence to a foot, so as to leave at least one pair on the upper extremity. Lastly, divest each cutting of its leaves from the middle to the bottom.

Plant those which require considerable care, by dibble, in a shady border. The mass of hardier sorts may be planted in open compartments. Having traced out rows for them, eight inches, a foot, or foot and a half asunder, and intervals in the rows of eight or twelve inches, insert each cutting a little more than half its length into the ground.

Some of the more curious or tender kinds may be planted in small pots or shallow boxes, several in each, to be cultivated therein till well struck.

Give water at planting. In the dry times of spring and summer give successive waterings, especially to the principal or more delicate sorts.

During the heats of summer, let the cuttings in pots be removed into the shade for four or five hours each day; and extend over the choicer plants in beds, occasional shade from the full sun.

Of a competent number thus treated, many will succeed, and be well rooted in a summer's growth, and will have made some top shoots. Of the hard-wooded evergreens, and a few other hard-wooded kinds, some probably will be two years before their complete rooting is effected.

When of one or two years' growth, after the effectual rooting has been indicated by the growth of the herb, they may be transplanted to greater distances. Let their age before removal be determined by the observations under NURSERY ROWS, and the time of the year by the directions given for transplanting under *Shrubbery*.

A few hardy deciduous species, that propagate freely by cuttings in the ordinary way, will also grow from large cuttings of several feet long; as the Elder, Willow, Lombardy, and native Poplar. This method is occasionally adopted, when it is requisite to form expeditiously some rough plantation, to serve as a hedge or screen along an outward boundary. Cuttings for this purpose may consist of long slender rods of one or two years' growth, or as well of large truncheons or stakes from three to six feet in length. Further, the Willow, in particular, will increase from large pole cuttings of from six to ten feet, planted out at once, to form either pollard-stems, or be trained into full grown standards. To receive these large shafts, let proper holes be formed by a large dibble pointed with iron; or for the better insertion of pole-cuttings of Willow, have holes dug with a narrow spade. When an extensive plantation of Willow-cuttings is made, to found a crop of rods for hoops and basket-work, it is a common practice to have cuttings of two or three feet sharpened at the lower end, that they may be pushed at once into the ground by the hand of the planter, which should be armed by a piece of stout leather. If the spring planting is postponed till March, an objection to the latter method arises, from the readiness of the bark to slide off by friction against the ground.

IV. BY SUCKERS.

From the roots disposed to spawn suckers, they rise abundantly in spring and summer. These parasitical excrescences weaken a tree, according to the length of time they remain on it. It has been long ago remarked, by Lord Bacon, that "the cutting away of suckers at the root and body doth make trees grow high:" it therefore concerns the cultivator, to balance this disadvantage against the expedition with which new plants can be obtained by nurturing suckers. In proportion as the alternative modes of propagation are slow and difficult, it may be worth while to fix on adult plants which offer layers, and to cultivate them for stools.

The Editor unwillingly notices this mode of propagating Plants. It is but a slovenly way of working; and it would be decidedly best to eradicate all suckers on their first appearance.

V. BY GRAFTING.

The artificial process of Grafting is not different in its object from that of Budding. The chief utility of both consists in enabling the cultivator to have the vigour of a seedling in the root and stem of a plant; and at the same time to continue permanent any approved variety, as respects the fruit, the flower, or the ornamental peculiarity of the foliage. The nursery-man may also secure the latter object, and dwarf the size of the entire plants in some degree, by taking stocks raised from layers or cuttings, instead of seedlings.

Grafted fruit-trees also bear sooner than trees raised by any other method.

There is another distinct end sometimes proposed by grafting. If the leaves of a forest-tree are acceptable to cattle, and the root is apt to hurt the pasturage by throwing out suckers, the plant is grafted on a stock not subject to this inconvenience.

The hardiness of exotics may also be increased by grafting. When the stock is chosen from some hardy member of the family, the tender exotic which is grafted upon it is better prepared to endure the changes of our atmosphere.

This mode of propagation is of most extensive use in the Fruit Garden. In addition to the species of fruit-trees, there are not many kinds of shrubs or trees on which it is commonly practised.

DECIDUOUS.

Beech, *Fagus sylvatica*. The Purple on stocks of the Common sort.

Elm, *Ulmus*. The common English, on stocks of the Witch Hazel. For ornamental purposes, the plants are much better than those raised from suckers.

Spanish Chesnut, *Fagus Castanea*. The French are said to graft the Spanish Chesnut for the fruit: but Miller says that such grafted trees are unfit for timber.

EVERGREEN.

Holly, *Ilex*. The Variegated on the Common Green. The stocks to be of three or four, and thence to six years' growth. But see BUDDING.

NOTE.—This operation may be extended to other ornamental Evergreens.

INARCHING furnishes a resource for propagating many choice shrubs which are not easily raised from seed, from layers, cuttings, or suckers, or even by the common methods of grafting or budding.

Stocks are usually supplied from the following sources:

Apples, from seedlings of Crab.

Cherries, from seedlings of the Wild Black Cherry.

Cytisus (small), on Laburnum, for high standard-trees.

Pears, from seedlings of Wild Pear, Hawthorn, and Quince, as raised from cuttings.

Medlar, grafted on the Pear.

Plums—the Muscle Plum propagated by cuttings of roots. Pear Plum struck by layers.

Roses, on the Apple-bearing Rose and Sweetbriar.

Service, on the White Thorn and Mountain-ash.

Raising Stocks.—The fundamental provision is, to have stocks of the proper age. It is a principle pretty well established, that the stocks ought to be of the same genus with the graft to be received. The proper stocks for each kind of fruit have been mentioned in the *Fruit Garden*. According to the standard by which the tree is to be trained, the stocks are raised from seed, from suckers if they offer, from layers, or from cuttings. They should be nursed from their origin with plants of the same species; and, according to their progress and destination, be finally prepared by removal into nursery rows. For this purpose, they should be dug up with full roots; some at the end of the first growing season; others, at the anniversary season after sowing the seedlings or planting the suckers, layers, or cuttings; and those last removed on the completion of the second year's shoot. The seedlings must proceed, by an intermediate bed, to the nursery-rows: being set out, on the first removal, six or eight inches apart. Let plants of the same species be subdivided according to their size, when placed in the nursery rows. The intervals between the rows for plants which are to stand to receive grafts should be from two

to three feet; and the distance of plants in the same line, eighteen inches or more.

Stocks for dwarfs are fit to receive grafts in the second or third year: for standards, in the third, and thence to the sixth year, or when the stem is of the height desired.

The seedlings, having a disposition to reach the full natural height of the species, are termed Free-stocks.

The wood of stocks which stand at a proper distance in the nursery rows will be better ripened and more compact than that of plants of which the heads are too contiguous. Some professional writers advise the rejection of stocks from suckers; alleging, that they are never so well rooted as stocks from any other origin, and that they are constantly disposed to emit suckers in great quantity, which tend to impoverish the soil, and are troublesome to eradicate. In some cases, the stocks to be grafted are established trees, already in the Fruit Garden.

Seasons for Grafting.—This operation may commence on deciduous trees during the latter fortnight of Feb, if open temperate weather: on the late-shooting kinds, it may be progressively continued till the second week in April; after which the graft and shoot will in few sorts unite. The close of Feb. is commonly opportune for the Cherry, Plum, and Pear; and the course of March for the Apple. Evergreens may be successfully grafted in March and April; and some exotics from warm climates, in May.

The early time for the operation prescribed by the forwardness of the buds on the graft, as will be explained, may be controlled by the expediency of waiting till the circulation of the sap is brisk in the stock. On the stock, the buds should begin to break into leaves before it receives the graft. These diverging objects may be thus brought together.

Provision of Grafts.—Early in Feb. prepare, by marking off grafts from the deciduous sorts of which the buds are most forward. Selected from healthful trees, they must be young shoots of the preceding year, for older shoots never unite well. After the middle of Feb., the buds on the early kinds begin to swell fast; and if the graft were not timely separated, the excessive developement of the buds would prevent the graft from uniting congenially, when inserted on the stock.

Regulated by the appearance of the buds, begin to cut the grafts in Feb. Take, from the outside branches of healthful trees, robust but moderate shooters, firm and well ripened, such as have not made lateral shoots. Cut them off at full length. As it is seldom proper to use them till three weeks

or a month after they are collected, on account of the start in vegetation which the stock should be allowed, to preserve them till grafting-time, lay them, by their large ends, in some dry earth in a warm border, buried half their length; cover the tops with dry litter, both to prevent their drying, and to guard against rigorous weather. Remember that the shoots of tender trees cannot be kept unimpaired so long as the more hardy. It will contribute to preserve a tender scion, if a small joint of the former year's wood be cut off with it. This may be detached at the time of grafting. Having preserved the scion entire till then, reduce it to five or six inches in length, so as to include four or five good buds. The middle part of each shoot forms the best graft.

Methods of Grafting.—Experimental cultivators have varied the methods of grafting in numerous ways; but those of established practical use are, *Whip Grafting*, *Cleft Grafting*, *Crown Grafting*, *Root Grafting*, and *Inarching*.

In all methods, the stock must be headed down previous to the insertion of the graft. A fruit-tree stock may be headed down for a standard, so as to leave a stem five or six feet high; for a half standard, three or four feet; for a dwarf standard, one or two; for dwarf walls, within six inches of the ground. Occasionally, the stock for a standard may be headed quite low, in order to have the strong shoot from a graft trained for a stem, which may be topped at the height at which it is desired to have branches spring to form the head.

To begin and complete the operation, these technical implements are necessary: 1. A neat small hand-saw, for severing the heads of large stocks; 2. A grafting-knife, or strong knife with a thick back, to make clefts in the stocks; 3. A grafting-chisel and small mallet, for making clefts in large stocks; 4. A budding-knife, or sharp pen-knife, for mutually sloping and shaping the grafts and stocks.

The following materials must also be provided: 1. Strings of bass or woollen yarn, to tie the graft and stock together; 2. A composition of good binding-clay, horse and cow dung, straw cut small, and a little salt. The use of the salt is to prevent the composition from cracking in dry weather. The whole should be moistened with water, well mixed, stirred every other day, and kept soft till wanted, by water floating in a cavity made at top.—Some persons have tried another composition; turpentine, bees' wax, and rosin, melted together: this is represented to keep out the air from the spliced wood better than the clayey mixture. When it is to be applied, a

quantity is put into a metal pot, over a gentle fire. Great care is necessary not to apply it too hot, lest the graft should suffer. A coat, laid over the joint, a quarter of an inch thick will be sufficient. It is not liable to crack from frost; and when the full heat of summer arrives, it will melt off without any trouble.

To proceed to the methods of grafting which have been named:—

(1) WHIP *or* TONGUE GRAFTING.

This, as the most expeditious method, is generally practised by nurserymen. The stock upon which it is performed must be slender, from the size of a goose-quill to any diameter which coincides with the thickness of the graft.

Having headed the stock at some clear smooth part, slope it on one side, with a knife, in a very acute angle: make a slit on the lower side of the slope, to receive the wedge or tongue of the graft. Secondly, having the prepared scions in lengths of four or five eyes, take one which matches the stock in size, and cut it sloping so as to fit the stock, that the rinds of both may correspond exactly: make also in the slope of the graft a slit like that in the slope of the stock, to receive the sharp end of the stock. Then unite the graft to the stock as evenly and completely as possible. Let the graft be carefully held in its due position, while a bandage is applied. Carry the string of bass in a neat manner several times round the stock and graft. Lastly, cover the joint with a suitable composition: if that of clay, above described, be used, coat from half an inch below the bottom of the graft to an inch above the top of the stock, and to the thickness of half an inch all round: finish it in an oblong globular form, taking care to work it so close that no wind, or wet, or sunshine, may penetrate.

(2) CLEFT GRAFTING.

This method is resorted to when the stock is too large to admit that already described. The size of the stock, however, must not exceed that of the graft beyond a determinate limit; for if the rind of the stock be too thick, the inner bark of the stock and scion will be prevented from uniting. The stock is usually from one inch to three in diameter. Begin the operation by smoothing with a knife the top of the stock where it has been headed: then marking about one fourth in diameter of this top to be left horizontal, cut from the mark to the opposite side of the stock in a sloping direction. Next, hold the edge of a strong knife on the top in a right angle with the slope, and with a small mallet make a cleft deep enough to

receive the scion: and keep it open with a wedge. To prepare the scion for insertion; first, cut the bottom of it with a double slope like a wedge; secondly, slope the bottom of the wedge, so as to leave a broad portion on one side of the graft with the rind entire: this side is to stand outwards. Insert the scion into the cleft of the stock, on that side of the stock which is not sloped, so as to make the rind of one join that of the other exactly; for without their perfect union the graft will not succeed. On removing the wedge, bind them together with bass, to prevent the cleft of the stock from opening. After which, protect the joint from the air, by a coat of composition, beginning from the bottom as far as the cleft extends, and carrying it up the graft a competent height. The scion may be six or eight inches long. Two eyes, at least, should be left uncovered for shooting.

Two grafts may be inserted into one stock: in which case the stock must be large enough to admit of two parallel clefts.

(3) CROWN GRAFTING:

(Sometimes called Shoulder Grafting, and Rind Grafting.)

It may be observed, that, although grafting may thus be performed in various ways, there is one true principle alone on which it can be accomplished, so as to accord with nature: see § 24. p. 13.

In this mode, two or more grafts are inserted into the horizontal crown of the stock. It is chiefly practised on large trees, of which the wood is too stubborn to be cleft.

Either the head of the stock, or one of the large branches, is sawed off horizontally, and pared smooth. The rind at the top of the stock is then raised, to admit the scions between the wood and the bark; and kept raised by a fine thin wedge. Each scion is to be pared away, on one side of the lower part, for about two inches, so as to make that side flat, and leave a shoulder forming a right angle with it. Introduce each scion between the wood and the bark of the stock, so that the shoulder of the scion may be in contact with, and rest upon, the crown of the stock. When all the scions are inserted, and the wedges withdrawn, bind them in with bass; and cover, with a composition of clay, the whole crown of the stock to the height of at least an inch, rounding it off so as to prevent any wet from penetrating or lodging on it.

As in this method the scions are merely placed between the rind of the stock and the wood, they are liable to be blown out by violent winds, even after they have made large shoots sometimes after the second or third year. To prevent this,

they should he supported by large stakes, till they have nearly grown over the crown of the stock.

The operation will he the more successful, if not performed till the sap of the stock has hegun to rise, which renders the hark more easily separahle from the wood.

It is not common, however, to take the following precaution, which very considerably promotes the success of the operation; viz. *to remove the outer bark of the scion* previous to inserting it; *being careful*, at the same time, *not to wound the soft, innor, green bark.*—See Technical Repository, Vol. I. p. 335.

(4) ROOT GRAFTING.

This is performed hy whip-grafting the scion upon a stock, formed merely of a piece of smooth root cut from a tree of the same genus.

The piece of root may be five or six inches long: it should he clean and smooth, and of the same diameter as the scion. The length of the scion may he four or five inches. Let them he united hy whip-grafting, hound together with hass, and well protected with a suitable composition over the joint, so as to prevent the wet from affecting the wounded parts. In planting them, the root and half the graft should be buried. Under this course, the scion itself will root.

The above is certainly an expeditious way of ohtaining a new plant. The Douhle Camellia japonica succeeds well, if grafted on pieces of the roots of the Common Single species: so will the Sophora japonica, a most interesting tree, if put on a portion of its own roots: in like manner the True Service, *Sorbus domestica*. And if recourse were not had to such a mode, those interesting trees would he scarce as stocks: on what they would grow is difficult to aver, as the slowness hy which they make young wood renders their growth from layers difficult and tardy.

(5) INARCHING, OR GRAFTING BY APPROACH.

To perform the operation:—Take the branch intended to he inarched, and bring it in contact with the stock that has previously been planted in the vicinity of the tree intended for propagation. Mark the parts where they are similar in size, and can be easily hent into union, so as to form a pointed arch. In that part of the branch which is to rest against the stock, pare away the bark and part of the wood to ahout three inches in length; and do the same in the side of the stock which is to receive the graft. Then, at the top of the unbarked part of the stock, introduce the knife, and cut a slit downwards behind

it, which at once forms a slit, and a tongue to go into a corresponding slit to be made upwards in the graft. After this preparation, let the tongues be mutually inserted, joining the unbarked parts exactly, rind to rind. Bind them together with bass, and protect the joint from the weather by a coat of close composition. Finish, by fastening the branch to a stout stake, driven firmly into the ground, to prevent the wind from disturbing the joint.

The use of this method for the Walnut is evident, and it is very convenient with the more valuable trees in the Green-house.

Management of Grafted Trees the same season.—In long-continued dry seasons, grafts are observed to be most liable to fail: the inference is, that waterings should be applied at proper times to the root, with constant attention.

Repeatedly examine the joints of newly-grafted trees. The clay is sometimes apt to divide, so as to leave a passage to the weather. When this happens before the graft is perfectly united, take off the old coat, and apply fresh composition to the joint.

In the course of the summer, rub or pinch off whatever shoots are sent out from the stock below the graft, as they appear; for these would intercept the nourishment which ought to go to the graft. Be equally prompt in eradicating suckers.

At the approach of Midsummer, the grafts which are doing well will be united. Remove the clay, and loosen the bandages; and cut away with care the heel or upper part of the stock; a necessary portion being left in the heading, close the stock, previous to the scion being inserted. (§ 23. p.13.)

Grafts which have been inarched may be expected to be well united by the first autumn after the operation. In separating the graft from the parent plant, be careful to use a perfectly sharp knife, with a steady hand. Slope off the lower ungrafted portion of the scion close to the stock. Then take off the old clay and bass, and substitute a fresh bandage and coating, which may remain a few weeks.

Training of Grafts the second season.—In March, such fruit-trees as have been grafted a year should have the shoots of the preceding summer shortened, that they may emit laterals, to form a head near the stock.

A similar course may also contribute to form a spreading head in ornamental trees: but it would be highly improper in timber-trees, which are usually raised with the intention of training them with a continuous straight lofty bole.—See subsequent CULTURE OF TIMBER-TREES.

For the future Training of Fruit-trees, see *Fruit Garden.*

VI. BY BUDDING.

The same general advantages, and some peculiar ones, which it is the object to secure by grafting, can be attained by budding: the rationale of which is at once understood by the physiologist. (§ 26. p. 14.)

Raising Stocks.—The directions for RAISING graft-stocks will apply in every respect.

The seedlings should be removed into nursery-lines, at the first proper season after one year's growth.

When the stocks are in their third summer, and from half an inch to an inch in diameter at that part of the stem where they are to receive the bud, they are of a fit age and size, if intended for half-standards or any thing lower: but full standards cannot rise to the adequate height in so short a time.

Season of Budding.—On a few forward kinds of the Apricot, Peach, and Nectarine, this operation may commence at the close of June. The general time for budding does not begin before the middle of July, and lasts scarcely a month. Performed on the latest kinds AFTER the middle of August, it is likely to be abortive. A criterion of the right time is presented by the state of the buds. Try one with a knife, as if you had entered on the process described below; and if it readily parts with the wood, it is in a fit stage. Cloudy weather is most auspicious for the operation: if such weather does not occur opportunely, take the morning or evening. The force of the meridian sun is apt to shrink the cuttings and buds, so as to prevent the bark from rising freely from the wood.

Cuttings for Buds.—These should be taken from healthy trees, and, if fruit-trees, such as bear well. They must be shoots of the spring: choose vigorous but not luxuriant shoots, showing fine short buds.

Budding-knife and Bass-strings.—The proper budding-knife has a sharp thin blade, adapted to prepare the bud; with a taper ivory haft, made thin at the end, for raising the bark of the stock.

Bass-strings will be wanted, as in grafting: these will be more pliant, if soaked in water.

Process.—This differs at the commencement from grafting, the head of the stock not being now to be touched. The height on the stem at which the bud is to be inserted, is, however, equally to vary with the destination of the tree, as it is to be trained a dwarf or a standard. For the operation,

choose a smooth part of the stem. Having marked the height and the place, prune away the lateral shoots about and underneath it.

With the knife, directed horizontally, make an incision an inch or two inches long in the bark of the stock, cutting in home to the firm wood, but not deeper: then applying the point of the knife, with the edge downwards, to the middle of this line, make a perpendicular incision under the first, extending from it about two inches.

Operating next on one of the shoots, begin, from the lower end of it, to cut away the leaves, preserving the footstalk of each. Having fixed on a promising bud, draw the knife about an inch below it across the shoot, slanting it upward, and cutting through the inner rind: do the same an inch above, except that the cut should be downward; then introduce the knife at the lower opening, and guide the edge along under the bud, so as to bring away the bud unimpaired, with part of the bark and wood adhering to it. The wood is merely brought away to avoid cutting too near the bud, and must be afterwards nicely detached: to do this, insert the point of the knife between the bark and wood at one end; and, holding the bark tenderly, strip off the woody part, which will readily quit the bark, if the shoot from which the piece has been slipped was sufficiently imbued with sap. Look next at the inner rind of the separated bark, to see if that be entire: if there be a hole in it, the eye of the bud has been pulled away with the wood, and the mutilated bud must be thrown away as useless: if there be no hole, complete the process as follows.

Returning to the stock, with the haft of the knife gently raise the bark just above the horizontal, as well as on each side of the perpendicular, incision; opening the lips wide enough to admit the prepared slip with the bud. If the slip be longer than the upright incision in the stock, reduce the biggest end.

Both stock and bud are now ready. Keeping the latter in its natural direction, introduce it gently between the bark and wood of the stock; lodging the top of the slip above the incision, and letting the eye of the bud project through the centre of the lips. Lay the slip with the bud as smooth as possible. Press down the raised bark of the stock.

Having thus deposited the bud, bind that part of the stock moderately tight with bass; beginning a little below the incision, proceeding upward so as to miss the bud, and finishing about an inch above the incision.

Management of Budded Trees the first season. — In three weeks or a month after the operation, it will be necessary to examine whether the bud has united with the stock. If the operation has succeeded, the bud will appear fresh and plump: if not, it will be blackish and contracted. As soon as the bud has taken, the bandage must be loosened, to give a free passage to the sap, and room to the swelling bud: it would destroy the bud were it longer continued.

Culture the second season.—In February or March, for deciduous trees, while the inoculated germ is yet dormant—and in March or April for evergreens — the stocks which were budded the preceding summer should be headed down; for the bud is to produce the future head of the plant, and requires the fullest nourishment. Take off the head of the stock by a section sloping downward from the inoculated side of the stem. The section may be made, either but just above, or four or five inches above, the budded part. A superfluous stump is sometimes retained as a support, to which the first summer's shoot from the bud may be tied: but this stump must be cut down close the second spring after budding. Cover the wound with a plaster of grafting-clay or cow-dung.

Soon after the stock has been divested of its head, the bud may be expected to push strongly. Permit the shoot to advance in full growth the whole summer. According to the species, its length at the end of the season may be from one to five feet. Give the support of a stake to any vigorous shoot which requires it. Remove lateral shoots on the stock, as soon as they appear. Eradicate suckers.

The first shoots from the buds are liable to be attacked by insects. Timely care may stop their ravages. Examine the young shoots: wherever the leaves are curled, detach them quickly, for they abound with insects. For further remedies against insects, see APPENDIX.

If mildew appear, strew flour of sulphur over the shoots.

Training of the Bud-shoot the third season.—In the second spring after budding, if the subject be a FRUIT-TREE, it will be proper to shorten the first shoot a few eyes, just as it is beginning to push, in order to obtain lower laterals to begin the formation of a head. It is sometimes proper to stop the second set of shoots, but in general more eligible to reduce them. These being pruned in the summer immediately following their rise, or at the commencement of the fourth spring (the latter is the most approved practice), will furnish a further supply of branches. Train the branches to stakes; and thus

by degrees a full regular-formed head will be produced. Continue the removal of laterals on the stock, as soon as they appear, and the eradication of suckers.

In TIMBER-TREES, the first shoot is continued in full growth, that the plant may aspire in height; and laterals only are pruned, to encourage the vigour of the bole.

NURSERY ROWS.

Lifting Plants from the Seed-bed.—Those trees which are marked in the Table as difficult to transplant, and trees, indeed, of most species, should not have more than one year's growth in the seed-bed. On account of the injury to which the roots of a few species are exposed, even in early transplanting, large plantations of forest-trees for timber and underwood are sometimes founded by sowing the seeds where the future wood or grove is to stand, as under the division, "*Sowing Forest-trees locally,*" p. 385.

In transplanting seedlings, there are two things to be considered; the stage of growth, and the season.

The Oak, the Walnut, and the Chesnut, should in general stand but one year in the seed-bed. The Larch, the Cedar of Lebanon, the Stone Pine, and the Pinaster, do best when removed equally soon.

The Beech and the Spanish Chesnut, rising from a rich soil, are frequently fit for the nursery-lines at the end of the first year: but seedlings which are allowed ample room may stand two years.

The Ash, the Elm, and the Maple, may be nursed one year or two years in the seed-bed, as the plant is weakly or forward.

Let the Yew and the Holly quit the seed-bed at the end of the second year.

The Scotch Fir and the Weymouth Pine ought not to be removed to a second nursery-bed before the end of two years; nor, under any circumstances, should the transplanting of either be postponed beyond that time.

Any of the different kinds of the American Spruce Fir may be kept in the seed-bed two or three years, according to the strength of the plant; but should, on no account, have the roots disturbed after they have been allowed to take hold of the ground, in which the plant originated, more than three years; unless it be meant to destroy it.

In addition to the deteriorating effect of tearing away the fine fibres at the end of the soots, which are capital organs of nourishment, the roots themselves cannot arrive at their proper

extension, if too long subject to the confinement of a seed-bed. In that case, while the herb is making progress, the root will not multiply its fibres in due proportion.

For a natural criterion, dig up any seedling-tree at the end of the first year: if the principal root strikes comparatively deep in a perpendicular direction, the danger of letting such a plant, destined to be removed, identify itself with the soil by too long possession, is apparent: if the main root is shallow, or if there are competing roots which tend horizontally, while the entire cluster of radicals is compact, the plant may grow in proportion larger before it is removed.

As the interruption in the progress of a plant, or the diminution in the vegetable stamina of it, which may be caused by transplanting, depends more on the degree in which violence is committed on the habits and affections of the root than on any constitutional repugnance in the plant to removal at a fit season; so it is found, that when a tree is to be nursed to an advanced growth before it is finally planted out, intermediate removals, carefully made at least every alternate year, lessen the inconvenience of the last removal. Thus, the root is not only prevented from taking a local wildness of shape, by turning sharply from the obstacles, and stretching unequally through the yielding places of the first soil, but it is also kept ready to send out the finest terminal fibres, to feed immediately upon the soil in which it shall be finally placed.

A good palliative may be barbarously applied. Two-year seedlings of the Oak, the Chesnut, the Walnut, and the Beech, standing in drills as they have been sown, sometimes have the foundations of vigour and loftiness undermined as soon as they are laid. When the plants are deemed too numerous to be carefully transplanted, as a knowledge of their constitutions would prescribe, it is the practice, in some nurseries, to shorten their tap-roots as they remain in the ground. The intention of this mutilating process is, to render their removal easy at the end of the third year. It is performed by two workmen with sharp spades: these aim at severing the bottom of the root about eight inches below the surface, by cutting obliquely through the ground, on opposite sides of the plant, at the same time: the disturbed bed of earth is then pressed down. There is such a sympathy between the root and herb of a plant, that the main shaft of root cannot be materially reduced without affecting the adult stature of the plant. If, however, it is necessary to prepare the root of a tree for a shallow soil, it is far less injurious to take the root carefully out of the ground,

prune it with a knife while the hand can have the direction of the eye, and then set the plant in a fresh bed.

With regard to the season of transplanting: The directions under "*Shrubbery*," given separately for the deciduous and evergreen classes, will apply to all young trees, with little difference. But in proportion to the tenderness of infant plants, it becomes of more importance to keep, in the autumn-planting of DECIDUOUS trees, close AFTER the fall of the leaf; and in the spring-planting, close BEFORE the time of striking; that, while no part of the growing season is broken in upon, the risk of removal in the wet and cold months of confirmed winter may be avoided. If more plants are lifted than can be planted the same day, they should be laid together by the roots in a trench. Of the times for transplanting EVERGREENS, one may commence rather nearer the end of summer, in August; and the other rather nearer the beginning of it, in April or May; so as to clear the principal growing-season, and avoid the possibility of injury from frost:—the contrary inconvenience, the occurrence of a dry season immediately after planting, must be met by a regular course of gentle waterings. An evergreen should be taken up and re-planted in the same day. While the plant is out of the ground, the HERB should be pruned, according to the directions below.

If it be necessary to accommodate the ROOT of any deciduous plant to the cavity prepared for it, the knife should be sparingly exercised. It is desirable to keep the roots of an evergreen altogether unreduced. But whatever root is accidentally wounded, the injured extremity should be cut away. As much of the earth attached to the root of an evergreen as can be preserved, should be removed with it.

Culture in Nursery Lines.—Where a poor soil, or a previous crop, renders manure necessary, that which is applied should be conveyed in a dressing of mellow compost, dug in when the trenches are levelled. Rank dung is pernicious to the roots of nursling trees. See "*Preparation of the Ground*," above.

The distance of the lines must vary, not only according to the size of the plants, but as the plants are to stand for one year or two years in the same lines. In addition to what has been incidentally given on this subject, in relation to different stages and purposes, it may be sufficient to offer the basis of a general rule. Having regard to the probable increase of a plant by the time of its next removal, calculate on allowing it such a space, that it may, at the end of the third or fourth year, occupy a square of which one side may measure half its

height. This proportion may be lessened as the stem rises, but ample room is favourable to vigour of growth.

Seedlings of one year may be planted by dibble. Whenever this instrument cannot make a cavity wide enough to receive the roots of a plant without compressing them, the spade should be employed, either to dig in each row a furrow with a perpendicular side, or, for larger plants, separate cavities. To plant by opening a furrow: Stretch a line along, to mark its direction. On the verge of the line, cut a small neat trench, of the depth requisite for the roots, making the side next the string perfectly upright, and turning out the earth on the opposite side. Set the plants in the trench at the distance individually which will answer for the expected compass of the root and head at the end of the year, or two years, during which their growth is to advance in the same bed. As you proceed, keep the plants from falling out of position, by drawing the earth up to the stems. When all the row is set, turn in the mould with the spade: tread it gently over every root on each side. To set larger plants in separate cavities: Having set up a line and marked the distances, open with a spade the first cavity, and carry the earth to the other end of the line: set a plant in the hole formed: dig a second cavity, turning the earth into the first; and thus proceed to the end of the line, where the earth, taken from the first hole dug, lies ready to fill the last. Tread down the earth about the roots. Give or withhold water, according to the weather. The intervals between the lines at the first transplanting should never be less than a foot, and seldom need exceed eighteen inches.

In the dry times of the growing season after planting, occasional supplies of water will benefit the growth of all the plants: but to the evergreens, and to the more tender and very young deciduous kinds, the cherishing influence of gentle watering is particularly necessary.

Be attentive also, during the growing season, to subdue weeds as fast as they appear. For this purpose, let the eradicated weeds be regularly carried from the beds, and deposited in a place whence their seeds cannot be blown again into the garden: to accelerate their decomposition, let the rotting heap in which they are buried be strewed with lime.

Occasionally, loosen the intervals of the lines with a deep-cutting hoe, to revive the surface of the mould.

Once a year the ground should be dug a spade deep between such plants as are designed to remain longer in the nursery; or, where the plants are young, and the distances between

them small, the earth should be carefully turned with a fork. This may be done either at the opening of autumn, or in February or March: if the time of doing it fall at the anniversary of the time of planting, the work will be the better distributed. For this branch of culture, choose a period when the ground is neither dry and dusty, nor so wet as to adhere to the spade.

Trees of every species are tenderer in their infancy than adult plants; therefore the seasons for pruning, particularized under *Shrubbery*, are not suitable in their full latitude to very young plants in the Nursery. The severe winter months ought to be excluded from the arrangements for pruning even the deciduous kinds, till the plants attain some strength. The course of July and August is a time of year during which the constitution of any kind of plant, while it is young, will admit it to be pruned; and at any age of the Maple and the Birch, and of all evergreens, August is an excellent time for the operation of pruning to be performed upon them. If you prune while the herb is growing, and the sap in action, it is manifest that the sooner the shoot is shortened or pinched off, the slighter is the violence done to the plant. On the contrary, if you suffer the year's shoot to be perfected, wait till the vegetation of the herb is suspended, before you remove the shoot; and if the plant is tender, defer it further, as far as the two objects can be reconciled, till the danger from frost is gone over. Thus, when a deciduous plant in the nursery lines is to lose a shoot which has ripened its wood, the end of February, if the plant be not one of those mentioned below, is the best time for taking it off; because the winter is nearly gone, and the season for the sap to rise is not too near, so that the plant may be expected to bleed. The Birch and Maple, if not pruned in autumn, should not feel the knife after January. The Gean-cherry should be divested of an entire limb only in autumn.

While in the lines, the DECIDUOUS plants should annually receive a circumspect pruning, confined to the taking away of strong laterals, or the weaker of rival branches. Thus they may be run up with a clean single stem to any height, according to their destination. In all forest-trees, both DECIDUOUS and EVERGREEN, intended for timber, preserve the leading upright shoot, permitting it to aspire to its natural loftiness.

While the plant is young, it should be divested only of the strong laterals; the removal of all the small twigs from the stem would inflict unnecessary wounds; and the retention of

the weakest, at moderate intervals, will cause the sap to circulate more equally.

The laterals of the Larch, though a deciduous tree, should not be touched.

With regard to EVERGREEN nurslings, it is rarely proper to prune them; never, except to regulate any very low rambling shoot, in a tree training for an ornamental purpose: for in most of the evergreen tribe, particularly the *Pinus* and all the cone-bearing plants, the laterals should be preserved entire, at least till the plant has completed ten years of its growth. From the earliest stage, however, any branch, which, by contending with the select leader, is likely to divide the stem, or make the head irregular, ought to be either removed, or discouraged by having the top pinched off, according to the advanced state or infancy of the plant.

Until a plant has completed its second year in the nursery-rows, it will be seldom eligible to use the knife: till that time, the superfluous shoots which appear in spring may be pinched off every following summer. When the knife is applied to remove a ripened shoot, cut it off close by the bole, that the bark may easily grow over the wood.

Time of remaining in the Lines. — The forest-trees which are most difficult to transplant, such as the Oak, the Beech, the Walnut, and the Larch, should not, by deliberate management, be allowed to complete more than three years in the Nursery; one year in the seed-bed, and two in the lines: but this distribution of time may be reversed, provided the spaces in the first bed would allow the seedlings to grow with freedom for two years. In a few words, all the deciduous kinds may be planted out in the forest after one year's nurture in the lines, if the plants be vigorous; whether they stood in the seed-bed two years, or only one. The soft-wooded evergreens, such as the Pine, may be finally planted out either directly from the seed-bed, having completed the second year, or from the lines after they have been altogether three or four years in the Nursery, according to the strength of the plants.

Final Planting.—The root of a tree is likely to be unimpaired by removal, in proportion as the plant is young: nevertheless, as the retrenchment of the root does not so much affect the health as the stature of a woody-stemmed plant, there is not the same reason for accelerating the final planting of trees for the Fruit Garden as trees for the Forest. Fruit-trees which have come into full bearing are in continual demand from the Nursery. The immediate return from a fruit-tree,

and the personal proprietorship which the planter acquires over it, pays at once for additional care in removing it: and when it is requisite to convey plants to a considerable distance, they should be carefully packed with white Bog-moss, *Sphagnum palustre*, and guarded by straw and laths; the whole being enveloped with a wrapper of bass-matting: or if the specimens are small, they may be packed in a box or hamper, closely filled with bog-moss.

The *maximum* height at which a shrub or tree should be planted out has very little relation to the full height of the adult plant. Such DECIDUOUS trees as have the deepest tap-roots should not rise above three feet before they are permanently planted: the middle class, as to the depth of root, may attain four or five feet: those which strike comparatively shallow, six, eight, or ten feet. The EVERGREENS which it is most difficult to transplant, such as the Cedar, the Scotch and the Spruce Fir, will not often prosper, if more than three feet high when removed: some kinds of the Pine may, however, be nursed for particular situations to full four feet: the Box, Holly, and other native hardwood evergreens, may rise to the same height. The Yew is so easy to transplant, as to furnish no standard for other plants.

Forest-trees for hedge-rows, and for ornamental situations, are frequently detained in the Nursery, five, six, seven, and eight years, in order that they may the sooner form considerable objects in the situation for which they are designed. If ornamental plants have stood in the same lines more than two years, it is a good preparation to remove them to a free situation in the Nursery, a year previously to their ultimate removal.

To lift from the ground a plant thus advanced; dig a trench, on one side the stem, to the depth of the root: then open the ground on the opposite side; and introducing the spade underneath, so as to clear the tap-root, heel the plant over.

METHOD OF REMOVING LARGE TREES IN WINTER.

At a time when you may expect frost, but while the ground is still soft, dig in a circle all round the extremities of the roots of the plant, and, descending in an inflected trench, work clear under the centre of the tree, without intersecting the tap-root if there be one, or any capital branches of the root, so as to disengage, in a compact unbroken state, the mass of earth in which the plant is growing. For large trees, the diameter of the circle dug may be five feet; and the body of earth prepared for separation, half a ton in weight. Although it is

desirable to avoid cutting off the extreme fibres of the roots as much as possible, yet, where the circle would be enormously large were none of these touched, those which project the farthest may be cut through; and this has been done, in a recent instance, without any ill effect, by the planter and horticulturist who has communicated the principle and the details of the operation. The shape given to the section may be either that of a garden-pot, or of an inverted sugar-loaf, according to the habits and direction of the root.

Having finished the trench, and the bottom horizontal division of the mould, dig a cavity of the same dimensions in the place to which the plant is to be carried. Then wait for a frost of some continuance, to freeze the detached bed of earth into a solid mass for four or five nights or a week; in which state weigh it up, or raise it with a horse-truck and chain or other engine, and plant it in the assigned position. Thus managed, the tree will grow, at the rising of the sap, without shewing the least symptom of having received any check.

This method is not yet common, but has been tried with great success by a few private nursery-men, the managers of plantations belonging to some noblemen and gentlemen, in consequence of mutual suggestions and communications.

GROVE AND FOREST PLANTATIONS.

Preparation of the Ground.—For an extensive plantation the soil must be naturally of the quality suited to the trees designed to be reared. If the bottom or the surface of the ground lodges water, no plantation should be attempted, unless it can be effectually drained at a moderate expense. Open drains are best; for rubble drains are liable to be choked by the roots of the plants.

For a small plantation, the ground may be prepared by trenching; for a plantation of greater extent, by ploughing. If the ground be too uneven to admit the plough, or too extensive to have the whole surface wrought, places to receive the roots of the plants must be prepared, by digging with the spade small pits, about a foot in depth and superficial extent; or by loosening and turning the ground with a mattock.

Sowing Forest Trees locally.—On account of the difficulty of transplanting the most considerable forest-trees, large plantations for timber and underwood are sometimes founded by sowing the seeds at once where the plants are to be reared. The seed may be sown either in drills or in the broadcast method. The drills are usually from three to six feet asunder. When the broadcast method is adopted, the seed is harrowed

in; and this is sometimes practised by sowing the tree seeds with a crop of corn, which are left to grow after the grass is taken off the land.

Distributing the species in masses or promiscuously.—Where the soil is of a determinate quality over a considerable extent of ground, it is eligible to plant the species best calculated to prosper in masses: but when the soil is very mixed and unequal, a successful plantation is most likely to be founded by sowing or planting select hard-wooded species promiscuously.

Site of Trees in relation to making Timber.—Trees that have been raised, and continued in situations much exposed to winds, have harder and firmer wood than such as are considerably sheltered. Oak, and other trees, in such situations, abound in the crooked limbs fitted for forming knee-timber, which is in demand by shipwrights for joining the decks and the sides of ships.

Planting Trees in early growth.—Trees immediately from the nursery seed-bed, or after one or two years' growth in the lines, having reached the height of one, two, three, or four feet, may be finally planted out in drills formed by the plough; after which the earth is ploughed over the roots, and trodden down close;—or, where pits have been prepared, each plant may be set in a cavity adapted to the compass of the root. There are several other methods of forest-planting: but we merely propose to glance at this subject, as growing out of the business of the Nursery, rather than comprehended within it. For full instructions respecting the rearing and management of copses, woods, and forests, which would alone fill a volume, we beg leave to refer to some of the works professedly and exclusively embracing this branch of rural economy. Meanwhile, we hasten to finish our proposed outline.

Planting Nurses.—Infant plantations of hard-wood trees require to be sheltered, at least on that side in which their site is most exposed to the wind, till they are well established. If no ready-growing shrubs or bushes furnish a natural screen, a screen must be made, by introducing, in the first place, a border of plants not intended to be raised for timber, and which are technically termed *Nurses.*—These subordinate plants are also mixed with the principals in the interior of the plantation, for the same purpose, of affording temporary shelter.

The kinds usually employed for nurses, are, the Mountain-ash, the Larch, and the Scotch Fir. On humid soils, the Huntingdon Willow is an excellent nurse.

The plantation of the nurses should precede that of the prin-

cipals by a year or two. The nurses should be taken from the seed-bed, at the earliest period, and planted by the least expensive process. Those for the outer border should be planted in dense rows, multiplied to the breadth of eighty, one hundred and twenty, or two hundred feet. The interior nurses should be mixed with the principals—in any proportion from equality to intervention, on two, three, or four points. As the principals acquire strength, and want additional room, the nurses are to be displaced.—See "*Site of Trees in relation to making Timber.*"

Cropping the Soil.—To pay for the expense of keeping down weeds by hoeing and cleaning the land, the intervals on the surface of it, while the plants are young, may be cropped with such esculents as do not exhaust a soil. As, when a grove is planted, the unoccupied spaces are larger, this course is the more necessary, to prevent an intermediate waste of field, while the plants are growing up to their situations. The culture of the esculents must not interfere with the roots of the trees, as the raising of a subordinate, and not a full crop, is the object. When it ceases to be proper to take any crop, the intervals may be sown with grass.

Thinning out Infant Plantations.—As the rising trees advance, the inferior plants are thinned out. When the plantation has originated from broadcast sowing, the work of attenuation must begin as soon as the plants appear, in order to apportion the spaces between them; and thus a great number of the plants must be thrown away, or the advantage of sowing locally be lost. Under any other method of sowing, the seeds may be distributed with some regard to the space which trees occupy in a COPSE. But even under the method of sowing in patches, only the most promising plant in each patch can be reared in its original situation, even as underwood, in a copse: and if a grove is to be formed, it may happen that out of any nine, or sixteen, or five-and-twenty contiguous patches, no more than one adult plant will survive the progressive removal or destruction of its companions. Even when the sowing is managed in patches, the advantage of sowing locally is lost, in respect to those seedlings which must be removed at the end of the first or second year. It therefore may be eligible, under some circumstances, to sow patches in the following manner. Having prepared them at the distance, measured from centre to centre, at which one out of each of the rising plants may be cultivated as underwood, sow, of those plants which are intended to occupy the ground permanently, only two seeds; and

let three seeds, of a species less difficult to transplant, be also sown in the same patch. The seeds, as well as the patches, should be placed in the quincunx order. Of the two principals in the same patch, the proper place for one is the centre: where the second stands is immaterial, as it is merely put in the same bed in case the other should fail. If one good plant is produced from the principals, the secondary seedlings are transplanted to prepared ground, without sacrificing any thing of the original object. If both these fail, which will happen but in a small proportion of patches, one of the subordinate seedlings, most likely to thrive, may be allowed to retain its situation.

In woods sown promiscuously, as the underwood rises to several years' growth, the less-promising plants may be cut thinningly, for poles, and other purposes to which young wood is applicable. When the remaining plants have risen from twelve to eighteen feet, a height which they may be expected to reach in seven, eight, or ten years, it will generally be consistent with the interest of the proprietor to cut down the greater portion of them as underwood: while a number of the finest boles, distributed at the distance of from ten to thirty feet, according to the species, are left untouched, to stand for timber. Those cut down are to be severed about four inches from the ground: the bottom of the stems, left for stools, will shoot again. The shoots from these will frequently be found so numerous as to require thinning, to prevent the weakened plant from degenerating into brushwood. This thinning should gradually proceed every two years, till there remain, on each stool, one, two, or at most three vigorous shoots, to be reared as underwood, and again to be felled in ten, fifteen, or twenty years.

Heading-down young plants.—This branch of nursery-culture is not applicable to any soft-wood evergreens, such as the Fir. But besides the Larch, none of the deciduous kinds is to be excluded from it, when a languid plant requires this remedy. If after being planted out three years, a young tree has not begun to shoot vigorously, the stem should be shortened to within four inches of the ground. Make an oblique section with the knife, so as not to jar the root. Do this in March, at the time for heading fruit-trees.

SUBSEQUENT CULTURE OF TIMBER-TREES.

General Pruning for Timber.—The trees are now supposed to be established, so as to come under no exceptions founded only on the tender age of a plant. Deciduous trees, in general,

may be pruned between the fall of the leaf and the end of February. In the Birch and Maple, the sap flows so soon, that neither can be safely cut after January. Plants which exude gum, such as the Gean-cherry, gum the least when cut early in autumn. Evergreens may be pruned in March and April, or in August and September: these never should feel the knife in winter, or when frost may overtake them before the wounds heal.

If the basis of good training has been laid in the NURSERY ROWS, the *deciduous* trees will have come from thence with a natural aspiring leader, encouraged by the removal, or the temporary shortening, of every strong rival shoot. While the stem is left partially clothed with a regular distribution of small twigs and slender laterals, this course must be followed up, after planting out, by an annual pruning, to commence as soon as the tree has made new shoots. The head is now to lose only the strong ramifications, which, if fed with sap, might diminish the vigour of the stem: these must be cut off clean by the bole.

As the plant increases in magnitude, a saw will be necessary to sever strong branches. After a section is effected by the saw, the surface of the wounded stem should be pared smooth with a knife.

The head should at first be discouraged no further than is necessary to prevent any competition with the leader, and to keep the substance of the tree from being divided into massy laterals. In other respects, the head should be kept rich in branches and boughs; and this will ultimately ennoble the stem. Upon this principle, it will be the aim of the pruner gradually to carry the head up the tree, by encouraging the production of shoots above; while those underneath are taken away, tier after tier. By directing the sap into a cluster of channels at the highest part of the plant, and by shifting the draught of juices higher and higher, as the inferior limbs grow too large, the elongation of the stem is likely to be promoted, as far as the interference of the pruner can regulate the upright growth of timber. Every year, as the leader rises, take away some of the laterals, which would detain and distribute the sap at stationary points. While the head is allowed to flourish, guard against such an accumulation of branches there as might oppress the stem.

With respect to *soft-wood evergreens*, and also to the Larch: it has been mentioned, under NURSERY ROWS, that the pruning of those kinds should not commence THERE, except compe-

titors for the lead should rise among the early shoots, which rarely occurs; or except any luxuriant lateral is likely to grow out to an irregular length. When the plant has completed from seven to ten years' growth, an annual pruning, intended to carry the head up the stem, may commence in this class. Enter upon it cautiously. Take off half the lower tier of branches, and half the tier next above, close by the bole. In the following year, cut away, rounding smooth to the stem, the remainder of the two lower tiers. In the third pruning season, if the plant does not appear to languish from former wounds and the diversion of the sap, proceed to detach two entire tiers at once. By similar advances, annually lift the cluster of branches forming the head higher on the tree; and sometimes thin the laterals of which the head consists, if their compass and density appear too great for the stem. Seldom venture to take more from the bottom than the tree has gained at top the preceding season; or not oftener than every alternate year, as the leader of the plant thus deprived of the inferior arms appears to prosper under their loss.

No branch in a decaying state should be suffered to remain till it drop from the tree. Before the disease of the limb can spread to the trunk, and while the origin of the branch is sound, take it off close by the bole.

If, from any peculiar circumstances, it be necessary to shorten a branch, instead of taking it clean away, make the section in such a direction that the surface of the wound may lodge no wet; but if it be exposed to be washed by showers, it will be no disadvantage. Cut, in this case, close to a lateral.

If, from inattention to the progress of canker in a branch, or from an accidental bruise, any part of the bole is in a dead or rotten state, the part affected is to be pared away to the sound and living wood. If any part of the bark round the carious part is dead or decaying, it should also be cut away: but as the extension of the growing bark over the wound, by the progress of nature, is the great reparation at which the cultivator is to aim, no greater portion of the bark should be displaced than is absolutely necessary.

With regard to plasters for wounds by incision. The remedy in general may be trusted to the power of reproduction in the bark, whenever these two circumstances conspire;—the exposed part perfectly sound; and there is an extension from the shoot, in a healthy growing state, by the vessels of which sap will be carried beyond the wound. But, under even these circumstances, if a fracture make it necessary to apply the knife

at an unseasonable time, or if the part pared down be larger than can be covered within the growing season, a temporary plaster may be necessary: this may be made of cow-dung or clay, which will not interrupt the vegetation of the bark. When part only of a main limb is cut away, and no extreme lateral remains to conduct the sap, a permanent plaster, or rather coat, is advisable; as the exposed stump will never be covered by the production of the rind: in this case, coal-tar is a good artificial covering: sheet-lead has also been resorted to, to defend a large wound from the weather, and from the woodpeckers. But to healthy-*growing* trees, the best application is simply train-oil, spread over with a brush; this heals the bark, repels insects, and is a sufficient defence against the weather during the seasons in which the herb and bark of deciduous trees vegetate, or the narrower limits between which evergreens ought to be pruned.

Pruning Forest-Trees in respect to situation.—The preceding directions contemplate only the making of straight lofty timber, regardless whether a tree, as an ornamental object, be improved, or injured, by the controul of the pruner.

Up to a certain point, and on many occasions for subsequent regulation, the principles of pruning ornamental trees will coincide with the above. The exceptions to that course will commence soonest in regard to *detached* TREES in the cultivated *scene*. 1. The picturesque effect of many trees arises from their fantastic forms; and from the individual diversity taken by the head of a plant, if the trunk is permitted to divide low into secondary stems, and these to send out laterals in any direction. 2. Although variety may be created by training trees with feathered stems, and with clean stems, in different degrees and to different elevations, yet the head of a tree cannot be dimiuished, by lopping the laterals from the bottom to any great altitude, without lessening even the apparent height of the tree, as well as destroying its beauty. The pruner therefore of ornamental trees, after moderately encouraging a fine leader in plants which naturally aspire, will let the head take the characteristic form of the species, and individual features, if consistent with health and beauty.

As to trees in a hedge-row: They are most frequently planted so that no strip of land applicabie to the raising of timber should be wasted; sometimes, to serve as a screen: the chief object in planting them is seldom ornament. Their branches should never hang low over an arable field: this is very consistent

with training for good timber. If ornament be the object, a hedge-row is capable of great variety.

Trees in clumps should be trained with feathered stems, because the want of depth in the plantation is thus better concealed. In the same manner, screens and belts are destitute of breadth; and therefore all the stems should be kept well clothed.

One great object in planting a grove is commonly to raise lofty clean-stemmed plants: in the interior of a grove, the course of pruning may be directed especially to this object. On the skirts of it, the trees should be left feathered and dense, and managed with more attention to ornament.

Thinning Timber Plantations.—In belts, screens, and all narrow plantations, and on the skirts of large masses, the thinning of the rising plants, like pruning, is to be conducted more moderately, according to the age of the trees, and the utility of preserving the shelter of a dense girdle. Trees that have been raised to an adult state in the centre of woods are sooner or later destroyed, if, in consequence of the felling of the surrounding timber, they are exposed to blasts from which they were protected in their former stages of growth. In the interior of groves, the Beech, the Pine, and many other species, are found to run up with the tallest, cleanest, and straightest stems, where the plants stand sufficiently thick to discourage the extension of their contiguous laterals; without being so near as to draw nourishment from the same portion of soil, by mixing the extremities of the roots, and contending for existence.

First-rate timber-trees, intended to reach their full magnitude, should stand at least thirty feet apart.

GREEN-HOUSE.

A GREEN-HOUSE, or Conservatory, is a building adapted, by its situation and construction, for the seasonable shelter and nurture of such exotics from warmer climates as are not hardy enough to endure the vicissitudes of our year, but yet neither require, nor would prosper under, the intense and more artificial culture of a Hot-house. Growing in pots, Green-house plants visit our open grounds in summer, and retire to the protecting roof during the seven or eight months of the year in the midst of which winter falls. They require, when there, the occasional aid of a slight fire-heat only in very rigorous

weather, or when cold damp exhalations, or descending clouds, render the air foggy and humid.

A Green-house may be made a very ornamental object as a structure: the plants within comprise some of the most curious and elegant productions which the art of the Gardener can nurture: its situation is, therefore, usually in a conspicuous part of the Pleasure Ground, contiguous to the family residence. The front of the building should stand directly to the south, and the ends have an open aspect to the east and west. Its extent may vary, according to the largeness of the collection to be cultivated: when most contracted, it should considerably exceed the breadth and height, in order to have handsome proportions. As to the breadth: were it more than twenty feet, those plants most remote from the windows would be troublesome to manage, as they must stand on very high stages to be reached by the sun: between twelve and twenty feet will be found the most commodious latitudes. The front, including a low parapet wall and a row of windows or upright glasses, may be eight or ten feet high, measured from the interior floor. It will be proper to lay the floor at least twelve inches above the level of the ground, and two feet in damp situations. The back is the only part at which an entire wall should be carried up to the roof: the precise height of this wall depends upon that of the glass front and the breadth of the house: the proportions of these three must be so accommodated as to give the proper slope to the roof.

It was formerly the practice to build Green-houses with glass-work only in the front, and even to introduce between the windows heavy piers of brick or stone: but this has given way to a light and ornamental style, by which the objects of cheerfulness and utility are better consulted.

To this end, the parapet wall, on the south, east, and west sides, which is the foundation of the glass-work, is not carried higher than a foot or eighten inches above the interior floor. For supporting that part of the roof which leans upon the front and the ends of the buildings, the piers between the windows or upright sashes are of timber only. Made no thicker than the rules of buildings require, according to their height, they intercept as little as possible of the sun's light and heat. To these, and to a frame of wood resting upon the low wall-plate, the upright sliding-sashes are fitted. The sloping top is framed either wholly of sliding glass sashes, extending from the front work to the top of the back wall; or, sometimes, the glass-work is continued only about half-way or

two-thirds up the roof; in which case the remainder of the roof is made to slope off behind, meeting the back wall, and covered-in with tile or slate. Wide glass folding-doors will be necessary for conveniently moving the plants in and out: the building will be more uniform with these in the front, while a small door for ordinary access may be made at one end.

Sunk a few feet into the ground behind one end of the back wall, should be a furnace, for an occasional fire, communicating with flues within, ranging, in two returns, along the back part of the house, with a single flue running along the front and end. Let the surface of the front flue be elevated twelve inches above the floor, and be crib-trellised, in order to be used as a platform for rare plants requiring to be most favoured in situation, both as to light and heat. Build the flues detached, about two inches from the walls, that the heat may be emitted into the house from them on both sides.

The floor should be laid with brick or tile-work, or paved with stone. The inside of the walls, and that part of the roof, if any, which is not glazed, should be finished neatly with lath and plaster. It is proper also to have the slated side of the roof cemented with mortar. The wooden frame-work should be painted white; and every part of the wall within should be white, to reflect the rays of light.

A Green-house in the old style was provided with folding shutters, which were commodiously hung to fall back upon the massy piers. In a modern Conservatory, the slenderness of the uprights, so convenient in every other respect, will not admit of this; and therefore light moveable shutters, or canvas curtains, or thick garden-mats, are substituted, whenever the rigour of the weather renders the shelter of the glass insufficient. The glass in the roof should be close puttied, that no shutters or additional covering may be wanted for that part, which would be troublesome to manage.

To ventilate the house when the sashes cannot be safely opened: First, make a recess in the back wall, to receive a winding tube for communicating with the external air: to break the force of air when thus admitted, fix a perforated plate to the bottom of the tube. It would be commodious to have, on all sides of the house, ventilating tubes, guarded with roses, and capable of being entirely stopped; in order that when cutting winds prevail, the admission of the air may be from the opposite point of the compass.

In fitting the house for the reception of plants an unoccupied void is to be left next to the back wall, at least five feet wide,

and running from end to end. This space is doubly useful: it admits a free circulation of air round the plants, which is ever necessary to their health; and it allows the cultivator a convenient stand for watering them from behind. The floor under this part may be elevated a step or two, according to the breadth of the house. Between the crib-trellis, running next to the windows, an alley will also be wanted, about thirty inches in breadth. Some persons advise, in planning a roof, to pitch it for hanging pretty near the heads of the tallest plants, to make them flower sooner: but if there be not a considerable space also at top, the damps occasioned by the perspiration of one range of plants are apt to settle about a neighbouring range, instead of being carried upward and dissipated. When the inmates of a Conservatory are pent up too closely, a stagnant vapour is often generated, of which the slightest ill effect is a mouldy incrustation upon the leaves and soft-rinded shoots; and when frosty weather renders it advisable to shut the house altogether, this exhalation within, repelled by too low a roof, may kill some of the plants.

In the unoccupied part of the house, there should be graduated stages, or tressels for planks, adapted to the increasing heights at which the retiring rows of pots and tubs must stand, to raise the heads of the plants sufficiently above those in front. All the parts of these stages are to be moveable. In summer, the Green-house is often converted into an elegant saloon.

For the more extensive collections of plants, two wings may be attached to the main Conservatory, and connected with it by partitions of glass. One of these may face the south-east, and the other the south-west. Under this arrangement, the front of the whole building may be either half an hexagon, or the segment of a circle. In the three internal divisions, the different degrees in which exotics from divergent climates require protection only, or protection and artificial heat, may be separately consulted by the addition of a second fire-place, and the distribution of the flues. Such a partition will also allow the Succulents to be associated no farther with other classes than is desirable.

It will simplify the instructions for the culture of Green-house exotics to divide them into three classes: HERBACEOUS PLANTS—SUCCULENTS—SHRUBS AND DWARF TREES. The Herbaceous class has been defined and fully described, with its subdivisions of *Annuals*, *Biennials*, and *Perennials*, under the department of the Flower Garden. The Succulent class

comprises numerous species, which chiefly belong to the Green-house or Hot-house: in these, the herb consists of fleshy leaves, stems, and shoots, abounding in humid juices, and hence termed *succulent:* some of these plants send up large stalks, as the Sedum: they are, almost without exception, durable in the stem and branches; and some have permanent leaves, as the Aloe: most of the Succulents are evergreen. The term *succulent* is however merely a distinction of *constitution,* and both herbaceous and shrubby plants are mixed in this class.

TABLE IX. Part I.—GREEN-HOUSE PLANTS.

SECT. I. HERBACEOUS.

Agapanthus umbell.—præcox.
Albuca altissima—parviflora.
Alstrœmeria pelegrina.
Amaryllis sarniensis—aurea—formosissima--orientalis--longifolia—purpurea—venusta—revoluta—undulata—vittata.
Anagallis fruticosa.
Antholyza æthiopica--Cunonia—meriana—plicata.
Aristea capitata.
Babiana tubiflora—villosa.
Calla æthiopica.
Campanula mollis—gracilis.
Chrysanthemum indicum.
Cyanella capensis—lutea.
Cyclamen persicum.
Dianthus albens.
Eucomis punctata—bifolia.
Erodium crassifolium—incarnatum.
Ferraria undulata—antherosa.
Gladiolus cardinalis—blandus—alatus—carneus—roseus *or* hirsutus—versicolor—viridis—undulatus—floribundus—Watsonius.
Gunnera perpensa.
Hæmanthus coccineus—pubescens—undulatus—ciliaris—puniceus.
Hypoxis stellata.
Iris chinensis.
Ixia conica—monadelphà—retusa—erecta—fucata—flexuosa—viridiflora—crateroides—columellaris—maculata—patens—hybrida.
Justicia Adhatoda, *Malab. nut.*
Lachenalia pendula—tricolor—odorata.
Lapeyrousia corymbosa.
Lobelia bicolor.
Massonia angustifolia--latifolia—violacea.
Monsonia lobata—speciosa.
Moræa Northiana—ramosa—viscaria—ciliatà.
Ornithogalum aureum—arabicum.
Oxalis convexula—incarnata—versicolor—flava.
Pardanthus chinensis.
Polyanthes tuberosa.
Sowerbæa juncea.
Trichonema cruciatum.
Tritoma Media.
Veltheimia viridiflora.
Watsonia aletroides—marginata—rosea—roseo-alba—spicata.
Witsenia corymbosa—maura.

SECT. 2. SUCCULENT.

Agave americana, *Americ. aloe.*
In its native climate, blows in about 12 years; in ours, not in less than 60. After flowering, the old plant dies, leaving numerous offsets to succeed it.

Agave angustifolia.

Aloe plicatilis — purpurascens —soccotrina — africana — arborescens—ferox—supralævis —flavispina — mitreformis — nobilis—distans—glauca—depressa—variegata—striata—obscura *or* picta — latifolia—saponaria—virens—suberecta —tuberculata—incurva.

Anacampseros divaricata.

Anthericum frutescens—pugioniforme.

Begonia Evansiana.
Stem dies down in autumn, having produced small bulbs at the joints, from which young plants are raised the succeeding spring. There is a bulb at the root, which will send up a new stem.

Cereus flagelliformis.
This sort produces more flowers than any of the other species; and they keep expanded three or four days, provided the atmosphere is not too warm. It takes two years to mature the fruit in a Green-house.

Cotyledon orbiculata—ovata—oblonga.

Crassula acutifolia—tetragona —arborescens — odoratissima —lactea—ciliata — perfoliata —scabra—imbricata—marginalis—pellucida.

Enphorbia meloformis—neriifolia.

Gasteria: 1. *Half Shrubby*; bearing unrooted suckers: obliqua—pulchra—nigricans.
As the last never produces any offsets, the only mode of increase is by planting the leaves, which few consent to rob their plants of.

2. *Stemless;* with rooted suckers: glabra—carinata—angulata—angustifolia—longifolia — brevifolia — intermedia — verrucosa.

Galarhœus Genistoides — imbricatus—spathulæfolius.

Globulea cultrata—obvallata—canescens.

Haworthia viscosa—tortuosa—maxima — major — attenuata —radula—cymbiformis—reticulata — retusa — mirabilis — pumila — spiralis — spirella—pentagona—imbricata—foliolosa.

Hoya carnosa.
It will not flower, unless near the flue, and requires poor dry soil.

Kleinia Nereifolia — papillaris —tomentosa—Anteuphorbium —carnosa—articulata.

Medusea.
Should have as much air as Mesembryanthema, otherwise they will draw up weak. Most of them will live with no other winter-house than a glass-case without fire, if kept dry and matted up from the effects of frost.

—procumbens — Fructus-pini —major—tesselata.

Mesembryanthemum.
Many plants in this extraordinary genus expand their flowers at night, or at some unusual time of the day: but the time is *morning* or *forenoon*, where the month only is inserted: where the month is omitted, the time is not known.

The following Arrangement is extracted from HAWORTH's *Synopsis.*

I. *Stemless*, or very short stems.
α. *Smallest:* obcordellum, 10-1.*
—obconellum, 10-1.—truncatellum, 10-1.—fibulæforme.
These species, in winter, should be kept near the sloping lights, and watered very sparingly. If any become too wet, they speedily rot, unless taken out of the earth, and laid to dry like bulbs. They live several months out of ground.
β *Spheroidal:* nuciforme.
γ *Semiterete:* testiculare—fissum—obtusum, 3, 4.
δ *Moniliform:* leafless in summer: moniliforme, 4.
ε *Awl-leaved:* acutum, 11-4.
—Bellidiflorum, 10-12.

* These figures denote the Months of the season; as, 10—1, Oct. to Jan.

ζ *Quill-shaped:* calamiforme, 7-9—obsubulatum—teretiusculum—cylindricum, 9-2—teretifolium, 9-4.

η *Beaked:* yellow: compactum, 11 — quadrifidum, 11 — bifidum, 3-11—bibracteatum, 4-11 — rostratum, 4 — ramulosum, 3-11—denticulatum, 4.

θ *Gaping-leaved:* yellow: tigrinum, 11—felinum, 11—caninum, 8-10—vulpinum—hybridum—alludum.

ι *Hatchet-leaf:* dolabriform. 5-11.

κ *Tongue-leaved:* yellow.—Two-rowed leaves: scalpratum—latum — adscendens, 7-11 — depressum, 9, 11, — linguæforme, 11-3 — longum, 8-10. —With very long soft leaves, obliquely crossed: præpingue, 8-10—taurinum, 9-11—cruciatum, 5-11—difforme, 5-11—semicylindricum, 5-11—heterophyllum.

λ *Gibbous-leaved:* rubicund: gibbosum, 1-4—luteo-viride, 1—perviride, 1-3.

II. *Stem erect:* leaves imbricate-headed alternately, very long: elongatum, 5 — capitatum, 7-9—pugioniforme, 7-9.

III. *Stem trailing:* strumous when old: loreum, 9—congestum — diversifolium, 3-10 — diminutum, 4—corniculatum, 3-5—tricolorum, 10, 11.

IV. *Branches creeping.*

α *Greater.* Decumbent-prostrate, shy flowerers: leaves, scymetar-shaped: acinaciforme, 6-9—lævigatum, 6—edule, 7, 8—rubro-cinctum—subalatum — glaucescens, 7—virescens, 6 — æquilaterale, 6—sarmentosum, 4.

β *Erecto-decumbent:* leaves short: filamentosum, 3, 4 — serrulatum, 11, 12 — rubricaule, 12-2.

γ *Ascending:* flowers showy; branches crowded: spectabile, 5-10: bloom abundant—conspicuum, 9, 10.

δ *Branches trailing, long, thread-like:* australe, 7, 8—crassifolium, 5-8—clavellatum, 6-7—reptans.

V. *Leaves flat:* crystalline.

α *Annual:* crystallinum, 5-8.

The ripe seeds being scattered in the Green-house, keep up a succession of plants all the year round. It is used to garnish dishes: by candle-light, its icy branches glitter with great brilliance.

—pinnatifidum, 5-10 — glabrum, 7.

Contrary to the nature of the Ice-plant, this ripens seed in the open ground, but not in a close Green-house: it must be raised on artificial heat.

—Helianthoides, 8-10—pomeridianum, 8-10—pilosum, 6-8—lanceolatum, 5-10.

Species preserved by striking cuttings.

β *Biennial:* Aitonis, 6-10—tripolium, 6-8.

γ *Perennial:* cordifolium, 5-9.

If suffered to shake its seeds in a south border, it becomes a hardy annual.

—anatomicum, 7, 8—varians, 7-10—pallens, 5-10 — tortuosum, 7-10.

VI. *Leaves channeled:* papulose.

α *Annual:* nodiflorum, 8-10.

Renewed by cuttings, or foreign seed.

—apetalum, 7, 8.

β *Spine-bearing* (from ribs of the dried leaves): tuberosum, 7-10 — spinuliferum, 6-10 — grossum, 5-9 — viridiflorum, 7-11 — canaliculatum, 7-10 — nitidum, 7-10.

γ *Various:* undershrubby peculiar: brachiatum, 7, 8—geniculiflorum, 6-9 — junceum, 8-10 — fastigiatum, 7-9 — reflexum — flexuosum, 7, 8 — splendens, 6-8.

VII. *Yellow-flowered:* undershrubby, erect: leaves short: flowers yellow, orange, saffron.

α *Perfoliose:* leaves pulpy,

crowded in whorls: verucu-
latum, 5, noon till even.

The heads of its small yellow flowers have a honey-like scent. If not watered too much, will have rubicund tips.

β *Night-flowering:* leaves very few, brittle, and thence nearly deciduous; shoots slender and wiry: stems, when cut down below the leaves, shoot freely: noctiflorum — stramineum — horizontale, 6-8, evening.

γ *Shy-flowering:* molle, 10 — strictum—cymbiforme.

δ *Free-flowering:* extremely beautiful: leaves longish: au-
reum, 3-10.

It thrives best without artificial heat.

—glaucum, 5-7 — aurantium, 6-8 — coccineum, 7-10 — bico-
lorum, 5-9 — inæquale, 5-9 — variabile, 6-8.

Presents flowers of various colours from the same roots.

—tenuifolium, 7, beautiful.

ε *Leaves rough, with dots:* sca-
brum, 7—versicolor, 5-8.

Flowers rubicund in evening and morning: pale silvery at noon.

—emarginatum, 6-8 — retro-
flexum, 5-10—deflexum, 5-10 —polyanthon, 8.

VIII. *Rough-stemmed:* specio-
sum, 5-10 — micans, 5-10 — maculatum.

IX. *Hispid:* bristly.

α *Stems bristly,* leaves naked: hispidum—floribundum, 5-10.

The freest flowerer in the genus.

—hirtellum— striatum, 5-10.

This species is much cultivated.

β *Leaves bristly:* echinat. 5-10.

γ *Leaves bearded at the tips:* star-like: barbatum, 5-10— stelligerum, 5-10—hirsutum, 9-11—densum: beautiful.

X. *Perfoliate:* leaves connate, embracing the stem.

α *Twin-branched:* geminatum —forficatum, 9, 10.

β *Flowers axillary:* solitary: perfoliatum, 8—viride, 7.

γ *Flowers panicled:* small, white: tenellum, 8--rigidum, 8 —vaginatum, 8—umbellatum.

The hardiest plants of the genus.

XI. *Leaves hooked at the tips:*

α *Flowers expanding* night and day: bracteatum, 8-1—radia-
tum, 8-11—compressum, 8-11 --anceps, 9, 10--stellatum, 8-11.

β *Flowers closing* in the even-
ing: spiniforme, 9, 10—adun-
cum, 2, 3.

XII. *Rubicund-flowered:* leaves with erect tips.

α *Keel-leaved:* erect: lacerum, 6 —heteropetalum, 5-8—muta-
bile, 7-9 — marginatum — in-
claudens, 7.

Flowers beautiful, always open: they may be worn while yet alive, like those of M. lacerum, as head-dress ornaments.

—caulescens, 5.

The flowers of this and of the two next species smell like white-thorn blossoms, or new-made hay.

—deltoides, 5—muricatum, 5.

β *Crescent-leaved:* maximum, 3.

A fine erect plant; leaves like a half-moon.

γ *Small-leaved:* sickle-shaped: plant erect: flowers small: mi-
crophyllum, 5—falcatum, 5-7.

Fragrant like hawthorn.

— glomeratum, 6, 7 — falci-
forme, 7, 8.

δ *Pale-flowered:* leaves obtusely-triangular; dotted: decum-
bens, 5-10—incurvum, 6.

ε *Leaves roundish-triangular:* plant erect; flowers rubicund: stipulaceum, 5-10--Haworthii, 6-1—læve—spinosum, 6-9.

The common treatment given to *early Mignionette* answers very well for all, except the dwarfs, and M. lacerum.

Pelargonium—peltatum — gib-
bosum—crassicaule.

Plantago—capensis—hirsuta.

Sempervivum: *Shrubby: large-leaved:* arboreum, with varie-
gated leaves, 8-3—canariense,

6, 7—glutinosum, 7, 8. *Stemless:* africanum — arachnoideum, 6.
Tetragonia: *Flowers Sessile:* expansa, 8, 9—crystallina, 6-8. *Flowers on footstalks:* fruticosa—decumbens — tetrapteris, 7, 9—spicata, 7.
Tithymalus: tuberosus—virgatus--piscatorius--melliferus.
Treisia: hystrix, 1-9.
Yucca: aloifolia, 8, 9--Draconis, 10, 11—serrulata.

SECT. 3. SHRUBS AND DWARF TREES.

Acacia longifolia — speciosa — verticillata--discolor—falcata.
Anthyllis Barba—Jovis—eri-
Aotus villosa. [nacea.
Arbutus canariensis.
Aspalathus albens.
Aster fruticulosus.
Azalea indica.
Banksia attenuata — speciosa —latifolia—grandis—serrata.
Bauera Rubioides—humilis.
Bignonia grandiflora—Pandoræ—australis.
Billardiera scandens--mutabilis
Borbonia Ericifolia--acuminata —lanceolata.
Boronia pinnata—serrulata.
Bosea Yervamora.
Brunia—nodiflora—phylicoides—speciosa—superba.
Brunnichia cirrhosa.
Calendula fruticosa.
Capraria lanceolata--undulata.
Cassine capensis—Maurocenia.
Ceanothus africanus--azureus.
Ceratonia Siliqua.
Chironia frutescens—baccifera —decussata—Linoides.
Chrysanthemum pinnatifidum.
Cistus Halimifolius—lævipes—formosus--Libanotis--villosus.
Citrus Aurantium — acida — Limonium — nobilis — Decu-
Clethra arborea. [mana.
Cliffortia obcordata — arachnoidea—plumosa—trifoliata.
Cluytia Alaternoides.
Cobæa scandens.
Colutea frutescens.
Convolvulus Cneorum—canariensis.
Coronilla glauca—valentina.
Corræa alba—viridiflora—spe-
Cratægus indica. [ciosa.
Crotalaria pulchella — incan-
Crowea saligna. [escens.
Cupressus australis—Juniper-
Curtisia faginea. [oides.
Dais cotinifolia.
Daphne odora.
Daviesia ulicina—corymbosa—acicularis.
Dianella cœrulea.
Dianthus arboreus.
Digitalis canariensis — Sceptrum.
Dillwynia glaberrima — floribunda—cinerascens.
Diosma ovata — glandulosa — oppositifolia — hirsuta — ericoides—ciliata — imbricata — cordata—rubra—tenella—fragrans — uniflora—orbicularis —fumosa.
Echium grandiflorum—longiflorum.
Edwardsia microphylla — tetraptera.
Empleurum serrulatum.
Epacris grandiflora — purpurascens.
Erica Banksii — Linnæana — caffra--cerinthoides--coccinea —comosa—formosa — grandiflora — mammosa—Monsoniæ —multiflora—elegans--vestita —ventricosa—Patersoni—tiaræflora--incarnata—Humeana —cubica — nudiflora — Sparmanni—mucosa—colorans.
Eucalyptus Globulus--piperita —resinifera.

Eustrephus latifolius.
Fabricia Myrtifolia—lævigata.
Falkia repens.
Fontanesia Phillyræoides.
Fuchsia coccinea—Lycioides.
Gardenia florida—spinosa—radicans.
Glycine bimaculata — coccinea —chinensis—rubicunda.
Gnaphalium odoratissimum — cylindricum.
Gnidia radiata — Pinifolia — simplex—imberbis.
Goodenia grandiflora — Calendulacea—lævigata.
Goodia Lotifolia—pubescens.
Grevillea Buxifolia—sericea—linearis.
Grewia occidentalis--orientalis
Hakea Oleifolia—gibbosa—saligna.
Halleria lucida.
Heliotropium peruvianum.
Hermannia Althæifolia—Alnifolia — Lavandulifolia — decumbens—micans.
Hibbertia Grossulariæfolia — volubilis.
Hydrangea Quercifolia, hardy.
Hypericum balearicum, flowers great part of the year—monogynum--canariense--foliosum.
Iberis semperflorens — gibraltarica.
Illicium parviflorum—floridanum.
Itea Cyrilla—spinosa.
Jasminum azoricum — grandiflorum—odoratissimum—simplicifolium—gracile.
Lamarckia dentata.
Lambertia formosa.
Laurus borbonia — indica — Camphora.
Lavatera Olbia—triloba.
Leptospermum grandifolium—scoparium—attenuatum—lanigerum—parvifolium—juniperinum—ambiguum—flavescens—baccatum.
Linum arboreum—trigynum—africanum.
Liparia tomentosa.
Loddigesia oxalidifolia.
Lomatia silaifolia—longifolia.
Lonicera japonica.
Lotus jacobæus.
Lycium afrum.
Magnolia fuscata—pumila.
Malva capensis—Grossulariæfolia.
Maurandia semperflorens.
Melaleuca nodosa—hypericifolia—decussata — squarrosa — fimbriata — densa — ericifolia — stypheloides — diosmæfolia —paludosa—rigida.
Metrosideros lanceolata—myrtifolia—pinifolia.
Mimulus aurantiacus.
Mirbelia dilatata—reticulata.
Monsonia spinosa—speciosa.
Myrtus.
Nandina domestica.
Nerium Oleander.
Olea americana—excelsa—capensis—fragrans.
Othonna pectinata — abrotanifolia—arborescens—bulbosa.
Oxylobium cordifolium—ellipticum.
Pæonia Moutan, rather hardy.
Passerina grandiflora--capitata
Pelargonium Beaufortianum—bicolor—Blattarium—cordatum—formosum—grandiflorum—speciosum—tricolor—tomentosum — elegans — hybridum—heterogamum—zonale—peltatum—inquinans—cucullatum — penicillatum — glutinosum — angulosum — nummulifolium — papilionaceum—echinatum—Radula—asperum—ternatum—graveolens--vitifolium--capitatum--balsameum—incisum—tetragonum—gibbosum—acetosum --denticulatum--quercifolium —dentatum—fulgidum—reniforme—fragile.
Penæa mucronata.

Periploca africana.
Persoonia latifolia.
Petrophila pulchella.
Phylica plumosa—imbricata.
Phyllis Nobla.
Physalis somnifera.
Pimelea linifolia—rosea.
Pinus longifolia—lanceolata.
Pittosporum coriaceum—revolutum—undulatum—Tobira.
Platylobium formosum — lanceolatum—procumbens.
Podalyria—biflora—sericea.
PolygalaMyrtifolia—Heisteria —oppositifolia — teretifolia— mixta—micrantha—spinosa.
Pomaderris elliptica—laxiflora —lanigera.
Protea mellifera — grandiflora —longifolia—magnifica—speciosa — acerosa — coronata — repens — nana — pendula — pulchella.
Psoralea bituminosa—glandulosa—odoratissima — arborea —aculeata—pinnata—aphylla
Pteronia camphorata.
Pultenæa daphnoides — obcordata—villosa—stipularis—linophylla—retusa.
Roella ciliata.
Rosa involucrata—berberifolia —Lawranceana.
Royena glabra—angustifolia—pallens.
Salvia pomifera—canariensis—interrupta—formosa—mexicana—Chamædrys—aurea—aurita—paniculata—colorata —rugosa—scabra.
Schisandra—coccinea.
Seriphium cinereum.
Serissa fœtida.
Sideroxylon sericeum — melanophleum—inerme.
Solanum pseudocapsicum.
Sparrmannia africana.
Sphærolobium vimineum—me-
Sprengelia incarnata. [dium.
Stachys coccinea.
Statice fasciculata.
Struthiola pubescens—ovata—virgata.
Stylidium fruticosum.
Styphelia longifolia—triflora—tubiflora—viridis.
Swainsonia coronillæfolia.
Tarchonanthus—camphoratus.
Viminaria denudata.
Westringia rosmarinacea.
Xeranthemum fulgidum—proliferum—retortum—sesamoides —fasciculatum—filiforme—speciocissimum—vestitum—spirale,*or* variegatum—Stæhelina.
Zanthorrhæa hastile.

Since the former Edition of this Work was published, a great addition has been made to the List of Green-House Plants; both from the circumstance of many species having been introduced from the various parts of the globe that are newly become opened to our countrymen; and not less from the great improvement made in the arts relative to propagation, by which many plants that were scarce are now become common in all our best nurseries. Neither are we less beholden for such increase to that curious mode of producing hybrid varieties of flowering plants, described in our sketch of Vegetable Physiology (§ 41. pp. 21, 22); as will be most pleasingly verified in a perusal of the following Catalogue.

With a view to render this small work as extensively useful as possible to all classes of Cultivators, the Editor has arranged

them in a Table similar to that of the various other tribes; whereby at one view may be seen the *Latin and English Names*, *Colour of Flowers*, and *Season of Blooming* as described by the number of the Month; with the *Compost* in which each kind is known best to thrive;—the characters explanative of which will be found in p. 255.

The Lists are *Numbered*, in order that persons may with ease, having this work at hand, readily keep a Register of the Plants they get into their possession. If a piece of yellow deal lath be cut smooth, and on it rubbed a small quantity of white paint, and a number or the name of the plant be written thereon, before it is dry, with a black-lead pencil, the writing will appear as long as the wood will last. This is the most eligible mode of labelling plants, either by sticking them into the mould, or tying them to the stems.

TABLE X. Part II.

NEWLY-INTRODUCED GREEN-HOUSE PLANTS.

			Months.	*Col.*	*Comp.*
1	Acacia armata	*Armed Acacia*	4 to 6	yellow	l. b.
2	diffusa	*Diffuse ditto*	3 to 6	yellow	ditto
3	hybrida	*Whitley's mule ditto*	.....	yellow	ditto
4	sulcata	*Furrowed-leaved ditto*	4 to 8	yellow	ditto
5	stricta	*Upright ditto*	2 to 5	yellow	ditto
6	verticillata	*Verticillate ditto*	3 to 5	yellow	ditto
7	lophanthoides	*Crested-flowered ditto*	5 to 6	yellow	b. l.
8	Actinotus Helianthi	*Large Actinotus*	6 to 12	white	l. s.
9	Acmena elliptica	*Elliptic Acmena*	5 to 9	white	l. b.
10	Adenandra fragrans	*Sweet Adenandra*	4 to 7	red	b. l.
11	speciosa	*Umbel-flowered ditto*	.....	white	ditto
12	fragrans	*Sweet-scented ditto*	.....	red	ditto
13	acuminata	*Acute-leaved ditto*	.....	white	ditto
14	Anemone capensis	*Cape Anemone*	3 to 7	purple	b. s.
15	Andersonia sprengelioides	*Sprengel-like Andersonia*	.....	white	b. l.
16	Amellus lychnitis	*Cape Amellus*	6 to 7	blue	l. s.
17	Angofora cordifolia	*Heart-leaved Angofora*	5 to 8	white	b. l.
18	Aplophyllum suaveolens	*Primr.-scent Aplophyllum*	6 to 9	white	l. b.
19	Arbutus canariensis	*Long-leaf Strawberry-tree*	5 to 6	rose	ditto
20	Aristolochia sempervirens	*Evergreen Birthwort*	.....	purple	l.
21	Aspalathus carnosa	*Fleshy-leaved Aspalathus*	5 to 8	yellow	ditto
22	globosa	*Globe-flowered ditto*	6 to 7	yellow	ditto
23	ciliaris	*Ciliated ditto*	7 to 8	yellow	ditto
24	callosa	*Oval-spiked ditto*	.....	yellow	ditto
25	Astelma eximium	*Giant Astel*	6 to 9	scarlet	l. b.
26	speciosissimum	*Splendid ditto*	7 to 9	white	ditto
27	Ardisia lentiginosa	*Freckled Ardisia*	7 to 8	white	l. s.
28	canaliculata	*Channelled ditto*	4 to 8	pink	ditto
29	Aster argophyllus	*Musk-scented Aster*	5 to 7	white	l.
30	liratus	*Fluted-stemmed*	.....	white	ditto

			Months.	Col.	Comp.
31	Barosma serratifolia	*Saw-leaved Barosma*	3 to 6	white	l. b.
32	ovata	*Oval-leaved ditto*	2 to 9	white	ditto
33	Banksia spinulosa	*Spiny-leaved ditto*	12 to 5	straw	ditto
34	marginata	*Various-leaved ditto*	5 to 8	green	ditto
35	integrifolia	*Entire-leaved ditto*	.....	straw	ditto
36	paludosa	*Marsh ditto*	1 to 4	straw	ditto
37	æmula	*Indented-leaved ditto*	1 to 6	straw	ditto
38	serrata	*Sawed-leaved ditto*	7 to 9	straw	ditto
39	Berberis pinnata	*Wing-leaved Barberry*	3 to 5	yellow	b. l.
40	Borbonia ruscifolia	*Ruscus-leaved Borbonia*	6 to 8	yellow	l. b.
41	ciliata	*Fringe-leaved ditto*	.....	yellow	ditto
42	Bryophyllum calycinum	*Lar. Cuppd. Bryophyllum*	4 to 7	brown	l. s.
43	Burchellia capensis	*Cape Burchellia*	3 to 6	scarlet	l. b.
44	parviflora	*Small-flowered ditto*	.....	orange	ditto
45	Calandrinia grandiflora	*Large-flowered Calandrina*	6 to 10	rose	ditto
46	Calceolaria corymbosa	*Corymb-flow. Calceolaria*	4 to 8	yellow	ditto
47	petioalaris	*Branched-flowered ditto*	6 to 9	yellow	ditto
48	integrifolia	*Entire-leaved ditto*	6 to 8	yellow	ditto
49	polifolia	*White-leaved ditto*	6 to 9	yellow	ditto
50	angustifolia	*Narrow-leaved ditto*	6 to 8	yellow	ditto
51	thyrsiflora	*Tufted-leaved ditto*	.....	yellow	ditto
52	scabiosæfolia	*Scabious-leaved ditto*	7 to 9	yellow	ditto
53	Calothamnus, glabra	*Smooth Calothamnus*	1 to 12	white	ditto
54	villosa	*Hairy ditto*	.....	scarlet	ditto
55	quadrifida	*Four-cleft ditto*	.....	scarlet	ditto
56	clavata	*Club-leaved ditto*	.....	scarlet	ditto
57	Calythrix glabra	*Smooth Calythrix*	4 to 6	white	ditto
58	Callistemon viridiflorum	*Green-flow. Callistemon*	6 to 8	scarlet	ditto
59	rigidum	*Rough-leaved ditto*	3 to 8	scarlet	ditto
60	lanceolatum	*Lance-leaved ditto*	11 to 6	scarlet	ditto
61	Camellia japonica	*Single red Japan Rose*	12 to 5	vari.	ditto
62	v. alba	*Single white ditto*	.....	white	ditto
63	v. semiduplex	*Semi-double red ditto*	.....	red	ditto
64	v. rubro-plena	*Double red ditto*	.....	red	ditto
65	v. carnea	*Middlemists' ditto*	.....	flesh	ditto
66	v. myrtifolia	*Myrtle-leaved ditto*	.....	pink	ditto
67	v. hexangularis	*Six-sided ditto*	.....	red	ditto
68	v. atro-rubens	*Loddige's red ditto*	.....	scarlet	ditto
69	v. anemoniflora	*Red Warratah ditto*	.....	crims.	ditto
70	v. dianthiflora	*Carnation Warratah ditto*	.....	varie.	ditto
71	v. blanda	*Blush Warratah ditto*	.....	blush	ditto
72	v. pomponia	*Kew blush ditto*	.....	blush	ditto
73	v. pæoniflora	*Pæony-flowered ditto*	.....	pink	ditto
74	v. Welbankii	*Welbank's ditto*	.....	white	ditto
75	v. luteo-alba	*Pale yellow ditto*	.....	straw	ditto
76	v. flavescens	*Buff ditto*	.....	buff	ditto
77	v. albo-plena	*Double white ditto*	12 to 5	white	l. b.
78	v. fimbriata	*Fringed white ditto*	1 to 4	white	ditto
79	v. imbricata	*Imbricate petalled ditto*	.....	red	ditto
80	v. variegata	*Double striped ditto*	.....	strip'd	ditto
81	v. crassinervis	*Thick-nerved ditto*	.....	red	ditto
82	v. expansa	*Expanded ditto*	.....	red	ditto

			Months.	Col.	Comp.
83	Camellia japonica conchiflora,	*Shell-flowered ditto*	1 to 4	red	l. b.
84	v. rubricaulis	*Lady Ad'l. Campbell's ditto*	.....	scarlet	ditto
85	v. longifolia	*Long-leaved ditto*	.....	red	ditto
86	v. Chandleri	*Chandler's Warratah ditto*	12 to5	rd.&w.	ditto
87	v. Aitoni	*Aiton's single red ditto*	.....	scarlet	dltto
88	v. althæiflora	*Holyoak-flowered ditto*	.....	red	ditto
89	v. corallina	*Coral-flowered ditto*	.....	red	ditto
90	v. insignis	*Splendid ditto*	.....	red	ditto
91	v. florida	*Clustered-flowered ditto*	.....	red	ditto
92	v. anemonæflora,alba,	*White Anemone-flow. ditto*	.....	white	ditto
93	v. Rossii	*Ross's ditto*	.....	red	ditto
94	v. Wiltoniæ	*Miss Witton's ditto*	.....	strip'd	ditto
95	v. Elphinstoniana	*Miss Elphinstone's ditto*	.....	red	ditto
96	v. rosæflora	*Rose-flowered ditto*	.....	red	ditto
97	v. Cliveana	*Lady Clive's ditto*	.....	red	ditto
98	v. heterophylla	*Various-leaved ditto*	.....	red	ditto
99	v. Egertoniæ	*Miss Egerton's diito*	.....	red	ditto
100	v. Goussoniæ	*Miss Gousson's ditto*	.....	red	ditto
101	v. Barnabiæ	*Mrs. Barnaby's ditto*	.....	pink	ditto
102	v. radiata	*Single-rayed ditto*	.....	red	ditto
103	v. supina	*Supine ditto*	.....	red	ditto
104	v. Hibbertii	*Mr. Hibbert's ditto*	.....	red	ditto
105	v. Percyæ	*Duke of Northumberland's do.*	.....	red	ditto
106	v. Woodsii	*Mr. Wood's ditto*	.....	rose	ditto
107	v. argentea	*Silvery-cupped ditto*	.....	red	ditto
108	v. basilica	*Princely ditto*	.....	scarlet	ditto
109	v. princeps	*Double carmine ditto*	.....	crims.	ditto
110	v. sanguinea	*Single crimson ditto*	.....	crims.	ditto
111	v. sericea	*Double Silky ditto*	.....	rose	ditto
112	v. Byronii	*Lord Byron's ditto*	.....	rose	ditto
113	v. carnescens	*Single pale red ditto*	.....	red	ditto
114	v. eximia	*Fine double red ditto*	.....	red	ditto
115	v. bicolor	*Single rosy and white ditto*	.....	ro.&w.	ditto
116	v. purpurascens	*Single dark red ditto*	.....	red	ditto
117	v. gigantea	*Large double ditto*	.....	rose	ditto
118	v. lucida	*Double bright red ditto*	.....	red	ditto
119	v. ornata	*Pink Warratah ditto*	.....	pink	ditto
120	v. papaveracea	*Poppy-flowered—Loddiges*	.....	red	ditto
121	v. rotundifolia	*Round-leaved ditto*	.....	red	ditto
122	v. Spofforthiana	*Red-lined white Spofforth*	.....	white	ditto
123	v. Herbertii	*Mr. Herbert's ditto*	.....	rose	ditto
124	v. Haylockii	*Haylock's ditto*	.....	white	ditto
125	v. reflexa	*Reflexed petalled ditto*	.....	crims.	ditto
126	Sesanqua	*Lady Bankes's Japan Rose*	11 to1	red	b. b.
127	v. semiduplex	*Semi double ditto*	.....	red	ditto
128	v. flore-pleno	*Double-flowered ditto*	.....	red	ditto
129	Clematis aristata	*Awned-anthered Virgin's-bower*	5 to 8	white	b. l.
130	hedysarifolia	*Saintfoin-leaved ditto*	7 to 2	white	ditto
131	brachiata	*Armed ditto*	10 to12	white	ditto
132	cylindrica	*Long-flowered ditto*	7 to 9	blue	ditto
133	Candollea cuneiformis	*Wedge-leaved Candollea*	5 to 8	yellow	ditto
134	Ceanothus azureus	*Blue Ceanothus*	4 to 5	blue	ditto

			Months.	Col.	Comp.
135	Canarina campanula	*Canary Canarina*	1 to 3	orange	ditto
136	Chlorantlius monostachys	*Single-spiked Chloranthus*	2 to 6	strip'd	l.
137	Convolvulus pannifolius	*Cloth-leaved Convolvulus*	6 to 9	blue	ditto
138	Conospermum taxifolium	*Yew-leaved Conospermum*	4 to 6	straw	ditto
139	Correa speciosa	*Shewy Correa*	11to5	red	b. l.
140	Cotyledon ovata	*Oval-leaved Cotyledon*	7 to 8	yellow	l. s.
141	coruscans	*Sparkling-leaved ditto*	3 to 5	orange	ditto
142	curviflora	*Curved-flowered ditto*	8 to10	yellow	ditto
143	Crassula arborescens	*Tree Crassula*	5 to 6	pink	ditto
144	lactea	*Milk-white ditto*	9 to 2	white	ditto
145	centauroides	*Centaury-flowered ditto*	5 to 7	red	
146	Crowea saligna	*Willow-leaved Crowea*	7 to12	pink	b. l.
147	Crotalaria retusa	*Wedge-leaved Crotalaria*	5 to 9	yellow	ditto
148	fenestrata	*Window-calyxed ditto*	.....	yellow	ditto
149	Cunonia capensis	*Cape Cunonia*	5 to 7	white	l. s.
150	Cytisus biflorus	*Two-flowered Cytisus*	.....	yellow	l.
151	Cynanchum pilosum	*Hairy Cynanchum*	6 to 9	white	b. l.
152	Daviesia latifolia	*Broad-leaved Davisia*	5 to 8	yellow	b.
153	Dianthus crenatus	*Long-cupped Pink*	6 to10	white	l. b.
154	Dionæa muscipula	*Venus's Fly-trap*	7 to 8	white	b. m.
155	Diosma rubra	*Heath-leaved Diosma*	2 to 5	blush	b. l.
156	Dias cotinifolia	*Cotinus-leaved Dias*	6....	pink	ditto
157	Disemma Herbertiana	*Ld. Carnarvon's Passion-fl.*	6 to10	scarlet	l. b.
158	adianthifolia	*Norfolk-Island ditto*	.....	orange	ditto
159	Diospyros sylvatica	*Wood Date-Plum*	5 to 8	white	b. l.
160	pubescens	*Downy leaved ditto*	4 to 5	white	ditto
161	Embryopteris	*Glutinous ditto*	5 to 8	green	ditto
162	Dodonæa oblongifolia	*Oblong-leaved Dodonæa*	6 to 8	green	l. b.
163	Dolichos lignosus v. falciformis	*Falcate-podded Dolichos*	7 to 8	rose	ditto
164	Dryandra floribunda	*Many-flowered Dryandra*	1 to12	yellow	ditto
165	Dumasia pubescens	*Pubescent Dumasia*	8 to12	yellow	l. s.
166	Elæocarpus cyaneus	*Blue-fruited Elæocarpus*	6 to 8	white	b. l.
167	Entelea arborescens	*New-Zealand Cork-tree*	5 to 6	white	l. b.
168	Epacris grandiflora	*Great-flowered Epacris*	1 to 6	crims.	b. l.
169	purpurascens	*Purple ditto*	2 to 6	lilac	ditto
170	paludosa	*Marsh ditto*	4 to 6	white	ditto
171	Erinus Lychnidea	*Phlox-flowered Erinus*	3 to10	purple	ditto
172	Erythrina herbacea	*Herbaceous Coral-tree*	6 to 9	scarlet	ditto
173	poianthes	*Crowded-flowered ditto*	4 to 6	red	l.
174	Humeana	*Sir A. Hume's ditto*	5 to 6	scarlet	b. l.
175	crista galli	*Cockscomb ditto*	6 to10	scarlet	l. b.
176	Escallonia rubra	*Red-flowered Escallonia*	8 to10	red	sand
177	glandulosa	*Glandular ditto*	.....	white	ditto
178	Eucalyptus Lindleyana	*Lindley's Eucalyptus*	4 to 6	white	l. b.
179	pulverulenta	*Powdered ditto*	11to 3	white	l. b.
180	Eurya chinensis	*Chinese Eurya*	6 to 8	white	ditto
181	Euryale ferox	*Prickly Euryale*	7 to 9	red	ditto
182	Fabricia lævigata	*Smooth-leaved Fabricia*	5 to 6	white	l. s.
183	stricta	*Upright ditto*	5 to 7	white	ditto
184	Fagelia bituminosa	*Clammy Fagelia*	4 to 9	yellow	l. b.
185	Fuchsia lycioides	*Boxthorn-leaved Fuchsia*	4 to10	red	l.

			Months.	Col.	Comp
186	Fuchsia arborescens	*Tree Fuchsia*	6 to 10	rose	l. s.
187	excorticata	*Changeable-flowered ditto*	4 to 10	gr. & r.	ditto
188	Gardenia radicans	*Rooting Gardenia*	3 to 6	white	b. l.
189	Rothmannia	*Spotted flowered*	7	var.	ditto
190	Gnidia pinifolia	*Pine-leaved Gnidia*	5 to 6	white	l. b.
191	imberbis	*Smooth scaled*	8 to 4	straw	
192	imbricata	*Imbricated ditto*	4 to 8	straw	
193	oppositifolia	*Opposite-leaved*	5 to 7	yellow	
194	Goodenia grandiflora	*Great-flowered Goodenia*	6 to 8	yellow	l.
195	ovata	*Oval-leaved ditto*	6 to 10	yellow	l. b.
196	Goodia pubescens	*Downy Goodia*	4 to 7	purple	l.
197	Gonolobus niger	*Black-flowered Gonolobus*	9 to 11	black	ditto
198	Gomphocarpus fruticosus,	*Shrubby Gomphocarpus*	6 to 9	white	ditto
199	Grevillea punicea	*Scarlet-flowered Grevillia*	4 to 9	scarlet	ditto
200	sericea	*Silky-leaved ditto*	.....	rose	ditto
201	linearis	*Linear-leaved ditto*	.....	lilac	ditto
202	v. alba	*White-flowered ditto*	.....	white	ditto
203	buxifolia	*Box-leaved ditto*	2 to 9	purple	ditto
204	acanthifolia	*Acanthus-leaved ditto*	5 to 8	green	ditto
205	Hakea microcarpa	*Small-podded Hallia*	4 to 8	white	l.
206	florida	*Many-flowered ditto*	5 to 6	white	ditto
207	nitida	*Shining-leaved ditto*	6 to 8	white	ditto
208	saligna	*Willow-leaved ditto*	3 to 7	white	ditto
209	pugioniformis	*Dagger-podded ditto*	5 to 6	white	ditto
210	Hibiscus hispidus	*Hispid Hibiscus*	6 to 9	y. & p.	ditto
211	Rosa malabarica	*Malabar Rose*	8 to 10	scarlet	b. l.
212	Hypericum chinense	*Chinese Hypericum*	3 to 9	yellow	ditto
213	ægyptiacum	*Egyptian ditto*	6 to 7	yellow	ditto
214	Indigofera australis	*Round-stemmed Indigo*	3 to 6	lilac	l. b.
215	amœna	*Scarlet-flowered ditto*	3 to 5	scarlet	ditto
216	endecaphylla	*Eleven-leaved ditto*	7 to 9	red	l.
217	Inga purpurea	*Soldier Wood*	3 to 5	purple	ditto
218	Ipomœa Michauxii	*Michaux' Ipomea*	8 to 11	blush	ditto
219	pandurata	*Virginian ditto*	6 to 9	white	ditto
220	sagittifolia	*Arrow-leaved ditto*	7 to 9	rose	ditto
221	Jasminum laurifolium	*Laurel-leaved Jasmine*	1 to 12	white	b. l.
222	undulatum	*Waved-leaved ditto*	2 to 6	white	ditto
223	acuminatum	*Sharp-pointed leaved do.*	6 to 9	white	ditto
224	Kalosanthes versicolor	*Var.-col. Kalosanthes*	6 to 8	var.	s. l.
225	jasminea	*Jasmine-flowered ditto*	6 to 8	white	ditto
226	Kennedya prostrata	*Scarlet-flowered Kennedy*	8 to 8	scarlet	l. b.
227	coccinea	*Lesser Scarlet ditto*	5 to 8	scarlet	ditto
228	Comptoniana	*Comptonian ditto*	3 to 6	purple	ditto
229	ovata	*Oval-leaved ditto*	3 to 8	purple	ditto
230	Lambertia formosa	*Handsome Lambert*	6 to 8	rose	b. l.
331	Leucopogon juniperinus,	*Juniper-leaved Leucop.*	4 to 6	white	b. l.
232	interruptus	*Interrupted ditto*	3 to 6	white	ditto
233	polystachyus	*Many-spiked ditto*	6 to 7	white	ditto
234	Lissanthe sapida	*Recurved flowered Lissan.*	11 to 1	white	ditto
235	daphnoides	*Daphne-flowered ditto*	6 to 7	white	ditto
236	Lavatera triloba	*Three-lobed Lavatera*	.....	lilac	b. l.
237	Lachnæa buxifolia	*Box-leaved Lachnea*	5 to 7	white	ditto

			Months.	Col.	Comp.
238	Lachnæa glauca	*Glaucus Lachnea*	5 to 7	white	b. l.
239	purpurea	*Purple-flowered ditto*	.....	purple	ditto
240	eriocephala	*Woolly-headed ditto*	6 to 7	white	l.
241	Lasiopetalum ferrugineum,	*Rusty Lasiopetalum*	4 to 7	white	b. l.
242	Leptospermum grandifol.	*Large-leaved Leptosper.*	6 to 7	white	b. s.
243	flavescens	*Yellowish ditto*	.....	yellow	l. s.
244	Leucadendron stellatum	*Starry Leucadendron*	5 to 6	yellow	l.
245	tortum	*Twisted-leaved ditto*	3 to 5	yellow	ditto
246	concolor	*One-coloured ditto*	3 to 6	yellow	ditto
247	abietinum	*Fir-leaved ditto*	7 to 9	yellow	ditto
248	æmulum	*Related ditto*	6 to 9	yellow	ditto
249	Lotus australis	*New Holland Lotus*	5 to 9	red	ditto
250	albidus	*White-flowered ditto*	6 to 9	white	ditto
251	Lomatia silaifolia	*Cut-leaved Lomatia*	6 to 8	white	ditto
252	longifolia	*Long-leaved ditto*	5 to 8	white	ditto
253	Luculia gratissima	*Sweet-scented Luculia*	10to2	rose	l. b.
254	Magnolia pumila	*Dwarf Magnolia*	1to12	white	l. b.
255	Marsdenia suaveolens	*Sweet Marsden*	3 to 8	white	ditto
256	Maurandia Barclayana	*Barclay's Maurandia*	4 to12	purple	ditto
257	Melaleuca fulgens	*Splendid Melaleuca*	6 to 8	scarlet	ditto
258	squarrosa	*Myrtle-leaved ditto*	7 to 9	white	l. s.
259	incana	*Hoary ditto*	6 to 8	scarlet	l. b.
260	squamea	*Scaly-branched ditto*	.....	scarlet	l. s.
261	pulchella	*Splendid ditto*	6 to 9	lilac	l. s.
262	Mirbelia reticulata	*Netted Mirbelia*	5 to 8	purple	b. l.
263	Monsonia speciosa	*Red-flowered Monsonia*	4 to 5	red	b. l.
264	Muraltia mixta	*Heath-leaved Muraltia*	1to12	lilac	b.
265	stipulacea	*Stipuled ditto*	4 to 9	purple	ditto
266	Mussænda pubescens	*Pubescent Mussænda*	5 to 9	yellow	l. b.
267	Nauclea Adina	*Myrtle-leaved Nauclea*	7 to 8	white	b. l.
268	Nerium Oleander v.splend.	*Double-hybrid Oleander*	6to10	red	l. b.
269	v. alba	*White-flowered ditto*	.....	white	ditto
270	Olea capensis	*Cape Olive*	6 to 9	white	ditto
271	undulata	*Wave-leaved ditto*	.....	white	ditto
272	Otidia dasycaulon	*Thick-stemmed Otidia*	7to12	white	ditto
273	Oxalis rosea	*Rose-col. Wood Sorrel*	3 to 6	rose	b. l.
274	v. floribunda	*Many-flowered rose ditto*			
275	lobata	*Lobed ditto*	4 to 6	yellow	ditto
276	versicolor	*Various-coloured ditto*	1 to 3	rd.&wh.	ditto
277	Parnassia caroliniani	*Carolina Grass of Parnas.*	5 to 8	white	b.
278	Passiflora cœruleo-racemosa,	*Whitley's mule*	1to12	purple	l.
279	v. quinquelobata,	*Five-lobed Passion-flower*	.....	purple	ditto
280	alata-cœrulea	*Master's mule ditto*	4 to 8	rose	l.
281	Pavonia præmorsa	*Bitten-leaved Pavonia*	6 to 8	yellow	ditto
282	Penæa squamosa	*Scaly Penæa*	5 to 7	yellow	b. l.
283	imbricata	*Imbricate ditto*	4 to 6	red	ditto
284	Phylica spicata	*Close-spiked Phylica*	8to12	white	b. l.
285	reclinata	*Reclined ditto*	3 to 5	white	l. b.
286	capitata	*Headed ditto*	.....	white	ditto
287	Pimelea linifolia	*Flax-leaved Pimelea*	2 to 8	white	b. l.
288	rosea	*Rose-coloured ditto*	3 to 9	red	ditto
289	humilis	*Dwarf ditto*	6 to 9	white	ditto

			Months.	Col.	Comp.
290	Platylobium formosum	*Gr.-flowered Platylobium*	6 to 8	yellow	b. l.
291	Polygala latifolia	*Broad-leaved Milkwort*	1 to 12	purple	l. b.
292	grandiflora	*Great-flowered ditto*	4 to 9	purple	l.
293	bracteolata	*Spear-leaved ditoo*	5 to 10	purple	b. l.
294	speciosa	*Showy ditto*	6 to 9	purple	ditto
295	Pomaderris Simsii	*Sims's Pomaderris*	4 to 7	straw	l. b.
296	Protea grandiflora	*Great-flowered Protea*	5 to 6	rose&w.	l.
297	Scolymus	*Small flowered ditto*	.....	w.&rose	ditto
298	acuminata	*Sharp-pointed ditto*	3 to 6	crims.	ditto
299	lævis	*Smooth-leaved ditto*	5 to 7	rose gr.	ditto
300	cordata	*Heart-leaved ditto*	3 to 5	crims.	ditto
301	acerosa	*Pine-leaved ditto*	.....	crims.	ditto
302	speciosa	*Splendid ditto*	3 to 6	w.&br.	
303	formosa	*Handsome ditto*	5 to 6	scarlet	ditto
304	neriifolia	*Oleander-leaved ditto*	2 to 4	purple	ditto
305	Psoralea arborea	*Tree Psoralea*	5 to 10	blue	ditto
306	aphylla	*Leafless ditto*	6 to 8	blue	l. b.
307	spicata	*Long-spiked ditto*	7 to 8	wh.&bl.	l.
308	corylifolia	*Hazel-leaved ditto*	6 to 7	violet	ditto
309	incana	*Silky-leaved ditto*	6 to 8	blue	b.
310	Pultenæa stricta	*Upright Pultenæa*	4 to 6	yellow	b. l.
311	stipularis	*Scaly ditto*	.....	yellow	b.
312	paleacea	*Chaffy ditto*	5 to 7	yellow	b. l.
313	pedunculata	*Long-stalked ditto*	5 to 6	yellow	ditto
314	Rafnia triflora	*Three-flowered Rafnia*	5 to 7	yellow	l.
315	Reseda odorata v. frutescens,	*Tree Mignionette*	6 to 10	straw	l. b.
316	Rhododendron indicum	*Indian Azalea*	3 to 5	red	b.
317	v. phœnicium	*Purple Indian ditto*	3 to 5	purple	b.
318	v. Smithii	*Smith's ditto*	.....	lilac	ditto
319	v. purpureum	*Double purple ditto*	.....	purple	ditto
320	v. album	*White ditto*	3 to 6	white	ditto
321	v. luteum	*Yellow ditto*	5 to 6	yellow	ditto
322	R. sinense v. flammeum	*Flame-coloured ditto*	.....	flame	ditto
323	Roella ciliata	*Ciliated Roella*	6 to 9	bl.&w.	ditto
324	Ruta pinnata	*Winged-leaved Rue*	3 to 8	yellow	b. l.
325	angustifolia	*Narrow-leaved ditto*	6 to 9	yellow	l.
326	macrophylla	*Small-leaved ditto*	.....	yellow	b.
327	Salvia bracteata	*Long-bracted Sage*	6 to 8	lilac	l. b.
328	amarissima	*Bitter ditto*	7 to 8	blue	ditto
329	fulgens	*Glossy ditto*	1 to 12	scarlet	ditto
330	Sarcophyllum carnosum	*Fleshy-leaved Sarcophyl.*	5 to 8	yellow	l.
331	Selago fasciculata	*Cluster-flowered Selago*	6 to 9	blue	ditto
332	Septas capensis	*Cape Septas*	8 to 9	white	l. s.
333	globifera	*Globe-flowering ditto*	3 to 5	white	l. b.
334	Spielmannia africana	*African Spielmannia*	2 to 11	white	ditto
335	Sprengelia incarnata	*Flesh-col. Sprengelia*	4 to 6	pink	ditto
336	Styphelia viridiflora	*Green-flowered Styphelia*	.....	green	ditto
337	triflora	*Three-flowered ditto*	5 to 8	green	ditto
338	longifolia	*Long-leaved ditto*	4 to 6	green	ditto
339	Stenanthera pinifolia	*Fir-leaved Stenanthera*	5 to 7	scarlet	ditto
340	Stenochilus glaber	*Smooth-leaved Stenochilus*	1 to 12	scarlet	l. s.
341	maculatus	*Spotted-flowered ditto*	4 to 8	spotted	l. s.

			Months.	*Col.*	*Comp.*
342	Stenochilus viscosus	*Clammy Stenochilus*	4 to 8	yellow	l. s.
343	Stenocarpus salignus	*Sweet-scented Stenocarpus*	6 to 9	white	l.
344	Struthiola tomentosa	*Downy-leaved Struthiola*	4 to 8	red	l. b.
345	virgata	*Twiggy ditto*	.. ..	red	ditto
346	ciliata	*Ciliated ditto*	.....	scarlet	ditto
347	pubescens	*Pubescent ditto*	.....	red	ditto
348	incana	*Hoary ditto*	7 to 8	yellow	ditto
349	juniperina	*Juniper-leaved ditto*	4 to 9	white	ditto
350	ovata	*Oval-leaved ditto*	2 to 6	white	ditto
351	Templetonia retusa	*Green-leaved Templeton*	3 to 7	searlet	l. b.
352	glauca	*Glaucus-leaved ditto*	.....	scarlet	b.
353	Thomasia purpurea	*Purple Thomasia*	6....	purple	l. b.
354	quercifolia	*Oak-leaved ditto*	4 to 7	purple	ditto
355	Tetranthera laurifolia	*Laurel-leaf Tetranthera*	1 to 5	gr.&wh.	l.
356	Telopea speciosissima	*Splendid Warratah*	5 to 7	crims.	ditto
357	Tephrosia biflora	*Two-flowered Tephrosia*	6 to 9	purple	ditto
358	Tournefortia fruticosa	*Shrubby Tournefortia*	6 to 10	white	ditto
359	Tristania neriifolia	*Oleander-leaved Iris*	7 to 9	yellow	l. s.
360	Vestia lycioides	*Lycium-like Vestia*	1 to 12	gr.&wh.	l.
361	Viburnum odoratissimum	*Sweet-scented Viburnum*	5 to 6	white	l. b.

In addition to the above are a number of kinds arranged under the tribe of Bulbs, which are deserving of cultivation for their singular beauty: it would be swelling this List too much to enumerate them all; but Figures of them may be consulted in the *Botanical Magazine*, the *Botanical Register*, the *Botanical Cabinet*, and some other works of less note, under the generic names of *Amaryllis*, *Crinum*, *Ixia*, *Pancratium*, &c.

COMPOSTS FOR PARTICULAR PLANTS.

For the Orange-tree—Three eighth-parts cow-dung which has been kept three or four years; a fourth-part, vegetable mould from tree-leaves; one sixth fine rich loam; and one twelfth road-grit. To this may be added an eighth-part sheeps' dung. Some persons apply the latter in a fresh state, and lay it at the top of the mould; but it is better to keep it two years, and mix it with the other ingredients as a compost.

METHODS OF PROPAGATION.

The technical process, in each method of propagation, is the same as has been given in the *Flower Garden* and *Shrubbery*; and the additions to be made under this head merely regard the artificial situation of the plants, or singularities of constitution glanced at by the notices in the Table.

By Seed.—From the middle of March to the close of April is the best time for sowing. Prepare a hot-bed under a glass-frame, for nurturing the tender sorts. This bed may be composed either of hot dung, or fresh tan bark. The latter is to

be preferred: if tan enough for an entire bed is not at hand, a layer of old bark, ten inches thick, to plunge the pots in, spread on a foundation of dung, is more adapted to the purpose in view than a bed entirely of dung; for the heat will be more permanent and regular. Set on the frame; and when the crisis of heat is past, lay on four inches of earth, which will complete the preparation of the bed.

Fill small pots with fine mould, lighter or richer according to the kind of plant. As soon as these have received the seeds, plunge them in the bed; sprinkle the pots with water, and put on the glasses. As the plants break the earth, give air by raising the glasses a little at the back. Support the heat of the bed by a timely lining of fresh dung. Repeat waterings as the plants require.

In June, when from two to five inches high, transplant the seedlings; for the most part, singly into small pots. Plunge the more tender into a gentle hot-bed, to forward their rooting. Place such as least require this excitement under a garden-frame or glass-case. Give water. Harden the plants by daily admissions of air. Shade in the middle of hot days. When August arrives, the plants will be able to bear the open air; but they should be taken into the Green-house ten or fifteen days before the time for carrying in established plants.

In the following spring, transplant them into larger pots, corresponding to the full size of each kind. Plunge them into a gentle hot-bed. Give water, shade, and air, as requisite. By July, expose them fully. If they are shrubs, and intended to receive buds, the freest growers may be expected to be suitable plants in the second summer; and the more reluctant, by the next year. Whenever shrubs are under the nursery glasses, raise the frame, as they increase in height, five inches space above, that they may grow up with a straight stem.

Many sorts of the *Erica*, of which cuttings do not strike freely, are raised from seed. In short, the Green-house plants that may be thus raised are too many to be easily enumerated. Seeds are also frequently brought from other countries, which may be thus sown.—It is necessary to observe, that some seeds, as *Erica*, are very minute; and the soil in which such are deposited must be very fine, and the seed covered very slightly.

There should be attached to the Nursery for the Green-house some sound glass-frames without hot-beds, that the more hardy exotics may receive the less artificial treatment recommended by particular notices in the Table.

By Cuttings.—Various Green-house shrubs, such as the

Myrtle, Pelargonium, Cistus, Amber-tree, can be propagated by cuttings. Many succulents are also continued by this method; the Euphorbia for example, the Sedum, and the Cereus.

The usual time is from April to July; but rare annuals which do not seed here must be thus propagated, when the object of keeping up a succession requires.

Early in Sept. shift into large pots (32s), using rich mould, and watering with rich liquid manure. Keep them in the open ground till frost compels their removal to the Conservatory. By their having no shoots from the root, the strength of the plants goes to the blossom.

In taking cuttings of shrubs, if the operation precede Midsummer, the shoots should be those of the year before: if after Midsummer, the spring-shoots of the current growing season.

June and July include the best time for propagating succulents by cuttings. Most hard-wooded Green-house plants strike by cuttings, if taken off at the proper season, placed in mould under bell-glasses, and plunged in a shady border during spring and summer. Where succulents have any spray, take cuttings of the branches, from two to eight inches in length, according to the species. Some sorts run up with tall naked stems without spray, such as the Cereus: the top of the stems is sometimes taken off and planted; and the parent plant afterwards throws out side-shoots, serving for future cuttings. Other species present only leaves for subjects of this process. Some sorts may be separated with a sharp knife; others, slipped off. It is essential to remark, that the moisture with which succulents are replete will flow considerably at the severed part or base of the cutting: previously to planting, cuttings should therefore be laid upon a shelf, in a dry airy place, for a few days, till the wound be dried and cicatrized; otherwise the part detached would be liable to rot in the earth. Succulents must be carefully guarded from drip. The shoots taken should be planted in pots. If placed under a frame, they will strike the sooner: a hand-glass, over a little temporary bed of old tan or leaves of trees, is better than a frame without a hot-bed: tender exotics grow still more freely in a frame and hot-bed; but a bark-pit is to be preferred for striking cuttings expeditiously. The glasses must be gently raised at times, to give vent to moist vapour.

Give water lightly at planting. If the time be full summer, shade four or six hours in the middle of the day; and water every alternate day. When the cuttings have struck, fresh air will be wanted daily.

Cuttings of the Shrubby Pelargonium planted in May, or after, will strike very readily without a bottom-heat. The hard-wooded exotics are slow in making new roots, unless kept under a covering of glass, and excited by the morning and evening sun, and by a bottom-heat at about 90°: to the influence of these, it is well to add a genial dewy vapour, raised by sprinklings of water, once or twice a day.

The cuttings made early, and thus managed, will be mostly well rooted by July, when they may be transplanted singly into small pots. Cuttings not rooted by the housing time may be wintered in a frame.

By Layers.—Layers, the same as cuttings, may be made of the preceding year's shoots, in April and May; and of the shoots of the current year, at the close of June, or in July. The Olive, Jasmine, Oleander, and Pomegranate, are among the shrubs thus propagated. Where there is not room enough in the pot of the plant to allow the layer to be properly brought down into it, another pot, or tub, must be placed contiguously, to receive the layer: or it is usual to take a pot sufficiently wide, and so place the plant to be laid in it sideways, first turned out of its original pot. After finishing the process as described under NURSERY, lay on a little mulch, or mown grass, over the part covered-in, to keep the earth from being dried by the sun. Assist the formation of a new root by gentle waterings. If the pots of the plants be plunged in a hot-bed, the layers will promptly root, the same season. Some of the hardier kinds, without this excitement, may be expected to strike before the growing-season is over: such as are not well rooted by the end of September must remain on the stool till the anniversary season.

By Suckers.—Aloes are the principal Green-house plants thus raised. The slips, offsets, or suckers, spring from the stem near the bottom of the herb, and sometimes from the roots just below it. The last week in July, with the first fortnight in August, constitute a proper time for detaching the suckers of Aloes, and of other succulents, when old plants offer them. Plant the suckers separately in pots. Water very lightly. Set the pots in a situation which is shaded at noon. Water now and then, well regarding the constitution of Succulents.

By Grafting.—Fruit-bearing trees in the Green-house are sometimes inarched, either to have a diversity of fruit on one tree, or for the more useful purpose of obtaining a new plant of a kind that does not propagate well by the other methods. Choice specics of the Citrus are commonly inarched on Lemon

and Orange seedlings. The process of inarching is fully described under NURSERY. The time is April, May, and the beginning of June, according to the forwardness of the shoots. Curious shrubs that are not fruit-bearers, such as the Jasmine, are sometimes inarched.

By Budding.—As July is closing and August beginning, the proper interval for budding in the Green-house occurs. Distinct varieties of the Lemon and Orange are chiefly continued by this process. The stock, as soon as budded, should be set where it may grow freely: a gentle bottom-heat will aid the rising of the bud.

CULTURE OF ESTABLISHED PLANTS.

Watering.—All plants in a course of growth require occasional supplies of water; to be regulated by their constitution, and the state of the weather, as to heat or cold, dryness or humidity. In winter, the artificial heat of the house, and the situation of evergreens, in constant growth, deprived of the dews and rains which they would catch exposed in their native climate, renders the application of water necessary: though it requires great circumspection to administer this branch of culture without injuring delicate exotics. In rigorous weather, it is dangerous to water over the herb even of robust shrubs: and water spilt, in the house, in watering now and then at the roots, should be carefully wiped up, lest a damp vapour should be raised, calculated to fog-mould the plants. From Nov. to Feb. the shrubs nearest the flues, not Succulents, may require a little water once in three days; Herbaceous plants, once in five days: such as are in cooler parts of the house must have water seldom, and in less quantities. The Succulents, in particular, must be watered very sparingly in winter, and at intervals, once or twice a fortnight, when the earth in the pots is very dry; the more humid-leaved only in the saucers. The time of day for watering, in winter, is noon, or within an hour of it; and a mild sunny day should be taken, if such offers. In summer, Succulents which are shrubby partake of the wants of shrubs; and plants making new branches require water plentifully, and in dry hot weather almost daily, in proportion to the firmness and woody nature of the shoots: the completely succulent kinds require rarely, even in summer, to be watered over the herb. Succulent exotics, exposed to all the changes of our climate, suffer more from humidity than from cold: in or out of the house, they must be guarded carefully from drips: if, in the winter season, one of these delicate plants become too wet by accident, shake it out of the pot, dry

it for half a day, and replant it in dry earth. Herbaceous kinds require water in a middling degree. Water should never be withheld from any plant, so long as that the effect of a dry heat, unbalanced by water, may occasion the herb to droop. Use the soft water of a pond, river, or cistern.

Dressing the Plants.—Pick off decayed leaves, and leaves affected by damp, as soon as they are discovered. Cut off decayed mouldy shoots close into the sound spray.

At no season permit dust or filth to remain on the foliage. In the depth of winter use bellows only, in dislodging dust from the foliage of plants: but at the end of February, when mild, and thence according to the increasing warmth of the season, clean the hard-leaved plants with water. To large leaves use a sponge, cleaning them one by one: small-leaved sorts may be washed with a rose-pan over their heads. As the weather grows finer, a syringe or small engine may be employed. The Succulents should stand where they are not exposed to accidental wettings, when the other plants are washed; and, indeed, it is better for plants of their constitution to be separated from hard-wooded shrubs by a partition of glass. When the different sorts are removed into the open air and placed apart, the constitution of dry-leaved species, and the heat of summer, will admit the freest culture in this respect. After the plants are again housed, the free use of water, as a cleanser, will not be long safe, and must be discontinued as the influence of the sun declines.

Stirring and renewing the earth. — Stir the earth at the top of pots pretty frequently, which freshens the surface, and makes the distribution of water descending through the mould more equal and beneficial: delicate plants grow less vigorously when the earth about them is suffered to bind. Twice a year, spring and autumn, if the plants are not intended to be shifted, it will be well to renew the earth at the top of the pots: Take out as much mould as can be displaced without disturbing the roots, and fill the vacancy with fresh. Give water lightly, to settle the earth.

Shifting Plants.—When a plant has long grown in a confined pot, the mould gets exhausted: as it loses its sustaining power, the roots inclosed by it become matted; hence it is necessary, at certain periods, to shift all plants growing in pots.

The smaller Succulents should be shifted annually, or as often as the matting of the roots require it, by changing all the mould in the pot, except the ball of earth adhering when the

root is turned out. The end of August is a good time for shifting Succulents. With a sharp knife, pare away the smaller radical fibres which are matted: but avoid cutting off any fleshy roots, though they may be matted, or breaking the ball of earth. If the roots appear to have been too confined, replant in larger pots. Water lightly with a rose-pan, to settle the new earth. The larger Succulents will not require shifting oftener than once in two or three years: but annually, or twice in the year, renew the upper layer of compost, as directed in the last article.

Herbaceous perennials, if bulbs, are naturally shifted in the course of culture. As to fibrous-rooted perennials, they may be shifted once a year, into the same-sized pots, or larger; as the object is to restrain or encourage their growth.

In the spring or autumn dressing of Green-house plants, when the earth is uncovered to the root, it will be easy to judge of the propriety of shifting the plant or not. Matted roots require at all times a fresh bed. If the roots of a shrub have filled the pot or tub, it is not always proper to replant in a larger; for some shrubs and trees which have been dwarfed for the Green-house would thus outgrow their situation: in this case, the roots must be carefully pruned, to fit the plant for continuing in the same-sized pot.

Pruning and Training. — The common course in the *Shrubbery* and *Nursery* may be pursued; attending to the delicate nature of exotics, and the simple objects of health and ornament. When the decayed or irregular head of a woody plant calls for a more extensive application of the knife, the branches may be shortened in, or the stem headed down. Apply this remedy some time in March; and a retrievable subject will have a good head by July. Renew or shift the earth at the same time. Treat sickly plants as at the close of *Shifting*.

Culture of Exotic Fruit-bearers.—The Orange and the Lemon Tree will shew blossoms in June. Water every alternate day; taking care not to wet the bloom. Dress the top-earth, by stirring and renewing the surface. The clusters of blossoms and fruit will require to be thinned progressively: the reduction should not be completed till the fruit is set and swelling, in order to reserve some substitutes for casual failures.

Recovering of Evergreens. — Delicate evergreens sometimes drops their leaves in winter, from over-watering, or from something repugnant in their artificial situation. To recover their verdure, those which appear to have suffered from confinement

may, at the time of unhousing the plants, be turned out of the pots into the open ground. Re-pot them in time, at the end of summer.

Time of Housing the Plants. — By the middle of September, the expediency of housing the more tender sorts, or of keeping them in the open garden a week or a fortnight later, is to be weighed. Have regard to the cold of the nights, rather than to the mildness of the days. Michaelmas is the extreme period for exposing the more tender classes; such as, fruit-bearing exotic evergreens, easily injured by a slight frost; and decided succulents, which are equally impatient of damp. The less tender, comprehending the Myrtle, Olive, Cistus, Oleander, Solanum, Shrubby Aster, and the Candy-tuft Tree, should follow in a fortnight: thus, in good weather, the utmost limit for keeping out any division of Green-house plants is the middle of October.

Before you carry the plants in, cut off all the roots which have straggled through the pots, and finish all the routine of culture which can contribute to their health and neat appearance.

The plants may be placed promiscuously, till the whole are housed; at which time the rows which they occupy should be regulated by their size.

Temperature of the House.—By the admission or exclusion of external air, and the occasional aid of fire-heat, the temperature of the house is kept at a salutary medium. In the fine weather of autumn, the admission of air should be unrestrained in the day-time, particularly when the plants have been recently brought in; and at night, fresh air should be circulated, by leaving some of the sashes open, until the increasing sharpness of the nocturnal air forbids allowing the ventilators only to be used. As long as the weather continues fair without frost, open the windows in the day-time an hour after sun-rise, and close at the same time before sun-set. Never admit air by the door or sashes in foggy or damp weather, or when bleak cutting winds prevail. The admission of air in the middle of a clear frosty day will not hurt the plants, if counteracted by fire-heat. Admit air freely when the external temperature is at 42° by Farenheit, or above: admit it guardedly when between 35° and 42°; but not at all when under 35° before the furnace is employed.

Delay not to light the fires when the external air is as low as 33° by Fahrenheit, or the internal air down to 35°; below which the air in the coldest part of the house ought not to be

permitted to fall. If Succulents only were in the house, it would be necessary to raise the heat no higher than barely sufficient to expel frost and damp: but as exotics more susceptible of injury from cold are involved in the temperature to be sustained, the nature and health of the plants generally will be best consulted by aiming to keep the internal heat at 42°, and not suffering it to fluctuate more than two degrees below or above. A higher temperature is not wanted, in this department: for what is the object of fire-heat?—not to force any thing, but to imitate the reduced heat of a warmer climate, which is exempted from frost when summer is suspended. The morning air, intermediately warmed, is beneficial to Green-house plants, if it be even below the freezing point, so as the atmosphere be clear; and there will be no danger in a pretty free circulation of it, provided the temperature within is raised to 44° by a brisk heat from the flues.

Begin with fires in the evening, sufficient to keep the house warm during the night; and proceed to extend them to the mornings, and through the day, as the cold increases.

Growing plants should at no time be deprived of daylight: but in the rigour of winter, apply shutters, blinds, or mats, to the upright glasses, to exclude the frost effectually at night.

With regard to plants in frames: cover with mats, as the nights get severely cold. In confirmed frosts, apply a lining of litter, or warm dung, to the outside of the frame.

As winter gives way to spring, return gradually to the freest admissions of air; and preparatory to setting the plants out for the summer, inure them to an abundant circulation of fresh air.

Destroying Insects in the House.—Every three weeks fumigate the house with tobacco, which will destroy the green-insect, and some others which infest the plants, before their ravages can disfigure them. Do not burn sulphur in the house; for that will injure the plants. The scaly insect called the *coccus* chiefly annoys evergreen shrubs. When permanently mild weather allows the application to be safely made, soap and water is the best remedy. With a bit of sponge on a stick, carefully wash every part of the herb. The soap and dead insects should always be washed off afterwards, with pure water sent through a syringe. The *chermes* is to be eradicated by the same means. To dislodge the red spider, when the weather forbids the use of water, brush the under sides of the leaves with a new sash-tool which has never been used for painting. If grubs and caterpillars are not involved in the destruction of

other insects, they must be picked off. A sprinkling of sulphur on trees affected with mildew will check this parasitical fungus. — See the modes recommended for this, at the end of the work.

Time of Setting-out the Plants.—When May is half elapsed, if the weather be settled and warm, begin to bring out the hardier plants. At this time of the year, the more tender sorts do not always coincide with the classes described as such under the time of housing; for if the weather be dry, the Succulents are among the first that may come safely abroad; on the contrary, in a wet season, they must be kept the longest in the house. The beautiful families of the Citrus can never with propriety be brought out till June has commenced; and if blighting winds prevail, it is better to protect them till the fruit is set. As the plants are respectively brought out, stir and refresh the mould, take away dead wood or decayed leaves, and regulate disorderly shoots by pruning. To any, except Succulents or Fruit-bearers in bloom, conclude this dressing with a watering over the head. When first committed to the open garden, all the kinds should have a situation uniting warmth and shelter. In a week, or fortnight, they will be sufficiently hardened to take a more exposed situation during the summer.

CONSERVATORY.

This building differs from the Green-house, in Gardening phraseology, by being so erected as to allow of such exotics as are termed Green-house plants being grown to large sizes, so as to shew the specimens in their greatest splendour. The construction of this building also exhibits a proof of true taste, as it is displayed by persons in various parts of England engaged in Ornamental building.

The exterior form of such constructions should be chastely finished; lest it be too fine for the surrounding objects, and yet not devoid of necessary decoration; while the plants that are grown in the interior should justify the Gardener in his capability for selecting proper plants from the foregoing List, or from any others that may be introduced.

This is fully displayed, in its various points, in a small public Nursery Garden at Leamington, by the good taste of Mr. Collis, the proprietor; in the viewing of which, any amateur will find great delight.

HOT-HOUSE AND FORCING-GARDEN.

THE Horticulturist, when he steps into this department, aspires to the top and mastership of his art. A full acquaintance with what his predecessors knew, as principle—a vigilant attention to what his contemporaries offer as improvements, with a capacity to estimate new practices—a considerable personal share of intelligence, experience, and invention—will not more than qualify him for his profession.

Without an imitation of warmer climates, travellers alone could survey the beautiful and interesting plants with which Nature has arrayed her local gardens. When Discovery exhibits an extraordinary plant by the pencil of Descriptive Elegance, how inadequate is the picture! In the Hot-house, information is complete, and curiosity gratified.

Some of the delicious contributions from this department also give the table an elegant and princely appearance.

The term Hot-house, and that of Forcing-house, are not indiscriminately applied to the same description of place by practical men in general; nor is this a distinction without a difference. A Hot-house may be considered as constructed to sustain plants which are too tender to live in the open air of the country in which it is employed:—a Forcing-house may be defined to be an artificial garden for vegetables which will grow in the open air, by its aid to obtain a crop sooner than the natural operation of the seasons will raise and mature one:—thus the former is completely a substitute for a given hot climate; the latter is an anticipation of the local summer. The heat of the former is permanent and more uniform, resembling the steady elevation of temperature which prevails in the regions nearest the line: that of the latter fluctuates farther from a common medium; but whether raised or reduced, it is equally directed to an imitation of Nature's course in some climate. The Forcing-house, however, is frequently so assimilated in its construction and economy to the Hot-house, on account of the culture requisite for plants of a mixed nature, that the difference vanishes. But both the separation and the interchange may be accounted for by the nature of any given plant. Thus the Cherry will ripen its fruit perfectly in the open air; the Forcing-house for the Cherry is far removed from the Hot-house. Few kinds of the Grape, however favoured by aspect and shelter, come to maturity under the influence of our natural summer; and most of the sorts which are forced would

never ripen under it: the Grape Forcing-house and the Hot-house are, therefore, convertible things.

The elements of artificial culture are: 1. The *Glass-case.* A structure for shelter from inclement weather, contrived to admit the direct influence of the sun, as it respects both light and heat, from the east, south, and west. The value of the atmospheric light which might come in on the north side, were the weather-screen in that direction also transparent, is nothing, compared with the accumulation of natural heat gained by having on that side an opaque screen, calculated to intercept the sun's rays, and to reflect them into the body of the house.—2. *Moist Heat.* Unignited substances, such as dung, bark, and leaves, effervescent from a natural but regulated fermentation among the parts, raised by collecting them into a heap, are deposited within the chamber, or a heat from them is conducted into it without admitting the vapour.—3. *Fire Heat.* A factitious climate is formed by heating the interior air with flues from an excluded stove.—As these three things are combined, or as the first is used alone, or variously modified with the second only, or with the third only, we have the different engines of forcing, from a Hot-house in full action, to a common garden-frame. The principal combinations of these will be separately noticed, as we proceed.

PRINCIPLES IN THE CONSTRUCTION OF HOT-HOUSES.

A fundamental point is, the construction of the chamber which is to be heated artificially. Without entering into the visionary projects which have been offered on this subject, we shall simply give the minimum and maximum extent of houses for different purposes, with a few general principles for the glazed-work, bark-pit, and fire-flues.

Site and Aspect.—Every house in this department should stand on a foundation naturally dry, or effectually drained. The foundation and borders should also be secured from the lodgement of waste water, by permanent drains. A drain for the water sinking through the borders should be made at a depth six inches lower than the foundation of the building: another drain, to carry off the water projected from the roof, should be laid down in front of the stove.

As to aspect: the standard principle is, to set the front directly to the south.

Dimensions.—The width is comparatively definite; because as this is extended, the sun strikes faintly on the back wall: the best medium lies between ten and fifteen feet. The length may be ten, twenty, thirty, forty feet, or more: but the mul-

tiplication of fires is entailed, as the ends of a house run out more than thirty feet in length; while the advantage is not equal to the expense, unless the design be to cultivate some one kind of fruit on a large scale. The constitutions of different plants, whether it respects some difference in tenderness, or in the periods of fructification, can be better consulted in two or more houses of a moderate size, than in one of excessive magnitude. For a general stove: the height in front, including about two feet of brick basement to support the glass-work, may be six feet: the back wall may run up eight, ten, or twelve feet, or more:—no useless space above should increase the difficulty of warming the house:—some ornamental shrubs and fruit-bearing trees require a lofty room: but in forcing-houses for trees to be trained under the rafters, the front-glass-work need be no higher than the stem of the plant requires, so that the branches may be turned at an easy angle up the sloping lights.

Furnace and Flues.—One furnace, if the fire be graduated to the cubical dimensions of the place, will command a house of any length under thirty feet; and if the house be narrower than ten feet and proportionately low, or merely a flued pit, it may effectually charge returning flues of somewhat greater length: but in almost every house from thirty to fifty feet in length, distinct ranges of flues from two fires are necessary to convey a well-sustained heat to every part of it. The furnace should be outside the house, at any convenient part of the back wall: it is essential to have the fire-place fitted with a register, and with valves, to augment or diminish the fire-heat to the assigned degree, and also the discharge of vapour by the chimney.

The heat is communicated by a quadrangular line of horizontal flue under the floor of the house, ranging contiguously to the front, ends, and back wall, but detached from the walls three or four inches, that the heat may be diffused from both sides of the flue. Common circumstances require the stream of hot air to be first directed to the front of the stove, returning by the back wall. The flues may be five inches wide by twelve inches deep, and thence up to eight inches wide by fifteen inches deep, which is double the capacity. A contracted flue is the more efficacious in parting with the heat laterally: but the accumulation of soot, according to the materials intended to be burnt, must be provided for, in the compass given to the flue. If the flue be formed, at the sides, of bricks standing on-edge, and, at the bottom and top, of broad paving-tiles, it will be as

well adapted for absorbing and giving out heat as ordinary materials can render it. A few feet next to the furnace should be of fire-brick. Let all the joints of the brick-work be well cemented, that no smoke may escape into the house. Plaster, which is a bad conductor of heat, should be laid only at the bottom of the flue. This partial obstacle, in a direction where the heat is not wanted, must cause it to escape with more vivacity at the sides. The range of flue along by the back wall is often assigned a greater elevation, by several feet, than that of the course in front, according to the kind of house. This distribution of the flues is fitted for a Dry Stove, where all the plants stand upon platforms, increasing in height from the ground eight or nine inches every row. For the object of saving room, the end-flues, in their passage from the back to the front, and in the cross-return, are frequently carried under the paths of the house, so that no heat can enter by that part of the flue, but through the roof of it. When the contact of the flue with the air-chamber is changed, it may be of advantage to build different joints of the trunk on different principles. Of that part which is extant within the house, make the perpendicular dimension double the lateral, or more than double, and let the materials of the sides and top be good conductors of heat; but let that part of the trunk which crosses the house under the floor expand in width and contract in height: the best figure for the tube here would seem to be half a cylinder, or a horizontal roof laid upon a concave base. The sides and bottom, thus merged together in the segment of a circle, should be plastered, or otherwise coated, to obstruct the escape of heat; while the top is made a good conductor, and cemented merely at the joints to prevent the transmission of smoke, as already recommended.

In the former editions of this Practical Work, much has been offered on this subject which entitles the author to praise. At this time, however, when the Arts are increased and Science is generally diffused, it will be admitted that much of the size, form, and situation, depends on the taste of the projector. As regards the mode of heating these buildings, it must be observed, that the study and utility of scientific pursuits is one thing, but their application to *practical* purposes is another. The simple contrivance described in p. 10 is the most eligible yet known. It is for the practical or amateur Gardener merely to observe, that half a bushel of coals burnt under a boiler containing 15 or 20 gallons of water, will produce a portion of steam that, when conducted into a body of water, will raise the

temperature in twenty minutes much higher than any other known application of fire with four times the expense and labour.

Central Pit.—For the bark-bed it is necessary to construct a capacious oblong pit, extending in the middle space nearly the length of the house, and six or eight feet wide. In a small stove the pit may be carried home to one end of the house, instead of having a passage entirely round it; by which the breadth of one alley is saved. The pit is generally formed of thin brick-work, rising eighteen inches or two feet above the level of the floor, and descending far enough below it to make the pit, in the whole, at least a yard deep: three feet six inches is not too deep for a Pinery. Tree-leaves, which are weaker than bark, require four feet in depth.

Extraordinary Flues.—Sometimes in wide forcing-houses, in order to have every possible benefit of fire-heat, extraordinary flues are carried in parallel lines round ths walls of the pit, but detached two or three inches.

Parapets, and Glass-work.—The parapets in front, and at the ends, to be of brick-work, not exceeding two feet in height from the floor. The front wall should stand upon arches, to allow vines, and other large plants which may occupy the front, to extend their roots in any direction: if the stove be not at first fitted up for forcing fruit-trees, such a foundation will not interfere with any other use of the building. The timber serving as a frame for the glass-work will rest on the low brick parapets and the back wall. The quantity of upright glass, in front, will depend upon the circumstances glanced at under the article *Dimensions.* The glass-work, sloping upward from the front to the coping of the back wall, should consist of two tiers of sliding sashes: the upper to be narrowest, and made to slide over the lower.

Angle of the Glazed Roof.—The pitch of the roof, or its angle with the horizon, is usually varied according to the design of the house. Thus, for a stove to be in operation all the year, an angle of 40° presents a medium correspondence wih the ever-varying altitude of the sun's place above the horizon, which is all that can be attempted. If a house is to be worked but a part of the year, it has been a principle to increase, or diminish, the angle, as the forcing is to commence before or after the vernal equinox. The roof, or rather diagonal side, of a glass-case, designed for a short periodical course of forcing—to begin the 21st of December, may be 55°; 21st January, 50°; 21st February, 46°; 21st March, 43°. This

may be done for trees, because two intentions coincide—that of making the line of the glass as perpendicular as may be to the sun's rays, and that of giving the shoots of the trees room to expand. But too much importance must not be attached to the angle of inclination in the glass-work: if dwarf plants are to be cultivated in a house, and the use of a bark-bed will not allow those behind to be elevated, the rise of the roof at a great angle would give the chamber of air an unnecessary capacity, and increase the difficulty of warming it. On the same account, a gable-shaped sky-light may, in some stoves, yield an advantage, by contracting the internal space, which greatly outweighs any difference that a roof sloping entirely to the south would make in the incidence of the sun's rays on dwarf plants. As the meridian altitude of the sun never exceeds 63½ degrees in the latitude of London, some reduction in the upward space of any house might be made, without diminishing the quantity of sunshine to enter by the glass-work. Thus, on the north-side, instead of continuing the perpendicular wall higher than the application of the house to a specific branch of culture requires, substitute an unequal joint of roof to meet the southern plane of glass-work. The slope of this joint of roof must just clear the angle of 63½ degrees; so that the meridian sun, on the 22d of June, may form an evanescent angle with it, always striking the inside of it, and never completely perpendicular to it. As much glass-work as it would have taken to continue the southern plane of lights home to a perpendicular wall may be introduced into the top part of this north slope; and the lower tier of the slope may be filled up with boarding, and painted white within. Thus, while the space above is reduced as far as it would be superfluous, no direct sunshine is intercepted, and the beams falling on the boarded part would be reflected into the body of the house. This shortening of the southern lights at top may be limited to buildings where a lofty back wall is not wanted for fruit-trees; and the quantity of boarded roof, to the width of the back alley.

Materials for Glazed Frames. — The high price of timber, and the desirable object of constructing the frame for the glass-work to intercept as little light as possible, have led many designers of horticultural buildings to introduce iron rafters and copper sash-frames into new glass-cases. The objection to the free adoption of these substitutes for wood, arises from their liability to be corroded by moist vapours constantly rising to the top of the house, and by the water that must necessarily

come in contact with the frames in various ways. If such corrosion take place in the work within the house, the effect on the plants would be highly pernicious. Metal frames are complained of, as expanding from the operation of the weather, and causing the breakage of glass and other inconveniences.

Wire Trellising.—Iron wire, however, has long been employed for trellis-work in houses, without injury, being well painted as soon as fixed. To support this kind of trellising when branches of fruit-trees are to be trained up the roof, iron rods are inserted into the rafters, having eyes at the end to receive the wires: the depth of the rafter and the length of the rod should altogether leave a distance between the glass and the trellis—of ten inches for grapes, and of eight inches for fruit in general.

Wood Trellising.—To receive potted plants that require a great heat, a crib-trellis, formed of light bars of wood, may be erected over the coping of the front and other flues: detached three inches from the surface of the flue, the trellis allows the heat to escape freely, while the vacant interval prevents the mould in the pot from being scorched.

Ventilators.—Many expedients have been suggested for ventilating stoves, when extreme cold forbids opening the sashes. Some such as are noticed under *Green-house* may be tried in this department. Or, a tube communicating with the exterior air may be passed along some part of the flue, before it discharge any fresh air into the house: this should have a rose, and stop-cock. Many good practical gardeners, however, prefer trusting to the casual admission of air, by leaving unputtied the lappings of some panes in the sky-light; conceiving that, in rigorous nights, the most-guarded ventilation which can proceed unwatched is apt to admit more damp or frost than can safely come in contact with tropical plants, and that its chilling influence is more pernicious than the fresh air charged with it is salutary.

General Hot-house and Pine-stove.—These embrace the glass-case, pit for moist heat, and machinery for fire-heat, mentioned above. The *glass-case* is here permanent; as the delicate nature of the exotics cultivated under its shelter will not admit of their being exposed to the full air, even in the height of summer, farther than during the course of a fine day. The *pit* is also kept continually in action, except when it is necessary to renew it by stirring up, or changing, the fermenting materials: the moist hot vapour from a bark-bed is beneficial even in summer, and is calculated to counterpoise

any sudden change in the temperature of the atmosphere: the pit is also used on account of its bottom heat, to plunge the pots in, containing the more tender exotics and tropical fruits: the Pine-apple cannot be fruited in perfection unless constantly plunged in a bark-bed. The heat from bark, though moist, is drier than that from leaves; and the latter is less humid, and more permanent and regular, than the hot-steam from fermenting horse-dung. The last is never used in a regular hot-house, though it is sometimes employed in fluid pits, under a deficiency of bark or leaves: in this case there should be a foot depth of tan-bark at top, to keep down the rank steam of the dung, and to receive potted plants. The *fire-heat* is discontinued whenever the settled temperature of the season, combined with the warmth from the pit, or measured alone, is equal to the elevation marked for the different houses in the sections following the Table. Artificial heat is constantly necessary, during winter and spring, from November till May. The fires should be made every night and cold morning, and throughout cold days, to support a steady tenor of high heat to a given degree, rising somewhat at noon.

Dry Stove.—Some Hot-houses are worked only by fire-heat, between the decline and the return of summer, without a bark-bed. These are termed Dry Stoves. Peculiar succulent exotics are found to prosper best in a dry stove, as the moist heat of a bark-bed is not perfectly adapted to their constitution; *i.e.* succulent plants, as the Cactus, Euphorbia, Stapelia, and some others, that must be kept almost without water, and which, from their superior brilliancy of blooming, or their extra-appearance in growth, will be found best to grow in such a climate. The Dry Stove is also used for forcing some kinds of fruit. Where no pit is intended, a range of flues is sometimes conducted along the centre of the house, upon low arches; and the ground-plan on each side is formed into compartments to receive mould.

Forcing-house, with a Bark-pit.—This is usually applied to the forcing of hardy fruit-bearers and esculents, and differs from a General Hot-house in the course of heat requisite for specific purposes—beginning at a lower degree, and frequently terminating at a higher—in the temporary action of the machinery, and in the lights being made portable for occasional employment in succession at different places. Borders are sometimes laid in this for trees, on the same principle as the larger compartments mentioned in the next article.

Forcing-house, without a Bark-pit.—Such a house is

frequently built for forcing large fruit-trees; and the whole bottom is accordingly filled with rich unexhausted compost adapted to the plants, divided into a middle compartment, and a border of earth next the back wall: these are for receiving espaliers of graduated heights, and wall-trees respectively. Dwarf-standards, in pots, may be placed in front. A border in front, for trees to be trained up the rafters, is not consistent with the principal intention; as the back-part would be too much shaded. Where, however, there is a front border, as in the last-described house, or in the *Glazed Hot-wall*, to which this may be reduced, the forward flue must be so ranged on arches as not to offer any obstacle to the extension of the roots into the outward border adverted to under the article *Foundation*. This differs from a Dry Stove, the same as the preceding article differs from a General Hot-house.

The borders should be from three to five feet in depth, and not less than four feet wide in surface within the house; and, by communication with an outward border or with good soil laid under the floor, the principal border for fruit-bearers should be rendered not less, altogether, than nine feet in width. For the Vine, whose roots advance very far horizontally, and continue to do so every year, even after the plant is established, the border should have a supplementary compartment, laid on the outside the building, ten feet wide.

This kind of stove may be reduced into a *Glazed Hot-wall*, which is always narrower and usually much longer than the other houses. As to width: it is sometimes only four feet wide, and seldom exceeds eight. For the back-wall, twelve feet is a good height. The front glass-work is wholly sloping, constructed to rest upon the front ground-plate, from which it is carried directly to the coping of the back-wall: it is composed of two or three sliding tiers. The house is worked by fire-heat only, communicating from one, two, or more furnaces, according to its length: the flues may range, either in front, along the middle, or by the back wall, on low arches, in two or three returns, according to the intended situation of the border. The trees are generally planted in a border within: if at the front, they are trained up a trellis near the glasses; if at the back, they are trained to the wall. Sometimes a forcing-stove of this kind is constructed against the south-wall, already furnished with full-bearing plants.

The *Glazed Hot-wall* may be broken into two or more divisions, contrived for forcing the trees of each division alternately; allotting them a respite at intervals of one or two

years, during which the plants, growing only from the influence of the natural climate, and not allowed to fruit, recruit their strength. One set of moveable frames may be contrived to fit each division, to be fixed to different parts of the wall in rotation.

GLAZED UNFLUED PIT.—Where a moderately-early production only is aimed at, a glazed pit is sometimes worked by the heat of leaves or bark, without fire-flues. See p. 412.

UPRIGHT GLAZED FRAMES.—Other forcing-chambers are constructed of wood at the back and sides, and fronted with sloping glasses, to be worked by dung-heat applied on the outside of the back-part. This kind of frame has a greater perpendicular height than the common garden-frame: it is usually from six to nine feet high at the back part, and from five to eight feet in width: the length may be as required. The front to the south consists of sloping glazed sashes. The back part is formed of strong planks, an inch or an inch and a half thick, with the edges grooved to join perfectly close: the glass-work extends in a continued slope, from the ground-plate to the top of the wood-work behind. The vines, or other fruit-trees, being planted next the front, are trained up under the glasses to a slight open trellis, detached about nine inches from the glass; or they are sometimes planted towards the back of the frame, and trained to a similar trellis. When intended chiefly for flowers, shelves are erected lengthwise, forming a graduated stage, to receive the pots. To work this kind of frame, horse-dung duly prepared is applied at the back, close on the outside, in a bank or lining, half a yard wide at least at the base, and contracted by a gradual diminution to twelve or fifteen inches at top, stacked up firmly to the top of the frame. This substance of hot dung will throw in a fine exciting heat: to support a regular temperature, it is necessary to add a fresh layer of hot dung as the bank settles down. As soon as the heat is decreased considerably, either the entire lining is to be renewed, or the old dung worked up with some new. It it sometimes advisable to disturb but part of the lining at once; and to take away either from the middle part, or from one end, only half the mass, measured cubically. The moiety remaining will support a beneficial proportion of the original heat, and diffuse it into the frame, while the substituted part is rising to the proper temperature: the other half may then be renewed. The first bank of hot dung is seldom put in operation before the middle of January: and the influence of the continued lining is not necessary beyond

May. This upright kind of frame is not so much used as formerly, since the improved methods of combining fire-heat in houses have been introduced.

The forcing of fruits by dung-heat has occasionally been brought to bear on common wall-trees, growing in the full ground against a wall, or strong close paling, with a south aspect. The trees being already full bearers, a temporary frame is erected in front, to hold the sloping glazed sashes: the interval at the bottom is small, and the narrow ends are glazed. A strong lining of hot dung is applied, in the manner described above, to the north side of the fence: the moderate glow of heat, thus imparted, may accelerate the crop three weeks or a month, compared with that from trees having only the benefit of a wall.

The upright frame may, by enlarging its width to six or eight feet, be made to hold a *Pit* formed of brick-work or planking. Three feet and a half is a proper depth for such a pit. The hot-bed to be received is in lieu of a lining behind the frame. Lay hot dung in the pit, to the depth of three feet; and let this be covered with tan-bark, old or new, till the pile rise to the top of the pit; by which a strong internal heat will be effected.

Flat Garden Frame.—This is well adapted for forcing herbaceous fruit-bearers, such as the Melon, and need not be described.

Hot-wall, *without Glass-work.*—We mention this among the projects for forcing, as an old tried one, but not to recommend it. The wall is heated with fire-heat conveyed by flues behind, while the expense of glass-work is saved by a false economy: the plants are thus excited, on one side, by a strong artificial heat; and exposed to frost and damp, violent winds, and heavy rains on the other. Many practical men have found this contrivance calculated to produce an untimely show of blossoms, while the counteracting effects of their situation exposes both blossom and plant to perish. If not applied till the decline of summer, it may do some good in assisting fruit to ripen.

When any of the engines for forcing are erected in the garden on a new foundation, a complete preparation of materials, and substantial workmanship in the buildings, are alone likely to compensate the cultivator.

The methods of introducing, establishing, and managing trees in the glazed stove will be found under the "Forcing-house Department." The technical directions relating to the culture of plants in a house, or frame, may be separated into

the following principal heads:—*General Hot-house—Pinery—Dry Stove, Forcing-house Department—Frames and Pits without Fire-heat.*

GENERAL HOT-HOUSE.

The General Hot-house is an artificial garden for the cultivation of exotics requiring constantly a warm climate, of which the minimum heat is 60° of Fahrenheit.

It would exceed our limits to comprise, in the list of plants for this department, more than a selection from the beautiful and interesting exotics in the British gardens.

TABLE X. Part I.—STOVE PLANTS.

sect. 1. *Herbaceous, excluding Succulents.*

Aponogeton distachyon.
Arum Colocasia--spirale--esculentum--odorum--divaricatum
Bromelia Ananas—lingulata—bracteata—humilis—Karatas—Pinguin.
Brunsvigia marginata.
Costus speciosus.
Crinum erubescens—Sumatranum--longifolium--lorifolium—augustum—amabile.
Curcuma Zedoaria—mada.
Cyrilla pulchella.
Dendrobium cucullatum—polystachyon.
Epidendrum cochleatum—ciliare—elongatum—fragrans.
Euryale ferox.
Globba purpurea—sessiliflora—marantina.
Gloriosa superba.
Gloxinia speciosa—maculata.
Hæmanthus multiflorus—coccineus—puniceus.
Hedychium elat.—coronarium.
Heliconia psittacorum—Bihai.
Hellenia Allughas.
Ipomœa tuberosa—repanda.
Kæmpferia latifolia--pandurata
Limodrum Tankervilliæ.
Mantisia saltatoria.
Musa Paradisiaca—sapientum—coccinea.
Nymphæa Lotus—pubescens—Stellata—cœrulea.
Nelumbium speciosum.
Pancratium amboinense—littorale--Amancaes—caribæum—speciosum—amœnum.
Phrynium capitatum-spicatum
Pitcairnia angustifolia--bromeliæfolia—integrifolia—latifolia—racemosa.
Pothos cannæfolia—crassinerira—pentaphylla.
Stratiotes alismoides.
Strelitzia reginæ.
ZingiberCassumunar--Zeoaria.

sect. 2. *Succulents.*

Agave vivipara—flaccida.
Aloe barbadensis--dichotoma--lineata—brevifolia—spicata.
Bryophyllum calycinum.
Buonapartea juncea.
CactusMelocactus—gibbosus—nobilis—recurvus.
Caralluma adscendens--umbel.
Cereus.
1. *Great-angled.*
α *Erect.* Deeply furrowed between the angles: heptagonus—hexagonus: the number of angles varies from 5 to 8.—Nobilis.
β *Procumbent or Climbing.* Most

deeply furrowed: triangularis —quadrangularis—trigonus—triqueter.

II. *Small-angled.*

α *Erect.* Shallow-furrowed: Royeni — fulvispinosus—languinosus — grandiflora — flagelliformis.

Crassula perfoliata—cordata—Cotyledon—columnaris—coccinea—odoratissima—cymosa.

Crepidadia Myrtifolia — Padifolia—cordellata.

Duvalia elegans — cæspitosa—lævigata—radiata.

Epiphyllum Phyllanthus.

Euphorbia.

I. *Thorny-stemmed. Leafless:* lactea—antiquorum.

II. *Thorny-stemmed. Scanty-leaved:* grandifolia.

Furcræa cubensis—australis.

Gasteria obliqua—pulchra.

Gonostemon divaricata.

Gratiola Monnieria.

Haworthia.

I. *With stem.* Leaves very rigid: aspera—albicans—expansa.

II. *Stemless:* recurva.

Huernia campanulata--venusta —lentiginosa—guttata—barbata—tubata.

Kalenchoe crenata—acutiflora.

Larochea falcata.

Mammillaria simplex--prolifera

Obesia geminata.

Opuntia.

I. *Great-spined.* Joints subovate: elatior.

II. *Small-spined.* Oblong-jointed: maxima—cochinellifera—lanceolata.

III. *Longest-spined.* Joints very long: spinosissima.

Obrea maculosa—quinquenervia—bufonia—Woodfordiana —retusa.

Pelargonium discipes.
The leaves have a most singular, and, in different lights, changeable glaucous colour.

Polycarpea Teneriffæ.

Sanseviera spicata — zeylanica —guineensis.

Stapelia grandiflora — spectabilis--ambigua--reflexa--Massoni—Asterias— hirsuta—incarnata— Gordoni—punctata —decora.

Talinum crassifolium.

Tithymalus pendulus—biglandulosus—Cotinifolius.

Tridentea gemmiflora—stygia —vetula.

Tromotriche revoluta--Glauca.

Yucca obliqua.

Zygophyllum album.

SECT. 3. *Shrubs not Succulent, and Dwarf Trees.*

Abroma augusta.

Acacia grandifl.—odoratissima --Farnesiana--tamarindifolia.

Achania mollis.

Achras argentea—Sapota.

Adenanthera pavonina.

Adina globiflora.

Ægle Marmelos.

Æschynomene sensitiva.

Afzelia grandis.

Aleurites triloba.

Allamanda cathartica.

Amerimnum Ebenus.

Amyris polygama.

Annona muricata.

Areca Catechu.

Artocarpus incisa--integrifolia.

Asclepias curassavica — gigantea—tenacissima.

Aubletia Tibourbu—aspera.

Averrhoa Bilimbi.

Bactris minor.

Banisteria chrysophylla—purpurea—fulgens—nitida.

Barleria longiflora—cristata.

Barringtonia speciosa.

Bassia longifolia—latifolia.

Bauhinia variegata--tomentosa —parviflora—divaricata.

Bignonia chelonoides — Leucoxylon—paniculata--uncata.

Blakea trinervia.

Blighia sapida.
Bombax pentandrum—Ceiba.
Brosimum Alicastrum.
Brownea coccinea.
Brucea ferruginea--sumatrana.
Bubroma Guazuma.
Butea superba—frondosa.
Cæsalpinia enneaphylla.
Calophyllum Calaba—Inophyl-
Canella alba. [lum.
Capparis cynophallophara — frondosa—linearis—saligna—
Carica Papaya. [spinosa.
Carissa Carandas—spinarum.
Carolinea insignis—princeps.
Cassia arborescens—corymbosa —grandis — tomentosa — chi-
Catalpa longissima. [nensis.
Catesbæa spinosa.
Ceanothus asiaticus.
Cephaëlis elata.
Cerbera Manghas — Ahovai — Thevetia—fruticosa.
Cestrum laurifolium--diurnum.
Chiococca racemosa.
Chionanthus axillaris.
Chrysophyllum Cainito.
Cinchona caribæa.
Citrus trifoliata.
Clerodendrum fortunatum — infortunatum—paniculatum.
Clusia rosea.
Coccoloba uvifera—latifolia.
Codarium nitidum.
Coffea arabica—occidentalis.
Columnea scandens—hirsuta.
Comocladia integrifolia.
Conocarpus erecta.
Convolvulus speciosus—Jalapa
Cookia punctata. [—glaber
Cordia Sebestena — monoica — Geraschanthus — dioica—hirsuta — martinicensis — mirabiloides.
Corypha umbarculifera.
Cratæva fragrans.
Crossandra undulæfolia.
Croton variegatum—digitatum —polygamum.
Cycas revoluta.
Cynometra cauliflora.
Dalbergia ascandens.
Daphne Lagetto.
Datura arborea.
Dianella ensifolia.
Dicksonia arborescens.
Dillenia pentagyna—speciosa.
Diospyros Kaki—Ebenum.
Doryanthes excelsa.
Dracæna marginata—cernua—
Duranta Plumieri. [Draco.
Echites suberecta—torulosa.
Ehretia tinifolia.
Elæagnus latifolia.
Elais guineensis.
Embryopteris glutinifera.
Eranthemum pulchellum.
Erithalis fruticosa. [incana.
Erythrina Corallodendrum — Eugenia malaccensis--Jambos--zeylanica--fragans--axillaris.
Fagara Pterota—Piperita.
Ferreola buxifolia.
Ficus elastica, produces an elastic gum, from which Indian Rubber is manufactured.
bengalensis—nymphæifolia—nitida.
Flacourtia Ramontchi—flaves-
Flemingia grandiflora. [cens.
Gærtnera racemosa.
Garcinia Mangostana.
Gardenia radicans — florida — latifolia — campanulata — uliginosa—micrantha.
Geoffroya inermis.
Gesneria tomentosa.
Gnetum scandens.
Gossypium arboreum.
Grewia asiatica—mallococca—
Grias cauliflora. [paniculata.
Grislea tomentosa.
Guarea trichiloides.
Guettarda rugosa—speciosa.
Gustawa augusta.
Hæmatoxylum campechianum.
Hamellia grandiflora—patens.
Helicteres baruensis—Isora.
Heritiera littoralis.
Hernandia sonora.

Hibiscus Lampas—mutabilis—
Hillia longiflora. [radiatus.
Hippomane Mancinella.
Hirtella americana.
Hoya carnosa—crassifolia.
Hura crepitans.
Hymenæa Courbaril.
Ipomœa insignis. [huca—rosea.
Ixora coccinea — alba — Band-
Jacquinia aurantiaca--ruscifol.
Jambolifera pedunculata.
Jasminum Sambac — multiflo-
rum--trinerve.
Jatropha panduræ fol.--digitata
—elastica, from the juice of which is procured *Caoutchouc* or Gum elastic.
Jonesia pinnata.
Justicia coccinea—picta.
Kleinhofia Hospita.
Lagerstrœmia indica. [mara.
Lantana trifolia--aculeata--Ca-
Laurus Cinnamonum--Cassia--
Lawsonia inermis. [Persea.
Leea macrophylla—pinnata—
Licuala spinosa. [crispa.
Limonia triphylla — crenulata
—arborea
Lobelia assurgens — longiflora
—surinamensis—raumosa.
Malpighia lucida—urens—gla-
bra—coccifera.
Mammea americana.
Manettia coccinea.
Mangifera indica.
Marcgravia umbellata.
Melastoma malabathrica — co-
rymbosa — purpurea — acino-
MicheliaChampaca. [dendron.
Mimusops Elengi.
Monetia barlerioides.
Morinda umbellata.
Mullera moniliformis.
Murraya exotica.
Musa rosacea.
Myristica fatua.
Myrtus Pimenta — Tomentosa
—coriacea—dumosa.
Nama jamaicensis.
Nerium coronarium—odorum.
Nissolia fruticosa.
Ochna squarrosa.
Ochroma Lagopus.
Omphalea triandra.
Ophioxylum serpentinum.
Ormonsia dasycarpa.
Ovieda verticillata.
Oxyanthus speciosus.
Panax fruticosa.
Pandanus odoratissimus.
Passiflora quadrangularis—lu-
tea—maliformis—Bahamas—
laurifolia—edulis—pedata—
suberosa—alata—holosericea
—normalis—serrata—multi-
flora — minima — Curaçoa —
princeps.
Pavetta indica.
Paullinia caribæa.
Pelargonium cortusæfolium —
crassicaule—discipes.
Pergularia odoratissima.
Petrea volubilis.
Phyllanthus grandifolius.
Pinus Dammara.
Piper polystachyon — reticula-
tum--magnoliæfolium—Betle.
Pisonia aculeata—nigricans.
Plinia pedunculata.
Plumbago rosea—zeylanica.
Plumeria rubra--alba--pudica.
Poinciana pulcherrima.
Portlandia grandifl.—hexandra.
Pothos cannæfolia — crassiner-
via—pentaphylla.
Psiadia glutinosa.
Psidium Cattleianum—pomife-
rum—pyriferum—montanum
—aromaticum.
Pterocarpus cartaphyllum.
Pterospermum acerifolium.
Punica nana.
Quassia amara.
Rhus javanicum.
Rondeletia americana.
Roxburghia gloriosa.
Ruellia formosa—ringens—
ciliata—fulgida.
Ruizia Variabilis.
Samyda rosea *or* serrulata.
Santalum album.

Sapindus Saponaria.
Schæfferia completa.
Schotia tamarindifol.—speciosa.
Scopolia carniolica.
Sloanea dentata.
Solandra grandiflora—viridifl.
Sophora tomentosa.
Spathelia simplex.
Stachytarpheta mutabilis.
Sterculia Balanghas—fœtida—
Stillingia sebifera. [regalis.
Strelitzia augusta.
SwieteniaMahogoni—febrifuga.
Tabernæmontana laurifolia.
Talinum crassifolium—patens.
Tectona grandis.
Terminalia Catappa—Chebula.
Theobroma Cacao.
Thunbergia fragans.
Tillandsia flexuosa—utriculata.
Trichilia havanensis—odorata.
Triumfetta Lappula—Bartramia—semitriloba—grandiflora.
Urania speciosa.
Vangueria edulis—spinosa.
Volkameria aculeata.
Xanthochymus pictorius.
Zamia furfuracea—spiralis.

The following is a List of the more showy and interesting Stove Plants, that have been introduced of late years, or become plentiful in our Nurseries by propagation.

TABLE X. Part II.

NEWLY-INTRODUCED HOT-HOUSE PLANTS.

			Months.	*Col.*	*Comp.*
1	Abroma augusta	*Smooth Abroma*	6 to 9	purple	b. l.
2	Abutilon auritum	*Stipuled Abutilon*	12 to 3	yellow	l. b.
3	Acacia obtusata	*Obtuse-leaved Mimosa*	2 to 6	rose	l.
4	Adansonia digitata	*Sour Gourd*	6 to 8	white	ditto
5	Allamanda cathartica	*Willow-leaved Allamand*	6 to 7	yellow	b. l.
6	Althæa flexuosa	*Flexuose Althæa*	6 to 8	purple	l.
7	Anoda acerifolia	*Maple-leaved Anoda*	1 to 12	blue	l. b.
8	Arthrostemma versicolor	*Changeable-fl. Arthrostem.*	5 to 9	blush	ditto
9	Artabotrys odoratissimus	*Sweet-scented Artabotrys*	6 to 7	brown	ditto
10	Ardisia punctata	*Punctured Ardisia*	6 to 9	pink	ditto
11	colorata	*Red-flowered ditto*	3 to 8	red	ditto
12	pyramidalis	*Upright ditto*	4 to 9	pink	ditto
13	canaliculata	*Channelled ditto*	4 to 8	pink	ditto
14	acuminata	*Sharp-pointed ditto*	7 to 8	pink	ditto
15	paniculata	*Panicled ditto*	3 to 8	pink	ditto
16	umbellata	*Umbelled ditto*	6 to 9	pink	ditto
17	elegans	*Elegant ditto*	7 to 9	pink	ditto
18	Astrapæa Wallichii	*Wallich's Astrapæa*	12 to 1	scarlet	ditto
19	Bauhinia porrecta	*Smooth-leaved Bauhinia*	7 to 8	white	ditto
20	cumanensis	*Cumana ditto*	.....	white	ditto
21	Beaumontia grandiflora	*Great Beaumontia*	5 to 7	white	b. l.
22	Bixa Orellana	*Heart-leaved Bixa*	5 to 8	rose	ditto
23	Bocconia frutescens	*Shrubby Boceonia*	1 to 4	green	l. b.
24	Cassia corymbosa	*Corymbose Cassia*	7 to 8	yellow	l.
25	bicapsularis	*Six-leaved ditto*	5 to 6	yellow	ditto
26	biflora	*Two-flowered ditto*	12 to 4	yellow	ditto
27	occidentalis	*Occidental Cassia*	3 to 8	yellow	l. b.
28	ligustrina	*Privet-leaved ditto*	6 to 8	yellow	ditto
29	chamæcristoides	*Large-flowered ditto*	6 to 9	yellow	ditto
30	Catesbæa spinosa	*Spiny Lily thorn*	5 to 9	white	b. l.

			Months.	Col.	Comp.
31	Catesbæa latifolia	*Broad-leaved ditto*	9 to11	white	b. l.
32	Cerbera Ahouai	*Oval-leaved Cerbera*	6 to 7	yellow	ditto
33	fruticosa	*Shrubby ditto*	3 to 9	purple	ditto
34	Odallam	*Spear-leaved ditto*	6 to 9	rd.&w.	ditto
35	Tanghin	*Poison Nut*	.....	blush	ditto
36	maculata	*Wave-leaved ditto*	6 to 7	blush	ditto
37	dichotoma	*Forked ditto*	.....	white	ditto
38	Ceropegia africana	*African Ceropegia*	4 to11	brown	ditto
39	Cereus repandus	*Short-spined Cereus*	8 to10	white	l. b.
40	grandiflorus	*Night-flowered ditto*	6 to 8	yellow	ditto
41	speciosissimus	*Great-flowered Indian Fig*	6 to 9	scarlet	l.dry
42	phyllanthoides	*Rose-coloured ditto*	.....	rose	ditto
43	alatus	*Winged-stemmed ditto*	8 to11	gr.&w.	ditto
44	Chætocalyx vincentina	*St. Vincent's Chætocalyx*	.....	purple	l.
45	Chrysophyllum Cainito	*Star Apple*	5 to 6	white	l. b.
46	Clitoria occidentalis	*West Indian Clitoria*	6 to 8	purple	l.
47	Clerodendrum pubescens	*Downy-leaved Clerodend.*	7 to 9	white	l. b.
48	emirnense	*Small-flowered ditto*	6 to12	white	ditto
49	macrophyllum	*Large-leaved ditto*	8 to 9	sc.&bl.	ditto
50	Coffea arabica	*Coffee Tree*	8 to11	white	l.
51	Convolvulus pentanthus	*Five-flowered Convolvulus*	4 to10	blue	b. l.
52	Cryptostegia grandiflora	*Large-flower. Cryptostegia*	6 to 8	rose	l. b.
53	Cristaria coccinea	*Scarlet Mallow*	7 to 9	scarlet	ditto
54	Desmodium dubium	*Doubtful Desmodium*	7 to 8	white	l.
55	Dodonæa oblongifolia	*Oblong-leaved Dodonæa*	6 to 8	green	ditto
56	Echites suberecta	*Savanna Flower*	.....	yellow	l.
57	caryophyllata	*Clove-scented ditto*	9 to11	scarlet	l. b.
58	Erythrina carnea	*Flesh-coloured Coral Tree*	5 to 6	red	l.
59	speciosa	*Large-flowered ditto*	5 to10	scarlet	ditto
60	Humeana	*Sir Ab. Hume's ditto*	5 to 6	scarlet	ditto
61	Eugenia Michelii	*One-flowered Eugenia*	1 to 3	white	ditto
62	Roxburghii	*Roxburgh's ditto*	6 to 7	white	ditto
63	fragrans	*Fragrant ditto*	4 to 5	white	ditto
64	Ficus nymphæifolia	*Water lily-leaved Fig*	4 to 6	green	ditto
65	elastica	*India-Rubber Fig*	.....	green	ditto
66	Flacourtia sepiaria	*Obovate-leaved Flacourtia*	10 to 2	white	ditto
67	inermis	*Smooth ditto*	.....	white	ditto
68	Gardenia florida	*Cape Jasmine*	7 to10	white	l. b.
69	amœna	*Crimson-tipped ditto*	6 to 8	r. wh.	ditto
70	propinqua	*Strong-spined ditto*	5 to 8	r. wh.	ditto
71	angustifolia	*Narrow-leaved ditto*	7 to10	white	ditto
72	Thunbergia	*Starry-flowered ditto*	1 to 3	white	ditto
73	Gonolobus maritimus	*Sea-side Grape*	6 to10	g.&pu.	l.
74	carolinensis	*Carolina ditto*	7 to 9	purple	ditto
75	grandiflorus	*Large-flowered ditto*	8 to10	yellow	ditto
76	diadematus	*Red-crowned ditto*	9 to10	scarlet	ditto
77	Gossypium barbadense	*Barbadoes Cotton*	8 to10	y.&pu.	ditto
78	Grislea tomentosa	*Downy Grislea*	6 to 8	scarlet	dltto
79	Guatteria rufa	*Rufous Guatteria*	4 to 8	brown	l.
80	Helicteres Isora	*Great-fruited Screw Tree*	6 to 7	red	l. b.
81	verbascifolia	*Verbascum-leaved Screw T.*	6 to 8	red	ditto
82	Hillia longiflora	*Long-flowered Hillia*	2 to 3	white	ditto

			Months.	Col.	Comp.
83	Hibiscus Rosa-sinensis	*Single crimson China Rose*	1 to12	crims.	l.
84	v. rubro plenus	*Double Red*	.....	crims.	ditto
85	v. carneo plenus	*Double Salmon*	.....	salmon	ditto
86	v. variegatus	*Double variegated*	.....	strip'd	ditto
87	v. luteo plenus	*Double yellow ditto*	.....	yellow	ditto
88	syriacus	*Althæa frutex*	8 to 9	various	ditto
89	v. albo plenus	*Double White*	.....	white	ditto
90	v. purpureo plenus	*Double Purple*	.....	purple	ditto
91	pedunculatus	*Long-peduncled Hibiscus*	5 to12	pink	ditto
92	Manihot	*Palmated ditto*	7 to 9	y.&pu.	l. b.
93	ficulneoides	*Fig like*	6 to 8	yellow	ditto
94	mutabilis	*Changeable-flowered ditto*	10to12	various	ditto
95	v. flore-pleno	*Double-flowered ditto*	.....	various	ditto
96	Homalium racemosum	*Branching Homalia*	5 to 7	white	ditto
97	Hoya carnosa	*Fleshy Hoya*	7 to10	blush	ditto
98	pallida	*Pale ditto*	.....	flesh	l.
99	Inga purpurea	*Soldier Wood*	3 to 5	purple	l. b.
100	Ipomœa cairica	*Jagged-leaved Ipomœa*	6 to 9	purple	ditto
101	paniculata	*Panicled ditto*	.....	purple	ditto
102	jalapa	*True Jalap*	8 to11	rose	ditto
103	Ixora grandiflora	*Great-flowered Ixora*	7 to 9	scarlet	l.
104	Bandhuca	*Stem-clasping ditto*	1 to 4	scarlet	l. b.
105	flammea	*Flame-coloured ditto*	4 to 8	flame	ditto
106	crocata	*Saffron-coloured ditto*	.....	saffron	ditto
107	blanda	*Charming ditto*	.....	blush	l.
108	cuneifolia	*Wedge-leaved*	6	white	ditto
109	barbata	*Bearded ditto*	6 to 8	white	ditto
110	rosea	*Rose-coloured ditto*	4 to 8	rose	ditto
111	Jambosa amplexicaulis	*Stem-clasping Jambosa*	3 to 6	green	l. b.
112	purpurascens	*Purple-flowered ditto*	5 to 8	purple	ditto
113	vulgaris	*Narrow-leaved ditto*	2 to 7	scarlet	ditto
114	Jasminum Sambac	*Arabian Jasmine*	1 to12	white	ditto
115	v. multiplex	*Semi-double ditto*	.....	white	ditto
116	v. trifoliatum	*Tuscan ditto*	.....	white	ditto
117	undulatum	*Wave-leaved ditto*	2 to 6	white	ditto
118	laurifolium	*Laurel-leaved ditto*	1 to12	white	ditto
119	simplicifolium	*Simple-leaved ditto*	3 to 6	white	ditto
120	auriculatum	*Auriculate ditto*	5 to 9	white	ditto
121	paniculatum	*Variable-leaved*	2 to12	white	ditto
122	Leea crispa	*Curled-leaved Leea*	8 to10	white	l.
123	Malvaviscus arboreus	*Sweet Achania*	1 to12	red	l. b.
124	mollis	*Soft-leaved ditto*	.....	red	ditto
125	Manettia coccinea	*Scarlet Manettia*	12 to4	scarlet	l.
126	Mangifera indica	*Mango Tree*	6 to 9	yellow	l. b.
127	Melia sempervirens	*Evergreen Melia*	6 to 9	lilac	ditto
128	Melodinus monogynus	*One-styled melodinus*	4 to 8	white	l.
129	Modecca lobata	*Lobe-leaved Modecca*	6 to 9	green	b. l.
130	Murucuja ocellata	*Ocellated Murucuja*	7 to 9	crims.	ditto
131	Myrtus tomentosa	*Woolly-leaved Myrtle*	5 to 9	rose	ditto
132	Nerium odorum	*Sweet-scented Oleander*	6 to 8	rose	l.
133	v. carneum	*Flesh-coloured ditto*	.....	rose	ditto
134	v. flore pleno	*Double Flowered*	.....	rose	ditto

			Months.	Col.	Comp.
135	Nelumbium speciosum	*Sacred Bean*	6 to 8	blush	water
136	Nyctanthes arbor tristis	*Square-stalk'd Nyctanthes*	6 to 9	w.& y.	l.
137	Nymphea scutifolia	*Blue-Cape Water Lily*	.....	blue	water
138	cœrulea	*Blue Egyptian ditto*	.....	blue	ditto
139	rubra	*Red-flowered ditto*	.....	red	ditto
140	rosea	*Rose ditto*	.....	rose	ditto
141	thermalis	*Hungarian ditto*	.....	white	ditto
142	Lotus	*Egyptian White ditto*	5 to 8	white	ditto
143	versicolor	*Changeable ditto*	6 to 9	blush	ditto
144	Oxalis Plumieri	*Plumier's Wood-sorrel*	4 to 6	yellow	l. b.
145	Oxyanthus speciosus	*Tube-flowered Oxyanthus*	7 to12	white	ditto
146	Passiflora holosericea	*Silky-leaved Passion Fl.*	5 to 8	scarlet	l.
147	pallida	*Pale-flowered ditto*	5 to10	green	ditto
148	gracilis	*Slender ditto*	6 to10	white	ditto
149	alata	*Winged-stalked ditto*	4 to 8	various	ditto
150	quadrangularis	*Square-stalked ditto*	8 to10	various	ditto
151	laurifolia	*Laurel-leaved ditto*	6 to 8	various	ditto
152	ciliata	*Ciliated ditto*	7 to 9	various	ditto
153	Pavetta arenosa	*Tubercled Pavetta*	3 to10	white	ditto
154	Pavonia Spinifex	*Prickly Seeded Pavonia*	7 to 8	yellow	l. b.
155	præmorsa	*Bitten-leaved ditto*	6 to 8	yellow	ditto
156	Pentapetes phœnicea	*Scarlet Pentapetes*	7 to 8	rose	ditto
157	Periptera punicea	*Crimson Periptera*	6 to 9	orange	ditto
158	Pergularia odoratissima	*Sweet Pergularia*	6 to 7	scarlet	ditto
159	Plumeria rubra	*Red-flowered Plumeria*	.....	red	l.
160	acuminata	*Acute-leaved*	6 to 9	white	ditto
161	bicolor	*Two-coloured ditto*	.....	w. & r.	ditto
162	tricolor	*Three-coloured ditto*	.....	various	ditto
163	lutea	*Yellow-flowered ditto*	....	yellow	ditto
164	mexicana	*Mexican ditto*	.....	white	ditto
165	Poinciana pulcherrima	*Flower Fence*	6 to 9	crims.	l.
166	Psidium Cattleianum	*Mr. Cattley's Guava*	1 to12	white	ditto
167	cordatum	*Heart-leaved ditto*	5 to 7	white	ditto
168	Pterospermum acerifolium	*Maple-leaf Pterospermum*	7 to 9	white	l. b.
169	suberifolium	*Various-leaved*	9 to10	white	ditto
170	Quassia amara	*Bitter Quassia*	6 to 7	red	ditto
171	Rondeletia hirta	*Hairy Rondeletia*	6 to 8	br& yl.	l.
172	Salvia azurea	*Azure-flowered Sage*	8 to 9	blue	l. b.
173	Samyda rosea	*Rose-coloured Samyda*	6 to 7	rose	ditto
174	Scottia speciosa	*Superb Scottia*	6 to 9	crims.	l.
175	tamarindifolia	*Tamarind-leaved do.*	.....	crims.	ditto
176	Spermadictyon suaveolens	*Sweet scent Spermadictyon*	8 to12	white	ditto
177	Stapelia grandiflora	*Great-fl. Carrion Flower*	9 to12	purple	b. s.
178	stellaris	*Starry ditto*	8 to10	purple	ditto
179	deflexa	*Reflexed ditto*	6 to 9	purple	l.
180	rufa	*Rusty-brown ditto*	6 to11	brown	ditto
181	Strelitzia reginæ	*Qn. Charlotte's Strelitzia*	4 to 5	yl.&bl.	b. l.
182	augusta	*Plantain-like ditto*	2 to 5	white	ditto
183	ovata	*Oval-leaved ditto*	2 to 4	yel. & blue	
184	humilis	*Dwarf ditto*	.....	yel. & blue	
185	farinosa	*Mealy-stalked ditto*	.....	yel. & blue	
186	angustifolia	*Narrow-leaved ditto*	5 to 6	yel. & blue	

			Months.	Col.	Comp.
187	Strelitzia parvifolia	*Small-leaved Strelitzia*	5 to 7	yel. & blue	
188	Sesbania picta	*Painted Sesbania*	4 to 9	scarlet	l. s.
189	Sida sessiliflora	*Sessile-flowered Sida*	11 to 2	yellow	l. b.
190	globiflora	*Globe-flowered ditto*	10 to 12	scarlet	ditto
191	patens	*Spreading ditto*	7 to 9	purple	b. l.
192	Strophanthus divergens	*Spreading Strophanthus*	2 to 10	rose	ditto
193	Tabernæmontana laurifol.	*Ll-leav'd Tabernæ montana*	5 to 8	scarlet	l.
194	amygdalifolia	*Almond-leaved ditto*	4 to 8	white	ditto
195	coronaria	*Broad-leaved ditto*	6 to 10	white	ditto
196	v. flore pleno	*Double-flowered ditto*	.....	white	ditto
197	Tephrosia grandiflora	*Great-flowered Tephrosia*	6 to 9	red	ditto
198	Theobroma Cacao	*Chocolate-nut*	.....	yellow	l. b.
199	Triumfetta micropetala	*Small Petal'd Triumfetta*	4 to 8	yellow	l.
200	Trichilia odorata	*Sweet-scented Trichilia*	6 to 7	green	l.
201	Turnera angustifolia	*Narrow-leaved Turnera*	4 to 9	yellow	l. b.
202	trioniflora	*Kelmia-flowered ditto*	.....	yellow	ditto
203	Thunbergia grandiflora	*Great-flower'd Thunbergia*	3 to 8	blue	ditto
204	fragrans	*Sweet-scented ditto*	5 to 9	white	ditto
205	alata	*Winged-stalked ditto*	1 to 12	orange	ditto
206	Webera tuberosa	*Tuberose Webera*	5 to 7	white	ditto

To the above List, in which are enumerated most of the finest Stove Plants that are grown in English Hot-houses, might be added many bulbous-rooted plants, that are well worthy the notice of the collector of fine flowers, and will be found under the names of Amaryllis, Crinum, Hæmanthus, &c. &c., which afford to the cultivators of Varieties an increasing fund of Flora's finest offspring: as, by the practice of the art of crossing the breed between the various Species, a numerous tribe has been produced; as will be seen by comparing any descriptive Catalogue of the Species of Amaryllis, which a few years since did not comprise more than 14 or 15 kinds, and are now, by the means described (§ 41, p. 21), increased to between 200 and 300. These are all readily grown in the composts recommended; but care should be taken in the potting, for which general directions are given in our Introduction, p. 23.

CULTURE OF THE PLANTS.

Soil.—The directions given under Green-house, as to soil, will apply to the exotics of this department; with no other variation than what may be collected from the Table, and from the divisions below.

Pots.—By planting exotics in pots and tubs, it is much easier to manage them as their constitutions require; and there is great convenience in having curious and valuable specimens always portable.

Methods of Propagation.—The manual process is the same as in propagating Green-house plants. Whatever method of

multiplying Stove-plants is employed, it will facilitate a new germination to plunge the pots into the bark-bed. A bell-glass always expedites the striking of cuttings.

For PERENNIAL EXOTICS, which enjoyed in their original climate a perpetual summer, the course of April, May, and July, offers an eligible time for originating young plants; because they get established before our summer is past. June is excepted, merely because, just about the time of discontinuing fire-heat, the temperature of the house is likely to be the most unsteady. Where the parent plant does not yield off-sets till August or till the decline of our year, the time of planting must be controlled by that circumstance, as in the culture of the Pine-apple.

The beginning of March is the proper season for sowing most TROPICAL ANNUALS intended to be nurtured by a full course of heat, but not to be excited in opposition to the season. Where, however, it is found that a plant cannot be forced out of the periodical time of blowing acquired in a climate where the seasons in respect to ours are inverted, the seed must be sown proportionally late, and the rising plant nurtured by a full course of heat during our winter.

It is, however, much better to raise plants by cuttings or layers from the later summer shoots. This will serve as a general rule; but it must also be added, that no plant whatever can be forced, to any account, that is not previously established in pots or boxes.

Bark-pit.—In a general Hot-house, the use of this is constant. The mild, constant, and equable heat of the pit saves exotics from feeling, so much as they otherwise would, any casual declension in the fire-heat, or sudden vicissitude in the temperature of the external air.

The bark-pit is put into action by a proportion of new tan in a state of fermentation, modified by a mixture of old tan, which should be sifted; the smaller thrown out, and the larger portion mixed with the new tan.

On the first formation of a bed, the quality of new bark to be brought into the pit will depend upon the goodness of the bark and the design of the house. As much new tan as will fill two-third parts of the bark-pit, with a mixture of old, almost neutralized by decay, will produce a bottom-heat of about 85 degrees. When old tan with higher remains of strength is used to modify the new, the same heat may be produced, if the quantity of new be not more than half the capacity of the pit. This is said of a new pit. After a bark-

bed has been in action, partial renewals of bark, to keep up the heat, are frequently sufficient, in the reduced proportion of one-third, one-sixth, one-twelfth, or less. At intermediate stages between the partial renewals, the bed requires only to be excited into a brisker fermentation, by forking up. About five-sevenths of the pit from the bottom should be occupied by the new and old tan, as a fermenting body of bark: and about two-sevenths from the top, or a little more than the depth of the pots, whatever that may be, should consist of old tan, incapable of heating so as to burn the roots of the plants; at least, such should be the ordinary distribution of the tan: but where peculiar circumstances require a speedy augmentation of heat, without displacing the pots, as when fruit is to be swelled off in the last stage, the earthy tan at top may be taken away, and new tan substituted.

To measure the heat of the fermenting body of bark, distinctly from the air of the house, keep trial-sticks in the bed; or plunge the bulb of the thermometer about a foot into the bed, till it reach where the layer of old bark and the top of the fermenting mass may be supposed to join. The degree to which the heat here should be kept, varies with the intention of different houses. The following may serve as a standard, within a latitude of five degrees below or above which the forcing gardener should aim to keep the bark-beds.

General Hot-house, without pines . . .	75°
Succession pine-pit	72°
Fruiting pine-pit	82°

Successive Pines are frequently thrown into fruit prematurely, by being over heated. In the artificial situation of the plant, it is safer to keep the bottom-heat for succession plants reduced to 67° *min.* and 77° *max.*, lest they should start untimely into fruit.

Many persons work pine-stoves with a bottom-heat 5 or 10 degrees higher than the maximum standard set down for each house above. These, on the one hand, and the theorists, on the other, who censure the application of any bottom-heat to exotics as unnatural, both seem to be in extremes. In tropical climates, the earth itself about the roots of plants is frequently so penetrated with the violent heat of the atmosphere, as to maintain a temperature of 80 degrees, or more, in the shade; consequently, for the roots of exotics from such climates to be plunged into a bed heated to that degree is not unnatural: still it should be recollected, that the heat of the air there has a proportionate elevation above that of the earth.

During our winter, therefore, instead of keeping the roots of pine-plants in a factitious heat of 80°, while the artificial temperature of the air is, is some cases, let down to 55° and 60°, perhaps a better relation of the bed with the atmosphere would be supported by having the bark-bed at 60° or 65°, and the air of the pit at 70°, at least never less than the heat at the roots.

It should be observed, that when the bottom-heat is as high as 80°, with a layer nearly neutral at top, the heat from the tan at the surface of the bed will scarcely be more than 65°.

Renewal of the Bark-bed.—When the decline of the bed below a given temperature requires it to be renewed, take out the pots, tie the leaves carefully with bass to protect them from being broken, and set them in a place where the plants will receive no check, and proceed as above directed.

After renewing a bark-bed, if there has been a great proportion of new tan introduced, or if there is any probability that the heat may rise excessively, plunge the pots but one-third of their depth into the bark; or set them merely on the surface, till the full heat has risen and been found not in excess. Then plunge them to their rims.

Reviving Tan with the Fork.—If it be not requisite to take off the top, begin at one end of the bed, and dig out as much bark as will allow the remainder to be loosened, and completely forked over, without spilling any into the house. Fork it accordingly: return the bark taken out: level the top: and replunge the pots to their rims.

The keeping up a regular bottom heat is of all things the most conducive to the growth of Tender Exotics, and of Pines in particular; therefore the operation of *Renewing and reviving the bark-bed* should become a regular system of labour: for which purpose, after the bark-bed has been renewed by the substitution of new bark for that which is quite wasted, it may be expected to last in good action, with the help of an intermediate forking-up, for ten or eleven weeks; consequently, it will require renewal about five times in the year. As a gradual decline must take place between one renewal and another, the heat can scarcely be kept by any management from fluctuating less than ten degrees: and therefore, in planning the business of the year, it is a desirable thing to distribute the times of renewal, so that they may just precede those periods when something critical depends on having the bark-bed at a maximum heat.

As to forking up merely: If this be done at the end of six weeks after renewal, there will be four or five weeks to run,

while the heat is to be sustained on the old materials, which will be generally found a convenient distribution of this business.

In the continued hot weather of full summer, the fermentation in the bed may decline, faster than the strength of the tan is given out, from the mass of tan getting excessively dry. In this case, pour as much water on the surface, between the pots, as, in addition to that passing through the pots in common waterings, will restore sufficient moisture to the bed.

It is a common error, for unskilful men to neglect the bottom heat in hot weather, under the mistaken idea that plants do not need it: whenever this is the case, numerous kinds of insects are brought into life, and may with propriety be considered as injurious to the health of plants, as for persons to sleep in rooms where the atmosphere is *proportionably cold*, when compared with the day's heat.

Keep the surface of the bark free from fungi, or crusty spawn, which are apt to generate there.

Fire-heat.—Recourse must be had to the furnace, whenever the temperature of the house, from the natural heat of the season, aided by the bark-pit, falls below 60°. At 55°, indeed, the decline of atmospheric heat will not be got so far as to hurt Stove Plants in general: but, if you light no fires till the thermometer fall to 55°, it may happen that, before the flues can be brought into full action to affect the house, a sudden retrocession in the natural season may sink the air at once five or six degrees lower;—then, the tenderest exotics will be in a hazardous situation. It is not advisable to expose a PLANT THAT HAS BEEN LATELY POTTED, even to the extreme, 55°, lest it should be checked in making new roots. To refuse the aid of the furnace till the latest moment will also restrain the gardener from admitting fresh air, in the mean time, so as to have always pure air in the house. The maximum heat to be caused by fire alone in absolute winter, is 68°. This should be thrown to the middle of days not enlivened by sunshine; also, to periods when the heat of the bark-bed is from any cause deficient. The medium, 64°, for mere fire-heat, should be interposed on preparing to air the house in the forenoon; and in the evening, between three and eight.

The best kind of fuel is pit-coal, mixed with cinders of the same, on account of the duration of the fire and regularity of the heat: cinders are lasting in the next degree: peat may be resorted to under a deficiency of either of the others; it will require more attendance: wood blazes off so rapidly, that to

maintain and regulate a furnace fed by it is very troublesome. —See *Dry Stove*, Mr. Knight's Composition.

As soon as fires become necessary the attendant on the furnace should set it at work every afternoon, at five, four, or three o'clock, according to the time of year, beginning an hour before sun-set. His last examination of the furnace for the evening should not be earlier than ten o'clock, when as much fuel should be added as will support the proper heat till the morning, while the front of the fire is smothered with ashes to prevent too consuming a draught. He ought to be again at the fire, to refresh it with fuel, in the morning, within seven hours after leaving it: when the nights are longest, the decline of the fire will thus be repaired three hours before sun-rise. Thus the gardener has three different kinds of heat to bring to his assistance, in this department of his profession;—from the rays of the sun;—from fermentation of the bark;—from fires, in the colder season. This again induces the Editor, who has preserved the old mode merely for the information of many who do not "like to meddle" with new methods, to recommend, on any moderate scale, the method of heating as applied to the Economic Forcing-frame, p. 10, § 18.

The season for fire-heat falls mostly within the limits of eight months, specified below. Fire-heat is first resorted to in evenings; and is extended to mornings when the weather is cloudy and damp, or frosty. The lateness, or forwardness, of the seasons, will require occasional deviations from any outline drawn from the practice of a single year: the following outline is given to assist, and not to fetter, the director of the stove.

CALENDAR FOR THE STOVES.

Oct.—As soon as cold nights or foggy days occur, fires will be wanted in houses where the standard temperature marks a high minimum. The Pinery first demands the aid of the furnace, on account of all the plants having been recently potted. Gentle fires made in the evening, to last only for the night, will supply the few degrees of heat in which the natural climate is defective. Artificial heat is not applied to excite the pines to grow in the herb at this time, but merely to prevent any check to the new roots from cold and damp. If the tan-bed send up a good heat, the use of the stove in the Pinery may be deferred till the middle or end of the month.—In the General Hot-house, without pines, fires will scarcely be wanted till the end of Oct.—One object is, to keep the temperature up to a given minimum; another, to interfere with fire-heat when the declension in the natural climate is un-

seasonably abrupt. Thus 62 deg. at the end of Sept. is more severe than 58 at the end of Oct.

Nov.—Work regular fires every evening, and occasional fires on cold mornings, and throughout severe days. A violent heat would be pernicious. The maximum to aim at for the day-time, in rigorous frosts, is 65°, independent of any rise in the thermometer from occasional sunshine.

Dec.—Attend punctually to the furnace in the afternoon, late at night, and timely in the morning. Between five and nine in the forenoon, never let the course of fire-heat relax; but if between nine and three the sun should shine sufficiently to raise the thermometer to 70°, the furnace may be stopped, and need not work again till three in the afternoon.

Jan.—Recruit and regulate the stove evening and morning. To have the heat defective, or in excess, would be alike prejudicial.

Feb.—The furnace must be carefully attended, as the three principal hours of daily regulation come round. Maintain fires all day in rigorous weather.

March.—From the returning influence of the sun, and the gentle impulse of the stove, the plants will be excited strongly into growth. To conduct them by an equal progression, the fire-heat should be regularly sustained morning and evening, and raised, as noon approaches, to 70, 72, and 75 degrees, in case the power of the sun alone has not elevated the thermometer, by ten in the morning, at least to 70. To make the continuation of fire in a Hot-house, during the day, depend merely upon the presence or absence of frost, is to treat a Stove like a Green-house. According to the climate to be imitated, the tenor of artificial heat ought to bear some analogy to the revolutions of temperature caused by the sun, as it respects both the history of a day, and the rise and acme of a growing season.

April.—Continue fires regularly while the sun is down; and when the weather is chilly and gloomy, work the furnace all day.

May.—Go on with the evening fire: have a gentle heat in the early part of the morning, at least till appearances promise a fine warm day. Some managers, to spare fuel, dispense with the stove as soon as the thermometer can be kept, by the shelter of the house and the influence of the bark-bed, from sinking below 60° at the coldest time between sun-set and sun-rise. But, on the principle laid down in March, the heat ought to be progressive where pines are grown, and indeed where any fruit is forced that will repay the cost: in the Pinery, then, the minimum for May is 64° at the beginning, and 68° at the close.

June.—If the weather be seasonable, no fire-heat will be wanted. But if it be Midsummer, according to the Calendar,

resume fires in unseasonably cold intervals, in order to give sufficient air, without checking plants that have been excited by a higher temperature than that at which the natural climate happens to be during an anomalous day or two.

See also the article *Temperature*, in the different Houses.

In regard to the extreme heat of tropical climates: It is possible that the plants indigenous to such climates are adapted by constitution to BEAR, RATHER THAN TO REQUIRE, the *excess of heat beyond* 100° ; and that, transported to other latitudes, the same plants, cultivated as exotics, will grow in FULL PERFECTION, although the maximum heat *does not emulate that excess* ;—provided the minimum heat consult the constitutional tenderness of the plant in regard to cold ; and provided the periodical increase be intense enough to excite the plant in free growth ; and the climax of heat be equal to the ripening of the fruit, under unrestrained communications of air.

Temperature.—The influenee of the bark-bed on the chamber of air is weak, compared with the heat at bottom; bearing a reduced ratio according to the space over which it is dissipated. The temperature of the house depends partly on this influence; partly on the more intense action of the flues, when the furnace is charged ; and partly on the reduction of the artificial heat, by admitting the external air.

In respect to artificial heat: The temperature for the General Hot-house, without Fruiting Pines, is 58° *min.*, 70° *max.* When meridian summer is felt, the temperature must keep pace with the increase of heat in the atmosphere; and therefore will ascend, through all the intermediate degrees, to 75°, 80°, 85°, 90°, 95°, and even to 100°. The maximum heat in the house, in July and August, may in general be kept down to 90°, by free admissions of air, and by evaporation from the water given to the plants ; although the force of the season will sometimes prevail to 95° and 100°.

Situation of the Plants in the House.—If the Pine-apple is not cultivated in a separate pit, (see PINERY, p. 455,) the pots containing the pines must be kept constantly plunged in the bark-bed of the General Hot-house. Succulents, if there be no Dry Stove for them, do best upon the shelves. Exotics of any other description may be placed wherever they can have a suitable share of light and heat : if the bark-bed is vacant, those of the driest constitution may stand upon the surface, or be plunged into it, as the heat of the tan may be in excess, or not. Plants stationed near the windows, for the fullest light,

will still participate in the moist heat rising from the bed. Woody shrubs from tropical climates are preserved the most flourishing, plunged in the bark-pit: not that this is absolutely necessary, for many will live well in the Dry Stove; but a heat, independent of fire-heat and of the weather, has the preservative influence mentioned under *Bark-pit* above.

ROUTINE CULTURE.

The general rules for *Watering... Dressing the Plants... Stirring and renewing the Earth...Shifting the Plants...Pruning and Training...Culture of Fruit-bearers*...and for the *Destruction of Insects*...are so nearly the same in the Stove as in the Green-house, as to require only the slight deviations, or additions, particularized below. It will be perceived, that we have omitted some heads under GREEN-HOUSE, in which the management of the two departments is widely dissimilar.

WATERING. — The rules for watering the Succulents are nowise different in principle from those given under GREEN-HOUSE; though the greatest heat of the house may render it necessary to give small and circumspect waterings more frequently: but seldom water the Cactus and Euphorbia over their heads, even in summer. The woody kinds will stand in need of water—in December and January, about once a week; November and February, every fifth day; October and March, once in four days; September and April, every third day; August and May, once in two days; July and June, twice in three days, and some every day. In watering plants in the pit, you have not only to regard the plants, but the bark-bed in which the pots are plunged: if this be much spent, too copious waterings would make it damp; and if the bark be new, excessive waterings may cause it to ferment violently. The danger of chilling the bed by immoderate waterings is, however, the greatest. Such Herbaceous and Shrubby plants as will bear sprinklings of water over-head, must be cleaned from dust and insects by that means: this may be done freely in the heat of summer, in the morning about eight, or the evening just before sun-set. If dust and foulness be permitted to lodge upon the plants, the pores by which the vegetable perspires will be clogged up, it will become unhealthy, and the growth of insects will be promoted. Wash the foliage of large leaved shrubs with a sponge. In the colder months, the time of day for sprinkling over the leaves of shrubs must be changed from morning or evening to two hours after noon: having raised the temperature of the house to its maximum, sprinkle shrubs

not succulent every third day, if a fair sun-shiny day occur so often: otherwise wait five or six days for an opportunity.

STEAMING FLUES.—When, on account of fruit-bearers or other plants being about to set their blossoms, it becomes improper to water them over the herb, have recourse to steaming the flues, morning and evening; letting the flues be at a maximum heat before you pour the water on them.

GIVING AIR.—One of the weak points in artificial culture, is, the difficulty of ventilating the house in cold weather, without letting the temperature sink to an injurious degree: but it is better to raise the heat and air the house, than to lose the salubrious influence of a duly renewed and perfectly sweet air within, by keeping the house constantly shut up in inclement weather. From November to April, the admission of air must be very guarded; being given by small openings, about noon in fine days, from an interval of five hours together to half an hour before and after twelve; and on any adverse change in the weather, the sashes must be closed in a shorter time. In confirmed summer, draw down some of the top, or slide open some of the front sashes, an hour after sun-rise; and let them remain open till an hour before sun-set. Admit also a little air from evening till morning, when the nights are sultry. In admitting or excluding air at a natural temperature, have always regard to the thermometer.

SHIFTING AND DRESSING.—Stir and renew the surface of earth in the pots, or entirely change the mould and pots, when requisite. The course of April and May is a good time to shift plants that want it; and, whether they usually require a bottom-heat, or not, plunge them into the bark-bed, which will facilitate their striking. Keep down moss and weeds. Let all decayed leaves, and every thing that can generate unwholesome vapours, be removed.

INSECTS.—The destruction of insects may be attempted by the same means as in the Green-house: but if any fruit-bearing plants are in the house, the fumigations with tobacco must be finished before the plants come into blossom. To make the last fumigations more effectual, apply them at night when the house is shut up, and repeat them every four or five days. The higher and unintermitted course of heat makes insects more abundant here than in the Green-house, and more difficult to eradicate. The following additional remedies are chiefly directed against the Turtle-insect and Red-spider, which cannot be affected by tobacco-smoke. At the time of white-washing the flues in winter or spring, mix, with the

size and whiting, a quarter of an ounce of brown sulphur, for every 100 yards of flue. A coating of this mixture, laid upon the flues, diffuses a constant effluvia through the house: though this is scarcely perceptible by the human organs, and has no disagreeable effect, the Red-spider dislikes it, and is frequently kept away by this alone. The same antidote may be administered in another shape. Pour three gallons of cold water on half a pound of brown sulphur: let it stand from 24 hours to a week. In order to destroy the Turtle-insect and Red-spider, apply it with a syringe to the underside of the leaves.

MISCELLANIES IN THE HOT-HOUSE.

Time of Sowing Esculent Annuals.—Of those Esculent Annuals that are deemed worth forcing in a Hot-house, successive sowings are commonly made from the middle of December to the beginning of May, at intervals of ten days or a fortnight. Some forcers, ambitious to surmount the greatest disadvantages, raise annuals from August to November, to have fruit at the decline of the year and in mid-winter. The expected demand may prescribe the raising of some favourite vegetables by the most early sowing: but in proportion as the start precedes the times of germination by the natural influence of the spring, the crops are weaker and less productive. The beginning of March is a good period for sowing choice table vegetables in the house; the artificial heat conspires with the genial excitement of spring; under both, the plants are rather accelerated than forced, come up robust, and bear quickly and abundantly. It may be asked, What is gained by sowing Esculents in a stove so late as the beginning of March? If they are too tender to be sown in the open garden till towards the middle of April, the difference in the time of sowing, added to the acceleration of the house, is equal to two months.

Kidney-Bean.—The same heat which suits the Pine-apple suits the Kidney-Bean: the PHASEOLUS *vulgaris* is a native of India; and though reckoned hardy, because it will grow in the open garden, it is iu constitution quite tender, requiring fine settled weather if cultivated out of doors, and a maximum heat when forced.

The best kinds to force are the Early Speckled, Early Negro, and Dun-coloured Dwarfs. Sow in pots, or oblong boxes, containing a mixture of light earth and vegetable mould; depositing the seeds either in a triangular or quincunx order, and full an inch deep. If the plants are to fruit where sown,

the cradles should be ten inches deep: but if they are to be transplanted, which admits a greater number in the same space, the seed-pots or boxes may be shallow. Do not fill the pots with mould at first, to allow of gradually earthing up. When the beans have germinated, sprinkle the earth with water: after the plants have risen, give moderate waterings every other day; the last crops may want water every day. Sprinkle also the leaves with water warmed by standing in the house. Those raised in shallow pans should be transplanted for fruiting when two or three inches high. It is sometimes proper to stop luxuriant runners. These incidental crops may stand, in rows, on the flues or on shelves: but take care that they do not shade the pines and other principal plants. For succession, sow every fortnight or three weeks.

Cucumber.—The CUCUMIS *sativus* is a native of the Levant. Some gardeners, ambitious of early fruit, try a sowing in the stove, under the disadvantages of December. For fruiting this plant in the house, narrow boxes three feet long, and full twenty inches deep, may be found more commodious than pots. The boxes may stand upon the flues; or be suspended near the back wall eighteen inches from the upper tier of lights, so as not to shade the regular house plants: this is the best situation for a very early crop.

For the manual culture, see the *Kitchen Garden*, pp. 56, &c. The chief deviation from the course of the hot-bed is, that the plants must be trained in the house upright; for which purpose, form a light temporary trellis of laths.

Strawberry.—The Alpine and the Scarlet are the kinds found to answer in forcing. If there is no vacancy for them in a more suitable house, plants in pots may be committed to the front or end glasses in the succession Pine-stove: but to have them start with the Cherry, when a house for forcing that fruit is first put in action, is most eligible; and the Peach-house is adapted for bringing them on well in the next degree. It should be observed, however, that if the fruit in either of the houses is set, so as to require the maximum heat for the Cherry or Peach, the temperature even in the Succession Pine-stove may happen to be lower, and consequently less objectionable. On this account, where Strawberries are forced in large quantities, it is a good method to apply a pit to their sole cultivation; constructed, for the purpose, with a low glazed roof, and with facilities for giving plenty of light and air to the plants. Begin at 40° by Fahrenheit; and raise the heat as in the Cherry-house.

The plants should have a preparatory growth in pots, as directed under *Fruit Garden*, STRAWBERRY. In the house, give the culture at the end of that article. As the plants grow too luxuriant, thin the leaves, eradicate suckers, and take off runners.

Strawberries taken into the house in March, fruit in higher perfection than those forced earlier. The plants should be placed in parts of the Forcing-house where plenty of air can be admitted to them, and as near to the glass as may be.

Flowering Plants.—Pots, or boxes, containing any choice flowering shrubs, which it is desired to force into early bloom, may be introduced into the house from December, or January, till the natural time of flowering. See *Shrubbery*, FORCING ROSES AND OTHER SMALL FLOWERING SHRUBS.

Let the aspiring young gardener turn his attention to the List of Annual Flowers; as among those lately introduced from South America, are many that require this method of cultivation, to shew their pristine beauty. Nothing can exceed the grandeur of the *Schizanthus porrigens*, which the Editor saw, last spring, at Stoneley Abbey, produced by Mr. BROWN: and skill and industry will be well repayed, by giving to many other plants the same degree of beauty.

So also Bulbs &c., that are to be blown out of season, having been potted and placed under a sufficient heat to make new stems, may be brought into the house, to flower in perfection. See *Flower-Garden*, FORCING BULBS AND TUBE-ROSE-ROOTS.

The seeds of curious Hardy Annuals, sown in pots, may be raised in the lower heat of a Fruit Forcing-house, and placed in this department to flower, while vegetation in the open garden continues suspended. Tender Annuals may be raised here, from seed in March, if such a course should be more convenient than sowing them in a hot-bed under a frame.

The Vine.—This is the only HARDY fruit-tree that forces well, throughout every stage, either in the General Hot-house or in the Pinery; so that it is not an indispensable arrangement to have a Grape Forcing-house distinct from a permanent stove. For the management of the Vine in the house, see FORCING-HOUSE DEPARTMENT, *Grape-house*.

In addition to the fruits above mentioned, that may be brought to perfection in the Hot-house at an early period, may be enumerated the Raspberry, Gooseberry, and Currant: those, or any other plant that it may be desirous to bring forward, should be established in pots of suitable sizes, as is

directed for Cherries, Figs, &c. A West-India plant, *Psidium Cattleianum*, the Plum-shaped Guava, is well worth culture, for its delicate flavour and fine appearance at table. The Editor partook of this fruit at the table of JOHN MILFORD, Esq., at Exeter, last year: it is easily propagated, and grows as freely as any common variety of Plum, if placed in proper heat.

PINERY.

THE common Pine-apple, BROMELIA *Ananassæ*, is a native of the tropical sections of Asia, Africa, and South America. It is, from its origin and nature, a complete Hot-house plant: nevertheless, its culture is easier, less expensive, and in general more successful, when a house is constructed for raising it alone, or at least for cultivating it as the principal object. The chief difference between the Pinery and General Hot-house relates to the height of the glazed roof; for as the Pine-apple is under-shrubby, and, when the plant is luxuriant, does not exceed three feet in height, the glazed pit for it need not be higher than five feet in front, and eight feet six at the back wall; or, whatever be the breadth of the house, the difference between the height in front and in rear need not exceed one-third of the breadth. Thus the chamber of air to be heated may be materially reduced. To have full command over the temperature, let the lappings of the panes in the glazed roof be closed with putty; providing at the same time some permanent self-correcting ventilator, and outlet for moisture. The varieties most esteemed by gardeners are known among them by the following names:

Queen—tankard-shaped, and of a golden colour; esteemed the hardiest kind.

Brown Sugar-loaf--cone-shaped and dark-coloured till it ripens; the leaves brownish.

Prickly Striped Sugar-loaf—of a golden colour.

Silver-striped--an elegant plant, but a reluctant fruiter. This and the three preceding are less succulent than the black sorts, and require more water.

Havannah — tankard-shaped; dark-coloured till it ripens.

Black Antigua—shaped like the frustum of a pyramid; dark-coloured till it ripens.

Black Jamaica—this large sort, and the Black Antigua, usually require three years' culture to bring full-size fruit.

Soil.—A good compost for the Pine-apple is formed of the following articles:—1. The top-spit earth from an upland pasture, loamy, friable, and well reduced; 2. Hard-fed dung, rotted and mellowed by at least a year's preparation; 3. Small, pearly, river-gravel. Take equal quantities of each; and mix

soot, and limestone-gravel, or sea-sand, in proportion of one-eighth of the whole. Incorporate the ingredients fully; and turn the heap two or three times before using it.

Methods of Propagation.—The Pine is propagated by crowns or suckers. The crown consists of the leaves which grow at the top of the apple: and each plant produces one. Suckers spring at two different parts of the plant: they are found, in some kinds, at the base of the fruit, on the fruit-stalk: almost every pine-plant sends out suckers from the bottom of the stem, and from the roots. Suckers, which rise from the extremities of the roots, at a distance from the stem, have radical fibres already; but they are apt to have ill-formed hearts, and to prove untimely-fruiting plants. The plants from crowns or suckers will, in general, produce fruit after two years' culture: the same plant bears fruit but once.

As to the time of separating these:—When the fruit is served to table, the crown is to be detached by a gentle twist, and returned to the gardener, if it be wanted for a new plant. Fruit-stalk suckers are taken off at the same period: but if the plant from which the fruit is taken be of any scarce or desirable kind, and it be the object to propagate it as fast as may be, the suckers should be allowed then to remain. Suckers at the base of the herb are commonly fit for separation when the fruit is mature; though, if the stool be vigorous, they may be left on for a month after the fruit is cut, the stool receiving plentiful waterings on their account. The fitness of a sucker to be removed is indicated, at the lower part of the leaves, by a brownish tint there; on the appearance of which, if the lower leaf be broken off, the sucker is easily displanted by the thumb.

If the old-fruiting plant offers only small bottom-suckers, or fails to furnish any, you may bring out good suckers thus: Having waited till the fruit is cut, take the old plant in its pot out of the bark-bed; strip off the under-leaves near the root, and with the knife cut away the leaves to six inches from the bottom. Take out some of the stale mould from the pot, fill up with fresh, and give a little water. Plunge the old plant into a bed with a good growing heat. Let the routine culture not be neglected, and the old plants will soon send out good suckers. Allow these to grow till they are four inches long, or more; and, on the signs of fitness, detach them.

When either crowns or suckers are detached, twist off some of the leaves about the base: the vacancy thus made at the bottom of the stem is to favour the emission of roots. Pare

the stump smooth: let them remain out of ground in some dry place, lest the place of union should, from its moisture, cause it to decay. They will be fit to plant in five or six days. As to the prolonged period for which they may remain out of culture, pine-plants, if necessary, have been kept six months without mould, in a dry state; and the only injury has been loss of time. Crowns or suckers coming off before Michaelmas should be planted without any unnecessary delay, to get established before the winter. When late-fruiting plants do not afford offsets till after Michaelmas, it is best to keep them in a dormant state during the months least favourable to artificial culture: therefore, as you obtain these late offsets, hang them up in the house not too near the flues, to rest till March.

One mode of treatment is not adapted to the plants at every stage of growth; therefore the long-approved practice is, to have three distinct compartments for the pine, through each of which the same plant passes successively.

NURSING-PIT.

All plants are found to grow best when placed as near to the glass as may be: therefore, to bring on *crowns* and *suckers*, from their first planting until they are established in growth, requires a chamber of less extent than will be wanted in the subsequent stages, and a much lower heat than is requisite to fruit them. A common hot-bed frame furnished with the necessary heat is all that is wanting to cause the young plants to grow freely.

Temperature.—The artificial heat is 55 degrees for the minimum. This will keep the plants, in winter, secured from a check, and a few degrees above a dormant state. It is enough to aim at this minimum, when dung-heat is employed; for as its decline is never abrupt, there is no danger in going pretty close to the lowest extreme. When fire-heat is applied, it is better to aim at 60 degrees, as the charge in the flues is more liable to fluctuate suddenly. The maximum artificial heat, in winter need not go beyond 65 degrees: but as the season for excitement advances, this becomes the minimum. When the plants are growing vigorously in autumn, or spring, the artificial maximum is 70 degrees. In winter, the maximum, with the aid of sunshine, should not be allowed to rise higher than 70 degrees, because the benefit of airing would be lost: in summer, the maximum, under the effect of strong sunshine, may rise to 85 degrees; to keep it down to this, give, in July and August, the benefit of air freely.

Annual Potting.—The time for potting the great bulk of

crowns and suckers naturally falls just after the principal fruiting-season. When the Nursing-Pit is ready for striking them, they may be potted, having been treated as directed under *Methods of Propagation.* Mr. Speechly, and after him Mr. Walter Nicol, has observed, that any offsets from the Pine will succeed as well if planted the hour they are taken off as if laid by to dry till the wound be healed, provided the parent stock received no water for the ten days preceding:—They recommend, that such crowns as come off before the general potting be stuck at once into the bark-bed, where they will be making roots till that period. Both branches of this method illustrate *one* of the motives for laying the offsets aside to dry: 1. The withholding of water from the stool lessens the moisture in the offset; 2. By a temporary lodgment in dry tan, the rotting of the severed shoot from the bleeding of the wound is prevented. But one use of the *drying shelf* is not answered, and is indeed relinquished, under these alternatives: the object has been to keep the unrooted offsets in a dormant state, till the Nursing-Pit can be prepared for them. The planter who has to complete, in a narrow space of time, the manifold operations which accompany a change of plants in the Pinery, must find the obstacles to a good arrangement multiplied, by having his crowns and suckers shewing signs of growth before he has a regular place to receive them. Mr. Speechly adds, that the crowns must be potted as soon as they have struck two inches in the bark-bed.

The pots to receive unstruck crowns and suckers should be sixties (§ 45, p. 24). Lay at the bottom of each pot dry shivers. Fill the pots with the compost before described, and press the end of the rootless plant about three-quarters of an inch into the mould. Plunge the pots in the bed down to their rims.

After planting, shut the frame; and withhold water and admissions of air for some time.

Incidental Planting.—From March to Michaelmas, whatever crowns and suckers come off the fruiting-stocks before or after the general potting, continue planting them in the manner just described. But after Michaelmas, hang up such as come off, that they may remain dormant till a better season for striking them arrives. In the course of March, plant any crowns or suckers taken off since the preceding Michaelmas: had they been planted late in autumn, they would not have made perfect roots before winter had set in.

First Shifting.—When offsets have been potted in July or August, remember by October to examine the roots of the

most vigorous plants. Should any have filled the pots, shift them into larger, according to the instructions (§ 45, p. 23): for this reason, the forty-eights will afford a convenient increase of size for the roots. But new roots will not often have filled the pots at that inconvenient period.

Assuming the plants not to have required shifting in the October which followed the first potting—As soon as the Growing Season commences, examine into the state of the roots; and, between the first of March and the vernal equinox, shift into fresh mould the nurse-plants struck last season, if they have already filled the pots; if they have not, the shifting may be deferred till April or May. To confine the roots of a rising pine-plant in a pot which they have filled, causes them to mat; and the check thus unskilfully given, while it dwarfs the plant, will mostly bring it into fruit untimely, as a warm spring or summer may happen to ensue.

Take a fine day: begin early in the morning, and have assistance to complete the job before sun-set. Tie up the leaves of the plants, to prevent them from being broken, and set them where they will receive no check. Meanwhile renew the bark-bed in the Succession-house; and proceed to shift the plants. Twist off a few of the bottom leaves; then turn the plant out of the old pot; endeavouring, if the plant is healthy, to preserve the ball of earth entire; but if the plant is sickly, or infested with insects, shake the old earth entirely from the roots. If any leaves have been casually bruised, trim them off. Lay some compost in the bottom of the new pot. Set-in a healthy plant without reducing the young roots, except any very straggling fibres; but where the main root or fibres appear unsound, pare the affected parts quite away; and if the fibres are matted, separate them without injury. Fill the vacancy between the root and the surrounding pot with compost up to the bottom of the leaves, an inch above the old ball, so as to leave the depth of the rim vacant for water. Plunge the pots in the bark-bed to their rims; range them level; and with spaces from one to another, equal to the diameter of a pot at bottom. Give, to such as have not had their roots cut, a little water, warmed to eighty degrees, to settle the roots; or you may defer this till the heat rise in the bed. See, below, *Watering after Planting—Admission of Air*, and *Shading*.

Plants which were shifted early in March may, in the course of next May, if growing vigorously, be again shifted into pots of the next larger size, i.e. *thirty-twos*. Twice shifting within these limits is seldom absolutely requisite, but it will improve

plants which you intend to keep a twelvemonth in the Succession-pit. In re-potting such, shake the mould entirely from the roots; prune away the old fibres; and leave only growing roots untouched. Till they make fresh roots, let them have the same culture as unstruck suckers.

This is now the growing season, and over-potting is not so dangerous as in moist winter weather; and by shaking the mould from the roots, and disengaging a portion of the old fibres, it gives more room in the pots. It will be now found that the plants will, generally, go into the same size pot again; and be much accelerated in growth by the shifting into regular-sized pots, as the growth may indicate.

Watering after Planting.—After planting crowns or suckers, give them no water until the heat of the bark has risen, and the plants shew signs of siriking. Then water moderately at the root; but give none over the herb until the heart-leaves begin to grow. Meanwhile repeat watering at the root every four days. After the plant is established, water freely at root, and give sprinklings over the leaves from a fine rose.

After re-potting established plants which have not been reduced in the root, give a little water, to settle the roots; then withhold water until the heat of the bed has come up, and the plants have struck. Afterwards water at the root every three, four, or five days, and sprinkle as above.

When shifted pine-plants have been partially disrooted, forbear to water them till they have commenced a new growth.

Most plants will shew by appearance the want of water. Pine-plants are of a nature to require gentle waterings at the root, but are liable to injury by having too much. Let the young gardener attend to the directions for potting (p. 23), as a safeguard for it. Pines, on the other hand, are allowed to want water till their appearance indicates it: they will suffer more than any other plant whatever.

General Instructions for WATERING—to be particularly attended to, with a reasonable exercise of judgment:—

Part of the preceding article, no less than this, will apply to all the pits. Use soft water. In winter, let water that is to be given to plants stand in the house to acquire the same temperature; or warm the water to 75 degrees, before applying it.

From November to February—or as long as the deficiency of a strong exhaling heat in the natural climate makes it unsafe to let water fall into the hearts of the plants—give the water through a tube, composed of jointed pieces, so that it

may be shortened at will, and having a funnel into which you may pour the water.

When it is proper to water over the leaves, which is from March to October, EXCEPTING IN THE LAST STAGE OF FRUITING PLANTS, let the water be warmed to 80 degrees before it is applied, which will contribute to kill several tribes of insects.

From the middle of October to the end of February, the plants will require to be moderately watered only once in eight or ten days. When they have been recently potted, they require less than at other times. Under a continuance of moist and hazy weather, the plants may be kept without water for a lengthened interval. In the beginning of October and March, once a week may be sufficient. During the course of September and April, they may require watering every five days; August, May, June, and July, every three or four.

If, by accident, water fall into the heart of a plant in winter, the best remedy is, to shut the house close, and raise the heat something above the customary standard, that the water may go off in vapour before it can injure the plant.

The season of FREE-EXCITED GROWTH is usually from the first of March to September: though this must commence sooner, or be continued later, according to the forwardness, or delay, of the plant, and the *desired* time of fruiting. During this season, the mould in the pots should be kept constantly a little moist. Maintain the bark-bed in good action, when you begin to water at the root in an increased degree:—heat the air of the chamber nearly to the maximum, before you at any time dew the herb, and raise it fully afterwards; for moderate humidity, corrected and exhaled by heat, will make the plants thrive.

From May to August, the time of day for watering must recede more and more from the hour of noon—to ten, nine, and eight in the morning; or to three, four, or five in the afternoon, according to the power of the sun.

When July and August happen to be sultry, the pine, as a *plant*, will flourish the better for a little water once in two or three days; but from pines *in fruit* withhold water, as the signs of ripeness appear.

In the height of summer, pour the water over the leaves, and into the centre of the plant. It promotes the health of the plant, to have water standing continually in the heart of the plant, under a well-sustained heat never fluctuating more than 10 degrees below 80.

Shut the house close after watering, which will cause a dewy exhalation.

Steaming the Flues.—Having the flues at a maximum heat, sprinkle them occasionally with water from a rose-pan. The steam thus raised is congenial to vegetation, and destructive

to insects. It is a fine resource, when you cannot water over the leaves.

Watering with Drainings of the Dunghill.—In the growing season, about mid-day between the times of shifting the plants, pour every six or eight days a quantity of dunghill drainings on the mould, which is a compendious way of applying manure. Plants making new stalks and leaves may thus be invigorated; but after fruit is shewn, only pure water should be given, even at the root.

Admission of Air after Planting.—Having potted unstruck offsets, or shifted established plants, admit little or no air until the plants begin to grow. As soon as the herb shews that the root has struck, give plenty of air, which will make the leaves expand, and the entire plant robust.

General Instructions for ADMITTING AIR.—It must be observed, that the thermometer is a most useful instrument; but the experienced gardener must decide by his own feelings, especially under this necessary portion of *culture under glass.* The thermometer, when not placed in the bark-bed, should be set in any part of the house where the rays of the sun do not fall directly on it. If placed in the sunshine, it is useless; and the gardener should therefore study how to regulate the quantum of air in the day-time, and consult this artificial guide at *night,* and also for ascertaining the *temperature of the bark.*

You can scarcely give air without restraint, even in the day-time, at any other season than the last weeks of JULY and the course of AUGUST. When the nights are warm, leave openings for a gentle interchange with the unconfined atmosphere, so as not to expose the pines to casual rain. A constant circulation of pure air will always invigorate growing plants, and heighten the flavour of ripening fruit. In the middle of sultry days, keep down the heat to the maximum under *Temperature,* by a very free circulation of air.

In SEPTEMBER, commences the necessity for caution in admitting air, so as not to lower the temperature beyond the minimum for the house. When air is given in reduced quantities, divide it equally to all parts of the pit. The atmosphere at the autumnal, is seldom so cool as that at the vernal equinox, because the heat from the past summer is not soon dissipated. The 23d of September will more often correspond with the middle of May, than with the 21st of March, as to the influence on the glass of the withdrawing and returning heat in the natural climate. Proceed in September as in June and May below.

OCTOBER. To give air without hazard, see *Temperature* for the house, and the directions in April and March.

NOVEMBER. In calm fine days give moderate admissions of air, from about ten till two. Be careful to shut the sashes, if the atmosphere turn cloudy or excessively cold.

DECEMBER. In the middle of a clear sunny day, when such occurs, though the air be frosty with it, slide down a light alternately a little way. Meanwhile keep up a maximum heat by the flues; and shut the glasses by two o'clock—or sooner, if the weather, or the thermometer, requires.

JANUARY. As in December.

FEBRUARY. As in November; rather freer; in order to which, keep good fires.

MARCH. Watch for favourable opportunities to give air. In warm cheerful days, with little wind, draw open some of the glasses about three hours before twelve, and close again by four in the afternoon; or reduce the interval, as the suitable hours may be few.

APRIL. Every fair warm forenoon, as soon as the sun's influence will prevent the house from being chilled, admit fresh air by opening the sashes a little. From nine till noon, gradually widen the aperture for the air. Close again two hours before sun-set, or before the thermometer is below 60 degrees, or the higher minimum is prescribed by the forced advancement of the plants in particular houses. Whenever the weather is gloomy, raise the fire-heat preparatory to giving air.

MAY. Fresh air may be admitted, in bright warm mornings, an hour sooner than in April; and, on fine afternoons, the sashes may be kept open proportionally later, so as the thermometer be watched, and the exceptions after shifting plants, or renewing the bark-bed, be attended to.

JUNE. Give air liberally from seven to six, if the weather has attained a seasonable settled warmth. When the thermometer is down to 66 degrees, shut the glasses for the evening.

Shading.—From the time of potting new or established plants till they have struck root, shade them with thin mats in the middle of hot days; dividing the hours before and after twelve, so as to amount to a fourth of the morning and a third of the afternoon.

Dressing the Plants.—As you observe any leaves to be decayed, or casually bruised, twist them off, if they are at the bottom of the stem: such as grow above sound leaves trim off carefully with a knife. In the season of free-excited growth, midway between the times of shifting, take off about two inches of the upper mould, and replace it by fresh compost.

Covering in Winter.—This is not positively indispensable to flued pits, in which the minimum degree of fire-heat is regularly maintained; but it will add to the security of the plants, and admit of some retrenchments in fuel, if some warmer screen, in addition to that of the glass, is applied at night, during all the season when frost prevails or may be expected.

For this purpose, provide either double mats, or a strong canvas cover. The latter is commodious; because it can be mounted on rollers, and let down at will, or drawn up under a weather-board. Remove the covering at sun-rise, that the essential benefit may not be obstructed.

Refitting the House.—Every department of the Pinery must be kept at all times clean and sweet. At the period of removing sets of plants that have completed specific stages, purify the house thoroughly, and have the flues swept, the plaster white-washed, the wood-work washed or painted, and substantial repairs effected, if necessary.

REMEDIES FOR INSECTS.

The mealy pine-bug, *coccus hesperidum*, is the insect which principally injures the pine-apple. It infests not only this valuable exotic, but the grape-vine, and many other plants. It sometimes lurks in pots of earth plunged in the bark-bed, and insinuates into every part of the house, lodging in the crevices of the walls and wood-work. Another *coccus*, the brown scaly insect, also annoys the pine, disfiguring the leaves with brown specks, but it does not consume the leaves like the pine-bug.

So many different processes have been recommended for destroying these, that to devise any remedy new in principle would be difficult and altogether superfluous. Of the recipes, and specified methods, which have fallen into disuse, or were at once rejected by men of business, we shall avoid quoting any, merely to say, that this is too simple to be effective, that too elaborate to be of practical use, and a third as fatal to the plants as to the insects. It will be enough to select one or two remedies, which are safe with a little qualification, and certainly efficacious.

1. The ingredients of the first prescription are met with in many recipes. To Mr. Walter Nicol belongs the credit of mixing them in the proportion recommended below. We shall give the substance of his introduction to this remedy; because many experienced growers of pines concur in the opinion, that a chemical preparation is not to be resorted to, till the effects of a sound cleanly course of culture have been tried.

"If the plants, by proper culture, be kept healthy and vigorous, *insects will not annoy, but leave them.* The *coccus hesperidum* seems to delight in disease and decay, as flies do in carrion. I have, without the smallest hesitation, received into my stock, plants covered with the pine-bug; made no effort to get rid of them; and, by next shifting-time, in two or three

months, have seen no more of them. In short, I never but once in my life tried any remedy for the pine-bug; and as I was completely successful, I shall here give the recipe, which may safely be applied to pine-plants in any state, but certainly best to crowns and suckers at striking them in August: to others it may, at any rate, be used in the March shifting, when they are shaken out of their pots.

"*Take soft soap, one pound; flowers of sulphur, one pound; tobacco, half a pound; nux vomica, an ounce; soft water, four gallons: boil all these together till the liquor is reduced to three gallons, and set it aside to cool.* In this liquor immerse the whole plant, after the roots and leaves are trimmed for potting. Plants in any other state, and which are placed in the bark-bed, may safely be watered, over-head, with the *liquor, reduced in strength by the addition of a third part water.* As the bug harbours most in the angles of the leaves, there is the better chance that the medicated water will be effectual, because it will there remain the longest, and there its sediment will settle.

"The above is a remedy for every species of the *coccus*, and for most insects, on account of its strength and glutinous nature."

The application of this will make the plants look dirty: therefore, as soon as the intended effect may be supposed to have followed, whatever remains of the liquor on the leaves should be washed off with clean water.

It would be improper to pour a decoction charged with such offensive materials over fruiting-plants. Further, this peculiar dose for a tenacious insect is not to be applied indiscriminately to exotics in a general stove, as it might make the more delicate leaves of shrubs drop off.

2. There is another method, which proceeds on different principles, and is particularly adapted for destroying insects on fruiting-plants, without hurting the flavour of the fruit. The basis of this course is the combination of moisture with a high heat. The following account of it is abridged from the publication of Mr. James M'Phail.

Preliminary Experiment.—By submitting four plants to an ordeal of hot water, this author first proved, that a pine-plant can endure, for a limited time, a heat of 135 degrees, without receiving any injury. The four plants tried were divested of roots, and kept nearly an hour in vessels containing water heated to excessive points of elevation differing five degrees. That in 135 degrees was not at all affected. Those in 140, and 145 degrees, were a little hurt in the extremities of the leaves; but, being dried in the house, and afterwards planted, grew with unabated vigour. That in 150 degrees was totally destroyed.—He afterwards found that insects can be extirpated with heated air and warm water, while the temperature is kept far below the limits of safety.

He thus relates the satisfactory

Practical Experiment.—"In June, I selected twenty large plants, some of which had green fruit on them; and their leaves, fruit, and roots, were partly covered with insects. These plants I set in a tan-bed; and the weather happening to be warm, with much sun-shine, I watered the plants, often and plentifully, all over their leaves, with water about milk-warm, keeping the lights constantly close shut down. In this pit, I had no thermometer; but the heat was probably sometimes, about noon, upwards of 120 degrees. This great heat, and much moisture, made the plants grow most vigorously; and having subjected them to the said mode of management for a few weeks, the insects, in the course of that time, were totally destroyed, and lay dead on the leaves and fruit. In the spring, before this operation was performed, the plants had been strewed with sulphur. I mention this circumstance, because, from experiments which I have since tried, it is probable that the effluvium of sulphur, in conjunction with heated moist air, will more suddenly destroy insects than heat and moisture alone."

He then adverts to his subsequent general practice.

"Being satisfied with my success, I did not hesitate to water the whole of my pine-apple plants, whenever they wanted it, all over their leaves and fruit, with water about 85 degrees warm. This process I continued nearly twelve months, during which time I do not recollect that the thermometer was often below 70 degrees; and in sun-shine, in summer, it was often raised to 110 degrees. The plants became free of insects, grew vigorously, and ripened fine fruit.

"Many gardeners, perhaps, may think that the pine-apple cannot bear to be watered all over its leaves in winter, because it is of a succulent nature, and able to live long in a hot-house without being planted in earth or set in water.—They may here read my opinion, which is founded on practice, that there is not the least danger in watering pine-plants plentifully all over their leaves, AT ANY TIME OF THE YEAR, provided the tan-bed and the air in the house be kept sweet, and to proper degrees of heat."

Without contesting this proportion, we must narrow the practice considerably, on these grounds:—1. In winter, the expense of producing the extra degrees of heat would be very great. 2. A more serious objection respects plants that are not fit to be transferred to the fruiting-house, and yet might be precipitated into fruit by a high degree of excitement. 3. Adult plants might thus be started into fruit, a month or two sooner than is desirable, on account of the difficulty of maturing fine fruit in mid-winter. With these limitations, the remedy above described under *Practical Experiment* is excellent.

3. The following wash is not to be applied to any plants whatever; but, at the annual cleaning of the house, if the insects are supposed to breed in the building, it is to be introduced, with a brush, into the cracks and joints of the woodwork, and the crevices of the walls:—Of sulphur vivum take 2 oz. soft soap 4 oz. Make these into a lather, mixed with a gallon of water that has been poured in a boiling state upon a pound of mercury. The mercury will last, to medicate fresh quantities of water, almost perpetually.

COMPENDIUM OF THE COURSE OF CULTURE.

It will supersede many explanations that would otherwise be wanted under *Succession-Pit* and *Fruiting-House*, to exhibit here a compendium of the course of culture from the first striking of offsets to the period of fruiting.

The dates are arbitrary; but specific days or months must be assumed, to mark anniversary and other periods.

Nursing-Pit.

1831. *Aug.* 15.—Crowns and suckers planted.

—— *Oct.* 30.—If the plants, from forward growth, require more room, some are removed to another pit, and the remainder set at increased distances.

1832. *Mar.* 30.—Such plants as want it are shifted. Plants of the same standing are now sometimes distributed to houses where the treatment differs, as the plant is expected to fruit at the end of two or three years. 1. The large black varieties, as already mentioned, require three years' culture. 2. Crowns and fruit-suckers are seldom so forward as suckers from the stem. The last, indeed, commonly grow too vigorously, and do best under a moderate excitement during the first two stages.

THREE-YEAR FRUITING PLANTS.

Nursing-Pit continued.

1832. *May.*—Plants intended to complete a year in this pit, are re-potted; having the ball of earth shaken away, and all the *old* root-fibres pruned off.

Succession-Pit.

—— *Aug.* 15.—Plants that have been in the Nursing-Pit the previous year, are shifted, and transferred to this house.

Fruiting-House.

1833. *Aug.* 15.—Plants which have consumed ONE YEAR in the Nursing-Pit, and a SECOND YEAR in the Succession-House, are removed to this department.

1834. *Aug.* 1.—Fruit ripe.

TWO-YEAR FRUITING-PLANTS.

Succession-Pit.

1832. *Mar.* 30.—Plants from the Nursing-Pit are put into larger pots; and brought for culture here, as directed under this division.

—— *May* or *June.*—Succession Pines are sometimes intermediately shifted, without disturbing the balls of earth.

Fruiting-House.

—— *Aug.* 15.—Plants from the Succession-Pit, having consumed ONE YEAR in the first and second stages, are shifted into the largest-sized pots, to be treated as under this head.

1833. *Aug.* 1.—Having been cultivated as under Fruiting-House, the ripe fruit is fit to cut.

SUCCESSION-PIT.

The remarks, made under *Nursing-Pit*, on growing pines, without fire-heat, will apply to this department.

Renew the bark, in the proportion requisite, when a set of plants have been transferred to the Fruiting-House, in order to have it in activity for a set to succeed from the Nursing-Pit. Recruit or revive the tan at other times, as in pp. 440—442.

Temperature.—The directions on this subject under "Nursing-Pit" will apply to the Succession-House, with little alteration.

In the hot regions to which the Pine-apple is indigenous, the growth of the plant and fruit proceeds, at all times of the year, as the new plant may happen to spring, and as the advancement of the plant and the expansion of the organs of fructification follow at NATURAL intervals. As the force of the climate is always equal to conduct the plant to the next stage, whatever the present may be, nature's plants always shew their blossoms opportunely; and the fruit is swelled to perfection, however different periods of growth in plants of one family fall together. But, under a course of artificial culture, although a similar promiscuous succession may go on, and be cherished to the end of fruiting, without miscarriage; yet, to let the critical periods of growth fall in winter, without any failure of the crop or debasement of the fruit, requires so much additional expense and attendance, that our cultivators of pines endeavour to keep the MAIN stock of established plants just vegetating in winter, and to bring the time of full expansion in the plant, and as much as may be of the long and trying time of fructification, to coincide with the spring and summer of this climate. The dependence of the plant on artificial excitement is then so much less.

Hence, though it is contrary to the free progress of nature,

the Succession-Pines are kept under a temperature rather lower than that of the Nursing-Pit, in order that while the complete developement of the plant is provided for, it may not be excited into fruit prematurely in regard to its age, nor unseasonably as to the course of the natural climate during the period which the fruit will take to ripen.

STANDARD FOR THERMOMETER IN SUCCESSION-HOUSE.

	Minimum.		*Maximum.*	
	Climate and Dung heat.	*Climate & Tan, with Fire when necessary.*	*Artificial Heat.*	*Sunshine & heated Confined Air.*
Sept.	65	65	68	75
Oct.	58	62	64	70
Nov.	55	60	62	68
Dec.	55	60	62	65
Jan.	55	60	62	66
Feb.	58	60	65	70
Mar.	60	65	68	70
Apr.	62	65	68	70
May	64	66	68	72
June	66	66	68	75
July	68	68	68	80
Aug.	70	70		80

First Planting from the Nursery-Pit.—Sometimes the plants, originated in the Nursing-Pit in August or September, will be fit to bring into the Succession-House in March or April following; and sometimes, not till the anniversary season. Those, from late fruiters, originated in March, will be mostly established by the end of summer; during which period they should be encouraged to grow, by repeated shifting into larger pots, as the plants require.

When the plants are a year old, and it is deemed advisable to encourage their growth to larger size before they go to fruit, make arrangements to complete the business of *Shifting* in one day. The disrooting them does not give any check, if it be done in the summer months.—Be prepared with a bed of lively tan, the number of pots, the compost for pines, and some clean sea-gravel or shivers. As each plant is taken from the pit, tie the leaves together. Turn them out of the old pots singly. Then proceed as follows:

Shake off the ball of mould. Strip off a few of the lower leaves. Cut the roots off entirely: further, if the roots are scanty, or decaying, prune away a small portion of the stem, cutting in to the quick. Pot the plants: plunge them in the

tan, not entirely to their rims, till the new heat rising from the bark can be ascertained. Leave about five inches space between each. Keep them under a strong heat; and forbear to give water, or to admit cold air, till the plants have struck root.

Intermediate Shifting.—When plants are to remain in the Succession-House a year, shift them in March following their introduction. Let the fresh pots be full eight inches in diameter, and ten inches deep. It is one of the most availing precautions against the premature fruiting of pines, to allow rising plants a capacious bed, and free space for the herb to expand.

In turning healthy plants, NOW, out of the old pots, endeavour to preserve the ball of earth entire. But where plants appear to be sickly, and to be infested with insects, or to have bad roots, brush away the old earth entirely: then, with a sharp knife, trim the longest fibres; and if any part of the main root be unsound, cut it away. Strip off some of the lower leaves. Replant in the new pots. Set the plants in the bark-bed, leaving the pots partly out, lest the first heat should be too strong. There should be a distance of seven inches from pot to pot. Water full-rooted plants gently, to settle the mould. Plants divested of roots are not at present to receive water.

Second Intermediate Shifting.—The roots of large plants which were shifted in March should be examined at the end of May, or in June. If they have filled the pots, it will be necessary to shift them into pots of an increased size, so as to admit new compost to the extent of an inch all round the old ball. The diameter of the pots at top should be nine inches; the depth twelve, including an inch of pearly gravel at the bottom. If the roots are matted, carefully disentangle them: prune off old fibres, or not, according as the root has previously been spared or retrenched. In all cases, cut away unsound parts of the root, and slip off a few of the oldest leaves. After replanting, distribute the pots eight inches apart over the surface of the bed, without plunging them to their full depth till the heat of the renewed tan is ascertained.

THE FRUITING-HOUSE.

Temperature.—As long as it would be dangerous, or at least not desirable, to have the plants shew fruit, the temperature should be kept reduced to that of the Succession-Pit. But a capital elevation, in the course of heat maintained here, must be made for about eight of the last months which the plants

will remain in the house; that is, just as it becomes fit to excite them into fruit, and during the whole period of fructification.

As to the maximum of heat for plants *already in fruit*, the degrees expressed are merely to indicate that it would be an unnecessary expense to go higher; but should the natural climate not supply a greater heat, to go five or ten degrees higher, so far from being attended with danger, would be beneficial to ripening pines, particularly in allowing air to be given with greater security.

STANDARD TEMPERATURE FOR THE FRUITING-HOUSE.

	Minimum.		*Maximum.*	
	Climate and Dung heat.	*Climate & Tan, with Fire when necessary.*	*Artificial Heat.*	*Sunshine & heated Confined Air.*
Jan.	60	63	65	70‖75
Feb.	63	66	68‖70	82
Mar.	65	67	70	84
Apr.	65	67	72	86
May	65	68	72	88
June	68	68	75	90‖96
July	70	70	75	100
Aug.	70	70		100
Sept.	66	66	72	98
Oct.	63	66	70	94
Nov.	63	66	68	86
Dec.	63	66	68	82

Introductory Shifting.—The main set from the Succession-Pit will usually be ready for this house in the course of August. As to a criterion for removing full-grown pines; shift them just as the roots have filled the pot, so as to turn out whole (see p. 23). Late plants may not be in this state till October. The bark-bed, here, must be renewed as on every occasion of re-potting plants: but to guard against an untimely show of fruit, the strength of the new bark must be kept considerably below the extreme limit; and there should be a layer of old bark, to the full depth of the pots.

For the large sorts, provide pots twelve inches in diameter (that is, *eights*), and fifteen inches in depth. For forward plants also, which you are apprehensive require free space for the root and herb, to prevent them from fruiting too early, provide pots two inches wider and three inches deeper than those out of which they are to be turned: but the additional room in the pots should be no more than you may calculate the roots will fill up by the time at which you propose to have the fruit. On the other hand, if you have any reluctant fruiters, when you

transfer them to the Fruiting-House, postpone shifting them into new pots, in order that the impletion of the pots by the roots may accelerate their fruiting; or shift them into pots barely large enough to receive the roots, putting them into mould rendered, by an increased quantity of river-sand and fresh-loam, somewhat less rich than the compost for pines in general.—Whichever of these courses may have been taken, as soon as they shew fruit in the spring, shift them into large pots, WITHOUT DISTURBING THE BALL OF EARTH; then fill the pots with the best mould.

Lay in the bottom of the fresh pots, clean shivers, or sea-gravel, to the thickness of two inches (see p. 23), and as much compost as will keep the ball, or root, to be received level at top with the rim.

At the shifting of plants that come from the Succession-Pit, twist off some of the bottom leaves, as far as the ripened stem is ready to send out new roots. Turn out each plant with the ball of earth entire, set it in the new pot, fill the vacancy with compost, and raise the mould to the lowest leaves by spreading compost over the ball; leaving a hollow descent to the depth of the rim, to hold water. Plunge the pots in the tan-bed, distributing those in the same range eight inches apart.

When plants which were regularly shifted come into fruit early, and it is wished to retard them, you may give them a second shifting in February, or at any time before the fruit has attained half the full diameter; putting them into pots one size larger, and proceeding, in other respects, as at the introductory shifting. This acts as a temporary check, and the advantage of fresh mould contributes to swell the fruit. To plants which are sickly, or growing out of shape, the best remedy is, to shift them as soon as this is perceived, changing the mould, and pruning away decayed parts of the root, as there may be occasion.

Thus the cultivation of the pine-apple involves the necessity of causing the plant to grow, during its first period of vegetation, to the greatest extent. The second is, that of checking the growth of the plant, in order that this exotic may secrete the true sap (see § 42, p. 22); and then to give all the facility for its further increase: some of which kinds require three years; while others are caused thus to arrive at the best state of maturity within three. The natural growth of the pine-plant is thus assimilated to the English climate, and the fruit becomes fitting for the table at the best season. But, by adhering to rules similar to these, with such variations as the skilful gardener

can devise, pine-apples, in comparative perfection, may be, and are, produced every day in the year. The Editor has seen this effected, and could effect it; but his attempt to lay down absolute rules, beyond the aforesaid system of cultivation, would be as impossible as it would for a physician to prescribe to his patient without having the means of exercising his judgment on the constitution he undertakes to cherish. Experienced Gardeners are a valuable, and were once considered a respectable, class of men. It is unfortunate for them that their remuneration for service is far below what it once was! This neglect of them will, it is to be feared, cause the art of Horticulture much to decline; as few men who know their own value will be found to practise it.

Treatment till the Plants flower. — Endeavour to keep the plants growing gently, and to have the pots, in general, completely filled with the roots by the time at which you intend to excite them into blossom. From the middle of February to the 1st of March is a good time to have the main crop in flower; as the prospective season is the finest. About a month before you expect to see fruit, dress the plants, by taking away two inches in depth from the top of the mould. Twist off some of the lower leaves. Fill up with fresh compost, round the stem, to the remainining leaves. The bark-bed should be revived at the same time, so as to make it lively: but no new tan should be added, till the time for the fullest heat arrives.

Bark-bed for Plants in fruit.—Although the tan which has been employed to raise a gentle bottom-heat may not be exhausted, the strength of the bed must be raised to a maximum by the introduction of new tan: if the bottom heat be weak or unsteady, the fruit will not swell to a good size. On the other hand, when new tan has been brought in, to avoid over-heating the roots of the plants, let the pots stand partly above the surface, or be in contact only with the old tan.

Fire-heat —The fruit will not swell off fine, if the heat from the flues be too languid to support the prescribed minimum temperature, until the full dominion of summer supersede the aid of the furnace altogether.

Watering Plants in fruit —Between the times of watering, sprinkle the flues. Always suspend watering over the plant till the blossoms are fairly set. Afterwards, while the fruit continues green, it will be beneficial to give water now and then, over the plant, from a fine rose-pan: even departing winter is some restraint upon this; but after March has com-

menced, wash the herb perfectly clean every eight days. Use soft water that has been warmed to the temperature of the house; and, for two or three hours after, have a maximum heat from the flues to exhale superfluous moisture. Moderate humidity and the suitable degree of heat will make the young fruit swell apace. At seasons when the mid-day sun has much power, it is best to water over the leaves as soon as the morning sun is felt on the house, or two hours before sunset. The fruit will not swell off fine, if there be any deficiency in giving water.

When the fruit is well swelled, forbear to water over the fruit or leaves: but it is still necessary to keep the earth about the roots a little moist. Nor, when the fruit is pretty large, should water be poured into the crowns so copiously as to stand in them more than one day. The different degrees in which the varieties stand in need of water must not be forgotten (see p. 457). As the pine-apples begin to ripen, put them on short allowance of water; for excessive humidity spoils the flavour of the fruit. Begin the reduction by decreasing the quantity; for, in hot weather, frequent small supplies should be given on account of the suckers on the plant, till consideration for the fruit forbid even sparing waterings, lest it should be rendered insipid.

Giving Air to Plants in fruit.—Without plenty of air daily, the fruit will not swell to a handsome full size, nor will it acquire the elevated flavour which belongs to the pine-apple when in perfection.

Retarding Fruit. — Contrivances for retarding fruit are sometimes resorted to, that plants which have started too soon into fruit may have a better season to ripen in; and sometimes, in order that a whole crop may not come in at once. If you perceive the fruit ripening too fast, or advancing too nearly together, set as many plants as you intend to retard into a dry airy place, affording both shade and shelter. Give little water, as long as you wish to suspend their progress. For the same purpose, others may be set out green: while the excitement of these is lowered, they must be kept in a growing state.

Cutting Ripe Pines.—The indications of maturity are, a diffusive fragrance, accompanied by a change in the colour of the fruit; most sorts becoming yellow, or straw colour; others, dark-green, or yellowish tinged with green. Cut pine-apples before they are dead ripe, or the spirit of the

flavour will be dissipated. Bring away, with the fruit, above five inches of stalk; and leave the crown adhering to the top.

Refitting the House.—When the bulk of the fruit has been cut, in order to make room for a new set of plants from the Succession-House, remove the old stocks, carrying the few pines, which may not have terminated their fruiting, to a stove of the proper temperature. Then refit the house and the machinery.

DRY STOVE.

THE chamber, to be heated, may be reduced in depth, without the loss of any useful space, by building the solid floor in wide steps, each rising eight or ten inches higher to the back wall. While this serves instead of a wooden stage, the elevated floor, and prominent sections of basement-wall, will cause a much stronger reflection of sun-heat.

The Dry Stove is peculiarly adapted for the constitution and habits of succulents from hot arid climates. It is also calculated for the habitation of such exotics, whether Shrubby or Herbaceous, as are too tender for the Green-house, and yet not marked, by their native climates, as the most tender among stove-plants.

Most of the Cape Heaths, commonly included in the List of Green-house plants, do better in a Dry Stove; unless the Green-house is kept in winter at a higher temperature than the general plants of that department require, and unless the house is adapted for some constant inmates in summer. The art of cultivating exotics is carried to so great a pitch of excellence at St. Petersburgh, that houses of glass are constructed to keep the plants of various climates. English gardeners do not recognise more than the few detailed plants which succeed in a temperature below that of their native climate, but all will succeed in a higher one. See *Observations on the Nurturing Affinity of certain Plants*, § 44. p. 22.

The superior splendour of the new varieties of Cactus, &c., lately introduced, will warrant attention being paid to this article.

In the Dry Stove, it will not be necessary to light the fires before the external air is down to 55°. The lowest temperature to be safely proposed is 50°. In very rigorous weather, a good heat from the flues is wanted in the middle of the day, to allow the guarded admission of fresh air: but this need not be carried higher than 65°. When the sun shines with sensible effect in winter, air may be given freely till the thermometer

descends to 60°. In summer, the maximum from sunshine, and from the confinement of heated air in the chamber, should never exceed 75°; and fresh air should generally be admitted in some degree, while the natural climate sustains itself at 65° within three hours of noon.

Management of Fruit-trees in Pots.—We are indebted to Mr. Knight for the following instructions. Fruit-trees from which a crop of fruit is required very early in the season should possess the power of vegetating very strongly in moderately low temperature, at the period when they are first subjected to artificial heat; and for this purpose, it is most expedient to keep such plants in pots, as they can be removed from the excitement of the house, or brought under its influence at the discretion of the cultivator.

A pot which contains a quantity of mould equal to a cube of fourteen inches has been found large enough for a vine whose foliage occupied a space of twenty square feet; water, holding manure in solution, being abundantly given. Grapes acquire a larger size, and other fruits a higher flavour, under such management, than under any other.

The supposed necessity of frequently removing fruit-trees which grow in pots, to other pots of larger dimensions, appears to present a good deal of inconvenience: but this necessity is readily obviated, by means which can be confidently recommended to the attention of gardeners. When the plant or fruit-tree is first placed in the pot in which it is to remain, mix with the compost some material, in greater or lesser quantity, capable of ultimately affording nutriment, but which will decompose slowly. In some cases, slender half-decayed branches from the wood-pile may be employed; in others, sound chips, chiefly of apple-tree, mixed with mould, and in sufficient quantity to occupy at least one-fourth of the space afforded by the pot. As the roots of the plants increase, the lifeless wood gradually decomposes, at the same time giving food and space to the roots; which, consequently, do not become injuriously compressed in the pot. A nectarine-tree, after nine years' growth in the same pot, vegetated more strongly than it previously had done.

The trouble of conveying water to numerous pots, in hot weather, might be very considerable; but this inconvenience has been remedied by a very ingenious contrivance of Mr. Loddiges, of Hackney. A leaden pipe perforated with small holes, and regulated by a stop-cock, conveys the water, and

disperses it, as in showers, upon the foliage of his plants: thus the labour is reduced to the act of turning a cock: and if it was desirable to diminish or wholly take away the supply from any particular pot, this might easily be effected, by partially or wholly closing the apertures through which the water is made to escape from the pipe.

FORCING DEPARTMENT.

THE forcing of fruit from hardy plants, at an earlier season, or in higher perfection, than crops can be obtained in the open air, is an important branch of gardening. The Forcing-house has been defined in the introduction to the Hot-house. Plants of different constitutions require the course of heat to be varied both in climax and duration: the principal houses are those for the Grape, the Peach, the Fig, and the Cherry.

GRAPE-HOUSE.

Several varieties of the *Vitis vinifera* have been specified as proper for forcing, at the end of article *Vine*, under FRUIT GARDEN. The following list is partly a recapitulation of these, with some notices of their qualities, and partly a supplement to the catalogue.

Greek. — Berry rather oval, middling-sized, bluish-white. Skin thin. Pulp delicate, and much esteemed.

Black Hamburgh.—Berry oval, large. Skin thick. Pulp hard, but fine-flavoured.

Gibraltar, or *Red Hamburgh.*— Berry rather oval, large, dark-red. Skin thin. Pulp tender, juicy, and well-flavoured.

Portugal, or *White Hamburgh.* Berry oval, large. Skin thick. Pulp hard, not highly-flavoured. Bunch large and handsome.

White Muscadine (*Chasselas*). Berry round, moderately large. Skin thin. The pulp, which is delicate and juicy, has a far superior flavour when the vine is in a house, to that of fruit on exposed walls.

Royal Muscadine.—Berry round, middling-sized, white-amber. Skin thin. Pulp tender and juicy. Bunches frequently weigh six pounds.

White Sweetwater. Berry round, large, white. Skin very thin, the pulp particularly delicate.

Small Black Cluster, or *Burgundy.* — Berry inclining to oval, small. Skin fine. Pulp tender and sweet.

Large Black Cluster.—Less delicate than the preceding, the juice being rather harsh and rough in taste. Said to be the grape from which the wine called Red Port is made.

White Frontignac. Berry round, middling-sized, greenish-yellow. Skin fine. Pulp juicy, and of a high musky flavour. Bunch large.

Red Frontignac.—Berry round, middling-sized, bright red. Skin fine. Pulp of an elevated flavour.

White Raisin. — Berry oval, large. Skin thick. Pulp firm. Bunch long and handsome.

Black Raisin.—Except in colour, similar to the last.

White Muscat of Alexandria.—Berry oval, large, amber-coloured. Skin thick. Pulp not abundant in juice, but of exquisite musky flavour

St. Peter's.—Berry roundish, rather large, black, VERY LIABLE TO CRACK. Skin thin. Pulp tender, and full of juice. Bunch large.

Black Palestine.—A variety of the St. Peter's, but preferable to that, because the berries are not subject to crack.

Syrian. — Berry oval, large, white. Skin thick. Pulp firm, with a flavour inferior to that of more delicate sorts. Bunch grows to a noble size, and the fruit will keep much longer than that of other sorts.

Tokay. — Berry inclining to oval, midddling-sized, white. Skin thin; pulp melting, juicy, and agreeably flavoured.

Malvoise, or *Blue Tokay.*—Berry inclining to oval, small, brown. Skin thin. Pulp tender, abounding in juice of an exalted flavour.

Lombardy, or *Flame-coloured Tokay.*—Berry round, large. Skin thin. Pulp richly-flavoured. Bunch large, sometimes weighs seven pounds.

Black Muscadel.—Berry oval, large. Skin thin. Pulp juicy, and delicately flavoured.

Red Muscadel. — Berry oval, large. Skin thick. Pulp firm. Bunches sometimes weigh six or seven pounds. Ripens late.

White Constantia.—Berry inclining to oval, moderately large. Skin thin. Pulp tender and well-flavoured.

Black Constantia. Smaller than the White sort, and not so highly-flavoured.

Morocco, or *Le Cœur.*—Berry heart-shaped, large, tawny; berries on the same bunch irregular in size, the smaller without stones. Fruit much esteemed for its flavour. Plant scarce.

Black Damascus.—Berry round, large; on the same bunch, different-sized berries in contact; the smaller without stones; the larger with a single stone. Skin thin. Pulp delicate, juicy, and exquisitely flavoured. Ripens late.

Black Tripoli.—Similar to the preceding, except that the berries are regular in size, having one stone each; and the bunches handsomer.

Aleppo.—Berry roundish, middle-sized; on the same bunches black and white berries are frequently intermixed; and sometimes the same berry will be exactly divided by black and white on the opposite sides.

Smyrna. — Berry oval, large, red-coloured. Skin thin. Pulp delicate and juicy.

Claret. — Berry oval, small, black. Juice blood-red. If the berry is perfectly matured, the pulp is tender and agreeable.

Damson. — Berry oval, large, bright purple. The leaves are peculiarly thick and succulent, having the appearance of green leather.

Early White Teneriffe.—Berry round, moderately large. Skin thin. Pulp delicate, juicy, and

peculiarly delicious. May be forced very early.

White Corinth.—Berry round, small, white. Skin thin. Pulp tender, juicy, and well-flavoured.

Soil.—In proportion as the culture of the Vine in a stove is more costly, so it is important to fill up the borders with a compost suited to the constitution of the plant. The following are the materials and proportions of a good compost. Of top-spit sandy loam from an upland pasture, one-third part; unexhausted brown loam from a garden, one-fourth part; scrapings of roads, free from clay, and repaired with gravel or slate, one-sixth part; vegetable mould, or old tan reduced to earth, or rotten stable-dung, one-sixth part; shell marl or mild lime, one-twelfth part. As to the depth and extent of the borders, they cannot be made too wide: the roots of the vines will extend 30 or 40 feet; and the soil, made good, is always valuable for crops, or flowers that may be grown there.

Planting.—When Vines are to be forced in a Hot-house, they are planted on the outside. A Vinery allows the stems to stand under the glass, without being subject to a permanent heat, which is a great advantage. When a plant is to be carried through a hole in the wall of the house, protect the upper part of the shoot with a wrapping of moss, kept on by some folds of soft paper and bass-matting.

Mark centres, for holes to be dug, in a line with each rafter, on the outside, close to the front wall, of a Hot-house; and between the parapet and front flue, in a Vinery. Dig each hole something wider, and about an inch deeper, than the pot which contains the plant. Turn out the plant carefully, so as not to break the brittle extremities of the fibres. While one workman holds the ball steady, let another fill in the compost under and round it. Raise the surface an inch above the ball; settle the mould with a little water; and lay over a slight mulching of rotten dung. If the plant stand on the outside of the house, put the end of the shoot through the hole, take off the moss, and fasten the top of the shoot to the inside trellis.

In narrow lofty Vineries, where the plants are assigned to a border close to the back wall, they are trained to a light open trellis, a little detached to the wall and flues.

Training the first Season in the House.—The Vines may be expected to shoot soon after being in the stove: to provide against an accident, you may allow two shoots to start a little way: as soon as the principal is fastened to the rafters, take

off the other, but not at once, close to the old wood, lest the Vine should bleed. Train up a plant under each rafter.

From the time the Vines begin to shoot, they will require daily waterings, and more especially in the early part of the season, before the roots have struck deep into the border. As the shoots advance, keep them regularly fastened to the rafters. Divest them of their wires or tendrils, and also take off their laterals, as they appear. The Vines in general may be permitted to run twenty feet, and the most vigorous thirty-five feet, before they are stopped, if the rafters extend so far. Sometimes a vigorous shoot, having extended the length of the rafter, is conducted either in a returning direction down a contiguous rafter, or laterally along the top of the stove, as may be most convenient.

It is not advisable to let young Vines produce fruit the first season; and if plants in a bearing state are cultivated one season in the house, previous to forcing, in order to be effectually rooted, they are likely to sustain forcing better, and to last longer fruitful.

As soon as the leaves begin to fall, proceed to the winter pruning. If the shoots have grown with great, and nearly equal vigour, you may mark off every alternate plant for a distinct course the following season. The most vigorous plants may be prepared for fruiting: prune these down to twenty-five, twenty, sixteen, or twelve feet, according to circumstances. Prune the weaker plants, with a view to supply bearing wood, to come in the season after next: shorten these to five, four, or three eyes. Having chosen a bold eye to terminate the shoot, with a clean slope, sever it full half an inch above the eye.

Care of Outside Stems.—As soon as frosty nights may be expected, the stems planted on the outside of a Hot-house should be guarded from the stagnating effects of cold, by a bandage of hay, or moss and bass-matting, round the bole, and a mulching of dry litter over the root. The excluded stems must be protected in the same way at the commencement of the forcing season. While the Vines are young, it will also be advisable to cover the outside border, in winter, with strawy dung taken from the outside of old hot-beds.

Culture the Second Season in the House. It is a disadvantage attending Vines in a Hot-house, that they sometimes begin to push shoots, and to shew fruit, before it is wished to excite them. For this there is no preventive: to check the plant

would be injurious, and end in feeble shoots and small bunches: the best course is, to raise the heat of the house up to the maximum for the principal article cultivated in it, that the eyes may push generally.

As soon as the shoots are half a span long, the rudiments of the bunches will be perceptible. The bunch is produced on the naked side of the shoot, opposite the leaf-bud. Having ascertained the most-promosing shoots, divest the Vines of supernumerary branches as they rise. Fruitful laterals will sometimes shew two or three bunches at each eye; and this is apt to tempt the pruner to retain too many. On the leading shoot, retain of the best laterals, to the right and left, a number proportioned to the vigour and age of the plant;—one, on each side, as near the bottom as it offers, with a second, third, fourth, up to SEVEN, at the distance of THREE feet, if the plant is in its fourth summer; but only FIVE, at the distance of FOUR feet, if this be the third summer since the plant was struck. Train the shoots reserved on each side the rafter, tying them to the trellis with strands of matting. Leave on each branch TWO BUNCHES, or a SINGLE BUNCH; according as the plant is in the FOURTH, or THIRD, season from its origin: pinch off the others. Afterwards, stop the bearing laterals at the second joint above the fruit. Pinch off inferior laterals and tendrils.

Give air pretty freely by the sashes until the leaves unfold. Before the foliage is fully made out, begin to keep the house close, admitting air only by the ventilators; and particularly observe to have a sultry moist climate, while the blossom is coming out, and until it is off, and the fruit set.

The TIME OF FLOWERING is a critical period. If brisk winds accompany hot and dry weather, the berries of many kinds are apt to fail in setting. The best precaution against this, is, to sprinkle the walks and flues copiously; and immediately afterwards close the glasses. (See *Temperature* below.) From the time the buds rise till the fruit is set, manure the border, once in ten days, with the drainings of the dunghill, poured over the roots of the plants.

On some sorts the berries grow so crowded in the bunches, that they have not room to swell, and are also liable on that account to decay before they are mature. While such sorts are yet no larger than green currants, thin out the superfluous berries with fine-pointed scissars.

While the fruit is swelling and ripening, the plants will want abundance of heat and air.

If you wish to preserve ripe Grapes some time on the Vine, unimpaired in flavour, keep the house cool and dry.

After cutting the fruit, take off the laterals.

Methods of Pruning.—The pruning of established Vines admits of much diversity of method, as the plants are in different situations. Without reckoning the cutting down of young or weak plants, alternately, to the lowermost summer shoot, which is but a temporary course, three different systems of pruning have their advocates.

The FIRST is that laid down in the *Fruit Garden:* as to every point, it is applicable only to Vines out of doors; but it may be transfered to plants in a Vinery without any capital alteration. In this method, one perpendicular leader is trained from the stem; at the side of which, to the right and left, the ramifications spring. When the plant is established, the immediate bearers, or shoots of the growing season, and the mother-bearers, or shoots of the last year's growth, are thus managed. Soon after the growing season has commenced, such rising shoots as either are in fruit and fit to be retained, or are eligibly placed for mother-bearers next season, are laid in, either horizontally or with a slight diagonal rise, at something less than a foot distance, measuring from one bearing shoot to the next: the rising shoots, intended to form young wood, should be taken as near the origin of the branch as a good one offers, to allow of cutting away, beyond the adopted lateral, a greater quantity of the branch, as it becomes old wood: the new-sprung laterals, not wanted for one of these two objects, are pinched off. The treatment of those retained, during the rest of the summer, thus differs. As the shoots in bearing extend in growth, they are kept stopped about two eyes beyond the fruit:—the connate shoots, cultivated merely to enlarge the provision of wood, are divested of embryo bunches, if they shew any; but are trained at full length as they advance during the summer, until they reach the allotted bounds: were they stopped in the middle of their growth, it would cause them to throw out troublesome laterals. In the winter-pruning, there will thus be a great choice of mother-bearers. That nearest the origin of the former mother-bearer, or most commodiously placed, is retained, and the other or others on the same branch are cut away: the rest of the branch is also taken off, so that the old wood may terminate with the adopted lateral: the adopted shoot is then shortened to two, three, four, or a greater number of eyes, according to its place on the Vine, its own strength, or the strength of the

Vine. The lower shoots are pruned-in the shortest, in order to keep the means of always supplying young wood at the bottom of the tree.

The SECOND method is, to head down the natural leader, so as to cause it to throw out two, three, or more principal shoots: these are trained as leading branches; and in the winter-pruning are not reduced, unless to shape them to the limits of the house, or unless the plant appears too weak to sustain them at length. Laterals from these are cultivated about twelve inches apart, as mother-bearers: those in fruit are stopped in summer, and after the fall of the leaf are cut-in to one or two eyes. From the appearance of the mother-bearers, thus shortened, this has been called spur-pruning.

The THIRD plan seems to flow—from taking the second plan as a foundation, in having more than one aspiring leader; and from joining the superstructure of the first system immediately to this, in reserving well-placed shoots to come in as bearing wood. Thus, supposing a stem, which has been headed, to send up four vigorous competing leaders,—two are suffered to bear fruit; and two are divested of such buds as break into clusters, and trained to the length of ten, twelve, fifteen feet, or more, for mother-bearers next season. In the winter-pruning, the leaders which have borne a crop are cut down to within two eyes of the stool, or less, according to the strength of the plant; while the reserved shoots lose no more of their tops than is necessary to adjust them to the trellis.

One of the two last methods is the best adapted for a Hot-house; because the cultivation of other plants as principals requires that no more of the glass should be occupied by the Vines than is absolutely necessary. When old wood of four or five years' growth is to be removed, cut the shoot close to the bole, and pare the wound smooth.

At first planting a house, some of the Vines may be introduced as temporary plants. After the wood from a good stool is able to cover the space between two or more lights, plants less vigorous, or which bear fruit not so well approved, may be taken quite away. A Vinery is better adapted for cultivating a single plant to a considerable extent than a Hot-house. (See the art. *Hot-house and Vinery compared*, p. 482.) Many incidental things proper to be regarded cannot be commenced and finished, or discontinued, fully or exactly in a permanent stove.

Time of beginning to force.—The growing season of our

climate does not last enough to bring out, swell to full size, and perfectly ripen, the fruit and summer-shoots of the Vine. Hence, when the artificial excitement, applied to this plant, begins before the natural spring, and is continued till the plant is beneficially assisted, by keeping up a proper degree of heat, Grapes may be produced at almost any season, from April to the end of summer.

Temperature.—Begin at 50° min. 55° max. In a week, raise the minimum to 55°, and the maximum to 60°. Till the time of budding, the temperature should not exceed 60° from artificial heat, and 64° from collected sun-heat. After the buds are in full motion, it be may raised to 60° min. 64° max. from fire, and 68° from sun-heat. By the time the bloom expands, the lowest effect from the flues should be 66°: the highest may be 72°; and when the sun's influence is strong, let it be accumulated, by confining the interchange of air to the ventilators, till the heat rise to 80°. Afier the fruit is set, the minimum should be 75°, and fresh air copiously admitted.

In a Pinery, the heat must not be diminished, when the forcing of the Grape begins, below the minimum of the house; nor when the Vine is in flower, or the Grapes are to be ripened, must the heat be augmented beyond the maximum, unless the Pines are in fruit. The Vines merely take the benefit of the heat, which is regulated in subservience to the Pines. In the Pinery, the Vines must be kept trained along the rafters only, lest they shade the plants beneath.

Dressing the Borders.—The borders should be kept at all times clear from weeds. In winter and spring, the surface of an open border should be turned with a three-pronged fork, not digging deep so as to injure the roots. The design is merely to revive the surface. When it is necessary to recruit the soil, dig the exhausted part carefully up, and work in such a compost as has been described under *Soil*, or similar. The dung out of a cow-house, perfectly rotted, is a fine manure for the Vine.

Remedies for Bleeding.—If the pruning has been timely, the Vine is not liable to bleed. When the sap rises before the wound is healed, bleeding ensues, and is not easily stopped. This retards the plant; and, out of doors, the loss of a few days is, in some seasons, irreparable: but, in other respects, the consequences of bleeding are not so disastrous as many seem to apprehend; and a Gardener is sometimes surprised by a subsequent crop of uncommon goodness. Innumerable

remedies for bleeding have been proposed: the following rank among the best. Sear the place, and cover it with melted wax, or with warm pitch spread upon a piece of bladder. Or peel off the outside bark to some distance from the place; and then press into the pores of the wood a composition of pounded chalk and tar, mixed to the consistence of putty.

Destruction of Insects.—After the winter-pruning, peel off the loose bark, and wash the stem and all the shoots with soap and water. Also give the border two or three soakings, over the roots, with soap-suds.

If the plants should get infested with the pine-bug, this insect is to be extirpated by syringing the leaves with a strong infusion of tobacco-stalks, as the methods proper in the Pinery are not applicable to the Vine. Other insects are to be destroyed as in GENERAL HOT-HOUSE.

Expedients peculiar to the Hot-house.—Notwithstanding the plantation of the stem of a Vine on the outside of the house, the rest proper to a deciduous plant cannot be given to it, if the branches are kept subject to the influence of a permanent heat after the leaves are fallen: it is, therefore, desirable to provide some facility for withdrawing the top of the stem, with its branches, out of the house, immediately after the fall of the leaf; to remain on the outside till it be proper again to force the plant. The sap, no longer excited, will thus become perfectly inert; during which state the plant will want no cover in this climate.

One contrivance for this end is—Instead of having the hole, by which the stem of the plant is introduced, made in the wall, to have a small space, at the bottom of one of the upright sashes, filled up with a separate moveable-jointed plate of wood: this may be, in shape, a half or quarter circle: it is made to take in two pieces, fitted exactly; the hole for admitting the stem of the Vine is pierced through the joint, so that the plate may be easily taken out, when the branches are to be withdrawn. Another expedient substitutes a little square joint of stone, to take in and out of the brick-work, perforated, and made of two moveable pieces, on the same principle.

Hot-house and Vinery compared.—A plant which has its stem on the outside of a Hot-house requires less trouble in watering: but this trivial advantage cannot compensate for the many circumstances of its situation which are not desirable. In other respects, the General Stove, as a Forcing-house for the Grape, has many circumstances of inferiority to the Vinery; and although the shades of inconvenience, or imperfect accommo-

dation, in the Hot-house, are not weighty enough to forbid the dedication of any spare room to the Vine, yet they are sufficient to confer very great credit on the manager who obtains a good crop of fine-flavoured grapes under them. The Vine, in a close house, is exposed to the effect of excrementitious vapours escaping from numerous exotics of different constitutions: most part of such vapours is condensed on the upper lights; it soon after falls down in drops, and lodges, in great measure, on the foliage and fruit of the Vine-plants. The effluvium from the bark-bed, unless it be kept very sweet, is also apt to be injurious. The shoots, when trained under the rafters, to avoid overshading the constant inmates of the stove, lose themselves the direct benefit of a great portion of light. Air cannot be given at all times, precisely as the stage of the Vine may demand. The same may be said of heat. The destruction of the Red Spider, by syringing the foliage with water, cannot be closely pursued, at all proper seasons; because when the Vine is not in the critical stage between blossoming and setting the fruit, or in the last stage of ripening, other plants may be in one of those stages. In the Vinery, as both stem and branches have the protection of the glass-case, there is no danger of a check, in frosty weather, from the stem not having sufficient covering, or from not partaking in the excitement enjoyed by the branches:—Sometimes, from a fissure in the bandage round a stem outside a house, the frost penetrates, the circulation of the sap stops, and the young shoots and leaves appear contracted and shrivelled. Lastly, in the Vinery, as soon as it is wished to give the plant rest, there is nothing more to do than to put out the fires.

PEACH-HOUSE.

A house for the Peach is equally adapted to the Nectarine. For general directions as to soil, methods of propagation and pruning, and the chief points of routine culture, see the *Fruit Garden*. Further, some instructions, relative to Forcing, are given at the end of PEACH, in that department; so that a few additional particulars will suffice in this place.

The utility of a list of Peaches and Nectarines, proper for forcing, will be augmented, by classing separately the cling-stones, which can scarcely be ripened but in a house; and by subjoining, to each variety, the natural time of ripening, whence the period of forcing may be better calculated.

PEACHES.

Cling-stones.

Late Admirable. Mid. Sept.
Old Newington. Late in Sept.
Portugal. End Sept.
Golden. Sept.
Catharine. Early in Oct.
Monstrous Pavie. End Oct.

Free-stones.

White Nutmeg. End of July.
Large Mignonne. Mid. Aug.
Belle Chevreuse. Late in Aug.
White Magdalen. End Aug.
Red Magdalen. End Aug.
Montauban. End Aug.
Chancellor. End Aug.
Early Admirable. Begin. Sept.
Malta. Early in Sept.
Royal George. Mid. Sept.
Noblesse. Mid. Sept.
Le Teton de Venus. Late in Sept.
Late Purple. Late in Sept.

NECTARINES.

Cling-stones.

Red Roman. Late in Aug.
Newington. End Aug.
Golden. Sept.
Brugnion. Late in Sept.

Free-stones.

Scarlet. End Aug.
Murry. Early in Sept.
Temple. Sept.
White. Aug. and Sept.

Situation in the House.—Permanent occupants, intended to be forced early, should be planted in a front border, and trained up a trellis just under the glass roof; and also to an upright trellis, near the back wall.

Plants in Pots and Boxes.—All the varieties of the *Amygdalus Persica* are extremely well suited for forcing in large pots or tubs. Small plants, intended to come in before or after those in the borders, may be excited, in the first stage, in a distinct house; so as the temperature of that in which they are brought to finish fruiting be suited to their progress. The compost for plants in pots or boxes ought to be light and rich.

Time of beginning to force.—From the rise of the sap, it occupies, in some sorts, about four months to make mature fruit; in the later varieties, five months; and when much of winter is included in the course of forcing, the time is proportionally lengthened. To ripen moderately early kinds by the end of May, begin to force on the 21st of December. Little is gained by commencing sooner. Bnt you may put on the glasses a week before, and make gentle fires, admitting a constant stream of fresh air, to get the house ready.

Temperature.—Begin at 42° min. 45° max. from sun-heat; and rise in a fortnight to 45° min. and 50° max. from sun-heat, giving plenty of air: in the progress of the second fortnight, augment the temperature, from three to eight degrees, so as to have it, at the close, up to 53° min. 56° max. from sun-heat, admitting air in some degree daily. When the trees are in blossom, let the minimum heat be 55° min. 60° max. Con-

tinue to aim at this till the fruit is set and swelling. When the fruit is set, raise the minimum to 60°, the artificial maximum to 65°, in order to give fresh air: when the sun shines, do not let the maximum from collected heat pass 70°, rather employing the opportunity to admit a free circulation of air.

Watering.—While the fruit is in blossom, steaming the flues must be substituted for watering over the trees: at the same time, you may water the roots now and then gently, avoiding such a copious supply as might risk the dropping of the fruit to be set. Let the water be warmed to the air of the house.

Management of the House when at rest.—This should be nearly as for the Grape-house, except when there is but one set of frames to serve both an Early Peach-house and Late Grape-house: in which case, as soon as the young wood of the Vines is perfectly ripened, the glasses should be brought back to the Peach-house: for although the fruit of the Grape is to be set and ripened in a higher heat, the Peach-tree, as a plant, is more tender than the Vine; and, independently of forcing, comes into blossom about two months sooner.

FIG-HOUSE.

A separate house is seldom worked for the Fig-tree. This, however, seems a proper place for a short notice of the principles on which it is forced; because, from leafing time till the ripening of the fruit, this plant requires a temperature between that scale which is proper for the Peach and that for the Cherry. It may be introduced with general good success in a house where either of those plants is the principal.

The *Ficus Carica*, a native of the South of Europe, is a plant of a delicate constitution. It is not advisable to keep the frame off throughout the winter; but if the glass-case is wanted elsewhere, both the root and herb should be protected during frost; the root with dry long litter; the branches, if unnailed and laid down, also with litter,—otherwise, with matting.

The following are good sorts to force. The natural periods of ripening are annexed.

White Geneva. Yellow, large, high-flavoured. End Aug.

Chesnut. Globular, brown, large. Pulp purplish, delicious. July, Aug.

Black Ischia. Shortish, flat-crown'd, blackish. Pulp bright, high-flavoured. Mid. Aug.

Br. Ischia. Pyramidal, brownish-yellow, small. Pulp purplish, very rich. Aug. Sept.

Black Genoa. Pear-shaped, black, large. Pulp bright-red, high-flavoured. Aug.

Malta. Flat-topped, brown, small. End Aug.

Plants in pots may be easily removed, at all times of the year, to those situations which are most suitable, as the Fig-tree may be at rest, or in a state of growth.

Fig-trees in a house, and especially those in pots, require abundance of water, in the stages suitable for watering fruit-trees. For the method of pruning, and other articles of general culture, see *Fruit-Garden.*

CHERRY-HOUSE.

On the subject of forcing the Cherry, little in addition to what has appeared in the *Fruit-Garden* will be necessary. The principal thing is, to regulate the course of heat by a specific scale.

Temperature.—Begin at 40° by Fahrenheit; and throughout the first week, let the minimum be 40° and the maximum 42°, giving plenty of air. By gradual advances in the second, third, and fourth week, raise the course to 42° min. 45° max. In strong sunshine, admit air freely, rather than have the temperature above 52°, by collecting the warm air. In the fifth and sixth week, the artificial minimum may be gradually elevated to 45°; but the maximum should be restrained to 48° from fire-heat, and to 55° from sun-heat, until the plants are in flower. After the blossoms are shewn, and until the fruit is set, aim to have the heat from the flues at 48° min. 52° max. At this stage, maintain as free an interchange of air as the weather will permit; and when the sun-heat is strong, do not let the temperature within exceed 60°. Attend to this till the stone of the Cherry becomes hard; and then increase the heat at pleasure, to ripen the fruit.

As the fruit is to be swelled and ripened, the requisite heat is 60° min. 65° max.

In forcing the Cherry, it is essential to continue a free renovation of air; always sustaining the minimum heat in the different stages. The blossoms will sometimes fall abortive, or the young fruit drop off after setting, from no other cause than a stagnant atmosphere.

Extirpation of the Grub.—The Cherry is liable to be infested by a small grub-worm, which rolls itself up in the leaves, and extends its ravages to the fruit. As soon as this insect is perceived, the trees should be searched daily, that it may be destroyed by the hand, and prevented from spreading. It usually shews itself first about the time of flowering.

MISCELLANIES.

Plums and Apricots may be forced under the same heat as the Peach.

Pears, particularly the Jargonelle and Green Chissal, are sometimes forced by applying a glass-case and forcing machinery to a south-wall, furnished with established plants. But as to perfectly-hardy plants, for an anticipated crop from which there is not a regular demand, it is more advisable to prepare them in pots. Currants, Gooseberries, and Raspberries, are well adapted for occasional introduction.

GENERAL DIRECTIONS.

Watering.—Discontinue watering over the herb of plants in bloom till the fruit is set; as well as giving water to plants of which the fruit is nearly ripe.

Steaming the Flues.—To pour water occasionally on the flues when they are at a maximum heat, tends to fill the house with a fine growing vapour, refreshing to the foliage of plants, but destructive to most insects; and when watering over-head cannot be practised, this resource is particularly favourable.

Winter Pruning.—The winter-pruning should be effected immediately after the perfect ripening of the wood, and the fall of the leaf.

Destruction of Insects.—As in Grape-house and General Hot-house. Wash the trellisses also with the liquid composition described in Pinery, p. 461.

FRAMES AND PITS WITHOUT FIRE-HEAT.

Under this head, it is merely intended to supply such directions as become necessary, from substituting the moist heat from fermenting stable-dung, or tree-leaves, for the occasional aid of fire in winter. The principles of common culture, and of forcing, not affected by this change, must be sought under those departments to which the plants, as they may be hardy or tender, belong—such as, ASPARAGUS, CUCUMBER, MELON, PINERY. See also Introduction to HOT-HOUSE, *Upright Frames.*

Flued Pits without a Furnace.—Some brick frames are consructed with flues to receive the vapour of fermenting dung. Under the layer of mould in which the plants are grown, instead of a bed of hot dung, there is a hollow chamber formed of brick-work: the sides of this frame are of half-open brick-work two-thirds of the height. This chamber communicates with quadrangular flues above, which encompass, and cross under, the cradle for the mould. To fill this chamber with

heated air, linings of hot dung are laid against the open brick-work at the sides: thus a body of heated air is introduced under the cradle for the plants, which, passing into the flues, circulates round it: at the same time, no rank steam is admitted under the glass-case, which rests upon the brick frame. Some persons approve of this kind of frame; and others disapprove of it: but when the management of the air-chamber is understood, it may be applied very successfully to the forcing of early melons and choice esculents. It allows new stable-dung, even before any of the fiery particles are exhaled, to be used without any danger of burning the roots of the plants. In large beds, one flue is carried under each light; and the direction of the flues may be otherwise diversified. The principle of this device appears to have been first applied by Mr. James M'Phail.

Miscellaneous Memoranda.—In a common pit for Pines or other plants, when leaves of trees are employed instead of bark, the depth of the pit should increase in the proportion of four to three, to produce an equal degree of heat.—The Editor has left these observations merely for the curious in horticulture, as they may serve to amuse; but the mode of heating any kind of frame is so cheap by the plan before recommended, in p. 10, § 18, as to supersede every other.

Pits worked only by a moist heat require to have the escape of heat obstructed, by some addition to the thickness of the weather-screen, on the first approach of frost. For this purpose, at the close of September, begin to lay dry litter round the outside of boarded frames, and to cover them with stout mats at night. This auxiliary protection will be wanted till the end of May, or middle of June.

This inconvenience also attends the use of pits without a furnace, that, in very inclement weather, it is frequently necessary to continue the matting over the glass some time after sun-rise, and to replace it an hour or more before sun-set: nay, when the frost is most rigorous, it may be advisable to uncover no farther, even from nine till three, than just to admit some light to the plants.

Whenever the force of a hot-bed, either of bark, leaves, or dung, is materially decreased, a lining of good dung must be applied to the sides of the bed: at first, the back part may be lined; afterwards the front, and both ends, according to the decline of the bed, the sharpness of the weather, and the temperature to be sustained. In mid-winter, when the frost is intense, it may be requisite to build the principal bank of

lining to the top of the back wall, or planking. If the plants are in pots so as to admit the surface of the bed to be renewed, a layer of fresh hot dung may be introduced at top, twelve or eighteen inches thick; and upon this a sufficient depth of earth, or old tan, to receive the pots. It will be necessary to renew these linings, and revivals of the surface, throughout the winter, and, for the greater part, till the beginning of June, or settled warm weather.

If the bed be formed partly of horse-dung and tan, or partly of the former and tree-leaves, or wholly of tan or tree-leaves, the heat will decline the sooner; and the application of fresh linings of new stable-dung must be repeated at shorter intervals.

In November, December, and January, plants in a course of forcing under a moist heat will, in general, be safer without water: in October and February, a little water may be requisite occasionally, if the middle part of the day is frequently enlivened and warmed by sun-shine. Between March and September, water may be given something under the proportion, as to quantity and frequency, directed for plants in a stove. If the mould should appear dry at a season when the external air is much below temperate, give a gentle sprinkling at noon; and shut down the glasses.

The inability to augment the artificial heat for an hour or two, at will, as in fire-flues, much restrains the admission of fresh air in severe weather. But wherever a bed of fermenting dung is worked under a glass-case, some portion of the hot steam should be constantly allowed to escape, by a minute aperture, left so narrow as to be almost evanescent: and to prevent a stream of cold air from rushing in, let a curtain of stout matting be hung over the place. This is the more necessary, if the vapour from the hot-bed be not perfectly sweet. At any time of the year, you may slide down the glasses for a short time when the meridian sun shines with force.

In October, March, April, and May, when the weather is calm and fine, admit air, by sliding down the lights partially, from about the third hour after sun-rise till the corresponding time in the evening; increasing the aperture as the warmth of the day increases. In July and August, and great part of June and September, the pits without a furnace and the dormant stoves will be on a level, as to the freedom of giving air.

In November and the beginning of December, collect the fallen leaves of trees, if you propose to build any hot-beds of this material. Those from the Oak and the Beech are capable

of yielding the most-lasting heat: but under a deficiency of these, a promiscuous collection of leaves may be taken. For this purpose, they cannot be obtained too soon after they fall: nor deliberately let them lie exposed to rain; for though they will not ferment if quite dry, it is better to store them up dry, and to sprinkle them when you want to raise a fermentation. When they have fermented a fortnight or three weeks, they will be sufficiently prepared for the pit. Tread them down as they are put in, which will prevent the bed from over-heating, as well as make it firm and level. If you want to strengthen the bed, or to make up for a deficiency of leaves, short straw-litter and stable-dung, brought by the common process into a sweet state, may be mixed with them, or laid in separately at the top of the mass.

APPENDIX.

CHINESE METHOD OF PROPAGATING TREES.

A METHOD of propagating trees very different from any of those which have been described in the *Nursery*, is practised with success by the Chinese.

In the spring, when the buds begin to swell, the operation is commenced. A proper branch is selected; and, beginning on the upper side of this, at the distance of six inches, or a foot, from the trunk of the tree, a portion of the bark is removed by transverse parallel cuts about an inch apart, carried on in the direction of a belt, but not continued till the ends meet; for a small neck or causeway of bark must be left, or the conveyance of sap into the branch would cease. The causeway of bark may be one-eighth of the circumference of the branch, or less, if the branch exceed an inch in diameter. The ends of the disbarked part should be contracted and rounded.—The bark is to be cut away, *down to the wood.* The part is then encompassed by a composition made of clay and earth, with which some straw or hay has been incorporated, similar to that used by bricklayers for clay walls: but it ought not to be too tenacious. The magnitude of the ball, thus made, should be proportioned to that of the branch operated upon, and may vary from the size of a small to that of a large melon. This is to be encompassed and secured by a bandage of hay or straw, over which some of the same composition should be spread. A proper vessel is then to be fixed over this ball, for the purpose of being constantly filled with water; and adjusted to drop its contents very slowly on the ball, two or three drops an hour,

in order to preserve a constant moisture in it till the operation is completed. Such new roots as issue from the upper lip of the divided bark will be seen, in the autumn, ramifying in the external surface of the ball. Remove the branch from the parent tree, at the proper season for planting, that is, in the month of September; as the exposure of it to the constant droppings of water would be pernicious when the weather turns cold. Let the detached branch be placed in the ground without breaking the ball.

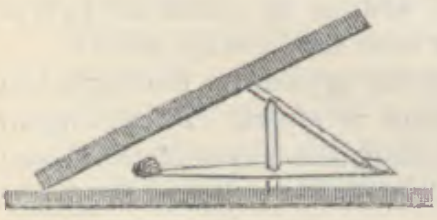
MAKING OF VEGETABLE MOULD.

The substance of decayed tree-leaves is one of the richest kinds of mould; and nothing is more generally fit to be applied in composts and dressings.

Begin in November to collect the leaves. Such as are intended to be rotted without being intermediately used in hot-beds may be taken of promiscuous sorts, and raked together, in a wet, in preference to a dry, state. Throw them up in a heap out of doors, with a little earth and lime over them: the one will keep them from being blown about; and the other will accelerate their rotting. Let them lie till April: then turn them completely. Turn them afterwards frequently. They will thus be sufficiently reduced in a single year: but those which are prepared for a hot-bed, by the different course in p. 489, will not be fit for use till the end of the second year.

DESCRIPTION OF A GARDEN MOUSE-TRAP.

Provide two slates; and three pieces of lath, split very thin, shaped and notched so as to form a loose frame, which will fall asunder on being touched where the bait is tied on. The *bait-stick* may be two inches shorter than the slates: at four-tenths of its whole length from the outer end, cut a straight section half through the width of the stick; and from the bottom of the section, working toward the outer end, cut away as much of the wood, with a circular slope, as will make it easy for the pillar to slide out: half an inch from the same end, make a notch quite across the surface. The *pillar* may be half as long as the bait-stick: form the top with a chisel edge, to fit a notch in the rafter. The *rafter* may be three inches long: the lower end is to have an angular edge to go into the notch at the extremity of the bait-stick; the higher end should have a slanting edge: at a suitable distance from this end, a notch is to be cut across the lower side to receive the top of the pillar.



To set the trap.—Lay one of the slates on the ground, pressing it down till it lie firm, and even with the surface. Fasten the bait to the lower end of the bait-stick. Place the *rafter*, sloping, upon the *pillar*: hold them together, while you connect the *bait-stick* with both, by lodging the bottom of the first upon the end of the last, and the straight side of the opening in the bait-stick pressing against the pillar. The other slate, which must be heavy enough to kill a mouse by its fall, is then to be raised, at a convenient angle, over the trap-frame, with the lower end in contact with the slate on the ground.

DESTRUCTION OF INSECTS.

Although several things under this head have been given incidentally under different department, yet, in the open garden, some additional instructions for subduing particular tribes of insects may be requisite.

The *Aphis*, or Green Fly, annoys plants in general, and is particularly destructive to wall and other fruit-trees, also to several flowering shrubs. The Rose and Peach are very liable to be overrun by it. It often begins its depredations while the leaf-buds are yet unexpanded: it also attacks the tender points of the young shoots. There are two good remedies: fumigation with tobacco, and decoctions of tobacco. Wait for a still morning or evening, to use the first. If the wall be not wet from a previous shower, wash it with an engine, in order to detain the smoke to be applied.

To fumigate a wall-tree.—Suspend an oil-cloth, or a cloth made air-tight; and fasten its edges with nails to the wall. Fumigate with the bellows till the cloth be full of smoke, and for five or ten minutes afterwards. Take down the cloth, and the insects will be found lying upon the ground in multitudes. Wash off such as may stick to the branches; and turn up the ground underneath, to earth them in.

To fumigate standard-trees, or bushes.—Cover them with a cloth large enough to be fastened to the ground on all sides: then proceed as above.

To apply the decoctions of tobacco.—Boil four pounds of tobacco-stalks in two gallons of water: and having nearly filled a garden-engine with pure water, mix a small quantity of the tobacco decoction with the water, adding an ounce or two of flowers of sulphur; then apply it over the infected plants.

Neither of these remedies must be applied to fruit-trees in blossom, nor after the fruit begins to ripen. Thousands of *aphides* may be usually seen on the stalk and leaves of the Rose; but none are ever observed on the flower: hence Professor

Davy inferred, that volatile oils, or odorous substances, may be peculiarly destructive to the minute insects and animalcula which prey on vegetables.

The *Thrips* is an insect so minute as scarcely to be visible to the naked eye. It most commonly lurks close to the veins of the leaves of plants, from which, on being touched, it skips with great agility. It attacks vines and most fruit-trees, French-beans, and many esculents; and, in the fruiting stage of plants, frequently fastens on the blossoms and fruit. On that side of the fruit next the wall, some may generally be found concealed, as if by habit. They may be destroyed by the same methods as the *Aphis*, particularly by fumigation.

The *Acarus*, or Red Spider, though most troublesome to plants under glass, yet is found to multiply on many plants out of doors, particularly fruit-trees trained against walls. It is sometimes not to be distinguished without a microscope. Pure water, directed on the foliage from an engine, is effectually destructive to this insect, if the applications be repeated with sufficient closeness; and this is salutary in its effect on the plants, unlike that of the solution of lime-water, or other acrid ingredients. The trees may sometimes be dusted with flowers of sulphur, if an additional remedy be wanted.

The *Caterpillar* is to be destroyed by a very strong decoction of tobacco-water, diluting the original decoction by the addition of only three parts of pure water to one of the liquor. Discharge this from an engine having a rose on the pipe.

The *Grub* is to be subdued by the same means.

In addition to these remedies, lime-water is often used with advantage, and in some instances slacked lime in powder, as recommended by Mr. Sweet for the destruction of the caterpillar infesting gooseberry and currant bushes. The method is this: Let the trees be completely wetted with water, taking especial care to moisten the under surface of the leaves; and immediately after this an attendant is to shake the powdered lime so that it may fall in dust on every part of the moistened leaves: many of the insects are killed; but all quit the plant, and can be collected and destroyed on the surface of the ground.

The *Earwig* and *Wood-lice* may be caught in a trap, formed of a hollow piece of bean-stalk about a foot in length.

Wasps and *Flies* may be decoyed into phials, half-filled with honey and water, or sugar and beer.

Wasps chiefly build in dry banks, facing the morning sun. Their nests may be easily and effectually destroyed, at night, by introducing a squib or tube of wild-fire into the hole leading

to the nest, taking care to stop every aperture with clay or dirt. This suffocates the wasps; but it will be afterward necessary to dig out the comb, and to burn it, or cast it into the river, as otherwise the chrysales will become wasps.

Slugs and *Snails* should be picked off the plants and ground, at morning and evening. If boxes, pots, or baskets, inverted and raised an inch or so from the ground, be placed near plants which they frequent, many of them will take harbour there in the morning; particularly if the roots of cow-parsley, decaying cabbage-leaves, peas-haulm, &c., are placed under the boxes; the smell of which is sure to attract them. If they attack young crops standing in rows, strew winnowed barley-chaff along the intervals and round the extremities of the lines, so as to surround without touching the plants: after which, give the plants a watering, and repeat the watering for a day or two.

Worms may be picked off the beds or ground either late in the evening or early in the morning, especially after showers of rain. And see p. 226.

TO INDUCE SHOOTS OR BRANCHES, WHERE REQUIRED.

It has been a common practice, with the Gardener, to make an incision through the bark, over such buds, in the stem of the tree, as are required to fill up some irregular and unsightly gap on wall-trees by new shoots: but the French Horticulturists, to whom vegetable physiology is much indebted, have more successfully improved upon this plan. An incision above the bulb, in the form of an *inverted* v (thus, ʌ), interrupts the descending sap, not only immediately downwards, but laterally, and is found most efficient.—The writer can decidedly testify to the uniform success which has attended this mode of operation.

TO DESTROY THE MOSS OR LICHEN ON THE BARK OF FRUIT-TREES.

A mixture of lime and cow urine, diluted with water, is projected over the tree, by means of a brush, at the latter end of the season. This serves to clean all the bark; and the tree assumes a most luxuriant and healthy verdure.

TO RESTORE THE FERTILITY OF FRUIT-TREES.

For this mode of treatment we are indebted to Mr. Lyon, who has published a work on the subject. The Editor has adopted the plan successfully:—it is very simple. The outer bark, or epidermis, is removed soon after the fall of the leaf; being cleanly detached or scraped from the main stem, close to the parenchyma or cortical layers, from the surface of the soil to the commencement of the smaller branches. Or it may be *partially* done, in places where the bark has suffered injury, or

become very cankery; so as to stop further decay, and effectually to remove all harbour for vermin. And, in cases where it is necessary to lay the wood quite bare for a considerable space, it has been recommended to introduce a thin slip or twig from the same tree, to extend from the top to the bottom of the wound, with its ends carefully placed under the cortical layers and epidermis; as thereby the sap is conducted across the wound, and a new bark soon formed; which, in the preservation of valuable Timber-trees from decay, must become a National object. In Cherry-trees, the removal of the rough or decaying epidermis, in rings, has been found particularly useful; both for the fruitfulness of the tree, and removal of insects.—Mr. Lyon's method has, doubtless, been suggested by the fact, that the canker in fruit-trees accelerates their fruitfulness, and raises it above its natural level. It may be also fairly inferred, from the same phænomenon, as a consequence, that trees thus unnaturally forced cannot be permanent; in other words, that they must be hurried to destruction. With veteran trees it may be of little consequence: it must be of important use, however, where the bark can be renovated.

METHOD OF NUMBERING MARKS OR TALLIES FOR PLANTS.

(From the Transactions of the London Horticultural Society.)

This consists in cutting notches on a stick: and, to avoid inversion, observe always to read from the blank end of the stick towards that on which the notches are placed; and this will come naturally, if it be held in the left hand.

1 2 3 4 5 6 7 8 9 0

Any number may be expressed, by combining these marks, as with common figures.

In order to mark the *Genus*, the *Species*, and the *Variety*, cut the stick in the form of a prism of four sides; or of a triangle, with one of the angles cut off. On the narrowest side, notch the number corresponding with that of the *Genus*; on the opposite and wider side, put the number of the *Species*; and if there be a *Variety*, put it on one of the intermediate sides: then thrust the end of the stick into the ground, or tie it to the plant.

GARDENS DEFENDED FROM FLOODS.

Gardens may be protected from the inundations of rivers, or even from the powerful overflowing of the sea, by a simple

process, which the Editor saw most successfully practised at Cuxhaven, a watering-place at the mouth of the Elbe, where the bank afterwards afforded a most agreeable promenade. This process consists in twisting straw into bands, and (with an iron pin ten inches long, curved inwards at the bottom, and a wooden mallet) driving the straw-band six or eight inches into the bank, there to remain; then withdrawing the iron pin, and, at a distance of four inches, again driving in the straw; and so continuing to affix the straw into the bank and soil liable to inundation, in direct lines, till the whole surface be covered; thus forming a close and smooth piece of straw-work.

It is advisable to commence this business when the soil is tolerably dry; not only for the convenience of the operation, but especially for sowing the grass seeds under and within the bands; as the grass soon springs up through the straw, and forms a beautiful turf, which afterwards of itself becomes a natural barrier against the waters.

STRAW-WORK, FOR FENCES, WEATHER-GUARDS, &c.

Fences of straw may be formed of auy width and length, by the following process. Provide a wooden platform of the desired width, from one to two yards, with a shallow ledge along its sides, to keep the straw within a regular boundary. Let the straw be a little damped, and drawn by the hands into straight lines, to be disposed across, and of any desired thickness over the whole surface of the platform. When the straw is thus disposed, some loose bars of wood are laid across it, to keep it in place during the operation. Then proceed with a curved sacking-needle and twine, (commencing at one end of the platform, and at about two inches from the top,) to brace the straw with continued loops of the twine, in direct lines, from one end of the platform to the other; and knotting or tying the loops of the twine at distances of about two inches. The second and remaining lines of loops are made in like manner, about four inches apart, until the whole surface of the straw is thus braced and fastened. It is then rolled up, and placed on the right-hand side of the platform, for the purpose of uniting it with the second and continued process on the platform. By this means, any length of fence or weather-guard is obtained for horticultural purposes, at a very small expense; which can be used as a covering, or as an upright fence with a few stakes; and is readily rolled up and removed, without litter. It is also useful for the package of shrubs, or of dry goods.

INDEX.

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EDITED FROM AN ORIGINAL MANUSCRIPT OF

J. ABERCROMBIE.

BY J. MEAN,

Head-Gardener to Sir A. Hume, Bart.

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