

THE
NORTH BRITISH CULTIVATOR:

A TREATISE ON
GARDENING, AGRICULTURE,
AND BOTANY.

By ROBERT M'NAB,
MEMBER OF THE PERTHSHIRE ROYAL HORTICULTURAL SOCIETY.



"Nothing can resist perseverance and industry properly directed."

"Replenish the earth and subdue it, that it may give seed to the sower
and bread to the eater."—Genesis, i. 28, and Isaiah, i. 10.

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TO
THE ROYAL
HIGHLAND AND AGRICULTURAL
SOCIETY OF SCOTLAND,

WHOSE PATRIOTIC AND UNREMITTING EXERTIONS IN
STIMULATING AND DIRECTING

NATIVE TALENT AND INDUSTRY,

HAVE SO GREATLY DEVELOPED THE RESOURCES AND
INCREASED THE WEALTH OF OUR COUNTRY,

THIS

TREATISE ON GARDENING

IS MOST RESPECTFULLY

DEDICATED.

PREFACE.

THE first and chief employment to which the attention of man was directed, was the culture and management of the productions of the soil. The Vegetable Kingdom contributes more to our immediate wants than all the rest of the terrestrial creation; and the great law which requires that man should "cultivate the earth and subdue it," was the first laid down for his guidance and advantage.

Of the pleasure to be derived from Gardening and Botanical pursuits, it is superfluous to speak. By the possession and cultivation of even a few feet of soil, a man may greatly enlarge his store of rational and pure enjoyments: at same time the return, in a profitable point of view, will always yield an equivalent reward to his labour.

The importance and utility of Husbandry are universally felt and acknowledged, yet the more approved methods of cultivation are known only to a few, notwithstanding all that has been written on the subject. This may arise from the generality of these works being very costly, and often written by theoretical, rather than practical agriculturists. It therefore occurred to me, that a really practical work, by one familiarly acquainted with the subject, might be useful; and

on this account I have yielded to the persuasions of many friends, and endeavoured, in the following pages, to combine perspicuity and cheapness, so as to form a small volume as accessible and useful as possible. Feeling the truth of the apothegm, that "he who succeeds in making two blades of grass grow where only one grew before, is a benefactor to his country": and aware that in every pursuit, advancement can only be made by means of accumulated experience, in which every effort, however humble, in the right direction, has a beneficial effect,—I flattered myself that my labours might not be altogether superfluous.

My first object in planning the work was to render it as plain and brief as possible, at the same time both intelligible and interesting; and I earnestly trust that this will be found to be the case on perusal. My method of cultivating Vegetables and Small Fruits is of my own invention. There are many original passages in the Agricultural department, and particularly under the head of AGRICULTURAL BOTANY, which will account for much of the loss of cattle and horses yearly sustained by farmers and graziers.

The Botanical department is rendered more plain and practical than is generally the case in works of the kind; and the whole is compressed into as concise a form as possible. Each of the Linnean Classes is headed with a plain introduction, and where thought necessary, the natural orders of Jussieu have been added; which may prove serviceable to young gentlemen intended for the medical profession, intending emigrants, and every one connected with rural affairs. The Glossary of Botanical terms at the end of the volume, will be found a useful companion to Hooker's British Flora, and other works of the kind.

While utility, rather than profit, has been my aim, I may have been actuated with a little of the honest ambition of having it said of me, when I shall "pass that bourne whence none return," (as so justly has been said of that eminent agriculturist, the late Sir John Sinclair,) "that the welfare of the human race had always an upper share in my heart." Much of the merit due to my little essay, is owing to the abridged extracts scattered throughout it from the best modern authors. I have little else than the selection to be vain of; for those portions which are of my own composition, must, I am well aware, contain many imperfections. If I have succeeded, however, in stating plain and useful facts, in language intelligible to the community at large, I trust the reader will not be too fastidious respecting elegance of style, or harmony of diction. From an early age my hands have been chiefly occupied in guiding the plough and wielding the spade; whilst only my hours of rest have been devoted to the acquisition of general information, however small the amount. Like many of my countrymen, I have been bred in the school of hardship, and have had to struggle against the frowns of fortune; yet I feel pride in thinking, that the man who earns his bread by an honest calling, and walks through life with truth and honour, need not be ashamed to lay his humble labours before a discerning public.

The different portions of the work being preceded by suitable introductions, little more remains for me here than to state my acknowledgments to the several Newspaper Editors in Perth and neighbourhood, who, from time to time, have kindly given admission to pretty copious extracts from various portions of the work; and my gratitude for the very kind encouragement I have met from my friends, and from sub-

scribers, to whom I had latterly communicated my intention of publishing.

ROBERT M'NAB.

Bridge of Earn, September, 1842.

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EXTRACT of a LETTER from D. FORBES, Esq., Professor of Oriental Languages and Literature, King's College, London, to Mr M'NAB, after having seen the prospectus of this work :—

“I have no doubt that a little Work of the kind you advertise, is calculated to do much good. When I look upon the neat little gardens of the English cottagers, I cannot help remembering that the Scotch of the same class are, or were in my time, very far behind the Southern in that respect, and from no earthly reason but sheer laziness. Take, for example, the garden of our old friend, ———. There was a good piece of ground, I remember; but what did it produce? Green kail, and a few stray cabbages and *grozers* [*Anglicé*, gooseberries.] Now, if I were Laird of so much ground, I should pride myself in making it a miniature of Paradise;—I should have all, or a reasonable number, of the plants about to appear in your book;—I should bestow an hour or two a-day on their cultivation, instead of standing as long with my hands in my breeches' pockets, hearing the idle talk of the strath. In your low country, the gardens are of course a shade better, but even there you have much room for improvement.

“P. S.—The verse from Genesis is very applicable. I should not be surprised if your book should prove the best sermon yet made on the text—as you not only *tell* the people to *do* the thing, but *show* them *how* to do it.”

## CONTENTS.

PREFACE, . . . . . Page 1.

### KITCHEN GARDEN.

KITCHEN GARDEN, Formation of, p. 1; Selection and Improvement of Soil, 4, 12; Size, 5; Form, and Arrangement, 6; Walks, 9; Walls, 10; Water, 11; Manures, 14; Alternation of Crops, 18. How to select a good Spade, 28; do. Scythe, 63. Storing Potatoes, 76.

MONTHLY OPERATIONS in Kitchen Garden. . . . . Page 20 to 86.

SYSTEMATIC CATALOGUE and Dissertation on Cullinary SEEDS:—Alisanders, Asparagus, Angelica, Anise, Basil, Bean, Beet, Broccoli, Borecole, Brussels Sprouts, Borage, Cabbage, Cauliflower, Carrot, Caraway, Celery, Coriander, Cresses, Dandelion, Endive, Fennel, Gourd, Leek, Lettuce, Love-apple, Mustard, Orache, Onion, Scallion, Parsley, Parsnip, Pea, Purslane, Raddish, Rape, Savory, Scorzonera, Sea-kale, Scurvy-grass, Spinach, Succory. . . . . Page 87 to 111.

SYSTEMATIC CATALOGUE of Cullinary ROOTS and HERBS:—Artichokes, Balm, Brook-lime, Chive, Chamomile, Elecampane, Shallot, Garlic, Herb-patience, Horse-radish, Hyssop, Lavender, Liquorice, POTATO, Rue, Rosemary, Rhubarb, Sage, Sorrel, Tanzy, Wormwood, Thyme, Wood Sorrel. . . . . Page 112 to 128.

Quantity of Seeds or Roots necessary to plant any given space, 129.

Table of the different Cullinary Vegetables, shewing the time of Planting and mode of Propagation. . . . . Page 134.

### FRUIT GARDEN.

FRUIT GARDEN, 137; Situation and Soil, 140; Planting, 144; Private Orchard, 148; Selection of Fruit Trees, 150; Formation of Borders, 153; Aspects and distances for Fruit Trees upon Walls and Espaliers, 155.

PRUNING FRUIT TREES, 156; Heading-down and Pruning Dwarf Apple and Pear Trees, 157; Pruning and Training do. on Walls and Espaliers, 158; do. Apricots, Cherries, and Plums, 162; Figs, 164; Nectarines and Peaches, 164; Nailing Fruit Trees and Destroying Insects, 166; Watering, 168; Dressing Wall and Espalier Trees, 169. Pruning Goosecherries and Currants, 170; How to Kill Caterpillars on Fruit Bushes, 172; Pruning Raspberries, 172.

GRAFTING FRUIT TREES, 173; Implements proper for the work, 174; Grafting of Trees and Shrubs, 179; Budding or Grafting by Gerns, 181; Scallop Budding, 182; Propagation by Cuttings, 182.

CATALOGUE OF CHOICE FRUITS, chiefly adapted to the Climate of Scotland.—The Apple and Pear, 184; Winter Pears, 186; Autumn Pears, 187; Summer Dessert Pears, 188; Dessert Apples, 189; Dessert Pearmain, 191; Dessert Nonpareils 192; Kitchen Apples, 195; Peaches, 197; Nectarines and Apricots 199; Plums, 200; Cherries, 202; Geans, 205; Figs, 205; VINES, varieties, 208; Pruning and Training on Open Walls, 211; Disbudding Vines on the Walls, 214;

Gooseberries, 217; Currants, 219; Raspberries, 222; Mulberries, 223; Strawberries, 225; Cranberries, 227; Walnuts, 227; Chestnuts and Filberts, 228; Fruits not in General Cultivation, 228.

FORCING GARDEN, 230. Early Cucumbers, 231; Melons, 238; Pines, 240; Vines, 241; Forcing Pits, 245.

### AGRICULTURE.

AGRICULTURE.—General Remarks, 246; Change of Seed, 251; Rotation of Crops, 251 to 261; Choice of Seed, and Sowing, 262; Culture of Wheat, 263; Rye, 265; Barley, 265; Oats 267. GREEN CROPS:—Beans, Peas, Tares Clover, Rye Grass, Turnips, and Potatoes, 268 to 274. MANURES:—Theoretical Principles; Farm Yard Manure, Liquid Manure, Bone Dust, &c., Guano, Lime; Burning of do. with Coal or Peat; Shell Marl, 274 to 294; Connexion of Geology with Agriculture, 295.

AGRICULTURAL BOTANY.—Gramineæ, 298; The Improved Grasses: Wheat, 298; Barley, 298; Oats, 297; Rye, 299. PERENNIAL GRASSES Cultivated in Great Britain: Anthoxanthum Odoratum, Catabrosa Aquatica, Bent Grass, Foxtail Grass, Catstail Grass, Cocksfoot Grass, Fescue Grass, Tricuspis, Meadow Grass, Suffolk Grass, Rye Grass, Holcus, Rib Grass, 299 to 308; LEGUMINOSÆ, Clover, Sainfoin, Birdsfoot, Trefoil, Lucern, Lentil Tare, Vetch, Chickling Vetch, Sweet Pea, &c. The Bean, Indian Corn, Cabbage, Rape, Turnip, Flax, Hemp, Hop, 308 to 329. List of Pasture Grasses, 330.

### BOTANY.

SYSTEMATIC BOTANY.—Sexual System of Plants; Examples—Snow Drop, Daffodil, Lily. 331. LINNEAN CLASSIFICATION of PLANTS with examples of each Class. *First Grand Division*, Plants with conspicuous Flowers:—Class 1, Indian Arrow Root, Glasswort, and Marechal; Class 2, Rosemary; Class 3, Valerian; Class 4, Madder, Woodroof; Class 5, Sumach, Phlox, Forget-me-not; Class 6, Squill; Class 7, Horse Chestnut; Class 8, Mezereon; Class 9, Rhubarb, Flowering Rush; Class 10, Bauhinia, Carnation, &c; Class 11, Mignonette; Class 12, Rose, Myrtle; Class 13, Bugwort; Class 14, Foxglove; Class 15, Crucifers; Class 16, Marsh Mallow; Class 17, Clover; Class 18, St John's Wort; Class 19, Dablia, Groundsel, Ragwort; Class 20, Orchis; Class 21, Larch, Cedar; Class 22, Juniper; Class 23, Maple, Ash, Fig. Class 24, *Second Grand Division*, Plants with Inconspicuous Flowers: CRYPTOGAMIA, example, Mushroom. Page 334 to 363.

PROPAGATION AND CULTURE OF FLOWERS AND HERBS.—Slips, and Pipings, 362; Budding, 363; Herbaceous Grafting, 364; Inarching, 365; Propagation by Suckers, 366; Layers, 366 Cuttings, 367; Climbing Plants, 368; Concluding Remarks, 369.

THE ART OF MAKING BASKETS. . . . . Page 370.

GLOSSARY OF BOTANICAL TERMS. . . . . Page 374.

TREATISE  
ON  
GARDENING, AGRICULTURE, AND  
BOTANY.

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GARDENING.

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FORMATION OF THE KITCHEN GARDEN.

THE first and chief object towards obtaining a good garden is to be particular in the choice of a favourable situation. The second is to select deep and good soil. Sometimes both of these grand objects are to be met with naturally in the same place, and often both of them have to be assisted, or the deficiency supplied by art. But wherever a situation naturally presents itself, sheltered from cutting winds, and well exposed to the influence of the sun, and the elevation sufficiently great to be above the ill effects of damp vapours, and yet at the same time not too high nor too cold, and the soil good, many sacrifices should be made for its adoption. Natural situations are generally much better than artificial ones, and always more agreeable to the economist.

A certain degree of shelter is of the greatest importance to the garden produce, yet not so as to be shaded by lofty trees from the full rays of the sun. Shelter is necessary, because it renders the garden warmer, by the concentration of the rays of heat from certain bodies or colours, especially from the walls or close pales; it

is also necessary as a preventive to the bad effects of cold cutting winds. Those points from which the most inclement winds generally blow, should be guarded (if not naturally) by trees, and no time should be lost in planting them. In selecting the sorts of trees, those should be chiefly preferred which are of rapid growth.

If the situation of the garden is not already sufficiently sheltered by its natural shape, then recourse must be had to the planting of trees, yet they must be kept at such a distance from the wall as not to shade it too much, as well as to prevent the roots of the trees from robbing the borders which may surround the walls.

The winds chiefly to be guarded against are the north, north-east, and north-west, as it is from these points our coldest winds proceed. In the event of having the plantations to make, it will be an object to get them up with all possible speed. The ground, therefore, should be well trenched, and planted with sycamore, poplar, larch, spruce, and balm of Gilead firs, which are our fastest growing trees; taking care at same time to intermix a sufficient number of oak, holly, beech, elm and chesnut, to remain after some of the others have been thinned out, or have attained too great a height. There should be no trees of any height on the south side of a garden, for a considerable distance, for during winter and early in the spring they cast their long shadows into the garden, at a time when every sunbeam is valuable; on the east and south-west, also, they should be sufficiently removed to admit the morning and afternoon rays.

All the plantations round a garden, intended either for shelter or blinds, should be composed of evergreens thickly planted, preferring those which have been raised from seed, to those which have been propagated either by cuttings or layers, as being more likely to assume the habits of trees. As they grow up clear away the deciduous trees from among them. This will afford shelter in winter and spring, when it is most wanted, and which will not be so well effected, if deciduous trees alone be planted. It may be farther observed, that if

only a certain number of deciduous trees be left, the whole will in time have a good effect.

The altitude of a garden should neither be too high nor too low; the crops of the former are exposed too much to the cutting winds; the latter is seldom dry enough at bottom; and there is a natural sourness in low situations, which is not easily eradicated by draining or other means. The great warmth of medium low situations, being commonly better sheltered from the cold north-east and boisterous south-west winds, are agreeable circumstances; as the north-east winds in this climate are the freezing winds; and the south west ones being the most violent, are very liable to injure standard fruit trees in summer, by dashing their branches against each other, thereby bruising and beating off their fruit. In too low situations, the fogs in vernal evenings, by moistening the young shoots of trees and their early flowers, render them much more liable to the injuries of the frosty nights which succeed them, and which they escape in higher situations. A low garden is also much injured by rime and early autumnal frosts, and much more so when near still waters or marshes. In low situations in the neighbourhood of large cities, the smoke of the city wards off these vapours.

A good aspect for a garden, is allowed to be that which has a gentle declivity towards the south, and inclining rather towards the east, in order that it may receive the benefit of the morning sun; but this inclination should be as slight as possible, or else it will give the garden an awkward appearance. The inclination, however, may be only towards the south, and that not exceeding one foot in twenty, artificially made, but if the ground have naturally a greater or less inclination, provided that it be not inconveniently steep, there can be little reason for altering it. Ground which has a considerable inclination towards the south, is always the warmest. A flat or level surface is not desirable; it will be cold, and present a heavy and dull appearance.

## THE SOIL.

Where the soil is naturally good, it is generally much better, for the majority of purposes, than any that can be made by artificial means, and ultimately must prove a great saving of expense. The soil, if not very bad, is more easily and readily improved, or even entirely made to suit the various dispositions of the several crops to be reared, than it is to provide shelter by artificial means, and is sooner accomplished, even on an extensive scale. Of whatever description the soil may be, it is absolutely necessary that it should be completely drained, as the basis on which all the future improvement of it is to be effected. If wet, strong, or clayey, draining is of still greater importance; though light, and even dry and sandy, drains should be introduced at the first formation of the garden, as this operation cannot be either so effectually, nor yet so conveniently done, at any subsequent period. In the first instance it is necessary to drain well, to carry off the stagnant water with which the subsoil may be surcharged; and in the second, to provide against a superfluity of water from heavy rains or other causes. The drains should be so contrived, that they may be brought to discharge their contents in large channels under the walks, and these again should discharge themselves beyond the garden boundary. All gardeners agree that the soil best adapted for general garden purposes, should be of rather a light, rich, friable, loamy texture, dry, mellow, and capable of being wrought at any season, and of a good depth, that is from two to three-and-a-half feet; and that the worst kinds are those of the very light, sandy, and stiff clayey texture. In the formation of a garden, a moderate and prudent expense should be bestowed at the beginning, if the undertaking is to be ultimately crowned with success and satisfaction. It would be desirable to have a variety of soils in every garden, but this is seldom to be met with naturally, and few are at the expense of constructing them artificially, as most of the vegetables cultivated in our gardens seem to accommodate themselves to the soil of which they are formed.

## SIZE OF THE GARDEN.

The size and extent of the garden ground, like that of its distance from the mansion, must in some measure depend on the taste of the owner, his style of living, number of his family, &c. It is, however, always better to have too much rather than too little space, for there is nothing incongruous in a small house having a large garden. Some families use few, others many vegetables, and it makes a great difference whether the owner be desirous to have a long season of the same production, or is content to have a supply only at the more common times. But to give some rules for the extent of ground to be laid out, a family of four persons, exclusive of servants, should have a rood of good working open ground, not encumbered by bushes, &c. and so on in proportion. This, however, is only applicable to families of retired tradespeople, and gentlemen of small fortune, who are not supposed to indulge in all the luxuries of the table like families of rank and fashion. Few country seats have less than one acre, and some exceed twelve, in regular cultivation. As kitchen garden, from one and a half, to five or six acres, may be considered as the common quantity enclosed by walls; and the latter size, if properly managed, will be found to afford sufficient vegetables for a family of the first class; as many vegetables, such as potatoes, turnips, carrots, savoys, and some others, are found to be much better in quality when cultivated in the open fields. If the owner be attached to agriculture, or farms a piece of ground, it will be found very beneficial to grow a supply of those vegetables in the fields. The vegetables thus produced will be of a higher flavour than those which are reared in the garden by force of manure, and will present an opportunity of renewing the quarters of the garden by fallowing, or giving them rest in succession.

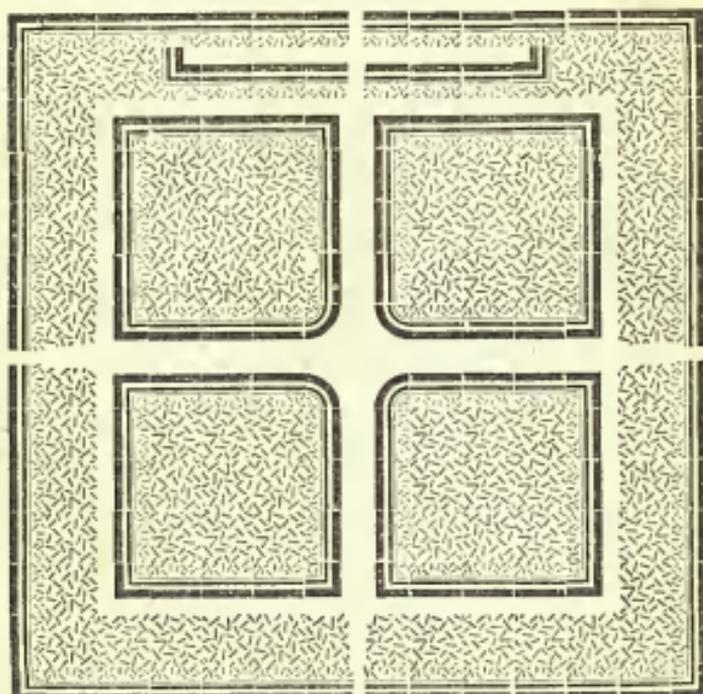
Mr Towers, a most able writer on horticulture, in an article on the cabbage tribe, in the Quarterly Journal of Agriculture, states, "I do not recommend it (the best early York cabbage) merely as a culinary vegetable; it

might, and I think should, be made to rotate with the crops of the farm. It is not my desire now to digress, but I hope on a future occasion to adduce facts which will go far to prove, that every farm throughout the kingdom would be improved, and the farmer proportionably benefitted, by greatly enlarging rotation. The land has powers and capabilities to double its productive return."

#### FORM AND ARRANGEMENT.

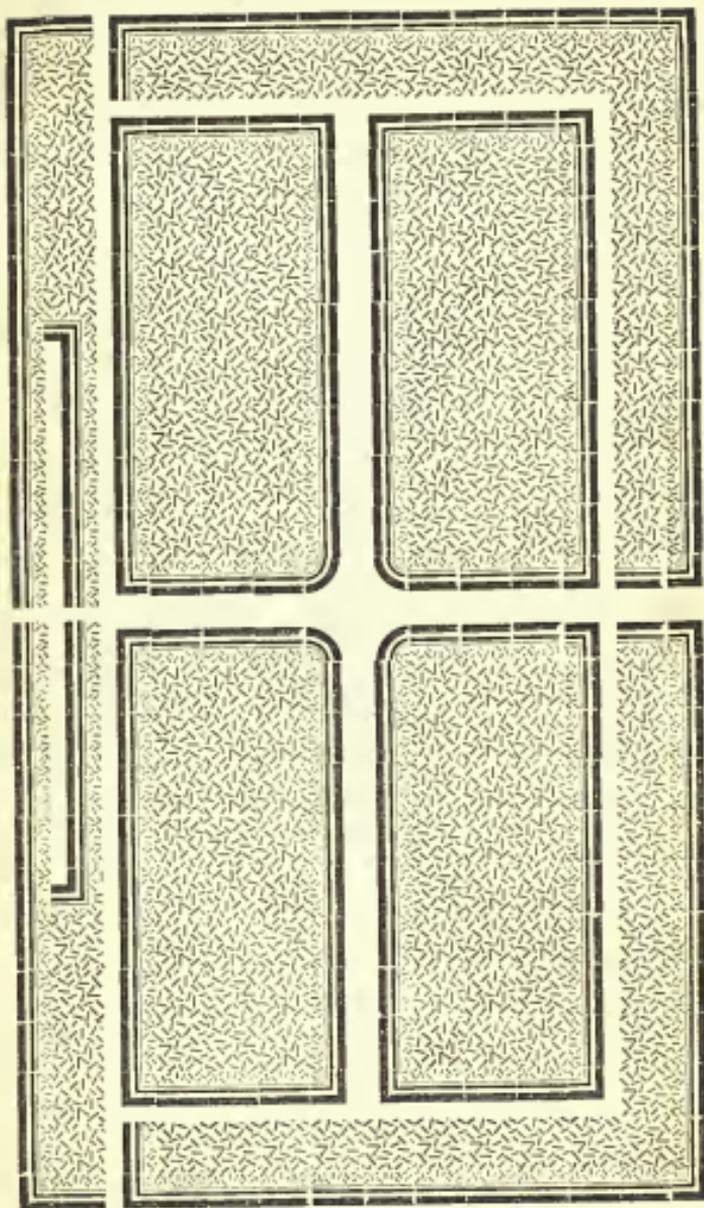
Various forms have been recommended by practical men, particularly for that part of the culinary garden surrounded by walls. Some have recommended a square form, as represented in

FIGURE I.



The walks are shown by the white lines; the black lines indicate the position of the surrounding wall, borders, and hot-houses.

FIGURE II.



There is frequently an outer boundary or enclosure beyond and around the wall, not marked in the diagrams, which may be occasionally alluded to in the course of the work.

The form most generally adopted, and by far the most rational, is that of a lengthened square, or parallelogram, whose greatest length runs from east to west. See Figure II.

Such a figure is more conveniently divided into quarters, and those quarters will always present a neat compact appearance. A form of this shape will produce the greatest extent of south wall, which is a matter of no trivial importance, for, without the aid of those southern walls, few of the finer fruits will arrive at perfection, even in our most favourable situations. The outer fence or boundary need not be exactly parallel to the walls, as circumstances may so combine as to render that disposition unnecessary. The slips, or surrounding piece of ground, may be cropped with coarse vegetables, and probably planted with fruit trees and bushes, or in many cases entirely occupied as an orchard. The form, therefore, of the outer boundary, need not be confined to any particular figure. A square, like an entirely level surface, will always have a stiff and heavy appearance; but this objection may, in a great degree, be remedied, by running a wall across from east to west, and thus dividing the space into two equal or unequal pieces. This plan is often adopted, to increase the extent of walls for the production of our finer fruits.

The arrangement of such a figure is simply to carry walks parallel to the wall, around the interior of the garden, leaving borders for the cultivation of fruit trees, &c. of sufficient breadth, and bearing a just proportion to the height of the walls. The breadth of these borders is generally allowed to be equal to the height of the walls, for if narrower, they do not admit of sufficient scope for the roots of the trees to run in, and it gives the walls the appearance of being higher than they really are. If much broader, they diminish the effect

of the walls, and where they are not cropped with vegetables, from an idea that they injure the fruit trees, a great loss of ground must be the inevitable consequence. A walk should divide the garden into two equal pieces from north to south, unless the extent exceed an acre, in which case two or more walks will be necessary; as also one from east to west, intersecting each other in the centre of the space, and thus dividing the whole into four equal quarters, the sides of each quarter being exactly parallel to the walls. If the extent be more than an acre, it will be advisable to divide it into six compartments, for the greater facility of cropping the whole. In the arrangement of other figures, it is necessary, likewise, to have the fruit tree borders divided from the rest by a walk running parallel to the walls, and the remaining space divided in the most equal manner possible. The walks should be separated from the larger compartments or quarters by a marginal border, from four to six feet wide, in which an espalier rail is often fixed, for the purpose of training apple and pear trees, at the distance of three or four feet from the walk, or instead of espaliers, dwarf standard trees may be planted, according to the taste of the owner. An alley or path, commonly two feet broad, separates this border from the quarters, and is to be used by the labourers while engaged in the several occupations of gardening.

#### THE WALKS.

According to Marshall, the number and breadth of the walks must, in a great measure, be regulated by the quantity of allotted ground, exceeding in those particulars where there is room; but that few and wide walks are preferable to many contracted ones. If the garden be small, one good walk all round is sufficient; and if long and narrow, the cross ones should not be many; six or eight feet walks are not too wide for a moderate sized garden. In the formation of the walks, the ground, if good, should be excavated to the depth of two or three feet, and disposed upon the compartments, in or-

der to admit of a sufficient depth for a layer of stones, brickbats, rubbish, rough gravel, &c. to render the whole perfectly dry at all seasons, as well as to prevent the rising up of the worms. Under the walks, good drains should be formed to carry off the superfluous water. The bottom being thus prepared, the lower stratum being laid as hollow as possible, the whole should be finished with the best gravel that can be procured, from six to twelve inches in depth. That of a binding nature is best. The colour should be of a yellowish hue, as dark coloured gravel, although it may be equally good for rendering a walk dry, firm, and hard, has not so cheerful an appearance; lighter coloured gravels are also sooner tarnished, and unless exceedingly well kept, soon look ill.

Other materials are sometimes used as substitutes for gravel, where it cannot be got. Of these, coal ashes are the best. Road sand is also good, when it is procured from roads formed of flints; saw dust, &c. is also occasionally employed. Whether gravel, or any of these substitutes, be used, it is necessary to have an edging of some sort or another; that of box is certainly to be preferred as being the neatest, and requiring the least trouble in the management of it. Thrift (*armeria maritima*) is often used, and will last for a couple of years; but it requires so often to be replanted, that it cannot be recommended.

In gardens of small extent, edgings are sometimes formed of useful kinds of vegetables, such as parsley, strawberries, thyme, hyssop, winter savory, or chamomile; these, while they remain young and ungathered, have an effect not out of character with the kitchen garden.

#### WALLS.

Walls are constructed of various materials, such as brick, stone, wood, mud, or flints. The chief use of walls is for the production of fruits, which will not arrive at an equal degree of perfection on an espalier, or standard trees. They are also of use to surround the kitchen

garden, for the better exclusion of hares and rabbits, which cannot be kept out by any other fence. They also afford a considerable degree of shelter, and, by the reflection of the rays of heat on the borders, render them better fitted for the production of tender vegetables at a season earlier than they would be produced in the open quarters of the garden.

Many good kitchen gardens, however, considered merely as such, are wholly destitute of walls; very good gardens being inclosed by hedges, paling, and other sorts of fences.

The late W. Nicol observes: in designing and laying out a modern garden, a degree of taste as well as fitness or propriety, ought to be displayed, the basis of which is the right placing, proportioning, and constructing of the walls. If these be properly set down, so as to answer the cast of the ground, and be raised to proper heights according to its extent, the rest is easy, and follows as a matter of course.

The north wall can be placed quite level, and also the south wall, on a lower level, and so as that the east and west walls shall fall from north to south a foot in thirty, or in twenty-five, or according to the slope of the ground; and if the ground be lengthened from east to west, in the proportion from three to two, the extent being two or three acres, on such a spot may be erected a garden that will not fail to please.

The height of the walls should be regulated agreeably to the extent and declivity of the ground to be enclosed. Where economy is a consideration, low walls of six or eight feet in height, are to be preferred to those which are from ten to eighteen feet. The generality of trees will thrive well on such walls, and some kinds are supposed to flourish better.

#### WATER.

Water is so necessary an element in vegetable bodies, that without it they cannot exist. It is of the utmost consequence in a garden, and no one should be without a regular supply.

It may be unnecessary to say, that river, pond, or rain water, is to be preferred for all purposes of garden culture, to that which is procured from springs or deep wells, unless the water of the latter has been collected into a reservoir freely exposed to the action of the air, by which means it becomes softened, as it is technically called, and more fit to enter into the parts of vegetable economy. When water abounds upon ground more elevated than the garden, the advantage should not be lost sight of, as, at a moderate expense, a regular and constant supply of water can be brought in pipes of lead or earthenware; or, which is still more economical, where circumstances will allow, in an open drain; and, to use the phrase of an antiquated writer on this subject, this will prove "the life and soul of the garden."

#### THE SOIL.

Soils may be improved by a variety of operations performed on them, independent of their improvement by manures. This is a serious consideration to all cultivators of the earth, but much more so to the gardener than to the farmer; and for this important reason, that it exonerates his productions from the charge of being either unwholesome or ill-tasted on account of their pabulum, or food from which they derive their support. Thus vegetables grown in the open fields, where we are to suppose the land less glutted with manures, are by the generality of people preferred to those which are grown in highly manured gardens. Hence the necessity is obvious of improving the soil by other means than that of yearly gorging it with more manure than is absolutely necessary, for bringing to perfection such vegetables as are expected to be produced.

Without abundance of roots, no vegetable flourishes; therefore we ought to adapt the soil, as much as possible, to the encouragement of those necessary organs, the conviction being strongly impressed on our minds, that the quantity of nourishment which is taken up, depends more upon the number of absorbing fibres, than the

quantity of nutritious extract contained in the soil. The rendering the soil of a proper consistency, by trenching or digging, is not only necessary before sowing or planting, but also during the progress of vegetation, and this should be performed by digging or hoeing between the rows, or round the stems of the growing plants. A strong proof is here adduced of the superiority of planting or sowing culinary vegetables in drills, as by that means the operation of pulverization is better and more conveniently performed. Even digging between the rows of some plants is of much importance to them, as by that means it operates on the principle of pruning, by cutting off or shortening the extending fibres, which causes them to throw out a number of others, by which the mouths or pores of the plants are considerably increased; and thus by multiplying the number of organs, the plants will of course collect a greater quantity of food. Ground should never, for any length of time, lie uncultivated, or without being cropped, unless for the purpose of giving it rest; and in that case, as soon as the crop is cleared off, all the refuse which is left on the ground should be immediately dug in; this would not only have a tendency to improve the ground, but would give the garden always a more neat and orderly appearance, and a considerable degree of labour would thereby be economised in the destruction of weeds.

In the improvement of soils by the operation of trenching, particular care must be taken to perform it in moderation, that is, to trench the ground according to the depth of the soil. All garden ground should be from two to three feet deep, of good mould, either natural or artificial, and for the quarters of gardens this would be amply sufficient. The fruit tree borders must of course be of various depths, according to the nature of the trees planted in them. In trenching too deep, much injury may be committed, as the better parts of the soil will thereby be buried, and the subsoil brought up to the surface in its crude state, which is wholly unfit for the nourishment of vegetables.

Black vegetable, hazelly brown, chesnut coloured loams, are all proper for the purpose of garden ground ; and all those which are of a more stiff or tenacious nature, or too loose, and insufficient to support trees and plants, must be made good by the application of such substances as are of a contrary nature. In procuring mould, either for improving or renewing the soil, care should be taken to prefer such only as is near the surface, as it is in general the most productive and fruitful, and is in reality the true vegetable earth. The top spit, that is to the depth of one foot from the surface, of any common or field, which has not been much cropped, is to be preferred, and the fuller it is of fibrous matter the better it will prove for the growth of plants. Soils of the best quality will be much improved by occasional dressings of such mould, either applied in its fresh state, or after having been partially ameliorated by being kept in the compost yard for a few months before it is used.

Mould dug from a greater depth is not fit for being used in its crude state, but should be exposed a twelvemonth at least to the action of the weather, and even then it is deficient of most of the animal and vegetable matter of which the top spit is chiefly composed.

#### MANURES.

Manures are of two kinds, one attracts water and is attracted by it; dung, for example, salt, calcined limestone, commonly called quick lime, or simply lime. Another, which neither attracts water nor is attracted by it; shell marl, for example, clay marl, stone marl, raw limestone beat into powder.

The manures commonly used in Scotland are dung, lime, shell marl, clay marl, stone marl. Many other substitutes are used; shavings of horn, refuse or husks of malt, and even old rags, scourings of ditches, sweepings of vents, rich soil, fat moss, old ditches, chalk, sand, coal and peat ashes, gypsum, bone dust, sea ware, urine of animals, carbonate of soda, &c.

Green vegetable matter is an excellent manure, but

less attended to than it ought to be. All plants in a succulent state contain much saccharine or mucilaginous matter, and therefore cannot be used too soon after their death. It has been the practice to carry all vegetable matter considered as useless to the compost yard, and by collecting it into a mass, a quantity of vegetable mould or manure has been procured; but this is a great waste of the best part of the manure, and should only be adopted when such vegetable mould may be required for particular purposes. Instead of collecting all the weeds, useless vegetables, &c. in a garden into one heap, let the following simple method be adopted. When a piece of ground is going to be dug, go round and collect all the decayed vegetables, &c., and immediately dig them in, the sweepings of grass walks and lawns are also of much use as a vegetable manure; and on being brought every day into the garden, they should be dug in, before fermentation commences. But it must be observed that they should not be buried at too great a depth, otherwise fermentation will be prevented, by compression and the exclusion of air. Green crops, hand weeds, the parings of hedges or ditches, fresh turf, or any kind of fresh vegetable manures, require no preparation to fit them for manure. The decomposition slowly proceeds under ground, the soluble matters are gradually dissolved, and the light fermentation that goes on, checked by the want of a free communication of air, tends to render the woody fibre soluble, without occasioning the rapid dissipation of elastic matter.

Sea weeds, where they can be procured, make excellent manure for most vegetables, but particularly for sea-kale, artichokes, and asparagus.

Manures, whether animal or mineral, are of such importance to vegetation, that we should use all possible diligence in the collecting and preparing of them for the different purposes for which they may be required. By a proper application of them, and by a rotation of cropping, founded on just principles, the worst garden ground may be not only improved, but rendered

fit for the production of every vegetable that is usually cultivated in these islands.

In hard weather, wheel out manure of all kinds, and build them up in neat little heaps on proper parts or plots, where needful to answer the different kinds of crops, and cover over with a little earth. The urine of cattle, soap-suds from the washing tub, and sindings of dishes, &c., mixed together, forms a powerful manure for the kitchen garden, and the best that can be applied to the fruit garden. It should be spread over the heaps laid up as above, and equally over the onion ground, &c., and poured about the roots of fruit trees and bushes, which will increase the quantity and quality of the fruit to an astonishing degree.

Cottagers and others should keep this in view. Their garden ground should be turned up, and the fences repaired; any manure that can be collected by the roadside, or other places, such as scourings of ditches, &c., should be carefully attended to, and if the cottager be unemployed, his time cannot be better spent than in wheeling into his garden any old banks by the sides of roads, or other waste places, where permission can be obtained. It will much improve his soil if it be laid on the ground, and left to pulverize till the following month, or March, when it should be dug into the ground along with any other manure which he may be able to procure from his pigs, or the ashes of his fire. The dung collected from the roads and pasture parks is a valuable acquisition to farms but more so to gardens. As cattle are addicted to lie at corners and certain spots of the park in which they pasture, such places must be over-dunged, therefore, a portion of it should be carried off to the garden and other parts of the farm. When properly broken and mixed, it forms an excellent manure for top dressing to onions, carrots, turnips, sallads, and strawberries.

The following method of obtaining a cheap and efficacious manure, is recommended by a gentleman in Bristol. Raise a platform of earth on any spare piece of land, eight

feet wide, one foot high, and of any length according to the quantity wanted. On the first stratum of earth lay a thin stratum of lime, fresh from the kiln; dissolve or slack this with brine from the rose of a watering-pan, and immediately add another layer of earth, then lime and brine as before, carrying it to any convenient height. In a week it should be turned over, carefully broken and mixed, so that the whole mass may be thoroughly incorporated. This compost has been used in Ireland; has doubled the crops of potatoes and cabbages, and is said to be far superior to stable dung.

Decayed leaves should be all cleared away and dug into the ground, or carried to the compost yard for vegetable mould. If a garden be thus laid up in fallow it will have a neat and tidy aspect all winter, and will be viewed with more pleasure by its owner than if left in that state of neglected confusion in which we generally see kitchen gardens at this season. It will be a saving of labour to the gardener in the spring, when one man can do more than six, as well as materially improving the soil. In strong clayey wet soils this is of the utmost importance, and few gardens are so light as to be injured by it. "In this country, the frost does more to pulverize the soil than the plough; and of all harrows for this purpose frost is the best." Heaps of different sorts of composts for manure should now be turned over, and properly mixed; but this should be done in dry weather. Draw in fresh loam, grass, turf and other such like matter, to incorporate with dung, and be not sparing in collecting such profitable materials, and remember that composts thus prepared are much better than rank dung; too much therefore cannot be collected, and no season of the year is better adapted for that business than the present.

The above hints are applicable to October and four following months. There are mutual connections between man and the ground he treads on, that fit them for each other; and nothing can be more gratifying to him than to see his efforts crowned with complete

success, his crops doubled, and their quality as much improved.

#### ALTERNATION OF CROPS.

All crops for a few years thrive well on newly turned up virgin mould; in a few years they degenerate, and require a fresh soil. Land in the course of years, often ceases to produce the most common vegetables, and fields which are well laid down with cultivated grasses, lose every one of them in a few years. They become as if it were tired of them; but the truth is, they have exhausted the nourishment proper for their respective sorts, and consequently die, and give place to others. This fact is frequently experienced by botanists, to their regret, for a plant is often found in abundance for years, in one field or wood, and in course of time wholly disappears. A change of crops is founded on an acknowledged fact, that each sort of plant draws a nourishment peculiar to itself. From the general richness of garden ground, and much manure being constantly employed in the raising of garden crops, much less attention has perhaps been paid to the courses of cropping in the garden than in the field. It is, however, equally necessary in the one case as in the other, and the same principles are applicable to both. Variety of circumstances, however, conspire to prevent its being so effectually accomplished in the garden as in the farm; such as the smallness of the portions of ground generally allotted to their use; the vast number of articles which have to be grown, and their similarity and relation to each other. The following classification may be considered as the most proper:—

Broccoli, cauliflower, and all the kail tribe, are the same.

All beans and peas, ditto.

Carrots, beets, and parsnips, ditto.

Potatoes, leeks, onions, turnips, &c. ditto.

Celery, endive, lettuce, &c. &c.

It is found in practice that celery constitutes an excellent preparation for asparagus, onions and cauliflowers.

Turnips or potatoes are a good preparation for cabbages or greens.

Broccoli or cabbages are a proper preparation for beans and peas.

Cauliflowers prepare well for onions, leeks, or turnips.

Old asparagus land affords a good preparation for potatoes or carrots.

The strawberry, currant, gooseberry, and raspberry, for the same.

Turnips give a suitable preparation for celery or endive; and peas well manured, are a good preparation for spinach, &c.

By properly attending to all these different points of management, crops of almost all descriptions may be put into the soil, so as to succeed with much greater certainty, and in a much more perfect manner, than is usual in the ordinary method of putting them into the ground.

MONTHLY OPERATIONS  
IN  
THE KITCHEN GARDEN.

JANUARY.\*

Every spare opportunity should now be embraced in open dry weather for digging and trenching all vacant spaces of ground, (flower borders and between fruit bushes) intended for spring cropping. If the ground is to be manured for onions, carrots, or any other close growing crops, the dung should be well fermented and rotten, and ponned as small as possible, and regularly buried onspade deep in the bottom of each trench. The first trench should be opened at the side the whole length of the ground, from which the earth is to be wheeled to the other side, or rather beyond it, for filling up the last trench; each trench should be rutted or cut behind with the line and spade, 10 or 14 inches wide; then the surface pared an inch deep and turned clean over into the bottom of the trench, and over the dung if it be laid on the ground. Then commence at the one end turning over trench after trench, taking care that the bottom of each spadeful be laid uppermost in the trench, as the operation proceeds; always leaving the surface as rough as possible for the influence of the frost to pulverize the soil, and to kill the weeds and insects the more effectually. Or it would be less labour to lift a barrowful at

\* To avoid unnecessary repetitions, the culinary vegetables and herbs, not included in this Calendar, will be found, with ample directions, in the Systematic Catalogue at the end.

one corner of the plot and proceed digging the trenches diagonally. If the soil be strong and stiff, each spadeful should be set up on edge, three cornered, forming neat and narrow ridges, so that the nutritive matter imbibed from the atmosphere may be admitted more freely.

Now is the proper time for preparing the ground for the different kinds of spring sown crops, by dunging, digging, and trenching, if not already done, always taking advantage of dry open weather, in wheeling of dung, &c., performed in dry frosty weather. The soil of gardens should be from two to three feet deep, for several sorts of vegetables. Of such "take three years crops off the first surface, and then trench three spit deep, by which the bottom and top are reversed, and the middle remains in the middle. Take three crops off this surface, and then trench two spit, by which the top becomes the middle, and the middle the top; and take also three crops off this surface, and trench three spit, whereby that which was last the middle, and now top, becomes the bottom, and that which is now the bottom, and was the surface at first, now becomes surface again, after having rested six years. Proceed in this manner alternately, the one time trenching two spit deep, and the other three, by which means the surface will be always changed, and will rest six and produce three years.

Hence there will always be fresh soil in the garden for the production of wholesome vegetables; and hence also will much less manure be required than when the soil is shallow, and the same surface constantly in crop. In situations where the soil is only so deep as to allow of trenching two spit, and where expense in making it deeper may be grudged, the above hint may also be followed with advantage; by regularly trenching every third or fourth year, the ground will rest half its time; and, if judiciously managed, and cropped in proper rotation, wholesome vegetables may be produced in it for many years successively.

These remarks are applicable to the latter end of October, and five following months.

## ON SOWING PEAS.

PEAS, in open dry weather, should now be sown, on an early border, or other sheltered situation. Cormack's Early May, Early White Warwick, Improved Race Horse, and the Early Frame Double Blossom, are the best for early sowing. The drills, may be three or four feet apart, according to the sorts of peas, and the quality of the ground, and two or three inches deep in the drill. These early crops should be dunged in the drills. If the ground has been prepared, and manured as above directed, it is now only necessary to dress with the rake the space to be occupied by the drills, and above the dung. If the peas are to be sown in double lines the drills should be from seven to nine inches separate. A small quantity of bog mould or peat dross, pounded small, or put through a wire search or riddle, should be spread along the bottom of the drills previous to sowing, and also over the seed in the drill, which will prevent it from rotting or splitting by the cold wet soil. The refuse of a peat stack will answer the purpose well, and if brought from low marshy grounds, the sulphur it contains will serve other two important points, viz., the preserving of the seed from frost and mice. Draw the mould over the seed an inch or two deep, leaving it as loose as possible; afterwards, when the peas are germinated, but not above ground, choose a dry day and draw a little more mould over them; then give them a good dressing with the rake—two pounds of seed is sufficient for one sowing at this season, which may be repeated every three weeks, weather permitting. If the ground is not already dug, a moderate sowing should be put in during the progress of digging; and, should the soil prove heavy and stiff, the more littery dung will succeed best, and laid in the trenches a spit deep and same width, and at the proper distances; beyond which other two trenches or spits are to be turned over, and the seed drills then opened over the dung. Take your station in the open trench while forming the drills and sowing the peas; turn over another trench, and with the mould from the

bottom of it cover the last sown drill, leaving them loose and rough, as above stated, for some time. If the sown ground be not well sheltered, open a small narrow drain on the north and north west side of it near the drills, in which form artificial hedges of peas' stakes; then press the earth firmly about their root ends, and support them by driving in some paling stakes, with a spar or long pole on each side, and at middle height, and draw them close with a tar cord. Here they are to stand out of the way as a defence against cold cutting winds, till wanted for the peas to climb upon. A mouse-trap or two, baited with oatmeal, and secured with small cords from cats, should be kept among the sown peas till grown one half inch above ground. Chopped crops of whins have been laid over the seed to keep mice from it, but a few ounces of the flour of sulphur will do better, and is less troublesome.

Every gardener ought to have a patch of peas, (of sorts as above) in readiness for transplanting in case of failure, or accidents, and to fill up blanks if necessary, and for a more early crop. Choose a well sheltered spot with a south aspect, and in it dig a pit two or three feet deep, four feet wide, and long as the quantity of peas may be required, in this pit form a sort of hot bed with stable dung or leaves, over which lay some mould. Procure a necessary number of grass turfs, three inches wide, and same depth, cut them in lengths from nine to fifteen inches long, invert each turf, and with a knife make a slit two inches deep, place a hand on each side of it, and open it two inches wide, put some rich mould in the groove thus opened, place in the peas two or three in the inch, cover and press firm. Place them one by one south and north on the bed, end to end and side to side, as close as you can press them, then cover slightly with mould through a riddle. (For transplanting see April.)

The best sort of bog mould for sowing peas with, is that which is composed of vegetable matter, principally such as is generally dug for fuel. This sort is antisept-

tic, and capable of resisting putrefaction. A stronger proof of this fact, cannot be adduced than the many vegetable bodies which we see constantly dug out of this matter in a state very little changed from their original; although in many cases, they must have been deposited there many centuries ago. The mould which is used for cultivating heaths, evergreens, and other tender-rooted plants, and which is generally called bog mould, is an excellent manure for early potatoes in long cultivated gardens: this sort should be called heath mould, being always found on the surface of uncultivated heaths.

**CABBAGES.**—Plant out in fair open weather. If the ground for this crop has not already been prepared, let it now be done (weather permitting) by trenching, length ways, one good spit deep, and a shovel off the surface, from ten to fourteen inches wide, to answer the different kinds of plants intended; if dunged, bury it in the bottom of every second trench in straight lines, over the centre of which plant the rows. Peacock's Fine Early Dwarf, with the Early York, and Knight's Early May, are the best for early planting; but any of the larger sorts may be planted out at the same time. Fill up the blanks in former plantations. Cabbages might be preserved in a fresh state by packing them up in casks among peat earth for six months or longer, for the use of vessels destined for long voyages.

**BROCCOLI.**—In prospect of severe frost, lay some pea and bean haulm, or other long litter, on the ground among their stems, and then stick the whole plot full of peastakes or other branches, in imitation of a natural cop-pice. This will, in a great measure, counteract the effects of sunshine succeeding severe frosts, which at this season, and following months particularly, are so hurtful to culinary vegetables.

**CURLED PARSLEY** may now be sown in drills half-an-inch deep, as an edging to a footpath or alley; if sown in an open space, let the drills be twelve or fifteen inches apart; cover and dress with the rake. This seed remains longer in the ground than any other culinary ve-

getable before the process of vegetation commences. The plain-leaved sort should never be sown on account of its similarity to hemlock, which bears some resemblance to the common plain sort, and is a deadly poison.

**SPINACH.**—A little of the round seeded kind may be sown in drills between the crops of early peas and beans, to be gathered early in spring.

**BEANS.**—Weather open and the ground moderately dry, the opportunity of preparing the ground, for the different kinds of beans should not be lost. This may be done, as already stated for peas, and also using the bog-mould for the earlier crops. The Mazagan is the hardiest and best flavoured of the small and early sorts, and is best adapted for the earliest crops. It and the Cluster beans may be sown in drills two or three inches deep, two feet apart, and two or three inches distant in the rows. For the larger sorts let the rows be three feet apart from each other, two or three inches deep, and plant the beans four or five inches apart in the lines.

In cold situations beans may now be planted on warm south borders; but in early situations they may be planted in the open quarters of the garden. If the ground be in good heart it need not be dunged for this crop. Beans thrive best as a full crop in strong land, but of course will be earlier in light soil. The Mazagan and Dwarf cluster are more convenient for the gardens of cottagers and artizans, as occupying little room, and may be planted between the cabbage plants which are now in the course of planting, or which have been planted last autumn. Three beans may be dibbled in between every two cabbages in the same line, or between every second cabbage in two lines, taking care that the bean in the one line be opposite the blank in the other, and so on.

As beans transplant very well, dress a piece of ground, six feet square, in a warm sheltered place; open small drills, from four to seven inches asunder, and two deep; plant the beans therein three inches apart, cover with fine mould, and press it firmly upon them. This small

plot may be easily protected in severe weather by placing a frame and light, or mats laid over hoops, placed arch-ways over it. When the weather appears settled, transfer the plants to the open ground prepared for them. The drills should be made sufficiently deep to receive the mass of roots; the earth is to be brought into close contact with the fibres, and raised two inches high about their stems.

**CAULIFLOWERS.**—In open weather examine the plants in the frames, and all those that are withered or damaged, let such leaves be picked off; keep them clear of weeds, and if the ground can conveniently be moved a little, it will be of great use to the plants. In mild weather, let the plants have plenty of free air every day, by tilting the glasses, or by taking them entirely off, when the weather will admit, keeping them close down every night, and never opening them in frosty weather. If very sharp, cover the glasses every night; and if the weather be rimy during the day, with mats, straw, or fern; also lay some litter round the edges of the frame. Cauliflower plants under hand glasses should be treated in a similar manner. Always in mild weather be careful to destroy snails and slugs among the plants.

Cauliflowers pricked into pots stand the winter well, as by that means they may be removed from one place to another, as circumstances may require; and being turned out with balls, when planted where they are to remain, will greatly promote their future growth, and much more so if frequently watered with tepid manured water. In April they may be turned out into the open air, between the asparagus beds, or any other warm and sheltered spot. They will require to be put in pretty deep, and protected by branches of trees for some time, lest they suffer from inclement skies after being planted out.

**ONIONS.**—In light soils, the months of August, January, or the beginning of February, are the proper seasons for sowing onions, with the view of obtaining a plentiful crop; but if the soil be heavy, March, or early

in April, is to be preferred. If the ground be not in a dry state, onions should not be sown this month; nevertheless, the opportunity should not be lost, whenever the ground will admit of it. Early sowing and treading in the seed tend greatly to prevent the maggot among the onion crops. The best onions I ever had were of this month's sowing. For full directions, see the following months.

REMARKS.—“ Nothing can resist persevering industry properly directed.” A mass of earth gives birth to the nourishing wheat, the despised nettle, to the lofty pine and the humble weed; all of them contribute to the service of man in some way or other; thus common nettles gathered young and fresh, bruised, and from one to two or three tea spoonfuls of their juice pressed out of them, drank in a little spirits or spring water, is a safe remedy for internal injuries, and will cure the throwing up and spitting of blood. A handful of the small white flowered nettle (*urtica urens*, it grows about the sides of houses and in cultivated ground frequently,) put into a quart of water and boiled into a pint and poured down the throat, is the best cure yet known for the murrain or redwater in cattle.—Look over the ground where peas are sown and see that none of the seed appear above ground, as this would be an inducement for vermin to find the seed in the drills, which would certainly snatch them up unless carefully covered an inch or two deep. Murrain not at your low estate or humble calling, though digging in the field; “ If you are diligent in your place, you serve your Maker as well as the minister in the pulpit, or the prince upon the throne.” Continue trenching or deeply digging all vacant pieces of ground for the different purposes for which they may be intended; but this work should not be done if the ground is too wet, or snow lying upon it; the rougher the surface can be made the better, whether trenched or dug; if dug, form it into ridges of any convenient size, so that the frost may the better operate upon the surface. The frost in this climate pulverizes the soil as much as the rays of the

sun does within the tropics. This operation of winter fallowing, either by trenching, digging, or ridging, is of infinitely more importance to garden ground than all the manure that can be given it without. Soft annual weeds, such as archangle, chickweed, groundsel, &c., pare and shovel into the bottom of the open trench. But spreading perennials, such as the creeping crowfoot, gout weed, speedwells, long trailing roots of grasses and vetches, &c., must be forked clean, and wheeled to a distance. This rule should be attended to at all times and seasons, every turn the ground gets, until properly cleaned. Trim deciduous hedges. Collect and make ready pea stakes. If draining has been neglected in the formation of the garden, where the nature of the ground requires them, it should be done now, or if any of the old drains be out of repair, they should now be mended. Examine all bulbs in the store room, onions and roots look carefully, and all those in a state of decay remove to prevent contamination. Where much wheeling is to do, this is the time to perform it; collect leaves in the woods, &c., to make dung. Each gardener should have a full set of tools, and in bad weather they ought to be looked after and put in proper repair if necessary, and where one is broken or worn it must be replaced. A too much worn spade does not answer for rough digging or ridging, therefore when it is so, go to a shop and observe the following rule to select a good one;—get a number of the sorts and sizes required (No. 4 is generally used by gardeners) first examine the handles that they be wholesome, free of knots, and straight in their growths; next see that the irons be handsome, and have no visible faults, if it seem to please you, suspend it by the handle on the end of your staff, or on your finger, and with your knife or a piece of metal strike it in this hanging state at the two corners and the middle near the mouth; if it sound clear and long, place it by you for a second inspection; go on in this way examining and placing by you until you have selected three or four spades for every one to be purchased; go over them a second time,

hanging and sounding as at first, and always the spade that has the clearest and longest sound, resembling a bell, make choice of it as the best spade, which will prove a long lasting and clean working tool.

#### FEBRUARY.

PEAS of the sorts mentioned last month for a full crop, may be sown at the beginning of the month; and Blue Imperial, Dwarf, Marrowfat, and any other of the larger sorts, towards the end, allowing the latter from six inches to two feet more room between the rows, according to the quality of the ground. For small families, tradespeople, and cottagers, about the middle of the month is best for sowing, to obtain a profitable crop. Peas may be sown every three weeks, during this and two following months, and from thence twice, to the middle of June, reducing the quantity each time from the last week of April. The earlier sorts only are to be sown after the second week of May.

BEANS.—Plant as directed last month.

POTATOES may be planted about the middle or towards the latter end of this month, if the weather be mild and dry.

ONIONS.—This crop seems to have been as liable to failure for some years past as the potato has been, owing to the maggot attacking the roots of the plants after they are come up two or three inches. Soot is a powerful manure, and ought to be used in a dry state, and sown evenly over the surface of the ground as a top dressing to it, immediately previous to pointing it for the reception of the seed; and where it has been sown no maggot has appeared. A rich deep black, or rich loamy soil, is to be preferred for this crop, which should have been rough dug in autumn, as already stated; but if this has been omitted, the sooner it is done now the better. If favourable weather, manure and rough dig the ground for this crop: in this state it may rest a short time. If road or pasture dung can be had, collect a quantity of it, and prepare it by turning, breaking, and mixing lime,

dung of poultry, and soot among it. Gather up, and keep it dry, till the appearance of a fine day; then early in the morning, so soon as the frost is out of the ground, spread this compost over the surface, and begin at the higher or north end to point with the spade from three to six inches deep, and dress with the rake as you proceed, leaving the surface as even and level as possible, till the whole be dressed and levelled; then square off a foot alley at both ends; from the side mark off the beds four feet wide, leaving an alley between of twelve or fifteen inches wide. Provide a number of small sticks, such as the prunings of apple trees or currant bushes, of last year's shoots; take a handful of them, even and cut them at once, about eight or nine inches long. The breadth between the rows should be marked on the measuring pole, which is to be the rule for measuring and marking the drills, by the small sticks in each end of the bed, which will contain seven drills, and eight or nine inches between. Sometimes only six drills are made in each bed, which will of course leave more room between the rows for thinning and weeding the crops. The outside drills in every bed must be two or three inches from the alleys. In lieu of a driller, the beds being marked at each end, strain the line between the pins in the side of the first bed, and, by pressing the head of an iron rake along the line, form the drill, and shift the line to the next two pins, and proceed in this manner till the whole be drilled. The one half of the bed is to be drilled from the one side, and the other half from the other side, with your feet always in the alleys. The seed should be sown immediately after the drills are formed, while the ground is fresh. The following sorts may be mixed and sown at this time:—The Strasburg, Deptford, Spanish, Portugal, the Silver-skinned, Red-skinned, &c. A few radishes and early horn carrot may be mixed with the onion seed, for drawing young. If the ground is light and dry, sow the first drill of each bed with your feet in the alleys. Tread in the seed of this drill as you return, by placing the one foot close be-

fore the other. Light shoes should be worn for this work. Proceed to sow the next drill with the one foot on the sown, and let the other foot follow the hand sowing the seeds, and so on. Sow thinly, and tread evenly, length ways; then begin at one end of the beds and tread evenly cross ways. Pare the alleys, taking care not to disturb the drills, and cover evenly one-fourth of an inch deep, and dress well with the rake.

If the ground be strong, or too damp for the above treatment, make the beds three feet wide, with five drills in each, or with six drills in the four-foot beds, which may be sown without treading the beds; when sown, give all the beds a gentle beat with the back of the spade, previous to covering them, and dress with the rake as above. Another way of sowing onions in drills, is to begin to point and dress the ground at the side instead of the end of the plot, when two or three drills are to be sown, covered, and dressed, as the operation proceeds, and, by missing every seventh drill, will leave the ground divided into beds as before, without treading on the sown ground. If the seed is to be sown broad-cast, the beds are to be marked off as at first, and the line strained across the ends of the beds as far as the seed is intended to come, which form a drill as above, and likewise on both sides of the beds. In these drills sow the seed evenly but thinly, thus forming a neat boundary to all the beds; then sow the seeds evenly within this boundary, beat the beds with the back of a shovel, pare the alleys, and cover to a quarter of an inch deep, and dress off with the rake. These beds will have a very neat appearance, and the alleys be much easier hoed and cleaned than when left ragged. For destroying the maggot among the onion crops, see May and June.

The winter onions that have been sown last autumn, should be gone over about the end of the month, and cleared of weeds.

CHIVES are generally used both in the kitchen and in salads, and are a substitute for spring onions. They are of easy culture. Divide the large tufts into small sets,

and plant them in rows eight or nine inches asunder, and four or five inches in the row; or they may be planted as an edging, any time this month, or in March.

**SPINACH** of the round sort may be sown at the beginning of the month in a rich soil, in an open spot; and also for successional crops at the end of the month. Hoe and thin the winter crops to two or three inches between the plants in the rows.

**LEEKS** may be sown in a bed of rich land, moderately thick, as part of them are to be afterwards transplanted.

**PRACTICAL REMARKS.**—The process of trenching and digging should be continued with due diligence, if not finished last month; and every thing there recommended should be done as soon as possible, for the double advantage of pulverizing the soil and forwarding the work, as the following months are the busiest of the year with the gardener. In open dry weather level down ground for sowing and planting, that has been digged in ridges, only such parts that are to be directly sowed or planted, breaking all lumpy parts and hard clods. Lay the ground regularly even, and form an equal surface for the reception of the seeds and plants, which should be put in before the ground is either too much dried, or rendered too wet by rain, &c.

Back digging is the mode of digging flower and fruit borders, and among plots of fruit trees and bushes, &c. Thus, when you dig with your back towards the east or west, the open furrow runs south and north, the surface not being shovelled to the bottom of the trench; therefore each spadeful is to be turned over forwards, with the surface laid undermost, into the bottom of the trench, and on arriving at the end of it, the motion of the spade has to be reversed, always leaving the surface as rough as possible for some time. In this state the ground will remain longer clear of weeds, and the weather will pulverise it much better than can be done with the back of the spade. Afterwards, on a dry day, when the weeds begin to appear, the ground is to be levelled down, and dressed with the rake.

## MARCH.

**BEANS**, of all the sorts, will succeed well after this time of planting. Where a constant succession is required during the summer and autumn, plant of the best kinds every fortnight. If it be intended to plant cauliflower, cabbages, or savoy between the rows, they should be three and a half feet apart.

**PEAS**.—When a former sowing appears above ground, put in another, cover about two inches deep, or if the mould be dry, three or four inches deep; choose a fine dry day afterwards to dress the drills with the rake. Hoe, and draw earth to the stems of all beans and peas two or three inches above the ground, this will very much accelerate their growth. Stick all peas as soon as the tendrils appear. For choice selections of beans and peas see catalogue.

**CABBAGES**.—Transplant of all kinds; if the plants be strong and the weather good, the sooner it is done the better. If the ground has been prepared and dunged as already directed, extend the line over the spaces where the dung has been laid, travel upon it by placing the one foot close before the other edge-ways, thus forming neat furrows for the reception of the plants, then plant as has been already described.

The early sorts that are meant to be eat young, should be planted much closer than the large, which are to attain the full size. Hoe, and fill up all blanks among former planted cabbages. Cabbage seed may now be sown in drills, every way as described for onions; only the ground should be poorer, make choice of the early Peacock, Sugar Loaf, Battersea, and Yorkshire; also Red cabbage.

**CAULIFLOWER**.—When the weather appears propitious, plant out from the warm borders and from among the seed beds of cabbage, and other plants among which they have been reared and sheltered during the winter. Allow them good ground, and rotten dung or rich compost, and the same room as the large cabbages. Plant every way as directed for that crop, but let the mould

fall gently about the roots, and do not press hard with the dibble. Cauliflower seed should be sown in a bed of good soil in a warm situation, and if sown on a slight hot bed it will forward them two weeks sooner for transplanting; some of these plants will be ready for cutting in August.

**LEEKS**, for a full crop, may be sown towards the latter end of the month, in a bed of light earth for transplanting in June and July. The true Scottish, or Mus-selburgh Flag, and the London broad leaved, are the best.

**JERUSALEM ARTICHOKE**.—This is a proper time for planting them. They are cut and planted in the same manner as the potato, by planting the roots in rows about three feet apart, and nine or ten inches in the rows. It is of easy culture and thrives in poor soil.

**SAVOYS**.—Sow of the green and dwarf kinds.

**CURLED PARSLEY**.—Sow now, if not done last month.

**SPINACH**.—Continue sowing every three weeks, where required, of the smooth or round seed kind. The seed may be sown in drills twelve or fifteen inches asunder, or between the rows of beans, peas, cabbages, or cauliflower. Hoe and thin the former sown crops.

**CHIVES**.—Divide and plant now, if omitted last month.

**ONIONS**.—If not already sown for a full crop, should now be done on a fine dry day, see last month. Small onions of the common sorts, and about the size of hazel nuts, may be planted in rows seven inches apart, one inch deep, and four or five inches distant in the rows. Plant Potato Onions the same way, and both will grow alike.—(See December.)

**HORSERADISH**.—Plant in light soil; procure sets three inches long with the crowns; they may be dibbled into the head in rows eighteen inches apart, and six inches in the lines.

**POTATOES**, may now be planted in an early dry situation. There are two sorts in cultivation in this country, which I would recommend as preferable to all others for garden culture. The Ash-leaf Early Irish or Royal Dwarf; and the true Early-White American. The for-

mer has a large handsome tuber, which is a little broadish or oval, and somewhat flat at the ends, and the eye<sup>s</sup> or buds on the sides are so plain as to be scarcely perceptible; for which reason they are easily injured when carried from a distance, especially if on horseback; therefore they should be carefully packed when to be conveyed from one place to another. When there are plenty of seed for selection; the best tubers should be chosen for planting. The fibre or root end (that is the end by which the potato has been fixed to the stem fibre) should be cut off and rejected, or these cuts should be all planted by themselves. What remains, if the potato be of proper size, is to be cut into two or more sets, according to size and number of buds. The top or extremity is to be kept separate from the rest, always taking care that the eye be as near the centre of each set as possible.

I am of opinion that the potato, being an exotic, is not capable of continuing its species genuine above 30 years in our soil and climate; except by the principal eye, which is in the middle of the extreme end: but this is only a conjecture; yet it is quite clear that it produces potatoes of better quality, two weeks earlier, and double the quantity, than the fibre end cut (by which it was attached to the stem.)

It is needless to state that the fibre end of the potato is the best for eating, and it may be used for that purpose, or given to the cattle, pigs or poultry. Here let every one judge for himself, whether or not he ought to keep the different divisions of his potatoes, when cutting them for seed, in two or three heaps by themselves, and plant them into different drills. Another of my methods is to plant some potatoes into the field in June, at the time of sowing the turnip, and in the same field, for seed, the produce of which cannot be selected till the spring, then if they be of the Early American sort, choose the best formed, roughest, and darkest in the colour for planting. The principal crops should be of the latter kind, as they are of a much better quality, and will re-

main good all the year, if well kept. The Early Irish or Royal Dwarf, is two or three weeks earlier, and are the best for forcing. The next thing to be observed in keeping undegenerated varieties always in use, is by hybridization, and rearing new varieties from seed.

We now come to the great and important question, How are we to provide against the disease and failure to which this crop has of late years been liable? I will answer in a few lines. If any danger is to be apprehended from vermin destroying the sets in the ground, guard against them in time, for it is neither troublesome nor expensive; provide a small quantity of quick lime, some dry soot, and a few ounces of the flour of sulphur; reduce the lime to powder, and to every pound of it add two oz. of dry soot, and one oz. of flour of sulphur, and mix them well together. Then as you go on dividing your potatoes into sets as already stated, with a common drainer sift a little of the mixture over each layer of the sets, and also over each basketful as they are laid on their respective heaps. Go on in the same way till the desired quantity be cut, and dusted all over.

This being done we have got one step past the danger of failure. Short, or rotten stable dung, with one third part of peat earth, peat earth alone, or the compost already mentioned, and decayed turf, are the best manures for potatoes. If the ground has been prepared for this crop, stretch the line over the spaces where the dung has been buried, if dunged, (I seldom dung early potatoes.) Use a large dibble two and a half or three inches diameter, three cornered at the point; it ought to be as long as a spade, with a tramp upon it, and a cross handle at the head like a tramp-pick, but straight; make the holes close to the lines from three to five inches deep, and about nine or ten inches apart. If peat earth is to be had, put a small handful into the bottom of each hole, previous to dropping in the sets. You may put one fourth of a handful of it over all the sets, and cover with your feet if the ground be dry, as it ought to be, if not, cover with the rake. I always allow the potatoes two feet between

the rows. All these directions being attended to, there is no danger to be apprehended from failure. This early planting should only consist of a moderate portion, and chiefly of the Early Ash-leaf (See Botanical department).

REMARKS.—He that says be fervent in prayer, says also, be not slothful in business. If the weather be dry and mild, the various branches of cropping should be attended to with assiduity, and remember that April is the key stone of the year, for on it chiefly depends the wealth and happiness of Britain. No time should be lost in committing to the soil the requisite plants, seeds, and all useful roots.

In all early light dry soils, it will be of great advantage to sow and plant early, whereby the crops will arrive at sufficient strength to resist the droughts of summer; but in such as are cold, wet, and late, the state of the weather alone must determine the best time of sowing. Cabbages, savoys, or greens, occupying favourable situations in the garden, should now be removed to a remote corner, or behind fences, &c. and laid into the earth closely, in a sloping posture, covering them up to the necks with earth. Here they may remain to be cut for use as required; after that they will afford excellent sweet gatherings until the new crop be ready. Rough dig all ground not immediately required for cropping, pare the surface in digging as directed above, but it need not be laid up in ridges.

#### APRIL.

ARTICHOKES should now be dressed, and new plantations made where required. Where the earth has been ridged up over them to defend them from frost, it should now be levelled down, observing as you proceed to dig and loosen all the ground about the plants with the garden graip (four pronged fork). Open the earth deep enough about each plant, and examine the number of shoots or suckers springing from each stool or root, choosing two or three of the strongest on every stool to remain, and all above that number to be taken off close, by the hand. Close the earth in again about the roots, and also about

the young plants, laying the mould close about them with the hand. Artichokes are propagated by planting the best of the shoots taken off as above, and by no other method, and this is the proper season for that purpose. Where a new plantation is required, let them be planted so soon as good plants can be procured.

There are two sorts in general cultivation, the large globe artichoke and the French or green oval; the former is greatly to be preferred for the general supply, the heads being larger, and the eatable parts, which are the heads, thicker and more fleshy: plant them in an open situation, and in good ground, which should be trenched two spit wide, and two or three deep, if the depth of soil will admit of it; and a quantity of good rotten dung buried one good spit deep in the two spit wide trenches, three and a half or four feet apart from centre to centre, over which the sets are to be planted, in patches of three sets each, all supplied with fibres, and about a foot apart, and two or three feet between the patches in the rows. Crop the leaves so as to reduce the sets to the length of six inches above the root. Give a hearty watering if the weather be dry.

SPINACH, or TURNIP, &c. may be drilled between the rows the first year.

ASPARAGUS should now be spring dressed by forking or digging their beds with the garden graip. Be careful to loosen or fork every part of the bed or drill to a moderate depth, taking great care not to go too deep to wound the crown of the plants. This dressing is necessary every spring to improve and loosen the ground, and to relieve the buds in shooting up, also to give free access to the sun, air, and showers of rain. A top dressing of the park dung already alluded to, or any short rotten dung, with the mould scattered over the beds from the paths between, will prove of great advantage. Rake all smooth with a short toothed rake, which will not hurt the buds. This plant delights in rich deep sand. It may also be produced in great perfection in light loamy earth, well enriched with dung, or compost. It does not thrive

well in stiff, wet soils, nor in any that are less than two and a half feet deep. The ground should be well trenched, two and a half feet deep if it will admit of it, and well broken, if stiff. The manure ought also to be mixed with the soil to the very bottom, and most of it should be applied there.

Where a new plantation is required, the seed should be sown in drills an inch deep, and three feet asunder, sowing rather thickly. After the plants are come up they should be thinned out to five or six inches in the rows, or they may be transplanted at one or two years old into eligible drills (ground prepared as above). It is three years after sowing before it is ready for the table. It may be greatly improved by pouring liquid manure over the rows during winter, after they are covered with long litter or landed up. Artichokes and Asparagus beds may be dressed in March, in early seasons.

**BEANS.**—Plant more for a succession; if any have been sown for transplanting, do it now; open trenches at proper distances deep enough to receive the masses of roots, place them from three to five or six inches apart in the rows according to their sorts; close the earth about the roots and press it firm and draw up the mould two inches about the stems. In dry weather give a good watering after transplanting.

**PEAS.**—Continue sowing for successional crops, and transplant the peas that have been reared on the grass turfs. Open small trenches rather wider than the turfs, and an inch deeper, throwing the loose earth to the north or south-west side of the trenches. Lay the turfs in them, and regulate them by the live, press the earth close to their edges. Place the loose earth from the trenches, as ridges of defence against cold and piercing winds. Pease so planted cannot be too early supplied with low branchy stakes—these are of great benefit to the plants which they greatly protect and excite; for the pea being a climber, sends out its tendrils very early, and thus attains that perpendicular growth which nature ordains it to assume.

When the tendrils appear, the mould should be well drawn up to the peas; then to the outside of the drills give a gentle beat with the back of the spade and place in the stakes, which should be sized to suit the different heights of the plants when grown to maturity. The tallest and most branchy put on the side next the sun, as the pea has a tendency to lean in that direction. If they are grown in double lines, the smallest branches are to be placed thinly in the centre between the rows, and the taller stakes on both sides, in an upright position, and pressed down firmly, so near the rows as can be done without injury to the plants. The stakes should not be put in too thick at first, as they can be afterwards supplied as occasion may require.

**CAULIFLOWER.**—Plants under hand glasses should have earth drawn up round their stems; but due care must be taken in earthing up cauliflowers, at all times, that no earth be drawn into the hearts of them, as that would much injure the plants. Clear them of all decayed leaves.

The glasses may still be kept over them at night, and during cold and wet weather; but in fine days, and when there are warm showers, let them be exposed to the free air. About the end of the month, if the plants be large, they may be taken quite away. Where any of the winter-standing cauliflower plants in frames, borders, &c., were not planted out last month let it now be done, as there directed. Sow more cauliflower seed on a open spot by themselves, or along with cabbage, savoy, or German greens seeds, &c., which will serve to nurse and greatly protect them, from which they will be easily selected when wanted for planting out.

**CAPE BROCCOLI**—That sown in autumn, wintered with the cauliflowers, may now be planted out, and treated in the same manner as the cauliflower. Protect them from the cold and cutting winds of April with a few branches of spruce or broom, &c., stuck round each plant. This will answer the purpose of breaking the winds, and partially sheltering them until they have taken root.

**BROCCOLI.**—This delicious vegetable is, perhaps, without its rival in the garden, and its culture is very simple. Sow a moderate quantity of Meigle broccoli, Portsmouth, Sulphur-coloured, Early White, Late Dwarf, Purple Siberian, or Danish. Sow the seed on a rich sheltered border, and cover with mats or long litter if the weather be frosty. If it be dry and mild give plenty of water. When the plants are two or three inches high, transplant them into rich beds four inches apart, and still continue to water if the weather be dry. In two or three weeks more some of them will be ready for planting out where they are to stand finally.

**CABBAGES,** sow and plant. You may prefer for this sowing Peacock's Fine Early Dwarf, Early York, Imperial, Pyramidal, Battersea, and Pentonville. The seeds should be sown on a light soil.

**BORECOLE-SOWING.**—Many sorts of kail are understood under the name of Borecole, or open kail; the principal of which are, the Red-shanked Scotch Kail, the Green Broccoli or Scotch Kail, German Greens, Buda Kail, Woburn Perennial Kail, Rugged Jack. The Woburn Kail is propagated by cuttings of six or seven inches long, and planted where they are finally to stand. By the end of this month the crops of these kails will be exhausted; the stems may be cut down within three or four buds of the ground. They will sprout up afresh. The ground must be dug over (if they have not been laid in by the heels, as already hinted), and afterwards kept clear of weeds.

**SAVOYS** may be sown at the beginning and end of the month.

**SPINACH**—Where a constant supply of this plant is required, sow of the round sort once a-fortnight. It may be sown in drills between the crops of peas, beans, &c., the shade afforded by them will prolong the crops of the spinach.

**LEEKs.**—If a full crop has not been sown last month, the sooner done in this the better.

**LETTUCES.**—Continue to sow and transplant of all sorts, if wanted.

**RADISHES.**—Sow every two weeks during summer, where required.

**SMALL SALADING.**—Sow once a-fortnight. The sorts are rape, cresses, mustard, &c.

**ONIONS.**—Where circumstances prevented the principal crops from being sown last month, let it now be done. In strong wet soils they may be sown with better success than if sown earlier, and more so if the ground was wet.

**TRANSPLANTING ONIONS.**—This should now be immediately attended to, if not done last month, especially the crops sown in autumn. Prepare a piece of rich ground, which has been well manured for the preceding crop, by trench-digging it, with a paring; make fine with the spade and rake, and as the process of digging is carried on, strain the line upon the edge of the digged ground, and cut drills one inch and a half deep, and nine inches and a half apart. Having opened the first drill, commence drawing from the autumn crop such a number of plants as to leave a crop on the ground, draw them carefully. If the ground be hard, loosen the whole with a narrow-pointed tool. This will not only enable you to thin out the crop without injury to the plants, but will greatly accelerate the growth of those that remain, and much more so if they be watered once previous to thinning, and twice after, between the rows with soap suds from the washing tub through the pipe of a watering-pan. Having enough to plant one line, proceed to set them regularly in the drill from four to five inches apart, taking care not to cover the bulbs of them too much. The fibrous roots only ought to be covered, and this should be done to the thickness of an inch and a half. Press the mould that covers them gently down with the back of a rake or the back of a spade, and give them a gentle watering over head. Prefer to cover with a light sandy loam, or vegetable mould. Leave a space of about 14 inches between every fifth row, as alleys for the conveniency of watering, hoeing, and weeding. If the weather prove showery, in a few days all the crop will have taken root in the

ground; but if the weather be dry, let them be watered every afternoon from the rose of a watering-pan, until they have taken root. Onions sown in a slight hot-bed may be transplanted in the same manner.

**FRENCH BEANS** may be sown on a light rich warm border towards the close of the month; they must be sown in drills about two feet apart, and two inches deep, or the beans may be dropped in, at an inch distant; this will cause a more even crop to be obtained. They should be sown in dry weather, and the bottom of the drills sprinkled with peat earth previous to sowing, and also a little of it spread over the seed in the drills with the hand to prevent them from rotting in the ground, as all these kinds of seeds are subject to. Do not tread them in, but cover loosely, and dress with the rake. The sorts to be sown at this time are the Speckled Dwarf, the Negro, Battersea, and the Liver-coloured.

**TURNIP** may be sown at the beginning, middle, and the end of the month, in an early light spot of ground. Sow in drills one inch deep, and nine and a half or twelve inches apart, or at the rate of five drills in four feet wide beds. Either tread the seed or beat with the back of the spade, then cover and dress with the rake. They may be sown between the rows of peas, asparagus, sea kail, or in every other drill along with kail plants. The plants must be removed in time to allow the turnip room. Sow the Early White Dutch, and the Maltese Golden Yellow. Keep them clear of weeds, and thin them out to three or four inches apart.

**SEA KAIL** thrives in light sandy garden soils, it comes to perfection with little care, but in strong clayey soils it is often apt to rot in winter. In preparing ground for sea kail, if the ground be naturally strong, it should be trenched three feet deep if it will admit of it, and well manured. Divide the ground into four feet beds, with alleys eighteen inches wide. Throw out the mould of the alleys to the depth of ten or twelve inches, which mould being laid on the beds, will raise them from 15 to 18 inches above the bottom of the alleys, which will

render the beds dry. About the middle or latter end of this month, if the beds be prepared as above, proceed to draw two drills in each bed about two inches deep in which the seed is to be sown. Sow moderately thick so as to secure a crop, which afterwards will be thinned out to 12 inches apart. A circle of quick lime should be strewed round the plants to check vermin. Sea kail will transplant when a year old, this must be done with great care. It may also be raised from cuttings of the roots one inch long, and planted in drills like potatoes.

Blanching Sea Kail is now performed in a variety of ways. The sprouts which rise at this time, and in May, being properly blanched, are held in high estimation. The easiest method for sea kail, which is not forced, is to cover the beds in autumn with leaves raked up from woods and lawns, covering each bed in thickness according to the strength and age of the plants, giving the greatest covering to the oldest and strongest plants. The covering may be from 5 to 15 inches when first laid on, and over that place a slight covering of littery dung, to prevent the leaves from blowing about; this covering is to remain on until the crop is all cut, when it is to be taken away, and the beds dug over; or when from particular circumstances this has not been attended to in autumn, as at this time the buds begin to appear, fork the beds regularly over, and cover the plants from 12, to 15, or 18, inches with sawdust or rotten tan, if it can be easily procured; if neither can be had, break the earth on the surface of the beds as fine as possible, and mould up the plants with it. But where there are blanching pots used for the crops of sea kail which have been forcing during the winter, place them over the plants, and draw a sufficient quantity of mould round their base to prevent the admission of air. Large flower pots, by stopping the holes, may be used in the same way. The action of the rays of the sun penetrating through the pots, will accelerate their growth. When the young stems are about four or five inches high, remove the leaves carefully with the hand, and cut them off for use, and taking

care not to injure the remaining buds. A succession of gatherings may be continued for five or six weeks, after this the plants should be uncovered, and their leaves allowed to grow. When the seed is not wanted, the flowers ought to be nipped off with the finger and thumb as long as they appear. This will much strengthen the plants.

**CARAWAY.**—For its seed, sow a small quantity on a light rich border, it will produce seed next year.

**FENNEL** may be sown in the same way.

**MARJORAM** may be sown any time this month, on a bed of light earth, and may be afterwards transplanted into rows nine inches distant, or as an edging to a border, and three or four inches apart in the lines.

**BASIE** may be sown the same way as marjoram.

**SWEETMINT, OR SPEARMINT,** is generally raised by slips off the roots, and may be either planted closely in a bed, or in lines six or eight inches apart. It is an herb that will thrive in almost all soils, but flourishes best in a light moorish earth.

The above remarks will equally apply to peppermint.

**SAGE** may be propagated either by cuttings, or by slips off the roots. This is the proper season for propagating it by slips, but the end of July, or the beginning of August, is the best time for its propagation by cuttings. It thrives best in light soil.

**MEDICINAL HERBS.**—This is a proper time for sowing, or otherwise propagating all medicinal plants, such as Angelsea, Balm, Hyssop, Lavender, Rue, Rosemary, Myrrh, Burmeot, Scurvy-grass, Wormwood, &c.

**THYME** may also be propagated, either by seed, or from slips. The seed requires to be sown on a very light soil, and when the plants are about two inches high, they may be planted out in lines, about nine inches apart, or the slips may be planted at the same distance. The seedlings may be thinned out, without transplanting, to near six inches square.

**TANSY** will thrive in any soil, and may be propagated by slips off the roots.

**SAVOURY.**—The same directions will apply for the propagation of this herb, as has been given for marjoram.

**CELERY**, for a full crop, should be sown the first or second week of the month, on a bed of light earth, in an open situation. If the seed be sown in rich vegetable mould, and kept rather moist, it will thrive the better. Water the bed frequently in dry weather. The common Upright Celery, the Large Hollow Upright, the Solid Stalked Upright, and the Large Red Stalked Upright, are the sorts most cultivated. The three former are preferred for general crops. The latter variety is rather coarse for salads, but being very hardy, stands the winter, and is well adapted for the use of the kitchen, either for soups, or stews. After the plants have attained three or four inches in height, they should be transplanted on a bed of solid dung, well rolled, and beaten into a solid mass with a mallet, or the plants should be pricked out in a very rich border; then give a moderate watering, and repeat it occasionally till the plants have taken root.

**CARROTS** should now be sown for full crops, the best sorts are the Early Horn, for the earliest crop, and the Altringham for the principal crops, being the largest, and best carrot in cultivation. It is originally from Cheshire. The seeds have numerous forked hairs on their borders by which they adhere, and therefore before sowing they should be well rubbed between the hands, and mixed with small dry sand, in order to separate them the better, and as they are very light, they ought to be sown on a fine quiet day. The seeds should be trod in length ways and cross ways after sown, previously to being covered and raked. The ground should have been deeply dug, or half trenched, in autumn, and now pointed and dressed smooth with the rake, divided into four feet wide beds, and drilled as directed for onions, only let the drills be nine and a half or twelve inches apart, or five drills in each bed.

The beds may be beaten with the back of a shovel, and not trodden, in strong stiff soils, and the seeds covered

in the drills with vegetable mould, or any other light dry soil that can be procured. Carrots may be sown at different periods, from the second week of this month, to the end of the first week of May.\* The same treatment will answer beets and parsnips, but allow them twelve or fifteen inches between the drills. The latter may be sown a month earlier.

To insure a crop, it is advisable for all general crops, to sow at two or three different times, that if one crop be destroyed, another may succeed. The best mode of sowing all small seeds, is in drills formed with the head of a large iron rake reversed, close to line, and by rubbing the thumb on the two forefingers, dropping the seed regularly and equally all along: the hand ought to be held within a few inches of the drill, followed by the foot, and the other foot in the former sown drill. Thus forming a sort of sowing machine. The most convenient vessel for carrying the seeds at sowing is a small flaggon, on which the lid can be put in the event of a shower.

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\* SPIRITS OF TAR A MANURE FOR CARROTS.—Most practical men admit that carrots are a very precarious crop, not only in old garden soils, but, in many cases, in those which have been for years in an uncultivated state. Upon Mr. Duncan's estate, near Lasswade, carrots have been found for years to fail. Three years ago, he prepared a piece of ground, by manuring and digging in October in the usual manner, to one half of which he applied spirits of tar, at the rate of about one gallon to every sixty or seventy square yards. The result was, that upon the half so prepared an excellent crop of well-formed roots was produced; the other half, which was not so prepared, was, as usual, a complete failure. This last season, by way of testing the experiment, he prepared the same ground in the usual manner; but did not apply the spirits of tar. The consequence was a total failure over the whole piece. This appears to prove two important points, viz., that the spirits of tar are beneficial only for one crop, and that they are completely efficacious when applied. Mr Duncan's mode of using the spirits of tar is simple and excellent. He procures a quantity of fine sand, which he saturates with the spirits until it is completely mixed, this he scatters upon the ground previous to digging, in about the proportion stated above.—*Gardener's Chronicle*.

POTATOES, for the principal crops, should now be planted both in gardens and fields. The varieties are numerous, but the two sorts described last month are the most suitable for garden culture, with the addition of some of the new or improved kinds. (See Catalogue.) The Lady's Finger, or Early Rufford Kidney potato is excellent for its quality, but requires a rich soil, or great plenty of manure to grow to any size. This planting should consist chiefly of the true Early White American. This kind ought also, in my opinion, be planted to a greater extent in the field, especially in late districts. The sets should be prepared as directed last month, and planted immediately after being cut, or the middling small-sized potatoes may be planted whole. If the ground has been prepared, dibble them in as directed last month. If not, plant them as the process of digging goes on; not in the bottom of the trenches as commonly done, whether dunged or not, but let trenches be always opened on the edges of the newly-dug ground, over the dung, if dunged, and two feet apart, and about four or six inches deep, thus forming shallow bulbs for the reception of the sets, which should be regulated and made straight by the line, placing the eyes, or extremity of the tubers, in every case uppermost. If peat earth or dross be spread beneath, and a little of it sprinkled over the sets in the drills, it will tend to increase the quantity and quality of the crop. The sets may be covered to the depth of one inch from the bottom of the trenches, and to three or four inches more by turning the next trench, and so on.

It is a frugal practice to stimulate two or three weeks' supply of early potatoes, which may be easily done by placing a necessary number of whole potatoes, with their extreme ends uppermost, closely on a slight hot-bed, with a stratum of peat earth mixed with small sand below and over them. Two or three feet square will be sufficient, which can be easily covered with long litter at night, or in the event of frost; or they may be placed in flat boxes with the same materials about them, and

placed upon a warm dunghill, or in any other warm and convenient place. The heat must not much exceed summer heat, for in this case the tubers are liable to decay, and much more so if they are cut. When the prospect of frost is over, they must be taken up and divided into sets with a thin-bladed knife, leaving as much of the soil adhering to the fibres as possible. Plant them in shallow drills, and draw the earth over them, leaving part of the leaves above the surface. A part of these sets ought to be reserved for filling up all blanks among the general crops.

By attending to this simple method, good potatoes can be obtained easily in June.

Perhaps it may be of use to drop a hint here for cooking potatoes. They should not remain after being washed, or peeled, unless covered all over in cold water. When set on the fire into a pot or goblet, the water should only touch the upper layer, or scarcely come in sight. They should be allowed a smart boil for about eight minutes, or parboiled, when the water should be all poured clean off them and (an onion, some spice, or a little fat may be added) then allowed to remain on the fire about nine minutes longer, or until they be ready. The lid should fit close, and remain off as short a time as possible until the potato be cooked, when the steam should be allowed to go off. Toasting, or steaming them in an oven is a better way. The time potatoes require for cooking, depends on the kinds, and the soil wherein they grow. The Small American Cluster potato requires only about three minutes, when grown in a garden.

The diseases which affect the potato are the curl, decay, and vermin. The first is occasioned by not changing the seed frequently, by planting over-ripe tubers, and by planting the same produce oftener than twice in strong clayey soils. This disease is never known to exist in the Highlands, or in cold late districts, where this crop is raised on a light black moor, or moss land. Therefore the refuse of peat stacks is a valuable manure

for potatoes in most garden soils; it should be spread in the drills, and in immediate contact with the sets. Decay is occasioned when the potato is stored up wet, or if planted in too wet land, where water is standing among the drills, or if planted in very dry land among hot dung. The decay commences at the cut ends of the sets.

There are two sorts of wire-worm, which are great enemies to the potatoes; the worst of which is the red or brownish, hard and wirey, with a black head, and about one half or three quarters of an inch long. But the most destructive vermin are small gray insects, which breed on the cut parts of the sets, and mostly among the seed that is brought from low early warm soils. When they make their appearance some time after planting, on the cut parts of sets, they are only seen as small and very white spots; but when viewed with a microscope they appear very active and voracious, and devour the sets with amazing rapidity, as they grow larger they become darker in colour till they be three eights or one half inch long, when they are dark gray. They are full of legs below, they have two small filament sort of horns, and their bodies are full of knots or joints. They are also very destructive to ripe strawberries, and to winter spinach, &c. A little quick lime well powdered, strewed over them, will destroy them for a season. Some are of opinion that lime in this state will kill vegetation, but that is not the case, as any one may easily prove.

REMARKS.—Provide a measuring pole, five feet long, with a brass tack one foot from each end, it should be square, and one half inch in the side; the two upper corners planed off will leave it six sided, with a flat side. The four upper corners are to be marked the requisite distances between the drills, say from eight, nine twelve, to fifteen inches, to answer the different sorts of crops. The length of the pole is used in marking out the four feet wide beds, and to the second tack for three feet beds, thus in every case allowing a foot for the alleys

which are formed by running both your feet, closely guided by the strained line, between the pins marking out the beds, and this will admit of the outside drills to be two or three inches from the alleys thus formed. The one half of the drills are formed with your feet, this side of the bed, and the other half in like manner on the other side: but when a drilling machine is at hand, it is more expeditious. Always bear in mind that treading in the seeds on light dry soil is recommended, and frequent hoeings among all the advancing crops should be performed in dry weather, drawing up the mould about the stems of such plants as require it. Keep under all weeds by hoeing and raking, in dry weather; and take the advantage of planting and sowing in showery weather throughout the summer. Dig up all creeping roots as they appear, such as crow-foot, docks, dandelions, &c. &c. rake and wheel them to a distance. Dress the walks, and let order and neatness be your constant aim. Still rough-dig all vacant ground. In every turn the ground gets, be very careful in gathering and destroying all wire worms wherever they make their appearance, and in the mornings, and after showers of rain, destroy slugs and snails by gathering, or strewing hot-lime over the ground where they are. In strong ground dig between the rows of broccoli with the garden fork, and earth them up with the spade. In furrowing up cabbages, cauliflowers, &c., be careful that the mould does not fall into the hearts of the plants, as that would destroy them. All seeds that are liable to be attacked by vermin in the ground, should be slightly, but regularly, dusted over in the drills, or before sowing, with a powder consisting of 16 parts of powdered lime, 2 parts of dry soot, and 1 part of flour of sulphur; viz.: 16 ounces, 2 ounces, and 1 ounce. "This mixture is inimical to insects, and does not injure the seed or the plants."—*Journal of Agriculture.* for January.

## MAY.

BEANS.—Plant the New Long Pod, Windsor, Toker, and White Blossomed. If they be planted three feet

apart, a row of savoys, cabbages, or cauliflower may be set between them, so soon as these plants are strong enough for planting out; or if they be four feet apart, then two rows of either of them may be planted between them, which will turn all the ground to the best account. Nip from two to four inches off all the beans according to their size, when the flowers begin to fade at the bottom of the stalks; this will direct the growth into the pods just forming, and forward them in a great degree.

**BROCCOLI**, for a late crop, may be sown at the beginning of the month. Sow the sorts recommended last month, to which may be added Metcalf's Gray, and Knight's Protecting. Those broccoli plants which are fit, should now be planted out two feet each way. Let the ground be prepared as has been directed, if not already done. All rough-dug ground must be pointed before being planted at this season.

**CABBAGES, SAVOYS, GERMAN GREENS, &c.**—Transplant spring-sowings of all sorts for autumn and spring use.

**ARTICHOKES** may still be planted. Trim the outer leaves so that the plants may stand about six inches long. For the method of planting see last month, and give plenty of water in dry weather.

**ASPARAGUS** will now be fit to cut for use. The shoots being two or three inches above ground, scrape away an inch or two of the earth, then thrust the knife close down by the side of the root another inch or two, and cut it aslant—taking care not to wound the crown, nor cut any other shoot that may be rising near the one you would have. The heads should be about five or six inches long. They are three years old before they are fit for cutting. Be careful to leave two or three shoots to each stool, or crown, in order to draw nourishment to it.

**REMARKS.**—Was man made or ever meant to be idle? No, even in his early state of innocence: but was at the very first taught to praise his Maker by the la-

bour of his hands, otherwise how could he be happy, for labour is essential to the health of the body, and to the happiness of the mind, and without it how could our land yield her increase? Therefore, lawful employment should not only be respected, but also considered as a great blessing, for no medicine can prove more beneficial to the health of the sedate tradesman and artizan, than a few hours' employment, morning or evening, in a field or garden at this season of the year.

If the weather in this month proves dry, the growth of many esculent plants will be considerably retarded, particularly the beans and peas, which are in flower, the blossoms of which fall off before arriving at maturity, and, consequently, are not succeeded by fruit. A certain degree of attention is therefore necessary to give a regular supply of water to the growing crops; at the same time, it must be observed, that in promoting the growth of the crops, the weeds are also encouraged, which at this season are very abundant, and which, if not timeously checked, prove highly detrimental to the young crops, by weakening them to that degree that they never afterwards recover their full growth. There is no work in the kitchen-garden which at this time requires greater attention than the eradication of weeds; many will now begin to mature their seeds, which, being shed on the ground, will occasion a considerable degree of labour for several years, to accomplish their extirpation, independent of the injury which is annually done to the crops, by choking them in their growth, and exhausting the soil of that nutriment on which the strength and flavour of the vegetables depend.

All pieces of vacant ground should be rough-dug; the action of the sun upon it will improve it much, and it will present a far neater appearance than if left in the state when the crop was removed. A constant attention should be paid to the seeds committed to the ground. Those which vegetate freely should be forwarded by hoeing, thinning, and watering; and in

those cases where the seed has failed, it should be immediately resown, no time should be lost when such circumstances occur. Some crops, such as beets, onions, parsnips, &c., may be restored by transplanting them in showery weather from those places where they may have come up too thick. Be careful to destroy snails, slugs, and other insects, by gathering them in the morning, and strewing powdered quick lime over them. When recourse is had to watering it should be applied as late in the afternoon as possible, or early in the morning. When the ground can be kept in a moist state during the warm months of summer, the most luxuriant crops may be expected.

#### JUNE.

BEANS of the earliest sorts may be planted at the beginning of this month for the last and late crop.

The beans now in blossom should be examined and topped as directed last month.

PEAS.—The last sowing for autumn crops should be performed at the beginning of this month. If the weather and the ground be dry, it will greatly encourage vegetation if the peas be soaked for a few hours in soft water, before they are sown; and it will much tend to their advantage, after the drills are opened, if a quantity of water be poured into them so as to completely saturate the ground. This sowing should be of very limited portions, and only practised in favourable situations. The seeds should be sown in single rows, and not thick. If the ground be not naturally deep, it must be made so by drawing up the mould, so as to form a ridge, on the top of which the drill should be made for the seed, which, after being properly watered, is ready for sowing. When dry weather sets in, these peas will require an abundant supply of water once or twice a-week. In this way the plants continue green and vigorous, resisting mildew, and yielding fruit until destroyed by frost. For the last sowing, made at the beginning of this month,

prefer the Race-Horse, the White Warwick, Cormack's Early May or Double-Blossomed frame, and Bishop's Dwarf peas.

**CAULIFLOWER.**—For successional crops, plant on a north border. Look over the plantations of early cauliflowers that are coming to perfection, and break down some of the large leaves over the young heads as they appear. This will blanch them of a fine delicate white colour, and prevent them from getting too open, or too advanced towards seeding, and thereby rendered unfit for the table. Those plants which are coming into flower, and advancing in growth, should, in dry weather, have copious supplies of water at their roots, two or three times a-week, which will cause them to produce large and handsome flower-heads. The seed sown in May, for the latest crops, will be fit to prick out; which let be done on a bed of light rich earth, at three or four inches square; water and shade them till they have struck root.

**CABBAGE,** for successional crops, may be planted. A few may be sown for coleworts, which can be planted out in July, or beginning of August. In dry seasons, towards the end of June, the cabbage crops often become stunted, and covered with aphides to that extent, that even if they escape being entirely eaten up, they present a loathsome appearance. To obviate this, in a great measure, a plentiful supply of water should be given them at their roots, and although a superfluity of water is supposed to be injurious to the flavour of most vegetables, it does not hold good in respect to cabbage, which are not in the least affected by it.

**BROCCOLI,** for full crops, choose an open situation; and let the ground, if not already in good heart, be well dunged in the drills, and in regular trenches one spit deep, with a paring off the top. Take advantage of showery weather for this operation; but if the weather be dry let the plants have several waterings at the roots. In planting this vegetable, and all others of the

brassica tribe, prepare a puddle, by pouring some water into a hole dug for the purpose, and stir the mould about, so as to form a puddle of a rather thick consistency, then draw the roots of the plants through it two or three times, until a sufficient quantity adhere to the roots. If the ground be very dry, after the line has been strained, and a drill drawn about three or four inches deep, make marks along the drills where each plant is to be set, then pour some water on each spot, stirring up the water at the same time, which will form a puddle, into which set the plants. By this means they will resist the effects of drought longer than by any other method.

Prick out more broccoli plants into nursing beds, from the seeds sown the two last months. If dry weather, give them water.

LEEKs, for a full crop, may now be transplanted. They require a good soil, and an open spot, and if newly dug the better. It can hardly be over-dunged for this crop. Loosen and draw a number of the strongest plants from the seed-bed, trim their roots, and also the straggling leaves of their tops. Prick them out in rows nine or ten inches asunder, and about six inches from each other in the line, observing to insert the greater part of the spank or neck of the plant into the ground. Do not press the mould tight about their stems. Make the holes large; after putting in the plants only let a little mould fall in about them so as to cover the fibres. In dry weather give a little water directly after planting, and they will take root the sooner.

BORECOLE.—All sorts of greens should be planted always as the ground becomes vacant. This is also a proper time to plant out savoys, cabbages, and all sorts of greens in the side or at any convenient corner of a turnip field. Plant a considerable number of them, and about 15 inches apart in the drill; they will become very useful in winter, and afford fine sprouts the following spring when vegetables are scarce. The

same might have been observed at the potato planting.

**BEEF** will now be rapidly advancing. Stir the surface often between them to destroy the weeds and encourage their growth. Be careful not to injure the roots with the hoe, or they will be rendered useless. Beet and parsnip should be thinned to five or six inches in the row. If dry weather, the ground should be hoed, and the earth well settled about the plants by a liberal watering.

**CELERY**.—Prick out a number of the April sowing. The plants pricked out in May will be fit to transplant into the trenches about the latter end of this month. The trenches may be one spit wide, and six inches deep; and dig a quantity of compost manure, or very short dung, into the trenches. The discharge of a sewer mixed with any moss earth, or any rotten scourings of old ditches, will answer well. A few only should be planted at this time, as many of them are apt to run to seed.

**CARROTS**.—By the end of May, or beginning of June, they will be advanced in their growth; and every encouragement should be given to promote it. They may be thinned out to three inches square, if sown broad cast; and if in rows, to two inches in the row. When they become thicker than the finger, five or six inches is the proper distance at which they should stand, in order that they may have full liberty to swell at the root. Carrots should not be thinned when the weather is dry, but always take the advantage of showery weather to do it; and if this advantage should not present itself, hoe and give an immediate watering to the crop after the thinning has been completed, for if the drought penetrates to the fibres and tap-roots, they will become stunted in their growth, and their flavour will become rank and disagreeable. Hoe them occasionally, it will advance their growth. The same directions are applicable to parsnips.

**POTATOES**.—Finish earthing up, and clear them of weeds. This should be done early in the mornins or

late in the afternoon, or on a dewy day, as then the shaws or leaves will be drawn up close to the stems. This operation should be performed with the spade, beginning at the one side, and striking the spade in the centre between the drills, and proceed drawing the earth up to the one side of all the drills, then commence at the other side of the brake, and earth up the other side of all the drills in the same manner. In strong stiff soils, the space between the drills should be loosened with a narrow garden fork, previous to earthing up. If there be any blanks among the rows, they should be filled up with any straggling plants that may be found growing throughout the garden. This should be done in showery weather (small pits should be opened for them), then proceed to lift the plants, with a little earth about each plant, and draw the earth up about them. In this operation the same sorts should be attended to, they are easily known by their leaves.

It may not be out of place here to notice, that the potato, when taken out of the ground in an unripe state, should not be long exposed to the strong rays of the sun, and much less after being washed, as is often the case with careless cooks; such treatment cannot fail to render fresh vegetables tough and of bad quality. Potatoes after being cleaned, should therefore be immediately covered in cold water; and the directions already given for cooking, may be followed.

**LETTUCES.**—Continue to sow and transplant where required.

**RADISHES.**—Sow of sorts for successional crops.

**SMALL SALADING.**—Sow once a-week, if wanted, such as cresses, rape, mustard, &c. Sow curled cress, it is to be preferred to the common crops, and is very useful for garnishing. Make choice of a shaded spot for sowing all sorts of small salading during this and the following month.

**TURNIPS,** for the principal crops, should now be sown for autumn and spring use. A considerable benefit will

be derived by sowing the seed in showery or rainy weather, or in prospect of rain soon after. Care must be taken to sow the seed equally, and when the ground is fresh after digging or pointing, and immediately tread the seed down; cover and rake evenly: It is a good practice where ground is scarce, to sow a quantity of garden turnips in the field for winter use. The crop which was sown in May should now be hoed and thinned to about nine or ten inches apart. The early crops of turnips should have a warm aspect and the soil ought to be of the lightest and driest kind. Sand, or gravel, with a proportionate mixture of loam, is the soil best adapted for turnip; for if the land be heavy, or very rich, a rank taste is imparted to the root, and also induces it to run too soon to flower. Liverpool Yellow, Yellow Dutch, or Yellow Stone, may be sown at the latter end of May and beginning of June, for winter and spring use.

The early crops will require to be again thinned, but this should be done by degrees, and not too much taken away at one time. It will be proper to thin the broad-cast to four inches square; and those crops which are drilled, to three or four inches in the row; afterwards, they should be thinned out to nine inches square, and to six or eight inches in the row, if it be intended that the roots should grow to a proper size. The operation should be performed in showery weather, and when the rough leaves are about an inch in breadth, or before they attain much greater size, as the work can then be done with greater facility. The crops will also be much benefited by being timeously thinned.

*Black Grub, or Turnip Saw Fly.*—This destructive insect, the larva of which is known under the name of the *nigger*, or black jack, has long baffled the ingenuity of agriculturists and gardeners to devise the means of its extripation, and it still continues annually to make its ravages on the turnip crops sown in the summer months. The Caledonian Horticultural

Memoirs, in a communication from Mr Gorrie, contain the following successful method of destroying it: "Dust the plants whilst in their seed-leaf with quick-lime, well powdered; should rain fall before the plants are out of danger, the operation must be repeated. He calculates that a bushel of lime is sufficient for an acre of drilled turnips." Mixing old and new seed has been recommended and successfully practised; the old and new seed to be of equal quantity, and then dividing the mixture into two parts, one of which is steeped in soft water 24 hours previous to sowing, by this means four different periods of vegetation are obtained, and accordingly four chances present themselves of escaping the fly.

**ASPARAGUS.**—It is desirable to cease the general cutting for the year about the latter end of this month, because, if continued longer, the roots will be too much weakened; for as long as the produce is cut, the roots continue to send up new shoots, although decreasing every time in size. The season of this useful vegetable can be prolonged, if new beds be annually made. This practice admits of this great advantage, that the old beds may be destroyed, the cutting of which may be continued so long as good shoots make their appearance.

The young plants which were sown in the spring, should be carefully hand weeded.

**ONIONS.**—The general crops should be thoroughly weeded, and kept clear of all weeds. If lettuce, radish, and carrots have been mixed with the seed, the two former should be removed entirely: the lettuce should be cut, and only a few of the carrots left to be thinned out for use. Also thin out the onions in proper time; the stirring and loosening the earth prove highly beneficial to the growth of the plants. Regularity should be duly observed in thinning this species of crop, always leaving the most promising plants at the distance of at least three inches in the line; and those intended for the full crop of larger bulbs, at four

or five inches asunder. Where young onions are in constant demand, it will be better to reserve a crop unthinned for that purpose, observing to thin them as regularly as they are used, leaving a sufficiency of the strongest plants for a general crop. The oftener the crops are stirred up with the hoe in dry weather, the better they will grow, especially in stiff soils.

*Composition to Destroy Vermin among Carrots and Onions.*—Take one part of the flour of sulphur, two parts of soot, and sixteen parts of lime-shells; dissolve the whole in a sufficient quantity of water for the space of ground to go over—say 1 lb. of lime, 2 oz. of soot, and 1 oz. of sulphur for every 25 feet of ground. If the crop be in drills, as all carrots and spring-sown onions ought to be, run over the drills with a watering-pan wanting the rose, the liquid being well stirred; if broad-cast, put a small branch in the stroup of the pan to scatter it more evenly over the crop. This should be done late in the evening or on a dewy day. It may be proper to hoe and handweed the crops previously, and pull out all the plants which are become yellow, as the maggot will then be in the centre of the onion. Soapy water from the washing-tub answers best. This mixture not only proves inimical to all vermin, but also highly beneficial as a stimulating manure to the growing crop.

**WINTER ONIONS.**—Go over the crop and pick out their heart-buds where they are shooting for seed. Clear away all weeds, and then lay down the whole crop, which is done by bending the stems down flat above the bulb, if done by the hand, giving each at the same time a gentle twist: but much time is saved in performing this work by two persons with a pole, or the handle of a rake, each holding an end of it, in such a manner as, when walking up the alleys, to strike the stems an inch or two just above the bulb. This process, which is called "laying over," is of great benefit to all crops of onions, as the growth of the stem is in some measure checked, and more nour-

ishment is thrown into the bulb. It is particularly so in bad, or late seasons, to which our climate is so often liable; a stop is thereby put to the luxuriance of their growth, and are, consequently, in a great degree forced to ripen.

**FRENCH BEANS.**—A successional crop may be planted at this time; any of the dwarf sorts should be chosen. In order to have a regular supply, they should be sown twice this month, as the pods in a very young state are the only parts used. The drills should be one or two inches deep and two and half feet apart. Use moss earth if the soil be anywise damp. Place the seeds two or three inches asunder in the drills; cover evenly and loosely, and rake smooth,

For artizans and cottagers the scarlet runners are both profitable, and ornamental for their gardens and cottages; but require to be planted in May.

**HERBS.**—Propagate sage and hysop by cuttings, borage and marigold by seed, also savory, thyme, and sweet marjoram by seed. Prick out the plants of burnett, borage, sorrel, clary, marigold, angelica, &c., which have been raised from seeds last year.

**REMARKS.**—Attend to the directions as given last month, and let all crops be timeously thinned as they advance in their several growths. Take every advantage of showery weather for this work, if possible; and in dry weather keep hoeing every part of the garden. Support with proper stakes the crops which stand in need of it. Destroy insects, eradicate grubs, which, at this season, are far more mischievous in the garden than any other object. This must be done by picking, wherever they appear. Destroy slugs by picking, or strewing hot lime round the plants. Let every part of the garden now assume a neat, clean, and orderly appearance. Where watering is necessary, let it be done from four to six in the morning, and from six to nine in the evening. For this labour the men should be allowed extra wages; or, if it be preferred, let them rest in the middle of the day.

*How to select a good Scythe.*—"Knowledge is power."—The mowing of grass is a laborious business, especially when performed by a clumsy, ill-tempered tool; but the improvements in the manufacture of scythes have rendered this work less fatiguing to the labourer. Take a light handsome blade of the requisite length (the steel-plates are the best), try the lower side of the edge by firmly pressing the nail of your thumb against it, to which it should yield a little, but not much; if it yields none it must be too hard, if it bends easily, it is too soft; choose, therefore, a medium betwixt the two; of such, lay past two or three for each one wanted, then balance them two by two in the scales; always select the lightest, which will prove satisfactory to both employer and labourer.

#### JULY.

PEAS may be sown for a late crop. Sow a few of Cormack's Early May. Give them occasional waterings in dry weather.

CAULIFLOWERS that were sown in May, for a late crop, and pricked out in June, will now be fit for planting out. Plant in an open exposure, and at 18 or 20 inches square, as these will not grow to so large a size as the former crops of the season. Let them be planted in good land, in order that they may be got in the greatest possible perfection, and in the greatest abundance. Where ground is scarce, a few lines may be planted in the alleys between the onion and carrot beds. If they be properly stored, as directed in October, some excellent heads may be had at Christmas, and also at a later period. They must be regularly watered, if the weather be dry; and in every other way attend to them as has been directed for the other crops of cauliflowers.

CABBAGES.—Plant out some for autumn and winter use.

ONIONS.—As the crops which were sown last July and August begin to ripen, attend to them; bend

down their tops. All those which are already ripe, should be gathered and taken to a dry place for a few days to dry, before they are removed to the store-loft. If they have succeeded well in their growth, they will be in general large, and will keep better and longer than the spring-sown crops.

**CELERY**, for the principal crops. Make the trenches from four to six feet wide, and one foot or more deep, throwing the mould taken out of the trench equally on both sides of the trench, and break the mould finely, which will render it more fit for earthing up the celery as it advances.

Lay a large quantity of rotten dung in the bottom of the trench, which dig in to a reasonable depth, or if the ground be shallow, and inclined to a gravelly bottom, the dung may be regularly spread on the bottom of the trench, and an inch or two of mould taken from the sides to cover it. In beds thus prepared, set the celery plants, which have been transplanted into a nursing-bed the preceding month, in rows across the trench about a foot apart, and the plants eight inches distant in the line. When planted give the whole a good watering. If the weather be dry, the beds may be watered as the process of planting goes on; and after all the plants are set give them a good watering to settle the earth about their roots. The dung should be laid on from six to nine inches thick, and as rotten as can be procured. The great advantage of this method, besides a great saving of ground, is, that if any quarter of the garden be fixed upon and cropped with celery, it will be, in two years, completely trenched and manured over to any depth that the trenches may be made, by making them, the second year, in the space occupied by the mould between the trenches of the preceding season.

The facility of earthing up the crop is greater by this method than by the other. When the plants require to be earthed up, take two boards of the same length as the width of the trench, and six or eight

inches broad, place the boards between two rows of the plants, then fit and place them pretty close to the plants, and the space between the boards should then be filled up with mould finely pulverized, by two men, one on each side of the trench. When a sufficient quantity of mould is put in, remove the boards and proceed to another space, and so on till the whole be completed. This is the most expeditious method, and the same space will contain six times the quantity of celery that is commonly obtained from the single drill system, and the plants will be found to thrive better too. The top roots and straggling leaves should be always trimmed previous to planting.

**BORECOLE.**—The several kinds of greens under this name should be planted as directed last month, in all pieces of ground, as they become vacant, which are not intended for any other crop, or for trenching, &c. Let them be filled with greens, savoys, Brussels sprouts, and broccolis, choosing the richest and best exposed situations for the latter.

**ARTCHOKES.**—If it be wished to have them of a large size, in order to encourage the main head all the suckers or small heads which grow out from the sides of the stems should be pruned off. Having cut off the principal head, break the stalk down close to the ground; if these be suffered to remain, they impoverish the roots, and will exhaust them so as to injure their future bearing.

**ONIONS.**—This is the proper time to sow some onion seed for next spring and summer's supply. Observe in late situations to sow between the 25th of this month and the 5th of August; and in early situations from the latter date of this, to the 20th of ditto, and the 19th of September if not done sooner. They require to be sown rather thickly, and in rich grounds well sheltered, but not shaded under trees or shrubs. The sorts proper for sowing at this time are the Strasburg, mixed with a few of the Deptford. Sow, tread, cover, and dress, as already directed.

**WELSH ONIONS.**—This is a bardy sort of onion, and withstands the severest frosts. A small bed of them may now be sown, and they will come in use in the spring. It is a perennial plant, and needs not be sown every year. Its leaves die down in winter, but spring up afresh in spring. A bed of them in good ground will stand two or three years.

**LEEKs.**—If a sufficient quantity of them were not transplanted last month, it should now be done. (See last month.)

**BROCCOLI** seed may be sown early this month, for a late spring crop, which ought to be the last sowing of the kind, this season.

A full crop of broccoli may now be transplanted, for which a piece of the richest ground should be dug, otherwise let it be well manured in the drills, which should stand at least two feet between the rows, and the plants should stand nearly that distance in the lines.

**FRENCH or KIDNEY BEANS.**—A few may be planted the first week of the month for a late crop.

**WINTER SPINACH** may be sown. The prickly-seeded should be chosen for this sowing, as being better adapted to stand the winter than the round-seeded sort. A situation should be chosen for it that has the advantage of the winter sun. After the ground is prepared, the seed should be sown thinly, in drills, and raked in.

A little brown Dutch or cabbage lettuce, sow along with spinach seed for winter use.

It may be advisable to sow two crops of spinach for winter and early spring use; the one on ground highly manured, and the other on a soil of lesser richness.

**TURNIP.**—This month may be considered as favourable for sowing turnips for autumn and winter use. An open situation should be always chosen for this; the ground well dug; and the seed sown whilst the earth is fresh, trodden, covered, and raked. The powder already described should be used in hot dry weather.

**COLEWORTS.**—Plant early this month for autumn and winter use.

**HERBS.**—Plant all the sorts which have been propagated this season, either by cuttings or seeds, continually as they appear strong enough and well rooted. Gather mint, balm, and all other useful herbs, when the plants are at or nearly at their full growth, and begun to flower. They should be cut on a dry day, and those for keeping instantly spread, or hung up to dry in an airy room, and where they may dry gradually, as the heat of the sun at this season would affect them too much, and render them of little use. All plants, whether for distilling or drying, should be gathered as here directed.

**SALADS.**—Sow and plant successional crops of lettuces. If a regular supply of small salading be required, sow some of each sort, such as mustard, cresses, &c., every week or two. The seed should be sown in shady borders, in drills, and in dry weather watered daily, or it will not vegetate regularly.

**CABBAGE-SEED.**—Sow of the Early York, and Peacock's Fine Early Dwarf, about the 25th or 28th of this month, a portion of which is to be planted out in October and November, and the remainder to stand in theseed beds until spring. This sowing may consist of the third part, and the rest to be sown next month; which see.

**REMARKS.**—As many crops will now require to be planted and sown for autumn, winter, next spring, and summer use, it is of particular advantage to take every opportunity of showery weather for performing these works, and keep the Dutch hoe and the rake in full operation in all dry weather. A wire riddle should be kept for sifting the mould from among the weeds and small stones as they are collected with the rake after hoeing; the former should be carried to the compost yard, and the latter laid aside for the tops of drains bottoms of walks, or for bottoming to fruit trees (see Fruit Garden). Let all useless and decaying leaves

and stems of vegetables be removed from among the crops, and carry them to any piece of ground that is to be soon dug; this will not only give the garden a neat appearance, but will manure the ground on which they are put. Such as the leaves and stems of cabbages, potatoes, turnips, &c., as they are daily gathered for use, are to be carried away to some unoccupied place and cut off, and so soon as convenient to be dug into the ground, or carried at once to the compost yard, to make vegetable mould, unless they be such roots of cabbages or borecoles as may be wanted to produce sprouts for a future crop.

#### AUGUST.

**CABBAGE-SOWING.**—The proper time for sowing the principal crops of the Brassica, or cabbage tribe, is between the 5th and 10th of this month. The sorts to be preferred for this sowing are the best Early York Dwarf, Peacock's Fine Early Dwarf, for the greater part; with some of Eastham, Early Emperor, and Sugar Loaf, for first crops; and London New York, Large York, Large Sugar Loaf, Battersea, Penton, Imperial, Antwerp, Russian, &c. for secondary spring crops. Also sow Green Savoy, Dwarf Green Savoy, and some Red Dutch or Pickling Cabbage. A small portion of cauliflower seeds may be mixed among the above, or among any of them, the plants of which can be easily selected from the others when wanted. They will be found to weather the winter better thus than in any other way out of the frames. All these do best in light soils, clayey ground will also answer them. Where the plants are liable to be thrown out, or damp off in winter, or with spring frost, rotten grassy turf or some strong loam should be pointed into the ground previous to sowing. The first two sorts ought to be sown in the best sheltered spot; and if not already so, a hedge may be formed on the north and north-west side of them with branchy pea poles. (See November and December.) All these seeds should be

sown (not too thick) in drills, seven inches apart, trodden in, covered and raked, every way as already described for onions.

CAULIFLOWER should again be sown about the 11th, and also about the 21st of the month, for early crops of next year. Sow on a warm border of light earth, and give water if the state of the weather requires it.

SPINACH of the prickly seeded sort should be sown both at the beginning, and also at the middle of the month, to produce a supply during the winter and spring months, until the spring-sown crops come in to succeed it.

COLEWORTS may still be planted if required.

CARROT-SEED may be sown in a small quantity on a dry light spot, to rear plants to stand through the winter for spring use. They may be sown the first week, and again about the middle of the month.

ONIONS.—This is the best time to sow a full winter crop. They should be sown the first or second week of the month, and in dry sheltered ground, or it can be sheltered as directed for peas and cabbage plants.

This is the most proper time in all the year to sow the full crops on very light sorts of land, because the crops sown on ground of that sort in spring, die often in the warm summer months, attacked by maggots, and more frequently so of late years than formerly, by which the crops have been entirely lost; but this is not the case with onions sown at this time, for before the heat of summer sets in, the crops are so well grown that they are beyond danger.

The most proper kinds for sowing at this time are the Strasburg and Deptford, the preference, however, should be given to the former; and in order to insure a plentiful supply in the spring, the seed should be sown rather thickly, green onions being then in request, as well as to yield a stock for transplanting.

In this month, the spring-sown onions will be coming fast to their state of maturity, and in order to promote the swelling of the bulbs as much as possible,

they should be very carefully laid down, according to the directions already given. All the ripe onions should be gathered once a-week, in order to forward the drying of them as much as possible. (See next month.)

**ARTICHOKES** will be now coming into fruit; when the object is to have large heads, all, or the greater part, of the smaller ones which issue from the sides should be displaced; but when the small heads are used for culinary purposes, they should be thinned while they are still young. Three or four heads are a sufficient crop for plants of a middling strength, but those which are very strong and well established, may be allowed to produce a greater number.

Artichokes, in order to produce chard, should, as soon as the principal crop is gathered, have their leaves cut over about six inches above the ground, and their stems cut as close to it as possible. It is to be observed that, to produce chard, the plant will be destroyed, therefore only a certain portion of the stock of plants should be set apart for that purpose; and on the supposition that new plantations are made annually to a certain extent, the loss of a portion of the oldest plants will be in conformity with good practice.

**TURNIP.**—The sorts to sow at this time, (the beginning of the month), are the Yellow Dutch, Aberdeen Yellows, and the Maltese. Have them timeously hoed and thinned, as also those sown last month. These sowings are to be depended upon for autumn and winter supplies.

**LETTUCE.**—Sow in the first week, and also in the last week of the month, in rich dry soil, and a warm situation, particularly the last sowing, from which, a supply for next spring is to be planted out in October. The first sowing will be ready to transplant in September, and will serve for autumn use. Sow the Brown Dutch, and Hardy Green Cabbage, and the Green and Black Seeded coss kinds.

If a thin sprinkling were sown among the winter onions or spinach, they might have a chance to stand.

Lettuce will weather severe winters in that way, if sown in dry soil.

HERBS.—Continue to cut or gather all sorts of pot and medicinal herbs, as directed in July, according to their season and their state of growth.

The flowers of Chamomile should be pulled from time to time, as they are produced; for the plants continue flowering for several months. They should be gradually dried, partly in the sun and partly in the shade, by being spread on a mat or sheet, lifted out of the sun in the heat of the day and exposed to it in the mornings and evenings. Lavender flowers should be gathered and dried in the same manner: observing to cut the spikes when the flowers on the under parts begin to drop their petals. The kinds mentioned in spring may also be raised by slips or cuttings at the beginning of the month.

REMARKS.—That which was committed to the soil in spring, should not be neglected in autumn. Every opportunity should be duly employed in preparing and gathering in the fruits of the earth, and in storing them past for the long winters to which our climate is subject.

Hoe, weed, thin and stir the surface among all crops; water, shade, and attend to neatness and order; clear off all crops, as soon as they are exhausted, in order that the garden may always present a neat and orderly appearance. As slugs and other vermin will now be making deplorable ravages among crops of young plants, a constant attention is required to subdue them. Those seeds that are ripening, should be gathered, when dry, and after being properly hardened, laid up for use, in a dry airy seed room.

Some seeds retain their vegetative properties better when kept in the pods, or seed-vessels, until they are to be sown in the spring; these, when perfectly dry, should be hung up in bunches in an airy shed, out of the reach of frost. According as the crops are removed, let the ground be cleared of the refuse, either by

hoeing and raking, or rather by rough-digging, which will give the garden a much neater appearance, besides very much improve the soil by exposure to the atmosphere. Where evergreen hedges are attached to the garden, this is a proper season for clipping them; and when the box edging requires renewing or mending, that may also now be done with every prospect of success.

#### SEPTEMBER.

**CELERY.**—The crops, as they advance, should be earthed up as previously noticed. As the goodness of this crop depends on the attention paid to this part of their culture, it may be proper to mention that the oftener they are moulded up, the finer and more luxuriant will be their produce.

**CAULIFLOWERS.**—Those sown in August will now be fit for transplanting into a nursing-bed; for this purpose, prepare a bed of light rich mould, about the size of a common garden frame, on which the young cauliflower-plants should be set, in order that if cold and wet weather set in, the advantage may be taken of placing a frame and lights over them. This being done, draw from the seed-bed some of the finest of the plants, and strip them of all decayed or broken leaves. The plants which are black, or crooked in their stems, should be rejected. They should be planted in rows, three or four inches apart, allowing nearly the same distance between the plants in the rows. Particular care must be observed not to plant them so deep as to bury their hearts—the consequence of which would be their total destruction.

The plants being set out, give them a little water, for the purpose of settling the earth about their roots; but this operation should be performed in a very gentle manner, otherwise the leaves may be broken, or the earth washed into their hearts, either of which circumstances would prove highly detrimental to the plants.

If the plants be backward in their growth, and small in size, it would be advisable to set on the frame and lights, which must be continued on for a few days until the plants have taken good root. When this has taken place, the glasses are again to be taken off, and used only occasionally during the following month. Observe that the plants should have a shade thrown over them when the sun is very strong; and during the whole of the time that the lights are kept over them, air should be admitted to prevent their drawing up too slender.

If any heavy rains come on, it will, under those circumstances, be necessary to put on the lights again as a shelter to the plants. A superabundance of moisture would at this time be very injurious to the young plants, causing their stalks to turn black, and be the means, perhaps, of entirely rotting them. The plants that have remained in the seed bed for about six weeks, should be transplanted where they are to stand during winter, under shelter of a south wall.

Some of the plants which were set out in the month of July for a Michaelmas crop, will, towards the latter part of this month, or the middle of the next, begin to show their heads. They should therefore be encouraged in their growth as much as possible, by drawing the hoe between the rows, and the earth up round their stalks; also keep them clear of weeds.

If the weather in this month prove dry, dispose the earth round each stalk in the form of a basin, into which pour a quantity of water; by this means their growth will be so accelerated, that their heads will have attained a tolerably large size in October and November. If at this season any neglect be shown in watering the plants, the consequence will be that the heads will be very diminutive in size.

WINTER SPINACH.—The crops of this vegetable directed to be sown in the past months, should be thinned out as they proceed, and completely kept clear of

weeds, either by repeated hoeing, or hand-weeding; the former, however, is always to be preferred, as the necessary stirring of the surface encourages the growth of the plants. In wet weather the latter mode of clearing them should be adopted. Crops may still be sown for spring use.

**CABBAGE SEED, &c.** mixed with a little Cauliflower seed, may be sown in very early and warm situations, about the end of August or the first days of this month, (as I was in the practice of doing when at Logie,) and as the plants will be smaller than those sown in the beginning of last month, they will have a better chance of standing the winter in low rimy districts. Cabbage plants of the last two months' sowing, should now be thinned, and pricked out in four-foot wide nursery beds, in rows six inches apart, and four inches in the lines. If dry weather, give water.

**ARTICHOKES.**—As the leaves of those intended for chard, and which were put in a state of preparation for that purpose last month, advance to the height of a foot or 18 inches, they should be tied together with strings of matting, and then enveloped with clean straw, and gradually moulded up, as practised with cardoons; or the leaves may be carefully held together by the hand, and bound round with hay bands, and the mould drawn round them.

**ONIONS LIFTING.**—After the middle or the end of the month, they will advance but little in their growth. They must be spread thinly on the ground, and if the weather be rainy, it would be more advisable to remove them to a gravel walk, or to a space prepared for the purpose with sand or gravel, and exposed to the full influence of the sun. They must be turned over regularly once or twice a day, until they be thoroughly dried, and then stored away in any well aired loft, barn, &c. If they be here spread thickly, they must still be turned occasionally, always picking for present use, such as are not come to maturity, and such as are springing; or they may be hung up by the tails,

or hung in a net. Before they are housed, the outer husks should be rubbed off, and deprived of any earth that may be adhering to them. The fibres should be left entire, or very little shortened, as in this way they will not vegetate so readily,

**LETTUCE.**—About the close of the month the different sorts of lettuces may be planted out on the borders where they are to remain.

**REMARKS.**—Remove all decayed leaves, and the remains of all crops which have been used, so as to preserve order and neatness, and make way for winter crops or winter fallows. Hoe and rake the surface; in dry weather separate all the weeds and small stones from the mould by a wire riddle, and carry or wheel the rest out of the way for the different purposes assigned to them. Destroy insects and vermin of all sorts; save all sorts of seed that may be ripe; keep all the walks in and connected with the garden in a neat and orderly manner.

Prepare ground for crops of onions for next year's sowing; for this purpose make choice of the ground they grew upon this year, but if there be any reasonable objection to that, choose another piece. Let it be well manured with very rotten dung, or rather with a compost of rotten dung, decayed vegetable matter, and fresh loamy mould. Let this be spread equally on the surface, and then dug in to an ordinary depth; lay the surface up as roughly as possible, so as to present the greatest surface to the action of the winter's frost. This will be in good state by next spring for pointing over and sowing the seed.

#### OCTOBER.

**PEAS,** for the early crops of next year, may be sown about the middle, or rather the end of this month, on a warm south border, fully exposed to the sun. The sorts proper for sowing at this time are the Early White Warwick, and Cormack's Early May. Sow either across the border, or longitudinally, agreeable

to the width of the border; or sow a double line longitudinally, three or four feet in advance of the wall, then plant a row of early beans three feet in front of that; observe, as has been already directed, to sow in shallow drills; bed and cover the seed with peat earth, for the reason already given, then cover loosely with the mould to about three inches. If the soil be cold and wet, open a trench a spit and a half wide, and lay in it long litter from the stables, clippings of hedges, &c., to the thickness of six inches or more, over which form a small ridge, and sow on the top of it.

CARROTS, in favourable situations, are found to stand the winter, and when that is the case, they come in as a favourite vegetable in spring, long before those sown for general crops are fit for use. It is useless to say, that the warmest situation should be chosen for this crop, as the chance of their standing is precarious, and as they are to be used when very little, a small spot of ground will be sufficient for an ordinary family, as they may be sown very thick.

Carrots, when left long in the ground, are liable, in some soils, to be attacked by worms; for this reason, and that they may be more readily got at during winter, they are taken up at this time. In taking them up, they should not be broken, nor wounded with the tools employed for that purpose. Their tops should be cut off with about one fourth of an inch off the top of the root, or nearly all that is green at the top of the carrot, to prevent it from sprouting. After being kept for some time, they may be piled up in a shade, &c., among dry sand, or the refuse of a peat stack, laid in layers of roots and sand alternately; or they may be stored in the open ground, as directed for potatoes; (which see).

#### POTATOES, TAKING UP AND STORING FOR SEED, AND FOR WINTER USE.

POTATOES should now be taken up in dry weather if sufficiently ripe, and stored by for winter and spring

use. Potatoes, intended to be eaten, probably cannot be too ripe, as we suspect that a greater portion of better matured fecula abounds in them, than in such as are taken up before they are fully ripened. Such, however, as are intended for seed, it has been stated, should not be allowed to become too ripe, as in that state they are more subject to the disease called *curl*, which is often very detrimental to the crops. In taking up potatoes, whether for eating or seed, it cannot be denied that by far too little attention has been paid to keep each sort separate. Cultivators, generally, make little distinction betwixt these kinds, no farther than keeping such as they term early potatoes separate from the late ones. Amongst the latter there are many varieties better calculated for keeping than others; these should be kept separate, and these sorts used first, which are found not to keep so well. It is necessary that potatoes should be taken up when the ground is perfectly dry, more particularly in damp strong soils, and either stored in places for the purpose, or piled up on dry ground, in a conical form, and covered a foot thick with straw, and then a foot of earth placed over them, leaving the surface of the whole as smooth as possible, the better to throw off the rain. This is the general practice in Scotland, where much attention is paid to this valuable root. But we learn that in chalky countries, excellent potato-houses are cut out of the solid chalk, in situations where there is no chance of their being injured by damp, or under water,—such houses being roofed over, and the roof only being above the surface, preserves them well for a great length of time. In such houses, there are often separate divisions, formed of boards, into which the potatoes are placed, each kind by itself; and were potatoes buried in deep wells sunk on purpose, and perfectly dry, they might, probably, be kept for some months longer than in the usual way.

It is a general opinion, that if the shaws of the potatoes in an unripe state be overtaken by frost, that

the potatoes will be rendered useless, or at least not so good for seed : but, in reality, this is not the case, and they cannot be taken up too dry.

Dry turf is unquestionably the best material for covering potatoes, in pits, under the mould. The grassy or heathy side should be laid next to them. Where circumstances will admit of it, the potatoes should, after being taken up, be allowed some time to dry, before finally covering them up.

PARSNIP is a native of many parts of Britain, as well as the carrot. They are cultivated and stored in the same manner as carrots (which see).

CAULIFLOWERS, sown in August and September, will now be fit to prick out in beds where they are to remain during winter. Keep them clear of weeds, and dead leaves, and guard against the attacks of slugs and mice. Cover the surface of the ground with coal ashes, or fine sharp sand, which will resist the damp. If the convenience of frames cannot be had, prick them out in the same way, in regular distances of about four inches apart, under a wall or paling, sloping the ground in the process of digging towards the sun ; or they may be protected in beds on a warm spot, covered occasionally with mats, supported by hoops. In either case, let them enjoy a free circulation of air, and be kept as dry as possible.

CAULIFLOWERS may be preserved for a considerable time by various methods. The most successful method we have practised for preserving cauliflower in perfection through the winter months, is to cut all those which are close, and well shaped, in dry weather ; dress all their leaves, put them in an airy place to dry for a day or two, then bury them in casks, or boxes, among bog mould (peat earth). The best sort of bog mould for this purpose, is that which is already recommended for sowing peas. The heads or flowers of cauliflowers, preserved in this way, should be well washed previous to using, as they become black when buried any length of time ;—not that such blackness

proceeds from any decomposition of the heads, but arises from the more subtile particles of the mould adhering to their surface.

**BEANS.**—About the middle or end of this month, plant some to come forward as an early crop in the ensuing summer; they will be fit for use about the end of May, or beginning of June.

The Mazagan bean is the best sort for planting at this season, on account of its coming in earlier than any of the other sorts, and, although they be of slow growth, yet they are plentiful bearers. They also possess the property of standing the winter better than almost any of the other sorts. The best situation in which to plant them at this time, is under some southern fence, in rows across the borders—which rows should be two feet, or two feet and a-half apart, planting them about three or four inches distant in the rows.

**BEEF.**—The crops of red beet should, at the close of this month, be taken up and laid by for winter use. For this operation, it would be advisable to choose a dry season; and the greatest care must be observed in lifting the roots, to prevent them bleeding at the wounds which they may have received. Some dry sand should be procured, and the roots placed in it, in some shed or cellar, beyond the influence of the frost. It is the practice of some persons to let the beet remain in the ground, and in this case they should be covered, before the winter sets in, with litter or reeds, or pea or bean haulms. By this method, however, they are not only likely to rot, but also to lose their colour from the influence of the rain. When the tops are dressing, the stalks should be left an inch long, to prevent their bleeding.

**CABBAGE.**—About the beginning or the middle of the month is a proper time for planting out early cabbage plants, where they are to remain for cabbaging early in the following summer. Spread some rotten dung over the ground chosen for them, before it be

dug, then dig the ground one good spade deep, with a paring off the surface, burying the dung regularly in the bottom of every second trench, over which the plants are to be set two feet apart, 15 inches in the row. Each second stock can be cut for use early in May, in order to allow the remainder room to grow.

If time can be spared, we would advise to trench the ground for this crop. A considerable portion of every garden is taken up with cabbages planted at this time, or early in spring. We would recommend to commence at one side of a quarter or division of the garden, and to trench the ground for this crop, forming the surface into ridges, and as the operation proceeds, trenching to the depth of two feet, or two feet and a half, according to circumstances. Give plenty of manure, and let it be regularly laid in the trenches, only one spade deep, as the operation proceeds. When one trench is finished, set the plants in the bottom or lower part of the ridge, and in wet soils, a row may be planted on the top of the ridge. If both survive the winter, either may be removed to make up blanks in the whole, or removed to another piece of ground, preferring to leave the row in the lowest part of the ridge. When the first row is planted, proceed with another trench, which ridge up in the same manner, and plant the second row of plants, and so on, until the whole piece intended to be trenched and planted is completed. By this means the whole garden will be regularly trenched, and when the whole ground has been gone over in this manner, begin again where the first operation commenced.

In old gardens, when the soil has been long cropped with the brassica (cabbage) tribe, this is almost a certain cure for that disease, occasioned by grubs, termed *clubbing*. The plants will be protected from cutting winds, and grown in a fresh soil; the eggs of the grubs will be buried, probably beyond the possibility of their again visiting the surface, at least for some time. If this, or a similar rotation were generally adopted, less injury

would be done by these and other insects. The various crops of brassica would then follow in crops of regular rotation, as they seldom succeed if planted too often on the same ground.

The general practice among farmers and cottagers is only to give their gardens a slight back dig in spring; this leaves the dung and the weeds not half buried, and the crops do not get the benefit of the third part of the dung. In this case they will not have half a crop, where they might have two or three in the course of one season, with less trouble, and much less manure. Such weeds as are of a spreading nature under the surface, should be gathered out of the ground.

**ASPARAGUS BEDS.**—Sometime in this month cut down the stalks and dress the beds. The stalks should be cut close to the ground, after which the weeds should be hoed clean away, and drawn into the alleys. Having then stretched a line, mark out the alleys with a spade about 20 inches or two feet, according to the original width which was allowed them.

Proceed to dig the alleys about a spade deep, spreading the greater part of the earth over the beds in a neat and regular manner; and accordingly as you dig the alleys, bury the weeds regularly in the bottom of the trench, covering them with a sufficient quantity of earth. The edges of the bed should be formed full and straight, and the bottom of the trenches made level and smooth. If it be intended to manure at this time, let a sufficient quantity of rotten dung and fresh loamy earth be prepared, by being well mixed and incorporated, with which to top dress the beds, and which should be laid on to the thickness of two inches; and over this should be laid an inch in thickness over the beds of mould taken from the alleys between them. Or a quantity of soap-suds, enriched with cow dung, or a little salt, may be poured over the beds during winter, after being landed up as above directed.

Seedling Asparagus beds, which were sown last spring, should at this time also have a little top dressing, such

as clearing the beds of weeds, laying a little short rotten dung over it, &c.

**CELERY** should be constantly earthed up as it advances, that the plants may be well blanched before the hard frost comes on. In dry days therefore proceed to this work, breaking the earth well first, and then laying it carefully up to the sides of the plants, without burying their hearts.

**REMARKS.**—Defer not till to-morrow that which can be done to-day; and remember the original command, “Replenish the earth and subdue it.” By neglecting this, consider the advantage you lose, and how little can be done—

When Winter all his snowy stores displays,  
In hoary triumph, unmolested reigns;  
The frozen furrow, and the fallow field,  
Nor to the spade, nor to the harrow yield.

All vacant pieces of ground should be now manured if required, and be either trenched, or deeply dug, leaving the surface as rough as possible, or ridged up in long narrow ridges, so that the frost may penetrate through. This operation of winter fallowing, either by trenching, digging, or ridging, is of infinitely more importance to the garden ground, than all the manures that can be given without it.

#### NOVEMBER.

**BEANS**, for early spring crops, should now be planted; —for which see last month.

**PEAS.**—This is a good time for sowing them. Those sown this month will be equally early with those sown last month; it is better, however, to sow at both times. —See last month.

**ARTICHOKES** should now be covered up before the winter sets in, with pea haulms or stable litter, as they are very liable to be injured, if not totally destroyed, by severe frost. The decayed stalks must be first cleared away, and also the bulk of the leaves. The litter must be laid along the rows, sufficiently broad to cover the roots, according to the size of the stools, and about the

thickness of a foot, and then trodden or beaten with the fork, (grape,) to prevent it from being blown about.

Leaves of trees will now be in abundance, they make a good covering, but are apt to blow away with the wind. As a preventive, however, cover first with leaves, and then add a little litter upon the top, and for greater security a little mould may be put over all. The best covering for artichokes is rotten tan, when no longer useful for fermentation.

**TAKING UP CARROTS, PARSNIPS, BEETS, &c. &c.**  
—See last month.

**SPINACH** should now be kept perfectly clean and free from weeds; and if the plants stand too closely together, draw up the smallest of them in such a manner that each plant may stand singly. In gathering spinach, the following directions should be attended to, viz. to cut off only the outside larger leaves, permitting the others to remain, which, by that means, will grow the faster, and be fit for gathering in succession.

**CELERY.**—The most forward crops should in particular be earthed up to within four or six inches of their tops, and a quantity of fern, or long littery dung, brought to the sides of the beds to be ready on the appearance of frost, wherewith to cover the whole of them. They should be covered to the thickness of 15 inches; but this covering should be always taken off as soon as the frost is gone. By attending to this particular, celery may be preserved through the winter.

**SEA KALE.**—The beds that are not intended to be forced, should be covered up, as has been directed last month for asparagus. Observing first to clear the ground of weeds, and to fork up the surface. The beds intended for cutting in spring should be also forked up, and cleared of weeds, and covered from five to 15 inches with leaves, which will now be in abundance; covering the strong and old roots thicker than the young and weak ones. A few branches, or old boards, may be laid over the whole to prevent the leaves being blown

away, and they will require no further attention till spring, when they will be fit for cutting.

**CABBAGE-PLANTING**, for next summer use, should now be completed as early this month as possible, that they may become rooted before the growing season ceases.

**WINTER ONIONS.**—The crops sown to stand the winter should be kept clear of weeds. The ground should be hoed between the rows in dry weather; but if wet, hand-weeding is preferable. As they increase in size, they may be thinned out for salads. Some allow the weeds to grow among the onions at this season, to protect the plants from frost.

**REMARKS.**—When the weather is dry, and there is time to spare, let such pieces of ground be trenched as require it. All other spare ground should now be rough dug, or ridged up to the action of the winter. Such crops as require to be protected during winter, should now be attended to; all rubbish and useless vegetables removed from the garden; and moulds, composts, and manures collected and mixed, to be in readiness for the ensuing spring.

Roots of all kinds intended to be preserved for winter use, should now be taken up and heused, as directed in the last and former months, as after this time they will not increase in size, and some of them will be injured by remaining in the ground, particularly beet root, which loses its colour; and carrots, which are apt to be attacked by worms when left too long in the ground. They are also more conveniently obtained when wanted for use, if packed in sand, straw, or otherwise, and are not injured by frost, which not only detracts from their flavour, but renders them less likely to keep for any length of time. Attention should now be paid to neatness and order, as well as during the former months. The walks in and connected with the culinary garden, should be kept neat and clean, and in dry days should be frequently rolled to keep the surface even and agreeable to walk upon, as well as to keep down the worm casts, which at

this season are very troublesome, and if not swept off, and the walks afterwards rolled, give them a coarse and neglected appearance.

#### DECEMBER.

**BEANS.**—If the weather will permit, plant some as directed last month; but if the ground be not dry, defer this until next month, or until February.

**PEAS** may be sown this month with every prospect of success, if the weather be mild and dry, and the ground somewhat dry and moderately sheltered. About six inches of fresh rank dung from the stables should be put into the bottom of the trenches, and covered with five or six inches of mould, over which the seed is to be sown. The peas should be bedded and covered with a thin stratum of peat earth, and guarded from mice, &c., by traps. The seed is to be sown as directed in January and October; and the same sorts there mentioned are to be preferred. The crops of beans and peas sown in October, should be carefully examined in dry days, and the earth stirred about their stems, and a little mould drawn up to them: bog mould will answer well for this purpose.

*Culture of the Potato Onion.*—The potato onion is of a more mild quality than those grown for seed, and is highly to be esteemed in the culinary department, in which it would, no doubt, if more generally cultivated, be more used. It is much to be regretted that so valuable an article is not more extensively cultivated, which I imagine is owing chiefly to a wrong mode of culture being applied. The onion is, in many cases, nearly lost at first planting, owing to its being planted too deep in the ground; and in others by its being earthed up like a potato, many persons supposing it requires the same treatment as that vegetable. However the idea is wrong, as the bulb requires to be on the surface of the ground. The best method that I can recommend is to prepare the ground in every respect as directed for the sown crops of onions. This being done, divide the

beds across into rows from nine inches to a foot apart, planting the onions six or eight inches apart in the rows. The planting must be done by simply pressing down the bulb into the ground on the surface, in such a manner that the crown or top is level with the surface of the bed. The after management is simply to keep the beds clear of weeds; but care must be taken not to disturb the earth round about the onions, until they have rooted firmly in the ground. When the onions are ripe, they are to be taken up and dried in the usual way. If the ground will not admit of their being planted this month, let it be done as early in the spring as the nature of the season will permit.

REMARKS.—The operation of trenching, digging, and ridging, should be continued, if dry weather; if not, it would be advisable to attend to the Fruit Garden. Deciduous hedges may now be cut; and fences put in repair, if necessary. The onions, and other roots stored, should be occasionally examined in bad weather, and all that show symptoms of decay removed, before they contaminate the others. If frosty weather, wheel out manures of all sorts, and lay them in neat heaps on different quarters of the garden, with a layer of bog mould or loam under them, several inches thick, to prevent their juices from sinking into the ground, and to be afterwards mixed with the dung; it will save much time in the spring when they are to be dug in. Let each heap contain as much manure as is supposed will be sufficient for the quarter on which it is placed; put it neatly up, and cover it with a thin coat of earth, &c., to prevent as much as possible its goodness escaping.

And now the life of plants, in prison held,  
 So bound with sluggish fetters lies concealed,  
 Till by spring's warm beams almost releas'd  
 From the dull weight, with which it lay oppres'd,  
 Its vigour spreads, and makes the teeming earth  
 Heave up, and labour, with the sprouting birth.  
 Urging its prison's sides, to break away,  
 It makes that wider where 'tis forced to stay,  
 Till having formed its dwelling house, it rears  
 Its head, and in a tender plant appears.

# SYSTEMATIC CATALOGUE

AND

## DISSERTATION ON CULINARY SEEDS :

*Comprising the most useful Species, to which the new and approved Varieties are added; with their popular character, whether used for culinary or medicinal purposes,*

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Where a capital *A* is added, it shows the plant to be an annual. *B* indicates a biennial; and *P* perennial. The following abbreviations mark the kind of soil and situations in which the various plants thrive best :—

- aq.* signifies ... watery places.
- co.* ..... common garden soil.
- c. p.* ..... common peat or bog.
- h.* ..... heavy rich clay.
- h. l.* ..... heavy loam. .
- l.* ..... loam.
- l. p.* ..... loam and peat, most loam.
- lt.* ..... light vegetable soil.
- lt. l.* ..... light loam.
- m. s.* ..... moist soil.
- m. wo.* ..... moist woods.
- p.* ..... peat.
- p. l.* ..... peat and loam, most peat.
- r.* ..... rich garden soil.
- r. m.* ..... rich mould.
- ru.* ..... rubbish.
- s.* ..... sand.
- s. l.* ..... sandy loam.
- s. p.* ..... sandy peat.
- s. p. l.* ..... sand, peat, and loam.

**ALEXANDERS**—*Smyrniolum Olusatrum*. (Class 5, order 2, B. s.l.)—This plant was formerly cultivated in our gardens, for culinary use; but is now superseded by celery. The seeds are bitter and aromatic, and the roots are more powerfully bitter. They stand recommended as resolvents, diuretics, and emenagogues, though seldom used in medical prescriptions. The seeds are sown in March in rows three feet apart, and afterwards thinned, out to six inches. As the plants advance they are earthed up like celery, and like it are ready for use during autumn and winter.

**ASPARAGUS** (class 6, order 1, P, r.m.), is a native of Britain, and is found on gravelly situations near the sea. When young it is employed as a favourite food with the nobility and gentry. The root is esteemed a diuretic. A peculiar vegetable principle has been found in this plant.

**ANGELICA**—*Archangelica*, (supposed angelic virtues; class 5, order 2, B, m.s.) It is found in *aq.* in Britain, but has probably been naturalized, being a native of Lapland and Iceland. The leaf stalks are now only used for candying, and for this purpose are in perfection in May. It is more generally used in medicine than in cookery. A sweetmeat is made of this root by the confectioners, which is extremely agreeable to the stomach, and is surpassed only by that of ginger. In Norway, bread is sometimes made of the roots.

*Wood Angelica*, (P, m.wo.)—This species of angelica possesses similar properties to the garden species, but in a much inferior degree. It is only used when the other cannot be obtained. The seeds, powdered and put in the hair, kill lice.

**ANISE**—*Tragium* (Trajos, a goat, odor or odour; class 5, order 2; A, co.) is a native of Egypt; introduced in 1551. A small portion of it is sufficient for a large family, being only cultivated for a garnish, and sometimes used for seasoning. It is extensively cultivated in Malta and Spain, and the seeds are thence imported into this country for distillation and expression. The seed has an aromatic smell, and a pleasant warm aromatic taste. An essential oil and distilled water are prepared from them, which are employed in flatulencies and gripes, to which children are more especially subject; also in weakness of the stomach, diarrhœa, and loss of tone in the system. The oil is sometimes used by vermin killers to scent poisonous baits.

**BASIL** (class 14, order 2; *r.m.*).—The common is a native of India; and was introduced in 1548. The leaves are used occasionally both in salads and soups, to impart a grateful odour and taste.

*Small, or Bush Basil.*—This plant is mildly balsamic. Infusions are drunk as tea in catarrhus and uterine disorders; and the dried leaves are made into cephalic, and sternutatory powders. They are, when fresh, very juicy, of a weak aromatic and very mucilaginous taste, and of a strong and agreeable smell, improved by drying.

**BEAN**, kidney or French, (class 17, order 4, *A. co.*)—It is a native of India, and was introduced in 1597, or earlier, and cultivated in our gardens as a tender and much admired esculent. The parts used are the pods, before they have arrived at maturity. In France, and other parts of the Continent, as well as in America, they cultivate them in the fields; and it has been suggested that the same practice would be beneficial in this country, as they will grow in any tolerably good soil, and become particularly useful in times of scarcity, either in their green state, or dried and ground into flour. On the Continent, the ripe seeds are used in cookery, forming what are called *barri-cots*, of different kinds, and are also put into some sorts of soups. At the end of the season, the crop is gathered, haulm and all, and, after being properly dried, they are stacked, and the seeds thrashed out when wanted. When young, and well boiled, they are easy of digestion, and delicately flavoured. They are less liable to produce flatulency than peas.

The sorts cultivated, are the early yellow dwarf, early red speckled, early black, or negro, early white, Battersea white, Canterbury white, black speckled, brown speckled, dun coloured, striped, tawny, large white, dwarf China. The first four are generally used for forcing; and the Battersea and Canterbury are generally preferred by the London market gardeners for general crops for sale, as being prolific bearers.

*Bean*, kidney, or scarlet and white runners (class 17, order 4). Grows 12 feet high, and is a native of South America, and was introduced in 1633. It is used for all the purposes of the last; but differing from it so much in its botanical character, as to constitute a distinct species. It differs also in its culture on account of its being a climbing

plant, and requiring to be supported by means of stakes, trellices, or other means. It will grow on the ground as the other kinds, but arrives at greater perfection when supported by sticks or strings. In cottages, and small gardens, they are successfully cultivated, by planting them in rows to hide any disagreeable object, or they are trained over arbours, or up the front and ends of the cottages. If supplied plentifully with water, and the pods picked off as they are fit for use, they will continue a useful ornament for many weeks;—the frost being the only thing to injure them under these circumstances.

The varieties of the runners are: The scarlet, large white, white Dutch, princess runner, and variable runner. Of these, the first is the best and most generally cultivated; next to it is the large white. The princess runner has lately been brought to notice, it is an excellent bearer, and the pods are used when full grown. All the sorts of French beans are much improved by being transplanted, and can be forwarded much earlier if reared in flat boxes, or in pans, and when about three inches in height transplanted where they are to remain. None of the varieties are fit for forcing, as they require too much room.

BEET, red, (class 5, order 2, B, r.m.), is a native of the sea coast of the south of Europe, and was cultivated here by Tradescant the younger, in 1656—it being introduced in 1548. The roots are used in salads, boiled and sliced, and also as a garnish, but particularly as a pickle. They are most esteemed when their roots boil of a beautiful red colour. The roots, when dried and ground, are sometimes mixed and used with coffee. The seeds of good red beet are difficult to be procured; therefore, when a gardener is in possession of a good sort, he ought to endeavour to save his own seed. The sorts most cultivated are:—The large rooted, long rooted, dwarf, turnip rooted, small red, green topped, and castlenaudari. Of these, the dwarf is the best, and the turnip rooted the earliest. Castlenadari is much esteemed on the Continent, and is said to have the flavour of a nut. A considerable quantity of sugar might be obtained from the root of the beet. It is likewise said, that if beet roots be dried in the same manner as malt, after the greater part of their juice is pressed out, very good beer may be made from them. It is occasionally used to improve the colour of claret.

*Beet*, white, (class 5, order 2).—It is a native of the sea coast of Spain and Portugal; and was introduced in 1570, and cultivated by Gerrard and Parkinson, who were botanical gardeners to Charles I. There are three varieties cultivated: first, the common white; second, the great white, or Swiss chard; and the third, though seldom grown in our gardens, is an extremely useful agricultural root, called mangel wurzel, or the great German beet. It contains much of the saccharine principle, and is very nourishing. Applied externally, is useful in cleaning foul ulcers, and is a better application than the carrot.

*BROCCOLI* (*brassica oleracea*; class 15, order 1; bresican, tender; Celtic name of the cabbage. *B. r.m.*) However singular it may appear, Professor Decandolle and others have proved that all the varieties of broccolis have their origin in the *brassica oleracea*, or the common wild cabbage. This is one of the best vegetables; and comes in the season of no great plenty. Among the best varieties are, the Meigle fine hardy dwarf sort, raised by Mr W. Brow, being the best at present in cultivation in this country; purple cape, or autumnal; green cape, or autumnal; Grange's early cauliflower broccoli; cream coloured, or Portsmouth broccoli; early white broccoli; Miller's fine late broccoli, a new sort; sulphur coloured; and the spring white; which is so very hardy that no winter can destroy it. This last sort, for a late crop, should be planted to a large extent, as it comes into use at a season when vegetables are most in demand, and it may be planted closer than any other, so that a large quantity may be produced on a small piece of ground.

The following two new sorts are cultivated in the North Riding of Yorkshire. Metcalf's gray, and Knight's protecting. The former is admired on account of its enormous size, and the latter for its excellent flavour. The season of sowing extends from the end of March to the third week in May.

Cape broccoli is said to have been introduced from the Cape of Good Hope. It is sown in autumn, at the time of sowing cauliflower; it comes into use rather earlier, and the same treatment is applicable to both.

*BORRUCOLE* belongs to the same tribe as the last. There are several valuable sub-varieties, more or less esteemed by the individuals where they principally grow. The sorts cultivated are as follow:—The green borrcole; Scotch

kale, or Siberian borecole. This is a very hardy sort of kale. To cottagers and farmers, a more useful vegetable cannot be introduced into their little gardens, for no frost hurts it; and if planted on ground which has been occupied by the early crops of peas, or potatoes, it will have attained a considerable size before the rigour of the winter sets in. It is universally cultivated by the Highlanders; and found to stand the most severe winters. It may be considered the national vegetable of the land of kail and cakes; and is the regular garnish of boiled beef at weddings, curling dinners, &c.

“Our ancient forefathers agreed wi’ the laird,  
For a piece o’ guid ground, to be a kail-yard.”

It is surprising to see the numerous varieties that this sort sports into; in one small cottage garden, from 20 to 30 distinct varieties may be easily distinguished, by the different shades of colours and the form of the leaves. The purple, or brown kail, is nearly allied to the last, and is equally hardy. The German kail; Germau greens, or curlies, are beautiful varieties, and very hardy. Of these, there are two sub-varieties, one of which grows close to the ground, the other grows much taller, and furnishes a good supply of sprouts in the spring. This is the sort most cultivated in our gardens.

**BRUSSELS SPROUTS.**—Of this excellent vegetable we have only one sort. Although hardy, it is the most delicate of the kail tribe. The top is different in flavour from the side sprouts, and should, in cultivation, be taken off, to encourage the growth of the sprouts; and, as their leaves fall off, they occupy less breadth, and may be planted thicker than common greens. Sow the seed in March; and plant, after a shower, in June or July.

**BORAGE.** (class 5, order 1; A, co.) It is a native of Britain, and is not unfrequently met with in waste places. It is seldom used in modern cookery, although formerly it was held in high repute. A syrup is prepared from the leaves, in France, and used in pleuresies and inflammatory fevers. Their principal use in this island, is in that grateful summer beverage known by the name of “cool tankard.”

**CABBAGE.**—The varieties of white cabbage, cultivated in our gardens, are Peacock’s fine early dwarf, pyramidal, London New York cabbage, being of the new and improved varieties, with the early dwarf York, large ditto, early dwarf

sugar loaf, and large sugar loaf, are the best for the earliest crops, and also for the later ones. The last is an excellent sort for early summer use. The following are good for principal summer and autumnal crops. East ham Westham, early Battersea, late ditto, early imperial, and the Pentonville. The last is a curious cabbage, wrinkled like the savoy, and very tender and white; it never closes, nor becomes hard. It is decidedly the best for late summer and autumnal use. It continues delicate and well flavoured when others are rank and ill tasted. The following are recommended for the late crops:—Plaw's early; Deptford; Emperor; Antwerp; Russian; early London; large hollow sugar loaf; large round winter white; round Scotch, or white Strasburg; and Bainbridge's flat Dutch. The drumhead, and round Scotch, are generally cultivated in fields for cattle.

*Cabbage*, Red, (class 15, order 1,) is chiefly used for pickling and garnishing. The principal varieties cultivated are, the large red, or red Dutch, dwarf red, and the Aberdeen red. The first is usually cultivated in market gardens. The second is the best, and usually grown in the gardens of gentlemen, and is most esteemed for its beautiful colour. The third is much cultivated for culinary purposes by the natives of Aberdeenshire, and some parts of the north of Scotland; and is an ingredient in the national dish, "the kail brose." Red cabbage is a very excellent test both for acids and alkalies, in which it is superior to litmus, being naturally blue—turning green with alkalies, and red with acids.

**CAULIFLOWER.** (*Cauliflora*, flowering cabbage, class 15, order 1, B, *r.m.*) Reckoned amongst the most delicate of vegetable food. The sub-varieties in cultivation are the early, the late, and the red cauliflower. Of these three we have been unable to discover much difference in point of quality. Their distinctions are so trifling as not to merit the attention of the practical gardener. Like the rest of the Brassica tribe, they are apt to sport into degenerate varieties from seed. Cauliflower was first introduced to this country from the isle of Cyprus, about the middle of the 18th century.

**CARROT,** (*Daucus carota*,) is a native of Britain, found in sandy loamy pastures, in waste places, and in borders of corn fields in almost every corner of the kingdom. The

effects of cultivation have almost entirely altered the appearance of its roots, which is the part used for culinary purposes. In its natural state it is small, hard, and dry, of a white colour, and strong flavour. The following rank as the more esteemed cultivated varieties: early red horn, common early horn, long horn, long white, yellow, long yellow, long orange, long red, long purple, and the Altringham carrot. The two first are generally sown for the first crops; but the Altringham is nearly as early, and a much handsomer and better carrot, indeed it is the best sort in the country. The long white yellow is an excellent and rather curious variety; it is sweet and pleasant to the taste, and looks beautifully when dressed, it is good for autumn use, but does not keep well in store.

The seeds of the wild carrot, by boys called birds' nests, on account of them turning up in the form of a nest or cup, are said to be more efficacious than those of the garden carrot; they possess demulcent and aromatic qualities, and are given in infusion or decoction in calculous complaints. The seed of the wild carrot is often used in decoction with marsh-mallows, and given to patients afflicted with the gravel, which generally proves of great relief. The wild or common carrot is found in great abundance on the estate of Craig, near Alyth, and by the sides of the Newtyle railway. As the seeds ripen the stalks should be cut, some inches long, gradually dried like other herbs, and laid by for use.

CARAWAY, (class 5, order 2; *B.s.l.*) is a native of Britain, growing in meadow pastures. The seeds, which are called *carvy*, are used in confections and medicine. In the North they are often put into cheese and oaten cakes; in like manner the Dutch, Danes, and Russians sprinkle the tops of their loaves with them. The seed, which is much used by distillers, and in medicine, is grown chiefly in Essex, and has an aromatic smell, warm pungent taste, and yields an essential oil much used by *rat catchers* to entice the rats into their traps. The seed is employed as a stomachic and carminative in flatulent colics.

CELERY, (the heavy smelling; class 5, order 2; *B. m.s.*) is a native of Britain. It grows naturally in ditches, and generally near the sea. This vegetable is much improved by cultivation. The taste in its natural state is rank, and the whole plant of a coarse habit; indeed in that state it is suspected to contain some of the narcotic properties of its

near associates, water dropwort, water hemlock, &c. which are poisonous. It is therefore unsafe to gather it in its natural state, as many fatal instances are on record of people having been poisoned by eating plants of the two genera above mentioned, by mistaking them for celery. The stalks, when blanched, are eaten raw as a salad; and in their unblanched state are used in domestic cookery. It is in general use over almost all Europe. The turnip-rooted sort, or celeriac is in general use among the Germans. The root, seeds, and fresh plant are aperient and carminative.

Flat stalked, is of the new and improved varieties; also the upright Italian, large hollow upright, solid upright, large red stalked upright, and the turnip-rooted, or celeriac. The first is cultivated in the North Riding of Yorkshire; one of its distinguishing characters being the great breadth and flatness of its leaf stalks, which are white and perfectly solid. The next three sorts are also preferable for general crops. The fifth is fit for stewing, and is hardy enough to stand a severe winter. The celeriac is cultivated for its roots, which may be preserved all winter in sand, or by any other ordinary means. It is much cultivated about Hamburg, and is thence imported to the London market.

CHERVIL, (*Chacrophylum sativum*; class 5, order 2; A. co.) is a native of Europe, and found growing on hedge banks in England. It is used for a salad, and for garnishing; for the latter use there is a sort more curled in the leaves, which is to be preferred: it is sold in our seed shops under the name of curled chervil. This is a salubrious culinary herb, sufficiently grateful both to the palate and stomach, slightly aromatic, gently aperient, and diuretic.

CORIANDER, (class 5, order 2; A. co.) is a native of the East, now naturalized to the fields in England. It is sometimes used as a salad, and as an ingredient of soups. In Essex, and other places, it is extensively cultivated for the seed, which is used by confectioners, druggists, and distillers. The smell, when fresh, is strong and disagreeable, but by drying becomes sufficiently grateful. They are recommended as carminative and stomachic.

The seeds of chervil and coriander are sown in shallow drills from six to ten inches apart, and covered with half an inch of mould, on a sheltered spot early in spring. These herbs are all to remain where sown, and the chief culture they require is to keep them clear of weeds; but as the plants

soon run up to seed, a small portion should be sown every month.

*Cress—American, or Early Belleisle*, (*Barbarea praecox*; class 15, order 1; P, *aq. co.*) Is a native of England, growing by the sides of brooks. It forms an excellent and useful addition to our winter and spring salads, being extremely hardy, and is fit for use during the whole of the winter, if grown in any sheltered spot. It is sold in the seed shops by the name of American cress, black cress, and French cress.

*Cress, Winter*. (*Barbarea, vulgaris*, common P, *aq. co.*) This and the last have yellow flowers. This species being a native of both countries, is found in similar situations, and about rubbish. It is also an useful and hardy salad. The leaves of this plant may be reckoned amongst the anti-scorbutics.

*Cress, Garden*, (*lepidum sativum*, pepperwort; A, *co.*) Is a native of Persia, introduced in 1548. It is the principal of all the small salads, and is in very general cultivation. The varieties in use are the common plain-leaved cress; this is the most extensively cultivated, but not by any means so fine as the Normandy or curled cress, which is not only a better salad and garnish, but much hardier, and not so apt to run up to seed. If sown at the bottom of a south wall, it will stand all the winter, and come in at the spring with the American and winter cresses already noticed. The other sort of cress cultivated is the broad leaved; it is not much grown for a salad, but generally for rearing turkeys, &c

*Cress, Indian*, (class 8, order 1; *Tropaeolum magus*, A, *s.l.*) is a native of Peru, and cultivated here since 1686. The flowers are used for garnishing, and sometimes with the young leaves as a salad. The berries are gathered green, and pickled; and are, in that form, a good substitute for capers. In all those cases where the warm and anti-scorbutic vegetables are recommended, this plant may be occasionally adopted, as a pleasant and effectual variety. Patients to whom the nauseous taste of scurvy grass is intolerant, may find a grateful substitute in the Indian cress. In the evening, the flowers emit spontaneously, at certain intervals, visible sparks, like those from an electric machine. This observation was first made by the daughter of Linnæus,

*Cress, Water*, (*Nasturtium officinale*, well grass; class 15, order 1; P, co.) grows wild in clear springs and rivulets in every part of Britain. It has a white flower, and the leaves remain green all the year, but are in greatest perfection in the spring. They obtain a place in the materia medica for their aëticorhutic qualities, which have been long acknowledged by physicians. The most pleasant way of administering them is in form of a salad, for which purpose they are much used. I know of several instances where a poultice, made of water cress, with a little meal to thicken it, proved a complete cure for the scurvy (*scorbutus gingipedium*) in the legs; and of one person in particular, who, a few years ago, had been not only rendered a cripple, but was unable to stand, with the scurvy in his legs. Many learned doctors were applied to for a cure, in vain. At length the above simple remedy was prescribed, when the patient was soon restored to his wonted ability, and is now as well as ever.

*DANDELION*, (class 19, order 6; P, co.) is a native of Britain, and a well-known weed. When blanched, however, it makes an excellent addition to our spring salads; and the roots are considered as good a substitute for coffee as chicory. It may be stored in cellars, or barrels, like chicory, for producing winter salads.

Murray informs us, that at Goettingen the roots are roasted and substituted for coffee by the poorer inhabitants, who find that an infusion, prepared in this way, can hardly be distinguished from that of the coffee-herry. The expressed juice of dandelion is bitter, and somewhat acrid; but that of the root is more bitter, and possesses more medicinal power than any other part of the plant. It has been long in repute as a detergent and aperient; and there are various proofs of its efficacy in jaundice, dropsy, consumption, and some cutaneous disorders. A strong decoction of the roots have most commonly been prescribed, from one ounce to four, two or three times a-day. The plant should be always used fresh;—even extracts from it appear to lose much of its power by keeping.

*ENDIVE, Succory*, (class 19, order 1; A, r.m.) is a native of China and Japan, and was introduced in 1548. Is used as a salad, and for stewing; and is in much repute both in Britain and on the Continent. The varieties most generally cultivated are the green curled leaved; white curled

leaved; and broad leaved Batavian. The former is most generally cultivated for principal crops; the second is a more delicate plant, and apt to damp off in winter; the third is not calculated to stand much frost, but for early autumnal use is much admired. Sow thin, in May or June; and when the plants are three inches high, plant them out in rich soil into rows, one foot asunder, and nine inches apart in the row. In dry weather, tie up the leaves for blanching when one foot high.

The wild sort is perennial, *co.*, and a native of Britain, growing in gravelly soil. It is used in agriculture and in medicine. All the varieties have blue flowers. It abounds with a milky juice, of a penetrating bitterish taste, and of no remarkable smell, or particular flavour. The roots are more bitter than the leaves or stalks, and these much more so than the flowers. By culture in gardens, and by blanching, it loses its bitterness, and may be eaten early in spring in salads. The roots, if gathered before the stem shoots up, are also eatable; and when dried may be made into bread. The roots and leaves of this plant are stated by Lewis to be very useful aperients, acting mildly, and without irritation, tending rather to abate, than to increase heat, and which may therefore be given with safety in hectic and inflammatory cases. Taken freely, they keep the belly open, or produce a gentle diarrhoea; and when thus continued for some time, they have often proved salutary in the beginning of obstructions of the viscera, in jaundices, cachexies, hypochondriacal and other chronic disorders. A decoction of this herb, with others of the like kind, in whey, and rendered purgative by a suitable addition of polychrest salt, was found a useful remedy in cases of biliary calculi, gravel or stone, and promises advantage in many complaints requiring what have been termed attenuants and resolvents. The virtues of succory, like those of the dandelion, reside in its milky juice; and we are warranted, says Dr. Woodville, in asserting, that the expressed juice of both these plants, taken in large doses frequently repeated, has been found an efficacious remedy in plithisis pulmonalis, as well as the various other affections above mentioned. The milky juice may be extracted by boiling in water, or by pressure. The wild and the garden sorts are used indifferently. If the root is cut into small pieces, dried, and roasted, it resembles coffee, and is sometimes a good substitute for it.

**FENNEL, or DILL**, (class 5, order 2 ; P, *s.l.*) grows naturally in chalky places in England. It is one of the oldest inmates of the garden, and is used for salads and garnishes, and when boiled, enters into many kinds of fish sauces. The culinary varieties are : the heavy smelling (B, *r.m.*) ; fennel (P, *s.l.*) ; sweet (P, *s.l.*) ; peppered (B, *co.*), and is sown for medicine. There is an essential oil, and a distilled water, prepared from the seeds, which are given in flatulent colics, and dyspepsia. They are also said to promote the secretion of milk.

**GOURD** (class 21, order 10 ; A, *co.*) There are nineteen varieties in cultivation, nine of which are sub-varieties. Natives of Astracan, Chili, and the Levant. The principal of which are : the water melon, introduced in 1570. This is the melon of the ancients, and is at present much used in the south of Italy.

The *Squach*, or *Melon-pumpkin*, introduced in 1597. In North America it is cultivated as an article of food.

The *Pompion* or *Pumkin* was introduced in 1570. This is the melon of the English gardeners. It is generally cultivated as an ornament of the garden ; but by some of the peasantry for pumpkin pies, &c.

The *Warted Gourd*, *Orange Gourd*, and *Bottle Gourd*, are only cultivated for curiosity.

The *Vegetable Marrow*, or *Intoxicating Gourd*, was introduced in 1824. It is cultivated in some families, and used for culinary purposes in every stage of its growth.

**LEEK**, (class 6, order 1 ; A, *r.m.*) is a native of Switzerland ; and was introduced in 1562. It is also a native of Egypt and other parts of the East ; and known to those countries before the departure of the Israelites. It is the national vegetable of the ancient Britons. Leek or posset soup, is much prized in some families. Every part of this plant, but more particularly the root, abounds with a peculiar odour. The expressed juice possesses diuretic qualities, and is given in the cure of dropsical diseases, and gravelly complaints, asthma, and scurvy. The fresh root is much employed for culinary purposes. The best sorts are, the Scotch flag, or Musselburgh leek, and the London broad-leaved, or tall leek.

**LETTUCE**, (class 19, order 1 ; ) It is not exactly known to what country this excellent vegetable owes its origin. The endive leaved belongs to South America, and the oak

leaved to Sweden. It was cultivated or introduced in 1562. It is the best, and the most universally cultivated salad that we have. It contains, like all the other species of this genus, a quantity of the narcotic principle, from which, of late years, a medicine has been prepared by Dr Duncan, senior of Edinburgh, under the title of *Lactucarium*, and which can be administered with effect when opium is inadmissible.

The varieties in cultivation are numerous. The best are Asiatic cabbage, French, new Cape cos, green cos, white cos, silver cos, Egyptian early cos, brown cos or Bath, red cos, Florence cos, lap, brown Silesia, common white cabbage, large white cabbage, brown Dutch cabbage, imperial cabbage, grand admiral cabbage, tennis-ball cabbage, bardy green cabbage or capuchin, Malta cabbage, &c.

The two first are new and improved varieties, cultivated in the North Riding of Yorkshire. The first stands long without running to seed, and with the New Cape cos are the best for general crops, as they grow very large, tender; and crisp. The brown Dutch, for being hardy. The lap to be drawn and used young in small salads. The bardy green tennis-ball, and brown Dutch, with the Asiatic, are the most backward in starting to seed, therefore they are highly useful for summer crops. The brown Dutch, is also a hardy sort,—we may add the hardy green, or the tennis-ball, any of which will stand the winter in ordinary cases. The cos lettuces have upright, oval, or oblong heads; and the cabbage lettuces have round leaves, and squat flat foreheads, but are white, firm, and close, when full grown.

LOVE APPLE, or TOMATO, *Solanum Lycopersicum esculentum*, (class 5, order 1; A, r.m.) The French, Italians, Portuguese, and Spaniards, are particularly attached to this fruit. It is an ingredient in almost all their soups and sauces, and is by them considered as cooling and nutritive. Scarcely a dinner is served in Rome or Naples, without this fruit being introduced in some shape or other. There are three sub-varieties cultivated here, red fruited, yellow fruited, and white fruited. Of these, the large red, and large yellow are the best; the preference, however, may be given to the former.

The plant is of the trailing kind, and needs support. Therefore, sow at the bottom of a south wall, or pale, to which it may be trained; and in a south aspect, as other:

wise the fruit may not come to perfection. Any blank place on a fruit wall, the size of a yard square, will contain two or three plants. The seeds may be dropped in about the latter end of May, in a line at the bottom, and may be thinned out to three or four plants after they have come up a few inches. It will grow in almost any kind of soil, and needs little other care than being trained to the rail or pale as it advances; and being pruned of its superfluous shoots as the fruit begins to colour, in order to let in the sun, the better to ripen them off.

**MUSTARD**, (class 14, order 1; A, r.m.) There are two species cultivated.

*Black Mustard* is a native of Britain, and is found in fields and cultivated places. This species is seldom cultivated in gardens, but is extensively grown in fields for grinding and medicinal purposes. When cultivated in gardens, its young tops are used along with other small salads, and when full grown, the leaves are used as greens.

*White Mustard*.—Found in the same places as the last, and is much used as a salad. When the plant is young it is agreeable, but when in its rough leaves, is harsh and unpleasant.

Mustard is considered capable of promoting appetite, assisting digestion, attenuating viscid juices, and, by stimulating the fibres, it proves a general remedy in paralytic affections. Joined to its stimulant qualities, it frequently, if taken in considerable quantities, opens the body, and increases the urinary discharge, and hence it has been found useful in dropsical complaints. Externally, flowers of mustard are frequently used, mixed with vinegar, as a stimulant, or sinapism.

**ORACHE**, (class 23, order 1; A, co.) is a native of Tartary, and introduced in 1548. It is used as a substitute for spinach, and is much used in France.

**ONION**, *Allium Cepa*, (class 6, order I; B, co.) Neither the native place of the onion, nor the time of its introduction into Britain, can be correctly ascertained. Some suppose it to have originated in Spain, but it is more probably a native of Egypt, the inhabitants of that country being partial to onions and garlic. It enters into the broths, soups, and other culinary preparations of almost every nation in Europe. This, like all the other alliceous vegetables, is of great antiquity. The sorts in general cultiva-

tion are, the silver-skinned, early silver-skinned, a sub-variety of the last, yellow, true Portugal, the seed of which is seldom imported into this country, Spanish, two-bladed, Strasburg, globe, James' keeping, Deptford, pale, red, blood red, Lisbon, Tripoli, these are all biennials. The Welsh, under-ground, tree or bulb-bearing onion, and scallion, are perennials. The Dutch and Flanders are the same as the Strasburg. The Deptford is only a sub-variety of the Strasburg. The Dutch blood red, and St. Thomas, are only varieties of the blood red. For pickling, the three former are preferred. The Spanish is much cultivated about Reading, and is a good sort for general crops; but the Strasburg is most universally cultivated, both for principal, spring, and autumnal crops. The globe is a good onion, and is much admired by some gardeners. James' keeping is a good keeping onion. The blood red is much cultivated in Scotland and Wales, and esteemed in the London markets only for its diuretic qualities. The Tripoli is the largest onion cultivated, but is a bad keeper. The Lisbon is a pretty good onion. Of the perennial sorts, the Welsh is esteemed for being hardy, and coming into use early in the spring; it is a native of Siberia. The under-ground species has, of late years, been much cultivated in the Isle of Wight, and on the coast in the vicinity of Portsmouth, as it comes in use before any of the spring-sown ones; and in that case, the cultivators find a ready market for them, in the purveyors for the East Indiamen and other ships, destined for long voyages, which leave England at a season when no other onion would be in a condition to take into their stores. It is a useful onion, and will afford a supply should the other crops from seed suffer by grubs or other accidents. It does not keep beyond February.

The tree or bulb-bearing onion came originally from Canada, where the climate being too cold for onions to flower and seed, becomes (as in the cases of many Alpine grasses, for example, *Poa et Fustuca Vivipara*) viviparous, and bears bulbs instead of flowers. This is one of Nature's grand provisions for the propagation of plants, when the summer is not of sufficient duration for the perfecting of the flowers and seeds, by the regular mode of impregnation, &c. By a mode peculiar to herself, Nature changes the parts of fructification from their natural dispositions, and forms them into bulbs or embryo plants, which, when

sufficiently matured, drop down, and either strike root that autumn, or else lie dormant till the return of another short summer, when they shoot up and become plants similar to their parents. This curious mode of propagation is common in the Alpine regions, and is not only exemplified in the two grasses above-mentioned, but also in that rare plant *Saxifraga vernua*, in *Polygonium vivipara*, and many others. This species of *Allium* is not likely to come into general cultivation, although the cauline hulks, when planted, become onions of a good size. It is our opinion, that the largest of the cauline bulbs are calculated for pickling, at least it would be worth while to make the experiment.

SCALLION.—(P. *co.*)—A variety of Askalan or shallot. Is a native of the south of Europe; and is propagated by off-sets.

The *Onion*.—Dr. Cullen says, onions are acrid and stimulating, and possess very little nutriment. With bilious constitutions they generally produce flatulency, thirst, headache, and fibrile symptoms, but where the temperament is phlegmatic they are of infinite service, by stimulating the habit and promoting the natural secretions, particularly expectoration and urine. They are recommended in scorbutic cases, as possessing antiscorbutic properties. Red onions, boiled among sweet milk, with a little sweet butter, &c. added, are a good remedy for a continued cold, or consumption. Externally, onions are employed in suppurating poultices; and suppression of urine in children is said to be relieved by applying them, roasted, to the pubes.

PARSLEY.—(B. *r.m.*)—Is a native of Sardinia, and was introduced in 1548, but is now naturalised to Britain. It is found in waste places, but generally near old gardens. The sorts in cultivation are, the common plain-leaved, the curled thick leaved, and the long-rooted or Hamburg parsley. The first is seldom cultivated, and should be expelled from our gardens, as, in its great resemblance to hemlock and fool's parsley, these plants are often mistaken for it—both of which are deleterious, the former being one of our most powerful vegetable poisons. The curled-leaved is both a much finer and a more beautiful sort: and, by generally adopting its cultivation, no risk would be run of mistaking it for either of the two plants above-mentioned. There is a sub-variety, called the giant parsley, which grows large, and is preferable to the others. The Hamburg sort is cultivated for its

long fleshy roots, and was probably introduced or much cultivated near Hamburg, from which place it derives its name. No seed sown in the culinary garden remains so long under ground as that of the parsley; this circumstance should be taken into consideration at the time of sowing.

It is sown among pasture grasses, as likely to counteract the liver-rot in sheep. The roots are said to be aperient and diuretic, and have been employed in nephritic pains and obstructions of urine. The seeds possess aromatic and carminative powers, but are seldom prescribed.

PARSNIP, (class 5, order 2: B, *s.l.*) is a native of England, and abounds in chalky fields, and road-sides, in many parts of Hampshire, Surrey, and Kent. It is astonishing to see to what a depth the roots of this plant will penetrate into hard chalky rock. By cultivation it has been much improved. In its natural state, it has a small bard root, and of rather an unpleasant taste, but in its cultivated state it has a large well-flavoured root, and abounds with saccharine and spirituous properties. It has long been an inhabitant of our gardens, but not so generally cultivated now as formerly. Amongst the Roman Catholics it is a favourite Lent root, being eaten with salted fish. In some places the sorts are dressed along with potatoes, and form a good dish for the children of the peasantry. Parsnip-wine is well known. In the north of Ireland, a table-beverage is prepared from the roots brewed along with bops. We have only one variety cultivated, but the French cultivate three; the *Siam*, *Coquaine* and *Lisbonaise*. Of these, the first is the smallest, but best flavoured; the second is the largest, and cultivated chiefly in the islands of Jersey and Guernsey, where the roots sometimes attain the length of four feet, and are often sixteen inches in circumference, and rarely so small as six inches. This variety deserves the attention, not only of our cottagers, but also of our dairy farmers, few vegetables being better for milch cows; and in situations where the soil is light, deep, and sandy, probably a better crop could not be grown for that purpose. The third variety, *Lisbonaise*, is nearly as good as the former, but does not grow to such a length, and probably would be far better for field culture. Depth of soil, however, is not so material in the cultivation of parsnips, if all other circumstances be favourable; for, as has been already observed, their roots penetrate to the depth of three or four feet in

solid chalk—nevertheless, the looser the ground is, the larger they will become.

The roots of the common parsnip are sweet and nutritious, and in high esteem as an article of food. They possess an aromatic flavour, more especially those of the wild plant, and are used in calculous complaints for their diuretic and sheathing qualities.

**PEA, *Pisum Sativum*,** (class 17, order 4; A, co.) The common cultivated pea is one of the most delicious vegetables which our gardens produce; it is an universal favourite, and is grown abundantly by persons in every station of life. It is of easy culture, and very hardy; but there are points which ought to be attended to, in order to promote larger crops with less danger of failure. These shall shortly be attended to in another place. It is a native of the south of Europe, and was introduced to Britain at a period at present not known to botanists. There are seven species besides the above, and some of them are of recent introduction. The varieties of the garden pea are very numerous, and capable of great extension by hybridization; some are highly valuable, both for garden and field culture. The following will afford ample choice for every appropriate season and situation. Numerous varieties are cultivated in our fields and gardens; but the most approved sorts are—Cormack's early May, racehorse, early white Warwick, early frame double blossom, and Bishop's early dwarf (the last only grows a foot or 15 inches high), for the first and last sowings. The following may be sown from the third week of February to the second of May:—New scimitar, Woodford's green marrow, blue imperial or King William's pea, Prussian blue, dwarf Prussian, Leadman's dwarf or Spanish dwarf, dwarf marrowfat, Knight's wrinkled tall marrowfat, improved blue imperial and Victoria.

*Cormack's Early May, Racehorse, and the Early White Warwick*, are new sorts, and the earliest peas in cultivation; they are adapted to the field as well as the garden, are moderately prolific, hardy, very rapid in their course of growth, soon off the ground, and of a high and peculiar flavour that to most persons is very agreeable. They may be sown from the latter end of October to the middle of February, and will come into bearing in a period as short as the nature of the season will permit. They are also adapted for medium and late crops. The straw rarely

exceeds a yard and a half in height. In the field, of course, they are never assisted by stakes, and are planted in rows about a foot or sixteen inches asunder.

The *Prussian* and *Spanish Dwarfs* grow two feet high, are of a close, compact habit, peculiarly suitable to dry situations, and to districts frequently visited with high winds. They yield well for their size, and the flavour pretty good, but are not considered early.

*Woodford's Green Marrow Pea*, one of the most estimable of the new or newly-named varieties; height, three feet, very prolific, pods of medium size, seeds large and full of a high-flavoured, delicious pulp; none can surpass it for general spring culture: unless it be

*King William's* or *Blue Imperial*; this is, indeed, surpassingly excellent. It is a hybrid between the Prussian blue and one of the marrowfats; height, three or four feet; straw rich, strong, and of a fine glaucous bluish tint, that is in soils and situations favourable to it. Time of sowing, from February to May.

*Prussian Blue*, a hardy and most fruitful variety, suitable to any climate—to the field as well as to the garden—for the middle and late crops. The fruit is of a bluish grey when quite ripe, and not so large as the imperial, four or five feet high.

The *Dwarf Marrowfat* is one of the best sorts for a full crop; seed large, and well flavoured; height, five or six feet; time of sowing, February, March, and April.

Of the taller growers, the *Tall Marrowfat* and *Rouncival* claim the precedence; but they are very inconvenient to the grower, and are liable to injury from high winds. One variety, however, merits particular notice, because it evinces the importance of cross impregnation—viz. *Knight's Wrinkled Marrow Pea*. The late Sir A. Knight, President of the London Horticultural Society, has described his experiments in the Philosophical Transactions. He had a degenerated pea in his garden which was not restorable by attention and culture. Being thus a good subject for experiments, the male organs of a dozen of its immature blossoms were destroyed, and the female organs left entire. When the blossoms had attained their mature state, the pollen of a very large and luxuriant pea was introduced into the one half of them, but not into the other. The pods of both grew equally; but the seeds of the half

that was not impregnated withered away, without having augmented beyond the size which they had attained before the blossoms expanded. The seeds of the other half were augmented and matured as in the ordinary process of impregnation, and exhibited no perceptible difference from those of other plants of the same variety, perhaps because the external covering of the seed was furnished entirely by the female. But when they were made to vegetate in the succeeding spring, the effect of the experiment was obvious. The plants rose with great luxuriance, indicating in their stem, leaves, and fruit, the influence of this impregnation; the seeds produced were of a dark grey. By impregnating the flowers of this variety with the pollen of others, the colour was again changed, and new varieties obtained, superior in every respect to the original on which the experiment was first made, and attained, in some cases, a height of more than 15 feet. I had this pea last year 18 feet high. Of the varieties thus obtained, the wrinkled marrow is the best and most prolific yet cultivated in North Britain, where larch thinnings can be obtained for them to climb upon. Time of sowing, March and April.

The *Sugar Pea* is not recommended for the ordinary uses of the table, but as forming a most excellent pickle, and is used nearly in the same manner as French beans, the pods being deprived of the inner tough film, render them very tender, hence the pod is occasionally cooked entire with fresh butter. It was only introduced about the middle of last century; it is much used in France. The foregoing list contains ample materials wherewith to form a very complete collection of peas. Farmers and cottagers would require three or four varieties only.

**PURSLANE**, (class 11, order 1; A. r. m) is a native of South America, and of Europe, and introduced in 1562 and 1582. It is used in salads, and sometimes pickled. The varieties cultivated are the green and yellow, or golden, and the aleraceous. It may be sown about the end of March. If sooner, it is apt to be hurt by frost, being very succulent. Sow on a light early border (much as you would do lettuce, but thinner), once in three weeks or a month throughout the summer.

**RADISH**, (class 15, order 1;) is a native of China, and mentioned by Gerrard, in 1584. There are 10 varieties in cultivation, and are divided into spring, autumn, and

winter kinds. The following is from the Transactions of the Horticultural Society:—

*The Spring and Summer kinds are*, the scarlet or salmon-coloured, and its sub-varieties.—Short-topped, and early frame scarlet; which are the two sorts generally cultivated. Purple; an early sort of good flavour, but at present neglected. Long white; the original variety, cultivated in Gerrard's time, white, semi-transparent, and delicate; these are long sorts. The turnip sorts are: the white, root globular like a turnip. Early white, a sub-variety. The pink, rose-coloured, scarlet, and crimson, are names applicable to one sort which approaches to the pear shape.

*The Autumn kinds are*: White Russian; the root larger than of the long rooted kinds, white, tapering like a carrot, flavour nutty, like that of the rampion. Yellow turnip; root large, ovate, yellow, or dusky-brown, and rough without, but the flesh white. Round brown; root large, shape irregular, externally matted with greenish brown, and the flesh soft, and of a greenish white.

*The Winter kinds are*: White Spanish; root large, oval, outside tinged with green, flesh hot, firm, solid, and white. Oblong brown; root middle-sized, pear-shaped, outside coat rough and brown, marked with white circles; flesh hot, firm, solid, and white, plant very hardy. Black Spanish; root large, irregular pear-shaped, rough and black externally, and the flesh hot, firm, solid, and white; very hardy. Purple Spanish; a sub-variety of the black, with a purple skin.

The roots are much esteemed as a salad, and are the only part of the plant generally used in a raw state. The pods are pickled and considered a substitute for capers. The several varieties of this plant are said to be employed medicinally in the cure of gravelly affections. The juice, made into a syrup, is given to relieve hoarseness. Mixed with honey or sugar, it is administered in watery asthma; and, as an antiscorbutic, their efficacy is generally acknowledged.

**RAPE**, (class 15, order 1; B, *co.*) is a native of Britain, and found in corn-fields and cultivated places. The young seed-leaves gathered, are used with mustard and cress in salads. It is much used in agriculture.

*Wild Navev, or Rape.*—The seeds yield, upon expression, a large quantity of oil called rape oil, which is sometimes ordered in stimulating liniments.

SAVORY.—There are two species cultivated: the—

*Summer Savory*, (A; r.m.) is a native of Italy, and introduced in 1652.

*Winter Savory*, (P; co.) is a native of the south of Europe, and known in this country since 1652. Both the species are cultivated in every garden, being used for seasoning, and other made-dishes in cookery. This low shrub has a warm, aromatic, penetrating taste, and smells like thyme, but milder.

SAVOY, (class 15, order 1; B, co.) A variety distinguished from all other hearting cabbages by the puckering of its leaves. It is one of the prime winter vegetables, and merits the attention of every one who has a garden, or kale-yard. It is divided into the following varieties: the green, dwarf, and yellow savoy; and these again into the sub-varieties: the round, oblong, and conical or sugar-loaf shaped; all of them being excellent autumnal greens. The green savoy should be first used, as it is less hardy than the yellow, and the dwarf is the hardiest of them all. Any of them will, however, stand in ordinary cases till after the middle of winter. As they thrive best in the fields, a portion of the seed should be sown early in spring to rear plants for planting out along with potatoes and turnips.

SCORZONERA, *Hispanica*; the systematic name of the esculent goats' grass, or vipers' grass; so called because it is said to be effectual against the bite of all venomous animals—(class 19, order 1; P, co.)—It is a native of Spain, the south of France, and Italy; and cultivated in the gardens of this country since 1576, mostly for its roots. The root of this plant is mostly sold for that of the *Humulis*, a different species of scorzonera.

*Scorzonera Hispanica* is esteemed diuretic, stimulant, and sudorific. A drink is made from it for variola; and a distilled water is also prepared from it. It is also an esculent of occasional culture. The root is carrot-shaped, about the thickness of one's finger, tapering gradually to a fine point, thus bearing some resemblance to the body of a viper. The outer rind being scraped off, the root is steeped in water, in order to extract a part of its bitter flavour. It is then boiled or stewed in the manner of carrots or parsnips. The roots are fit for use in August, and continue good till the following spring. Its culture is the same as that of the carrot or salsify.

**SEA-KALE**—(Class 15, order 1; P, *r.m.* or *s.l.*) There are two varieties cultivated. The common sea, which is a native of our sea shores, and the Tartarian, which is native of Siberia, and introduced in 1789. It is a delicious vegetable when forced or blanched. It is brought to table about Christmas, has a delicate flavour, and is much esteemed. It is cultivated on a large scale by the London market-gardeners, several individuals having a number of acres under crop at the same time, who find a ready demand for it in all the markets of the metropolis. The price is four shillings a punnet (a small basket) from December till April; and, after that time, seldom sells for less than half-a-crown or three shillings.

**SEURVY-GRASS**, *Cochlearia*. (class 15, order 1; A, B. *co.*) is a native of Britain, growing on our sea-shores. It is not cultivated in our gardens, but makes a wholesome ingredient in our salads where it is required. The variety called Dutch scurvy-grass is thicker and more succulent in its leaves, and is the best for cultivation. This indigenous plant is cultivated in the gardens in England for its medicinal qualities. Its expressed juice has been long considered as the most effectual of the scorbutic plants.

**SKIRRET**, (class 5, order 2; P. *co.*) is a native of China. The roots are the parts of the plant used.

**SPINACH**, (class 22, order 5; A, *r.m.*) has been cultivated here since 1568. It is used in culinary preparations in various ways, and esteemed in all families. There are three varieties cultivated: the common, or pot herb, the prickly, and the smooth, or round seeded. The prickly is preferred for autumn and winter sowing; and the smooth for general crops in summer, the leaves being more succulent and tender. This plant is sometimes employed for medicinal purposes in the cure of pulmonary consumption; made into a poultice, by boiling the leaves and adding some oil, it forms an excellent emollient.

**SPINACH, WILD**, *Chenopodium Bonus Henricus*; or Goosefoot. (class 5, order 2; P. *co.*) is a native of Britain, and found plentifully by the sides of roads near villages, but seldom at a great distance from houses. It is cultivated in Lincolnshire in preference to the garden spinach. The young shoots, peeled and boiled, are eaten as asparagus, and resemble that vegetable in flavour. It is not in general cultivation in the gardens. The leaves are ac-

counted emolient, and have been made an ingredient in decoctions for glysters. They are applied by the common people to flesh wounds and sores, for the purpose of drawing and healing.

There are two species of this tribe now cultivated in this country, called the green Quinoa, and the red Quinoa, which are both annuals, and natives of Peru, and introduced in 1822, and grows to the height of three feet. Their seeds are used as rice.

SUCCORY, or WILD ENDIVE, *Cichorium Intybus*, (class 19. order 1; P. co.) is a native of Britain, and found by road sides in calcareous soils. This plant is but little cultivated in this country, but is in high repute in Italy and France. When blanched, it has much the appearance of endive, and in that state is the *Barbe de Capucin* of the French. It has attracted the attention of both the French and English agriculturists, and has been cultivated by them as food for cattle. In Holland and Flanders it is extensively cultivated for the roots, which the inhabitants of those countries, and almost all the people on the Continent, grind and use for coffee, either by itself, or mixed with a small portion of genuine coffee. It is, possibly, to this admixture of succory root that the superior flavour of the French to the English coffee is to be attributed. It is much used in medicine, as has been already noticed under the name of Garden Endive.

# SYSTEMATIC CATALOGUE

OF

## CULINARY ROOTS AND HERBS :

*Enumerating the different species, and principal varieties in cultivation ; with their popular character and usefulness as food and medicine.*

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**ARTICHOKE**, *Cynara Scolymus*, (class 19, order 1 ; P, co.) is a native of the south of Europe, and introduced in 1548. There are only three varieties in general cultivation—the French or oval, the globe, and the dwarf globe ; of these, the globe is considered the best for general crops, but the French is supposed to be better flavoured. The latter is only a sub-variety of the globe, and valued as occupying less room than any of the others, and is therefore to be preferred for small gardens. Artichokes are used in almost all families, and are in much repute on the Continent, entering in a variety of ways into French cookery.

The leaves are bitter, and afford by expression a considerable quantity of juice, which, when strained and mixed with an equal quantity of white wine, has been given successfully in dropsies, in a dose of three or four table spoonfuls night and morning, but it is very uncertain in its operation. It dyes a good yellow, and the flowers curdle milk.

**ARTICHOKE, JERUSALEM**, *Helianthus tuberosus*, (class 19, order 3 ; P, co.) The name artichoke is given to it from the resemblance in flavour which the tubers possess to the bottoms of artichokes. Before the introduction of potatoes, this root was in high repute. In the reign of Charles I., Virginian potatoes (our common sort) were rare ; but Canadian potatoes (our Jerusalem artichokes) were in common use. They are used for a winter and spring dish.

BALM, (class 14, order 1; P, co.) *Melissa officinalis* with its sub-variety, Roman-hairy, are natives of the south of Europe, and introduced in 1573; and the heart-leaved, from Italy, in 1808. All these are medicinal. In its recent state, it has a sourish aromatic taste, and a pleasant smell of the lemon kind. It was formerly much esteemed in nervous diseases, and very generally recommended in melancholic and hypochondrical affections. It affords a grateful diluent drink in fevers, and is used in the making of balm tea. For medicinal use, the herb should be cut before it flowers, as it is then more odorous.

BROOK-LIME, Speedwell, *Veronia*, *Beccabunga*, (class 2, order 1; P, ag.) is a native of rivulets in all parts of Britain, generally growing along with water-cress; the former have blue flowers, and the latter white. The young tops are used like water-cresses for a salad, being milder and more succulent, and only slightly bitter in taste. They need not be cultivated, at least in a garden, for a very little attention will procure an ample supply in any stream, where they grow naturally.

It was formerly considered of much use in several diseases, and was applied externally to wounds and ulcers; but if it has any peculiar efficacy, it is to be derived from its antiscorbutic virtues. As a mild refrigerant juice, it is preferred where an acrimonious state of the fluids prevails, indicated by purient eruptions upon the skin, or in what has been called the hot scurvy. To derive much advantage from it, the juice ought to be taken in large quantities, or the fresh plant eaten as food.

CHIVE, (class 6, order 1; P, r.m.) is a native of Britain, growing in meadow pastures. A small bed, or row of it is sufficient for any family. The young tops are cut and mixed with salads in spring. The peasantry make a favourite dish of them, chopped small, and mixed with oatmeal into a sort of pudding. They are also used in seasonings to omelets, soups, &c.

CHAMOMILE, *Anthemis nobilis*, (class 19, order 2; P, co.) is a native of Britain, found in gravelly pastures. There are two varieties cultivated, the single and double flowering. The former, like all other single flowers, are the best for medicinal purposes; but the latter are most generally cultivated, as they afford a greater weight and quantity. They are useful in domestic medicine, and ought to have a

place in all gardens, where they may either form a bed, or be planted for edgings, for which they are well adapted.

Both the leaves and flowers of this plant have a strong though not ungrateful smell, and a very bitter, nauseous taste; but the latter are the more bitter, and considerably more aromatic. They possess tonic and stomachic qualities, and are much employed to restore tone to the stomach and intestines, and as a pleasant and cheap bitter. They have been long successfully used for the cure of intermittents, as well as of fevers of the irregular nervous kind, accompanied with visceral obstructions. The flowers have been found useful in hysterical affections, flatulent or spasmodic colics, and dysentery; but, from their laxative quality, Dr. Cullen tells us, they proved hurtful in diarrhoeas. A simple infusion is frequently taken to excite vomiting, or for promoting the operations of emetics. Both leaves and flowers are used externally.

ELECAMPANE, *Corvisartia Helenium*, (class 19, order 2, P, co.) is a native of Britain, grown in moist meadows, It was formerly in great repute, and cultivated in almost all the village-gardens throughout Europe. It is, however, seldom cultivated at this time, except as a flowering-plant in the borders, but it still holds its place as a medical plant of alexipharmick virtues, and for which it was probably so generally cultivated. The root, which is the part employed medicinally, in its recent state, has a weaker and less grateful smell than when thoroughly dried, and kept for a length of time, by which it is greatly improved, its odour then approaching to that of Florentine orris.

ESCHALOT, ASKALON, or SHALLOT, (class 6, order 1; P, r.m.) is a native of Palestine, and introduced in 1548. Its roots are much used in culinary preparations, in the manner of onions and garlic.

GARLIC, (class 6, order 1; P, co.) is a native of Sicily, Greece, the south of France, and also of Egypt, and was well known to the Egyptians long before the departure of the Israelites. It has been cultivated here since 1548. It is not very generally used in British cookery, at least in substance, but its flavour is communicated by steeping the cloves, as the bulbs are called, for a short time in the dish, and then withdrawing them. It enters more generally into French and Italian cookery than into ours. It possesses medicinal virtues, for which it is cultivated. The cloves of

garlic are by some bruised, and applied to the wrists, to cure agues, and to the bend of the gum, to cure toothache. When held in the hand, they are said to relieve hiccough; when beat with common oil into a poultice, they resolve sluggish humours; and, if laid on the navels of children, they are supposed to kill worms in the intestines.

**HERB-PATIENCE**, *Rumex Patentia*, (class 6, order 3; P, *co.*) is a native of Italy, and introduced in 1573. Formerly, this plant was cultivated as a spinach. It is now neglected, according to the opinion of Mr Neil, on account of the proper mode of using it not being generally known. It is much used in Sweden, as spinach. The root of this plant, and that of the *Rumex Alpinus* (Alpine dock), according to Professor Murray, is supposed to possess the virtues of rhubarb, but in an inferior degree. It is obviously more astringent than rhubarb, but comes very far short of its purgative virtue.

**HORSE-RANISH**, *Scurvy Grass*, (class 15; P, *s.l.*) is a native of England, growing in watery places, but more generally near villages, and in the vicinity of gardens. It has long been cultivated in our gardens, and is an article of profit to the market-gardeners. The roots lose all their acrimony by drying, first becoming sweet, and then almost insipid. If kept among sand, in a cellar or other such place, the roots retain their acrimony for a long time. The root of this plant only is employed, and it affords one of the most pungent substances of this order (*Siliculosa*); and therefore proves a powerful stimulant, whether externally or internally employed. Externally, it readily inflames the skin, and proves a rubefacient that may be employed with advantage in palsy and rheumatism, and if its application be long continued it produces blisters. Internally, it may be so managed as to relieve hoarseness by acting on the fauces. Received into the stomach, it stimulates and promotes digestion; and therefore is properly employed as a condiment with our animal food. If it be infused in water, and a portion of this infusion be taken with a large portion of warm water, it readily proves emetic, and may either be employed by itself to excite vomiting, or to assist the operation of other emetics. Infused in water, and taken into the stomach, it stimulates the nervous system, and is thereby useful in palsy; and, if employed in large quantity, it becomes heating to the whole body, and thereby proves

often useful in chronic rheumatism, whether arising from scurvy or other causes.

The medicinal qualities of horse-radish, like that of other siliqueous plants, carried into the blood-vessels, passes readily into the kidneys, and proves a powerful diuretic, and is thereby useful in dropsy; and we need not say that in this manner, by promoting both urine and perspiration, it has been long known as one of the most powerful antiscorbutics.

Two excellent modes of cultivating horse-radish have lately been described in the Horticultural Transactions, by Knight, a nursery-man, and Judd, a gardener. Both agree in trenching the soil to a considerable depth, and putting the manure at the bottom of the trench; but Knight plants the sets on the surface, and calculates on the root, that strikes down to the dung, for produce. Judd, on the other hand, makes holes quite to the bottom of his trenched soil, and in each drops a set, filling up the hole with wood-ashes, rotten tan, or sand, calculating for produce on the shoot made from the set at the bottom of the hole up through the sand or ashes to the surface. Judd's mode is the most ingenious, and appears the best, but either will do extremely well. A moist soil increases the bitter and alkaline flavour of this and all the *Cruciferae*. Make cuttings of the roots and inch or two long; the tops or crowns are best. February, or early in March is the season for planting them.

Hyssop, from the Hebrew name *ezob*, and is the same in Gaelic, (class 14, order 1; P. *co.*) is a native of the south of Europe, and introduced in 1548. This is not the byssop of the ancients. The leaves are sometimes used as a pot-herb, but their principal use is in medicine. Three varieties are cultivated, differing only in the colour of their flowers, which are red, white, and blue. The blue is the original colour, and is most cultivated. Hyssop is esteemed as an aromatic and stimulant, but is chiefly employed as a pectoral, and has long been thought useful in humoral asthmas, coughs, and catarrhal affections: for this purpose an infusion of the leaves, sweetened with boney or sugar, is recommended to be drunk as tea.

LAVENDER, (class 14, order 1; P. *s.l.*) is a native of the south of Europe, and introduced in 1568. It is seldom or never used in domestic cookery; but is found in every garden, in which it is cultivated for its fragrant spikes, which are either dried, and kept in bags or small bundles, or dis-

tilled, and becomes then the well-known lavender water of the shops. For this latter purpose, it is cultivated to a considerable extent, particularly at Mitcham, in Surrey, and Maidenhead, in Berkshire. The flowers are cut in dry weather when they begin to blow.

**LIQUORICE**, (class 17, order 4; *r.m.* and *s.p.*) There are three species cultivated: the common smooth, from the south of Europe, in 1562; the roughest, from Siberia, in 1795; and the hairy, from the Levant, in 1739. The planting and growing of liquorice began about the beginning of the reign of Elizabeth. It is only cultivated on a small scale in the gardens, but on an extensive scale in the fields for the use of brewers and druggists.

The root of the common smooth contains a great quantity of saccharine matter, joined with some portion of mucilage, and hence it has a viscid sweet taste. It is in common use as a pectoral, or emollient, in catarrhal defluxions of the breast, coughs, hoarseness, &c. Infusions, or the extract made from it, which is called Spanish liquorice, affords likewise very commodious vehicles for the exhibition of other medicines; the liquorice taste concealing that of unpalatable drugs more effectually than syrups or any of the sweets of the saccharine kind.

**MINT**, *Mentha*, (class 14, order 1; *P. co.*).—There are several species of mint cultivated:

The *Mentha viridis*, spearmint, is the most generally used in culinary preparations, being an ingredient in salads, and imparting a flavour to several dishes, such as peas, salads, &c.

The *Mentha pulegium*, pennyroyal, is used in different branches of cookery, and in medicine.

The *Mentha piperita*, peppermint, is less used as a culinary herb, but is more used as making tea and for distillation, for which the other two are also cultivated.

The stomachic, antispasmodic, and carminative properties of peppermint, render it useful in flatulent colics hysterical affections, retchings, and other dyspeptic symptoms, acting as a cordial, and often producing an immediate relief. Its officinal preparations are an essential oil, a simple water, and a spirit.

**POTATO**, *solanum tuberosum*, (class 5, order 1).—This invaluable vegetable is a native of Peru, in South America, and was introduced 244 years ago, having been brought

from Ireland to Lancashire, where it was sooner and more successfully cultivated than in any other part of Britain. The tubers of the potato, as a human food, if equalled, are not surpassed, by those of any other plant. Some tubers, said to be of the wild potato, have been received from elevated places in the tropical regions, or from the more temperate districts of the western coasts of South America, by the Horticultural Society of London, and cultivated by them. Their produce differs very little, if at all, from that of the common cultivated sorts; they are small, roundish, and pink and white coloured. To England the potato found its way from North America, having been brought from Virginia by the colonists sent out by the ill-fated Sir Walter Raleigh in 1548, who returned in July 1596, and probably brought with them the potato: Gerarde, in his Herbal, published in 1597, gives a figure of the potato under the name of the potato of Virginia, whence, he says, he received the roots; and this appellation it appears to have retained, in order to distinguish it from the Battatas or sweet potato (*convolvus battatus*), till the year 1640, if not longer. The sweet potato was used in England as a delicacy long before the introduction of our potatoes; it was imported in considerable quantities from Spain and the Canaries, and was supposed to possess the power of restoring decayed vigour. The kissing comfits of Falstaff, and other confections of imaginary qualities with which our ancestors were duped, were principally made of these, and of eringo roots. Gough says, the potato was first planted by Sir Walter Raleigh on his estate of Youghall, near Cork, and that they were soon after carried into Lancashire. Gerarde and Parkinson, however, mention them as delicacies for the confectioner, and not as common food. Even so late as Bradley's time, they are spoken of as inferior to skirrets or radishes. It was not till 1745-6, that the potato was introduced into the Higblands by the followers of Prince Charles. I have been told by an aged farmer, that the use of it was not much known so late as 1760. He and another boy were then herding together, and they got into an adjoining field, in which a few potatoes were growing in a sort of lazy-bed,—dug up some tubers with their staves,—and, with no other preparation than a rub in their plaids, ate them till their gums bled, and were little better pleased with their repast than was Sir W. Raleigh's gardener, who

made the first trial upon the plumbs or apples, as the eatable part. Now, throughout the land of mountains and of glens, and the remotest isles, the potato is cultivated with skill, and with even better success than in the Carse of Gowrie, for there is neither curl nor other disease known among them; which clearly shows that by planting over-ripe tubers, and clay ground, are the chief causes of the curl and failure. The other diseases which affect the potato, are decay, caused by planting over-ripe tubers in too hot dung, or, in other words, too high a temperature; and a small maggot, which attacks the sets in the drills, the ravages of which can be easily prevented by dusting the cuttings all over with a mixture of sixteen parts of powdered lime, two parts of soot, and one part of flour of sulphur, previous to planting. In the year 1816, the potato crops in the East Highlands of Perthshire were overtaken by the frost, before the tubers were half-grown, and consequently were of bad quality for eating; but proved excellent seed. The potato is not a native of Britain; therefore, like every exotic, it degenerates by long culture, unless new varieties be raised from seed, or fresh tubers be obtained from its native country. In a clay soil, change the seed every second year; not so often in a black or gravelly soil. Bog-mould or moss, well dried, is the most natural soil to potatoes, and most other American plants. In every case the seed should be procured from cold late districts. The turnip is a native of Britain, and will, on the other hand, improve by long and skilful culture. Indeed, no root hitherto discovered is so well adapted for universal use as the tubers of the potato; for having no peculiarity of taste, and consisting chiefly of starch, the farina is nearly the same as that of grain. Hence, with the flour of potatoes, puddings, and such preparations as do not call the gluten of wheat flour into action, may be made, equal to that of millet or rice; also excellent bread with a moderate proportion of good wheat flour. Potato-starch, independently of its use in the laundry, and as a hair powder, is considered an equally delicate food as sago or arrow-root. As starch and sugar are so nearly allied that the former is easily converted into the latter, the potato yields a spirit equal to that of malt by distillation, and a wine or beer by the fermentative process. New varieties are readily procured by sowing the seeds, which, with care, will produce tubers the

third, year, and a full crop the fourth. As few of the early sorts produce blossoms, to procure seeds from them, deprive the plant of its tubers as they appear, and keep the runners from which they proceed above ground, by not earthing up the plant, and blossoms and seeds will soon be produced. This, Sir A. Knight completely proved, and the rationale is developed in the Philosophical Transactions for 1806. It appears that the same sap gives existence both to the tuber and blossom, and that whenever a plant of the potato affords either seed or blossoms, a diminution of the crop of tubers, or an increased expenditure of the richness of the soil, must necessarily take place. This led Sir A. Knight to attempt the practice adopted by the Dutch florists with their bulbous flowers, viz. to pinch off the flowers to strengthen the bulbs. This, in the potato, the late Sir A. Knight thought might add an ounce in weight to the tubers of each plant, or considerably above a ton per acre. The practice is now general among scientific cultivators even in field culture. The culture of the potato, both in field and garden, is universally known. It may be forced in pots, or on dung or tan beds; and for this purpose, using sets from tubers that have been retarded a year in an icehouse, or cold place, is found a great advantage. Thus, in planting in December 1841, use tubers of 1840. These from the long period of repose which they have had, will be found highly excitable by heat, and of much more rapid growth than sets of the preceding crop. As matter of curiosity, boxes, containing alternate layers of light earth and potatoes of the last season but one, may be placed in any dry covered place, free from frost, in November, and they will produce a brood of young tubers in contact with the old ones on the December following, without either leaves, roots, or runners.

Potatoes are best preserved by burying in pits in dry ground, so deep as to be under the influence of surface temperature. They cannot be stored up too dry. At a certain depth (five or six feet), they will keep for years without vegetation. Where there is an ice-house, they may, when taken out of the pits, be kept in small quantities in it till wanted for use. The varieties of the potato are very numerous, differing in earliness, lateness, form, size, colour, and quality. The names for these are quite arbitrary or local. In general, every district has its peculiar or favourite

varieties. Some of these degenerate on removing from an early warm climate to a colder, and others improve when removed to a warm from a cold climate. The following are good sorts for garden culture:—Royal dwarf potato may be mentioned among the first; early dwarf ash-leaf potato; New Windsor ditto ditto; Swat's first early ditto ditto, which are dwarfs; early frame potato; round Dupplin ditto; Taylor's fold ditto; and the early white American potato. The last four sorts are not dwarfish. Potato-roots grow six, eight, or ten inches under the surface; and, by their size and numbers, divide and pulverize the soil better than can be done by the plough. Whatever be the natural colour of the soil, it is black when a potato crop is taken up,—consequently they are an excellent preparation for a wheat crop.

*Preservation of the Potato.*—Potatoes at the depth of one foot in the ground, produce shoots near the end of spring; at the depth of two feet they appear in the middle of summer; at three feet of depth they are very short, and never come to the surface; and between three and five feet they cease to vegetate. In consequence of observing these effects, several parcels of potatoes were buried in a garden at the depth of three feet and a half, and were not removed till after an interval of one or two years. They were then found without any appearance of germination, and possessing their original freshness, firmness, goodness, and taste.

*RUE, Rula graveolens.* (class 10, order 1.) is a native of the south of Europe, and cultivated here since 1552. It is used as a medicinal herb, but never in the kitchen. It is supposed to have derived the name of rue from *rue*, to repent. It was called the herb of grace, from the circumstance of its being used by the priests for sprinkling holy water among the people.

It is, doubtless, a powerful stimulant, and is considered, like other medicines of the fetid kind, as possessing attenuating, deobstruent, and antispasmodic powers. The dose of the leaves is from fifteen grains to two scruples.

*ROSEMARY*, (class 2, order 1.) is a native of the south of Europe, and cultivated here since 1548. It is seldom used in domestic cookery, but is used in medicine and distillation. It is reckoned one of the most powerful of those plants which stimulate and corroborate the nervous system. It has therefore been recommended in various affections sup-

posed to proceed from debility, or defective excitement of the brain and nerves, as in certain headaches, deafness, giddiness, and in some hysterical and dyspeptic symptoms. The official preparations of rosemary are: an essential oil, from their leaves or from the herb in flower; a conserve of the flowers, and a spirit formerly called Hungary water, from the flowery tops. The tops are also used in the compound spirit of lavender, and soap liniment.

RHUBARB (class 11, order 2; P. co. and r.m.):—Several species are cultivated in our gardens, principally for the foot stalks of their leaves, which are used in tarts and pies. Rhubarb has only of late years been cultivated as a culinary vegetable, but so great is the present demand for it that it is supposed there are above 100 acres in the neighbourhood of London under this crop; and Mr Wilmot, of Isleworth, sends it to Covent-Garden market by a waggon-load at a time.

The *Rheum palmatum* is a native of Tartary, and was long supposed to be the rhubarb, but Mr David Don, librarian to the Linnæan Society, has lately shown that the *Rheum Emodi* (now Austral) of Dr Wallich, is the medicinal plant. The *Rheum palmatum* having hitherto been the supposed species, this has been attempted to be cultivated in this country for the supply of our druggists, but not with that success which could be wished for so useful and safe a medicine. The Duke of Atholl, some years ago, at the suggestion of the late Dr Hope of Edinburgh, carried the cultivation of this plant to a considerable extent, and his benevolent design was attended with considerable success. The roots, which he cultivated in light sandy soil, similar to that of the Tartarian desert, grew to a considerable size, many of them were found to weigh 50 lbs., and to be equal in smell, taste, and effect, to those which we import at a considerable national expense. On being dried, they were found to shrink to one fourth of their original weight. There is great reason to believe, that the rhubarb of this country is superior to that of foreign growth, the latter being gathered at all seasons, on account of the Mongall bunters, on their route, drawing up the roots indiscriminately, piercing them at one end, and slinging them on their belts; then leaving them to dry in their tents without farther care. The scheme was ultimately abandoned by the Duke of Atholl; and, we believe, has not since been attempted to any extent by any one else. It was introduced in 1758.

The names of the culinary species are, the wavy-leaved, nodding-flowered, Siberian, windowed, hybrid, Caspian, curled, and Austrian; and the medicinal species are, Rha-pontic, palmated, compact, Tartarian, and the Austral or southern, which last was introduced from Nepal, in 1823. Its flower is purple, all the rest are white. There is a new kind mentioned in the Quarterly Journal of Agriculture, which is very remarkable on account of its productiveness, it is called the scarlet Gollah.

The qualities of this root are that of a gentle laxative, and so gentle that it is often inconvenient, on account of the bulk of the dose required. When given in a large dose, it will occasion some griping, as other laxatives do; but it is hardly ever heating to the system, or shows the other effects of the more drastic purgatives. The purgative quality is accompanied with a bitterness, which is often useful in restoring the tone of the stomach after it has been lost; and, for the most part, its bitterness makes it sit better on the stomach than many other purgatives do. Its operation joins well with neutral laxatives, and both together operate in a lesser dose than either of them would singly. Some degree of stypticity is always evident in this medicine: and as this quality acts when that of the purgative has ceased, so in cases of diarrhœa, when any evacuation is proper, rhubarb has been considered as the most proper remedy to be employed. It must, however, be remarked, that in many cases of diarrhœa, no further evacuation than what is occasioned by the disease is necessary or proper. The use of rhubarb, in substance, for keeping the belly regular, for which it is frequently employed, is by no means proper, as the astringent quality is ready to undo what the purgative has done; but it is found that the purpose mentioned may be obtained by it, if the rhubarb is chewed in the mouth, and no more is swallowed than what the saliva has dissolved. And it must be remarked, that in this way employed it is very useful to dyspeptic persons. Analogous to this, is the use of rhubarb in solution, in which it appears to me that the astringent quality is not so largely extracted as to operate so powerfully as when the rhubarb was employed in substance.

The officinal preparations of this drug are, a watery and a vinous infusion, a simple and a compound tincture. It is an ingredient in different stomachic elixirs.—*Med. Dic.*

SAGE, SALVIA (*Salvus*, safe medical qualities) belongs to the second class and first order, Diandria Monogynia; and natural arrangement, order Labiatae: Corolla ringent, filaments stalked crosswise, seeds naked. This is an extensive genus, and very ornamental. Many of the species are of recent introduction into Britain. I have read of sage some years ago, probably in the Gardeners' Magazine; how the natives in the south of Europe, where the plant grows wild plentifully, gather the leaves, dry them, and take them to China, and exchange them there for tea. The Chinese will give 4 lbs. of their best tea for every pound of sage leaves, and say they wonder the Europeans would go so far for tea, when they have better tea of their own. Ever since, sage has become an aromatic, wholesome, and favourite beverage with me, and many others. My manner of using it is, two parts of sage, and one part of tea, for infusion. I use *S. officinalis*, or common garden sage, of which there are many varieties, differing in the size, form, and colour of the leaves. The Chinese use it as a tonic for debility of the stomach, and strengthening the nervous system, and prefer it for those purposes to their own tea. In cookery it is used for sauces, and stuffing for luscious meats. *S. grandiflora* is preferred for making tea, it is also indigenous to the south of Europe, and of recent introduction to Britain. *S. pomifera* produces protuberances as big as oak galls, occasioned, like them, by the puncture of an insect. In the Isle of Crete, *S. officinalis* has the same sort of excrescences, and they carry them to market under the name of sage-apples. *S. verbenaca* is a native of Britain, and very aromatic. A mneilage is produced from its seeds, which, put under the eye lids for a few moments, envelopes any sand or dust there; and brings it out; and hence the name of *officinalis Christi*, clear eye, or clary. The flowers of *S. glutinosa* are used in Holland to give a flavour to the Rhenish wines. *S. sclarea* has a very strong scent, and was formerly used in medicine. A wine is made from the herb, or flower, boiled with sugar, which has a flavour not unlike Frontignac: *S. Indica* is a magnificent species, but rather tender in severe winters. *S. formosa* and *S. splendens* are very ornamental. All the species thrive in light soil, somewhat rich, and are readily propagated by seeds, cuttings, and dividing the roots. It is a remarkable fact, that the essential

oil contains camphor, which exists in such quantities in sage and lavender, that it has been supposed that the separating of it might become an article of commerce. In ancient times, sage was celebrated as a remedy of great efficacy, as would appear from the following lines of the school of Salerno:—

Cur moriatur homo, cui salvia crescit in horto ?

Cootra vim mortis, non est medicacoecio hortis.

Salvia salvatrix, naturæ enciliatrix.

Salvia cum ruta faciunt tibi pocula tula.

It has a fragrant, strong smell, and a warm, bitterish, aromatic taste, like other plants containing an essential oil. It has a remarkable property in resisting the putrefaction of animal substances, and is in frequent use among the Chinese as a tonic in the form of tea.

Doctors differ in opinion. The *Manse Garden* gives the following judgment: "Sage, one of the trash tribe, a perfect abomination, good for nothing, used by fools for stuffing ducks who feed for apoplexy."

**SORREL**, (class 6, order 3; P, *co.*)—There are several species cultivated; and of them some slight varieties, differing in the succulency of their leaves, which is their principal merit.

The *Rumex Acetosus*, or garden sorrel, is a native of our meadows and pastures; has long been in cultivation, and is used in soups, salads, and sauces, and very generally on the Continent as spinach. The leaves of this plant are sour, but not the root, which is bitter.

The *Rumex Scutatus*, or French, Roman, or round-leaved sorrel is a native of France and Italy, and cultivated here since 1596. It is used for the same purposes as the last.

**FANSEY**, (class 19, order 2; P, *co.*) is a native of many places in Britain; growing wild by road-sides and borders of fields. The young shoots and leaves are used to give flavour to puddings, &c.

Considered as a medicine, it is a moderately warm bitter, accompanied with a strong and not very disagreeable flavour. Some physicians have held a high opinion of it in hysteric disorders; particularly those proceeding from a deficiency or suppression of the uterine purgation. The leaves and seeds have been in considerable esteem as anthelmintics, or destroying worms in the stomach and intestines. An infusion of it, & weak as tea, has been strongly recommended

a preventative of the return of gout. The two culinary species are the common and the curled tansy.

TARRAGON, WORMWOOD, (class 19, order 2; P. *co.*) is a native of the south of Europe, and cultivated here since 1548. It is used as a pickle, and for fish-sauce. In France, it is employed, on account of its agreeable pungency, to correct the coldness of salad herbs. It is also put into soups, and other compositions. Every one knows the excellent and refreshing flavour communicated to vinegar by it.

*Artemisia Absinthium*, common wormwood.—This perennial has a yellow flower, being a native of Britain; and grows about rubbish, rocks, and sides of roads. The leaves of wormwood have a strong disagreeable smell, their taste is nauseous, and so intensely bitter as to be proverbial. The flowers are more aromatic, and less bitter than the leaves; and the roots possess an aromatic warmth without bitterness. This species of wormwood may be considered the principal of the herbaceous bitters. About London, it is cultivated for medicinal use. Its active constituents are, bitter, extractive, and essential oil. It is used in stomach complaints, and is of great service to hypochondriacs. It is also employed in intermittent fevers, hectic and hydrophic affections, in jaundice, and against worms. The herb is used in antiseptic fomentations; and macerated in water, it is applied to bruises to prevent swelling and discoloration. Many persons cannot suffer the disagreeable smell of wormwood, which is apt to occasion headache; but it may be freed from it in a great measure by decoction. The extract is a pure and simple bitter. The essential oil is of a dark green colour, and contains the whole flavour of the plant. It is stimulating, and is supposed to be a powerful antispasmodic and anthelmintic. Wormwood was formerly much used for the preparation of medicated wines and ales.

Externally, wormwood is used in discutient and antiseptic fomentations. This plant may be taken in powder, but it is more commonly preferred in infusions.

THYME.—(Thymus, Thymos, courage, smell reviving)—belongs to the class and order 14 and 1st *Didynamia Gymnospermia*, and natural arrangement *Labiatae*. *T. Vulgaris*, a native of the south of Europe, and has been cultivated in this country since 1548. It is a well known fragrant plant, and cultivated in all culinary gardens.

There are three varieties of the common thyme, viz., the common narrow-leaved, and broad-leaved, which is less common, and the variegated-leaved, which is grown for ornament. *T. Serpyllum*, wild thyme, a native of Britain, is fragrant, and yields an essential oil that is very heating. It has the same essential qualities as garden thyme, but the flavour is milder and rather more grateful. Its essential oil is both smaller in quantity and less acrid, and its spirituous extract comes greatly short of the penetrating warmth and pungency of the other. It is a common notion that the flesh of sheep that feed upon aromatic plants, particularly wild thyme, is superior in flavour to other mutton. The truth is, that sheep do not crop these aromatic plants, unless now and then by accident, or when they are first turned on hungry to downs, heaths, or commons; but the soil and situations favourable to aromatic plants produce a short sweet pasturage best adapted to feeding sheep, which nature designed for mountains, and not for turnip grounds and rich meadows. The attachment of bees to this and other aromatic plants is well known. Few plants are subject to more variety than wild thyme. In its most natural state, on dry exposed grounds, it is small and procumbent; but when it grows among furze or other plants, it runs up with a slender stalk to a foot or more in height. It differs also very much in the smoothness or hairiness of its leaves. The flowers are sometimes larger than ordinary, and of a paler purple colour, or even white.

*T. Vulgaris* has the aromatic qualities common to lavender, sage, rosemary, and other *Verticillatæ*. It yields a species of camphor in distillation with water. In Spain they infuse it in the pickle with which they preserve their olives. Before the oriental spices were common, it was much used in cookery.

Its virtues are said to be resolvent, emmenagogue, tonic, and stomachic; yet there is no disease mentioned in which its use is particularly recommended by any writer on the *Materia Medica*.

WOOD SORREL, *Oxalis acetosella*, (class 10, order 4; *P. co.*)—The only culinary sort of the whole tribe, which contains nearly an 100 different species. It is a native of Britain, growing in almost all woods, particularly birch, and appearing very early in spring. The leaves, which

are heart-shaped, are an agreeable salad, either alone or added to other salad herbs; and they communicate an agreeable flavour when boiled along with greens. This plant is sometimes called *lujula*, corrupted or contracted from *Allelujah*, praise the Lord; so called from its many virtues. The leaves stand three together on one stalk. It flowers in April and May, which are white, grounded with pink, are very pretty, and only three inches high.

The *acetosella* is totally inodorous, but has a grateful acid taste, on which account it is used in salads. Its taste is more agreeable than common sorrel, and approaches nearly to that of lemons, or the acid of tartar, with which it corresponds in a great measure in its medicinal effects, being esteemed refrigerant, antiscorbutic and diuretic. It is recommended by Bergius, in inflammatory, bilious, and putrid fevers. The principal use, however, of the *acetosella* is to allay inordinate heat, and quench thirst; for this purpose a pleasant whey may be formed, by boiling the plant in milk, which, under certain circumstances, may be preferable to the conserve directed by the London College, though an extremely grateful and very useful medicine.

Many have employed the root of *lugula*, probably on account of its beautiful red colour, rather than for its superior efficacy. A salt is prepared from this plant, known by the name of essential salt of lemons, which is an acidulous oxalite of potassa, and commonly used for taking iron-moulds and ink-stains out of linen. What is sold under the name of essential salt of lemons, in this country, is said to consist of cream of tartar with the addition of a small quantity of sulphuric acid. The leaves of wood sorrel, when employed externally in the form of poultices, are powerful suppurants, particularly in indolent scrofulous humours.

# A TABLE

SHewing THE

## QUANTITY OF SEED OR NUMBER OF ROOTS

NECESSARY

TO SOW OR PLANT IN ANY GIVEN SPACE.

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[It may be proper here to remark, that a three feet wide bed will contain five drills, nine inches asunder; and that a four feet bed contains seven drills, eight inches apart, which distance is the most convenient for onions, lettuce, kale plants, &c.; and the four feet bed will contain five drills, which distance is convenient for carrots, turnips, beet, parsnip, &c. The beds require from one foot to fourteen inches of an alley between bed and bed.]

1. *Alisanders*, or *Alexanders*.—The seed is sold by weight; and if sown to transplant for a bed, three feet and a-half wide by six feet long, half an ounce will suffice: if sown to remain in a drill, forty-eight feet long, an ounce will be requisite.

2. *Angelica*.—An ounce of seed will be requisite to sow a bed, from which the plants will afterwards be transplanted, of twenty-four feet square.

3. *Artichoke*.—For a row at two feet apart, and four plants in each patch, of twenty feet in length, forty plants will be necessary.

4. *Artichoke, Jerusalem*.—For a row of one hundred and twenty feet in length, the roots being placed at two feet apart, half a peck, or sixty roots, will be sufficient.

5. *Asparagus*.—If sown to transplant, one quart of seed will sow a bed of thirty square feet. If sown to remain for a bed, four feet and a half wide by thirty feet in length, one pint is necessary. If plants a year old, a bed four feet and a half by thirty feet in length, to contain four rows, nine inches distant in the row, one hundred and sixty plants will be required.

6. *Anise*.—One bed of twelve square feet will be sufficient for any family, for which half an ounce of seed is enough.

7. *Basil*.—A quarter of an ounce will sow a seed-bed of four feet square, and, when transplanted, fill a bed of forty-eight square feet.

8. *Beans*.—For early crops, one pint of seed will be requisite for every eighty feet of row; for principal crops, two quarts for every two hundred and forty feet of row; and for late crops, the same as for early.

9. *Beans, French or Kidney*.—For every eighty feet of row, the beans being at two inches and a half or three inches apart, half a pint will be sufficient.

10. *Beet, Red*.—For every fifty feet of drill, one ounce is requisite.

11. *Beet, White*.—The same quantity as the last, and so of the other sorts.

12. *Borage*.—For a bed of twenty-four feet square, an ounce of seed is plenty.

13. *Burnet*.—Half an ounce of seed will sow a bed of twelve square feet.

14. *Brocoli*.—Half an ounce will sow a bed of forty square feet.

15. *Borecole*.—All the sorts of these kales may be sown in the same proportion as the last.

16. *Brussels Sprouts*.—One ounce will sow a seed-bed of forty square feet.

17. *Cabbage*.—One ounce will sow a bed of forty square feet of the early sorts; for the more luxuriant sorts, one ounce will sow a seed-bed of sixty square feet.

18. *Capsicum*.—A small paper, the produce of two pods of each sort, will be plenty for most families.

19. *Cardoon*.—For a trench of thirty feet in length, an ounce of seed is plenty.

20. *Caraway*.—A quarter of an ounce is sufficient to sow a bed of twenty feet square.

21. *Carrot*.—For a bed one hundred and twenty feet square, if sown broad cast, one ounce will be requisite, and the same quantity for every hundred and fifty feet of drill-row.

22. *Cauliflower*.—In the same proportions as broccoli and cabbage.

23. *Celery*.—For a seed-bed of forty square feet, half an ounce is sufficient.

24. *Celeriac*.—A quarter of an ounce is plenty for a bed four feet square.

25. *Chervil*.—A quarter of an ounce is sufficient to sow a bed sixteen feet square.

26. *Clary*.—A small bed, of about four feet square will be sufficient for most families, for which a quarter of an ounce of seed will suffice.

27. *Coriander*.—Half an ounce will sow a bed of twenty-four feet square.

28. *Corn-salad*.—A quarter of an ounce is sufficient for a bed twenty-four feet square.

29. *Cress, Garden*.—One ounce, or one-eighth of a pint, will sow a bed of sixteen square feet.

30. *Cress, American, or Black American*.—If sown in drills, for every ten feet allow a quarter of an ounce.

31. *Cress, Winter*.—The same proportion as the last.

32. *Cress, Curled, or Normandy*.—Same as last.

33. *Cress, Indian*.—One ounce will sow twenty-five feet of drill.

34. *Cucumber*.—From six to twelve seeds in each pot.

35. *Dill*.—Half an ounce of seed is plenty for a bed twelve feet square.

36. *Endive*.—For a seed-bed of forty square feet, half an ounce is sufficient.

37. *Egg-plant*.—A small paper, the produce of two fruits, will be plenty to sow in most gardens.

38. *Fennel*.—Half an ounce is sufficient for a seed-bed of twenty-four square feet.

39. *Finochio*, a variety of the former.—The same proportion of seed as the last.

40. *Gourds*.—From four to eight seeds of each variety, in separate pots, will be plenty for most families—excepting the vegetable marrow, where it is used, from twelve to twenty seeds will afford a supply.

41. *Kidney-bean*.—See *Beans*.

42. *Leeks*.—One ounce is sufficient for a bed of thirty feet square.

43. *Lettuce*.—The seeds of lettuce require room. A quarter of an ounce is sufficient to sow a bed of forty square feet, and will produce upwards of four hundred plants.

44. *Love-apple*.—A small paper of seed is sufficient for most gardens, or the produce of one or two fruits.

45. *Marjoram*.—For a seed-bed of nine square feet, a quarter of an ounce is seed sufficient.

46. *Marigold*.—A bed of sixteen square feet will require a quarter of an ounce of seed.

47. *Melon*.—From four to eight seeds in each pot, of No. 48 size; or double that number may be sown, if there be doubts of the goodness of the seeds.

48. *Mustard*.—Sow in the same proportion as for garden-cress.

49. *Nasturtium*.—See *Indian-cress*.

50. *Onion*.—For every forty square feet, allow one ounce of seed.

51. *Parsley*.—An ounce of seed will sow a drill fifty feet long.

52. *Parsley, Hamburgh*.—May be sown in the same proportion as the last.

53. *Parsnip*.—Half an ounce of seed is usually sown on a bed of one hundred square feet.

54. *Peas*.—For the small early kinds, one pint will sow a row of twenty yards in length; for the principal sowings of large sorts, the same quantity will sow thirty-three yards.

55. *Pompion*.—See *Gourds*.

56. *Potatoes*.—For a plot of the early and secondary crops, eight feet wide by sixteen in length, planted in rows fifteen inches apart, and nine inches in the row, a quarter of a peck of roots or cuttings. For principal crops, a compartment twelve feet wide by thirty-two in length, planted in rows two feet distant, and twelve inches in the row, half a peck of roots will be required.

57. *Purslane*.—One-eighth of an ounce will sow a bed of sixteen square feet.

58. *Radish*.—For each sort, a bed of fifty feet square, two ounces of seed will be required.

59. *Rompion*.—It is not much used; and as the seeds are very small, one-eighth of an ounce will sow a bed of twenty square feet.

60. *Rape*.—Sow in rather less proportion than for garden-*cress*.

61. *Savory, Summer*.—A small paper, containing one-eighth of an ounce, will be sufficient for an ordinary-sized family.

62. *Salsafy*.—One ounce of seed is sufficient for thirty feet of drill.

63. *Scorzonera*.—Same as last.

64. *Skirret*.—Same as last.

65. *Savoy*.—Same proportion as cabbage, broccoli, &c.

66. *Sea-kale*.—Two ounces will sow a seed-bed of thirty-six square feet; or, in drills, the same quantity will sow forty feet in length.

67. *Spinach*.—Two ounces will sow a bed of one hundred and twenty square feet, if sown broad-cast; but if sown in drills, one ounce will sow the same space.

68. *Spinach, New Zealand*.—Thirty or forty seeds will produce enough for an ordinary family.

69. *Spinach, Mountain or Orache*.—One ounce will sow a bed of sixty square feet.

70. *Spinach, Wild*.—Half an ounce will sow a bed of forty square feet, and will be sufficient for an ordinary-sized family.

71. *Succory, or Wild Endive*.—Sow in the same proportion as for *Endive*.

72. *Turnip*.—Half an ounce will sow every hundred square feet.

A T A B L E  
 OF  
 THE DIFFERENT CULINARY VEGETABLES,  
 WITH THE  
 TIME OF SOWING, PLANTING, AND MODE  
 OF PROPAGATION.

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| Plants. &c.          | No. of<br>crops. | Time of sowing<br>or planting. | Mode of<br>propagation: |
|----------------------|------------------|--------------------------------|-------------------------|
| Alexander .....      | 2 ...            | March, August .....            | Seed.                   |
| Artichoke .....      | 1 ...            | March or April .....           | Suckers.                |
| Asparagus .....      | 1 ...            | March or April .....           | Seed or plants.         |
| forced .....         | ...              | October to February..          | Plants.                 |
| Balm .....           | 1 ...            | March or April .....           | Offsets, shoots, &c     |
| Basil .....          | 1 ...            | March or April .....           | Seed.                   |
| Beans, early .....   | 5 ...            | From Oct. to July ...          | Seed.                   |
| late .....           | 4 ...            | April or July .....            | Seed.                   |
| Beets .....          | 1 ...            | February or April ...          | Seed.                   |
| Borecole or kale ... | 3 ...            | March, April, June...          | Seed.                   |
| Borage .....         | 1 ...            | February or March...           | Seed.                   |
| Broccoli .....       | 4 ...            | March to August .....          | Seed.                   |
| Burnet .....         | 1 ...            | March or April .....           | Seed and roots.         |
| Cabbages, early ...  | 1 ..             | August or Septemb...           | Seed.                   |
| late .....           | 4 ...            | Feb. Mar. May, June.           | Seed.                   |
| red .....            | 3 ...            | Feb. March, June....           | Seed.                   |
| savoy .....          | 2 ...            | March, May, June....           | Seed.                   |
| for cattle .....     | 3 ...            | May, June .....                | Seed.                   |
| for seed .....       | 1 ...            | October or Novemb...           | Seed.                   |
| Camomile .....       | 1 ...            | March or April .....           | Parting roots.          |
| Capsicum .....       | 1 ...            | March or April .....           | Seed.                   |
| Carrots .....        | 3 ...            | January to July .....          | Seed.                   |

| Plants, &c.            | No. of crops. | Time of sowing or planting. | Mode of propagation.               |
|------------------------|---------------|-----------------------------|------------------------------------|
| Cauliflower .....      | 4             | Aug. Feb. Mar. May...       | Seed.                              |
| Celery .....           | 5             | Feb. March to June...       | Seed.                              |
| Cardoons.....          | 1             | March or April .....        | Seed.                              |
| Chervil.....           | 2             | March, August.....          | Seed.                              |
| Chives .....           | 1             | March or April .....        | Parting roots.                     |
| Clary .....            | 1             | March or April .....        | Seed.                              |
| Coleseed .....         | 1             | June or July.....           | Seed.                              |
| Coleworts .....        | 2             | Feb. June, or July ....     | Seed.                              |
| Corn-salad ....        | 2             | March to August.....        | Seed.                              |
| Cress for seed .....   | 1             | March or April .....        | Seed.                              |
| for salad .....        |               | March to Sept.....          | Seed.                              |
| on hot-beds .....      |               | Oct. to March .....         | Seed.                              |
| Cucumbers .....        | 5             | Jan. to May .....           | Seed.                              |
| on hot-beds .....      | 3             | Jan. Feb. March .....       | Seed.                              |
| for hell-glasses .     | 1             | April .....                 | Seed.                              |
| on open ground .       | 1             | May or June .....           | Seed.                              |
| Dill .....             | 1             | March or April .....        | Seed.                              |
| Endive .....           | 4             | April to July .....         | Seed.                              |
| Fennel.....            | 2             | Feb. August .....           | Seed.                              |
| Finochio .....         | 4             | April to July .....         | Seed.                              |
| Garlic .....           | 2             | Feb. Sep. ....              | Offsets.                           |
| Horse-raddish .....    | 1             | Feb. or March .....         | Cutting of roots.                  |
| Hyssop .....           | 1             | March or April .....        | Seed or slips.                     |
| Jerus. artichokes... 1 | 1             | Feb. or March .....         | Roots.                             |
| Kidney-beans .....     | 5             | March to July .....         | Seed.                              |
| Lavender.....          | 1             | May or June .....           | Slips and cuttings                 |
| Leeks .....            | 1             | Feb. or March .....         | Seed.                              |
| Lettuces .....         | 7             | Feb. to August.....         | Seed.                              |
| Marjoram .....         | 2             | March, April .....          | Seed or roots.                     |
| Marigolds .....        | 1             | Feb. to April .....         | Seed.                              |
| Mint.....              | 1             | March or April .....        | { Roots, offsets,<br>and cuttings. |
| Mushrooms .....        | 2             | March, September ...        | Spawn.                             |
| Mustard, for seed.. 1  | 1             | March or April .....        | Seed.                              |
| for salad .....        |               | March to Septemb....        | Seed.                              |
| on hot-beds .....      |               | October to March....        | Seed.                              |
| Nasturtiums.....       | 1             | March or April .....        | Seed.                              |
| Ons., to draw young 4  | 4             | Jan. and April to Aug.      | Seed.                              |
| principal crop ... 1   | 1             | February or March ...       | Seed.                              |
| for seed .....         | 1             | February or March... 1      | Seed.                              |
| Welsh .....            | 2             | July, August.....           | Seed.                              |
| Parsley.....           | 3             | Feb. March, July.....       | Seed.                              |
| large rooted..... 2    | 2             | February, April .....       | Seed.                              |
| Parsnips.....          | 2             | Feb. March, or April.       | Seed.                              |
| Pens.....              | 5             | Oc. Jan. Feb. Jul. Aug.     | Seed.                              |

| Plants, &c.          | No. of crops. | Time of sowing or planting. | Mode of propagation.                                                |
|----------------------|---------------|-----------------------------|---------------------------------------------------------------------|
| Pennyroyal .....     | 1             | March or April .....        | Slips and roots.                                                    |
| Potatoes .....       | 3             | Feb. March, April.          | Cuttings of the roots & seeds: the latter to produce new varieties. |
| on hot-beds .....    | 1             | January or February         |                                                                     |
| Purslane .....       | 3             | March, April, May ...       | Seed.                                                               |
| Radishes .....       | 9             | Jan. to Aug. and Nov.       | Seed.                                                               |
| on hot-beds .....    | 2             | January, February ...       | Seed.                                                               |
| for salad .....      |               | March to Sept.....          | Seed.                                                               |
| for seed .....       | 1             | May .....                   | Seed.                                                               |
| Rampion .....        | 1             | March or April .....        | Seed.                                                               |
| Rape.....            | 1             | June or July.....           | Seed.                                                               |
| for salad .....      |               | March to Sept.....          | Seed.                                                               |
| Rocamboles .....     | 2             | February or Sept.....       | Offsets and cloves                                                  |
| Rosemary.....        | 1             | May or June.....            | Cuttings and slips                                                  |
| Rue .....            | 1             | March or April ....         | Slips, cuttings, and seed.                                          |
| Sage.....            | 1             | March or April .....        |                                                                     |
| Salsafy .....        | 1             | March or April .....        | Slips and cuttings                                                  |
| Salsafy .....        | 1             | March or April .....        | Seed.                                                               |
| Savory .....         | 1             | March or April .....        | Seed.                                                               |
| Scorzonera .....     | 1             | March or April .....        | Seed.                                                               |
| Skirrets .....       | 1             | March or April .....        | Seed.                                                               |
| Sorrel .....         | 2             | March, August.....          | Seed and parting roots.                                             |
| Spinach.....         | 6             | February to July .....      |                                                                     |
| winter .....         | 2             | July, Aug. or Sept....      | Seed.                                                               |
| Tansey .....         | 1             | March or Sept.....          | Parting roots.                                                      |
| Tarragon.....        | 1             | March or Sept.....          | Roots, cuttings, and slips.                                         |
| Thyme .....          | 1             | March or April .....        |                                                                     |
| Turnips .....        | 6             | March to August.....        | Roots, cuttings, and slips.                                         |
| for seed .....       | 1             | February .....              | Seed.                                                               |
| Turnip-cabbage ..... | 2             | May, June .....             | Seed.                                                               |
| Turnip-radish .....  | 2             | January to Sept.....        | Seed.                                                               |

THE  
FRUIT GARDEN.

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INTRODUCTION

TO

THE FRUIT GARDEN.

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Thus apple trees, whose trunks are strong to bear  
Their spreading boughs, exert themselves in air,  
Want no supply, but stand secure alone,  
Not trusting foreign forces but their own,  
Till with the ruddy freight the bending branches groan.

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NEXT in importance to the cultivation of culinary vegetables, is that of fruits. Fruits have attracted the attention of man from the earliest period, and are supposed to have been the first vegetable production on which he fixed as an article of food. Of all fruits cultivated, the apple and fig are the most ancient. The vine is next in order; the fruit of which not only served as food, but also as a beverage. The almond, vine, and pomegranate were cultivated in Canaan; and, with the addition of cucumbers and melons, were known to the Egyptians from time immemorial.

The cultivation of good fruit requires the utmost attention of the gardener. The introduction of a worthless culinary annual or perennial vegetable into a garden, is a loss comparatively trivial to the introduction of a worthless, or bad fruit tree; the one only disappoints us for a season, the other for a number of years. The one can be rectified, perhaps the same year, if not, the succeeding one; but the other requires many years to arrive at that perfection which will enable us to judge of its merits.

To the exertions of Knight, Braddick, and others, we are indebted for many of our best fruits, and not only for the improvement of our native sorts, but also for the introduction of several foreign kinds.

It is better to be content with a few really good kinds, such as will be productive in most seasons, than to plant many sorts (even of those which are reckoned the finer) for the sake of variety, of which a crop is only obtained once in three, five, or seven years.

We would recommend to all who have it in their power to propagate from seeds of approved sorts, particularly if they have been assisted in the process of cross-impregnation, by destroying carefully the pollen of one sort, and introducing that of another, as the most likely means of producing a variety participatory of the good properties of both; and, when the young plants are of sufficient strength, to plant them out in some favourable situation in the shrubbery, or otherwise, until they prove by their fruits whether they do or do not deserve a place in the garden. By judiciously arranging them in the shrubbery or arboratum, they will harmonise with the other trees, and, at certain seasons, produce an agreeable effect, either by their flowers or their fruit. Those which are likely, from their habit, to be approved of as distinct sorts, may be brought to fruit sooner by grafting, or budding them upon an established tree. It will happen, in most gardens, that a particular sort may have been planted by accident, the fruit of which will be of little value;

in such cases let this tree be fixed on for a stock on which to work any of the seedlings, that it may be desirous, from their appearance or other causes, to be proved, sooner than they would be by remaining on the seedling tree. By this method, a great many may be proved annually without the least inconvenience. The necessity of renewing fruit trees by seed, for the purpose of either renewing the identical sort, or endeavouring to procure a new or a better one, is obvious, as the various methods of propagation by grafting are, in no instance, a renewal of the sort; or, in other words, making a new or young tree, for the case is wholly different. Every tree so propagated, is no more than an extension of the parent tree, by part of it being made fast to another root by means of grafting. Every Ribston pippin in the kingdom, propagated by any other means than by seed, is no other than a part, a wing, or a branch, of the original Ribston, discovered at Ribston Hall, in Yorkshire, and such trees, it is supposed, do not only inherit the properties of the parent in size, shape, and flavour, but also the whole train of diseases with which the original may have been affected. This is an important consideration, and deserves the most serious attention, as we see many of our old and standard fruits fast hastening to decay. The late Sir A. Knight and others have discovered this in the Herefordshire orchards, in which many of the esteemed fruits, and which were really good one hundred years ago, are now scarcely as good as the wild apple in the hedges. Apples removed from one country to another, are sometimes materially improved by the removal; thus, the Balgone pippin, an esteemed Scotch apple, similar to the golden pippin, supposed to be nothing else than the golden pippin imported from England about the period when that apple was in its prime. The case is the same on the opposite side; the Ribston pippin, originally brought from England into Scotland, is here one of the finest fruits in the country, and deserves

a south wall in many places, much better than some of the inferior peaches; while on the other hand, when it was brought again into England, it is not to be compared to many even of the third rank of merit. Although the Hawthorndean may be an exception to this rule. It is an excellent Scotch kitchen-apple, and is the same in the south of England.

We observe in the lower order of vegetables, that change of place is necessary for them; a plant whose roots are prisoned within a pot, soon exhausts all the nutriment in the ball of earth that surrounds the root, and when that is the case it soon ceases to flourish; but if repotted, and fresh mould given it to live in, it soon shows the change by assuming its wonted luxuriance. Hence we see the necessity of choosing good soil, either naturally or artificially made, for our fruit trees.—*Practical Gardener.*

#### SITUATIONS AND SOILS FOR FRUIT TREES.

APPLES and PEARS are, in every way, desirable articles in the domestic economy of a family; they are readily obtained, are profitable to a greater or less extent, even at the present low prices, and the culture of the trees is susceptible of much improvement, in a way which can scarcely fail to become a source of much rational enjoyment and satisfaction.

With respect to the situation of public orchards, it should be rather elevated than low; as on a gentle declivity, inclining to the south, a free admission of the rays of the sun and air is obtained, which is requisite to dry up the damps, disperse the fogs, render the trees healthy, and give a fine flavour to the fruits. It should be likewise well sheltered from the east, north, and west winds, by plantations, if not naturally sheltered by hills or rising grounds. Many orchards are admirably situated by the sides of rivers, sheltered by the winding banks, and sloping to the south, east or west. Where plantations are necessary for shelter, they should neither be too high, nor too

near the orchard; as, when that is the case, they prevent a free circulation of air, which is of as much injury to the trees as if they were not guarded at all. The soil is of more importance, probably, to the welfare of the trees, than any particular shelter, excepting in very bleak and exposed places.

In those situations where fruit trees are observed to thrive, cultivation ought to be extended; and in those which are found from experience to be unfit for them, they should not be attempted—at least with the intention of making them a source of profit in trade. The majority of fruit trees will thrive in a loamy earth of a middling texture, providing it be on a wholesome substratum, and of a competent depth. We frequently meet with an excellent situation for an orchard, where the soil is various; where some is good and some very indifferent; in such cases we must either improve the bad soil, or in planting, suit the different kinds of fruit to the nature of the different soils contained in the intended orchard. It would be a fruitless task to plant where the bottom is not naturally dry, or capable of being made so by draining. Wet, heavy, stubborn soils, are to be avoided equally with soils which are of a light, sandy, sterile nature. The shining gravelly soils disagree very much with fruit trees, unless there be a good quantity of loam intermixed with them. On a soil rather shallow, and on a chalky bottom, they seldom succeed; and where the bottom is a cold spongy clay, they seldom thrive. But where such is the case, and other circumstances combining, the ground may be prepared by trenching and elevating the situations for the trees above the general level, which will in a great measure secure their roots for some time from penetrating into the noxious subsoil. When trees are planted in such situations, the roots may be prevented from extending to an unnecessary depth, by placing rough pavement under them, or laying a floor of brick, or forming one of clay and coal ashes, allowing both

to be pretty dry before the trees are planted. To each tree planted may be given three or four wheel-barrowsful of good surface-mould, which has been prepared for them for some months previous, by frequent turning and exposure to the atmosphere. Dung should be avoided in all cases, unless the soil be very poor indeed, and then it should be of the rottenest description, as nothing tends to produce canker and gum so much as strong dung, although we see it practised daily by many who, in other respects, are excellent fruit-growers.

Some years since, an article appeared in the British Farmers' Magazine (May, 1831, I believe), wherein the writer, Mr Reid of Lancashire, proposed to plant an acre of land with fruit trees, which were to stand in rows  $5\frac{1}{2}$  yards asunder, and 11 feet, tree from tree, apart in the row; the number would be 240 and the varieties recommended were 120 Hawthorndeans, 20 Keswick codlins, 20 Nonsuch, 20 Farmer's pippins, 20 French crops or Esther apples, 20 Ribston pippins, 20 Scarlet nonpariels. The cost of preparation, was estimated, including the trees, at about £12, and a table of returns from a plantation, was arranged in the fourth year after planting, exhibiting a return of £412. The Hawthorndean appears to have been extraordinarily prolific; and the following quotation will tend to confirm the fact:—"I believe £300 of £360, received for apples in 1827, was for Hawthorndeans, the remainder was received for gooseberries and currants. A piece of ground, containing perhaps less than an acre, which was occupied by Hawthorndeans, produced £80, besides growing an excellent crop of potatoes followed by turnips." The average price of the apples was stated to be only 4s. 6d. per bushel.

In regard to the season of planting, it may be performed with success at different periods, according to the nature of the land. The best time for planting dry soils is in October; but if in wet soils, the end of February or March is better. The chief principle in

this business is to suit the trees to the soil, and to plant them at proper distances from each other.

In providing trees to plant an orchard, it is well to choose them from some eminent fruit-tree grower, as less risk is run in being deceived in the sorts; and in making a selection, it is better to be content with fewer sorts, provided that they be good, than to introduce a number, and then to have to grub up one-half of them when they have arrived at maturity. It is of importance to choose them from a soil similar to that in which they are to be planted, or as near to it as can be obtained, but if it be a worse soil, so much the better. Trees are found to thrive best that have been grown on a poor soil, when they are removed to a better; and trees grown in a rich soil, when transplanted into a worse, seldom recover the change. Care should be taken to choose such as are, to all appearance, free of canker, or are not bruised or damaged. They ought to be chosen the summer before planting, and then carefully examined to see if they be affected with insects, which, if it be the case, they should by all means be rejected. It is always better to pay double price for clean healthy trees, than take those which are unhealthy even as a gift. If the orchard, which is generally the case, is to be ultimately pastured with cattle, choose standards having clear straight stems, 4 or 5 feet in height; the apples being wrought on crab-stocks and the pears on free-stocks, and commonly such as are one or two years from the graft. In this instance, the Herefordshire orchardists commit an error, by planting trees often five, six, or more years from the graft, expecting thereby to have them fruit sooner, and that they will not be so liable to be injured by cattle; but they would be more successful if they planted younger trees, and were at more trouble in protecting them. Care should also be taken, in taking them up, that their roots be not bruised nor twisted, and that they be carefully packed, if sent to a distance.

## PLANTING THE TREES.

In regard to the proper distance for planting the trees, it should be regulated by the natural growth or spreading of their branches when fully grown, as well as by the goodness of the soil. It was formerly the practice to have them planted in lines of not more than eight or ten yards apart, but latterly they have been justly planted at a greater distance. For tall standards from 30 to 45 feet is the distance given in most of the cider counties; but this ought to be regulated by the soil and sort of trees. If planted in a cold, bleak, exposed situation, and in a poor soil, where the trees are not expected to grow to a great size, 20 or 30 feet are sufficient; whereas in a good soil, and sheltered situation, a distance of 40 or 45 feet may not be too great.

Cherries and plums may be planted at from 20 to 30 feet, according to the soil, and the goodness or badness of the situation. But it is advisable, in the first planting, to plant four trees for one that is finally to remain at the above distances, planting the proper kinds at the distances as above mentioned, and then the temporary plants between them each way; which temporary plants should be some of the freely growing sorts, that fruit early, such as the white or Caswick codlin, white Hawthorndean apples, May-duke cherries, and Crawford and other early fruiting pears; or any of Knight's new and improved varieties, that will fruit as early, if not earlier, than those just mentioned. These should be considered and treated as temporary plants from the beginning, and must give place to the principal trees, as they advance in growth, by being pruned away by degrees, and at last grubbed up entirely. In bleak and exposed situations, there can be no objection to introduce a few forest trees judiciously among the fruit trees, to shelter and nurse them up; the forest trees to be cut away as the others get up, and ultimately taken away altogether. In this operation, choose those which are of most rapid

growth, such as poplars, plane, &c.; round the boundary of the orchard, Scotch geans, a small sort of hardy cherry, filberts and other nuts, quinces, service trees, &c. should be planted; and to these, walnuts and chesnuts should be added: they will of themselves form a good shelter, and will by their fruits pay well for the ground which they occupy. Medlars, mulberries, &c. should be added to the other fruit trees in the orchard, and all sorts of fruit that will ripen upon standards. In the process of planting, at whatever season of the year, and in whatever soil, care should be taken to have a sufficient quantity of puddle made, by pouring an adequate quantity of water upon the ground, and by stirring it about so as to make a puddle of rather a thick consistency, through which gently draw the roots of the trees, two or three times or as often as necessary, until they be covered well with puddle. This will be of much service to them, and will not only keep the roots moist, but will greatly encourage the emitting of young roots immediately after planting. Where this is not done, the same end will be obtained by giving a supply of water to the roots, as the mould is put about them in the process of planting. As soon as the trees are planted, they should be prevented from being blown about by the wind, by being supported by proper stakes or other props, for where this is not attended to, much injury is done to the young tender fibres; the ground is also opened by the stem pressing the mould away on all sides, thus leaving a hole, by which, in the first place, too much wet penetrates to the roots of the tree, and the frost succeeding, freezes the whole into a solid mass; its expansive power tears and lacerates the roots, and in spring they will immediately be destroyed by the sharp drying winds. More trees, both fruit and forest, are destroyed by not paying sufficient attention to this point, than by any other cause whatever. Great care, however, must be taken in staking up the trees to prevent rubbing, for the friction pro-

duced by the tree rubbing against the prop will soon lacerate and bruise the bark, canker follows, and the tree is ruined. To guard against this evil, a piece of mat or a small bundle of soft hay should be introduced between the stem of the tree and its prop, and the whole tied together with a piece of oakum or tarred cord, taking care not to tie the cord too tight, which would prevent the stem from swelling. In situations where hares or rabbits are likely to get in to injure the trees, care must be taken to protect them from their attacks. Many modes have been adopted to preserve the stems of trees from these animals, but the most effectual and surest method is to clothe the stems with an envelope of moss, short grass, or litter, wound round with shreds of matting or rope-yarn; this not only protects them from hares, but is of great use the first year after planting, to keep the bark moist, and thereby aid the ascent and circulation of the sap in the alburnum. This operation should be performed immediately after planting, and left on till by decay it drops off of itself: it is of singular service in late planting, or when, from unforeseen circumstances, summer planting is necessary. When this envelope drops off, and exposes the stems again to their attacks, let it be a rule, before the approach of winter, to bush them round with thorns, which will, if properly effected, preserve and not injure them; or they may be again bound round with hay bands, from the surface as high as the animals can reach; this, if properly put on, will remain two years. In a few years the trees will be sufficiently proof against them, unless in very severe weather, in which case the stems and twigs of young apple-trees must be anointed with a solution of soot and cows' water, made to the consistency of cream, and laid on with a hair-besom or brush, and if rain falls soon after, before it has had time to dry, the operation must be repeated, this will save the trees from hares and rabbits for a season. The first summer after planting, the young trees should be oc-

asionally supplied with water according to circumstances; and this should be administered with a bountiful hand. In order to prevent as little of the water being wasted as possible, make a basin or hollow round the stem of each tree, which will contain the water until it soaks down to the roots. Fill this basin with littery dung to the thickness of four, five, or six inches, and to prevent its being blown about, cover it with a little mould. This nourishes the young roots, by preventing the drought from penetrating to their injury. It is also of consequence to cover the ground round the roots with long littery dung or fern, in order to prevent the frost from reaching the roots, during the first winter after planting, that is if they have been planted in autumn; after the first year this need not be done. In planting all sorts of trees, particularly fruit-trees, great care should be taken not to plant them at too great a depth. In good soils it is injurious to them, as it buries their roots so deep, as to be beyond the rays of heat, and induces them to go deeper for that nourishment which they can only find near the surface. Almost all roots are disposed to run to a certain degree horizontally, and if planted too deep, they can never approach near enough the surface, where their nourishment is prepared for them. In bad soils, it is better to plant upon the surface, or nearly so, and gather the mould round into a hill, which, by being increased as the tree advances in growth, will materially promote its welfare, by supplying it with fresh nourishment as the roots diverge from the centre. In planting extensive orchards, there can be no objection to cultivate the ground between the rows of trees; care being taken, for the first years of their growth, that no injury be done them by the plough or spade. Such crops as potatoes and turnips will rather benefit the trees than otherwise; the operation of preparing the ground for such crops will ameliorate the soil, and tend to improve the trees: the trees should not be planted promiscuously;

those of high lofty habits should be planted upon the elevated spots, or be planted by themselves, to form a sort of back ground, and the less lofty sorts in the middle, while the lowest of all should occupy the front.

The trees when planted in this manner will have a fine effect when grown up; but if they be planted promiscuously, they will not appear so agreeable to the eye, independently of which the smaller trees will be shaded by the larger ones, which will not only injure them, but spoil the flavour of the fruit. The trees, where cattle are allowed to pasture, should be protected from their browsing, or rubbing against their stems, particularly when young, by placing a triangular fence round each tree, and a few branches of thorn through their upper rails.

#### THE PRIVATE ORCHARD OR FRUIT-GARDEN.

In choosing the situation, in providing shelter, and improving the soil if it be necessary, more attention is required than in the orchard already described. There, only such trees will be introduced as are known to bring their fruits to perfection without having recourse to artificial means; but in the fruit-garden the case is different, here, the finest and more tender fruits will be planted, many of which will require great skill and attention from the cultivator to bring them to any degree of perfection, and therefore we should be more particular in choosing a proper situation and soil. The distance that the trees should be planted from each other must depend on the size of the ground, the sorts of trees planted, whether standard, dwarfs, or espaliers, the latter of which, though not commonly planted in orchards, deserves to be more particularly encouraged. Maiden plants, or such as are from two to three years from the graft or bud, should be preferred to older trees. The distance at which standard trees should be planted need not be more than from 20 to 30 feet. Dwarfs will require

less, for as they will not be allowed that scope, as in public orchards, less room will be sufficient for them. Espaliers may be planted on iron or wooden trellices or railings, of from four to eight feet in height, and the trees should stand according to their kinds and mode of training. Apples, 18 or 20 feet, if fan-trained, and from that distance to 30 feet if horizontally-trained; the latter is probably a better plan for low walls or espaliers; cherries from 12 to 15; pears from 20 to 30; and plums from 15 to 20; planting the spaces between each with currants, gooseberries, or raspberries, as a temporary crop to be cut away as the trees extend their branches. The same should be done between the standards, if dwarf standards. In the rows should be planted, between each tree intended permanently to remain, such sorts of fruits as will come into bearing sooner than some of the more choice kinds;—such apples as the white Hawthorndean, and white codlin; such pears as the Crawford or Lammas, with some of the new varieties; May-duke cherries, Orleans plums, and suchlike; and if required, gooseberries and currants, or raspberries.

In planting espaliers in an orchard, choice should be made of that part which is the most sheltered from cutting winds, and most exposed to the rays of the sun, as espaliers are substitutes for walls, and which they do so far resemble, that trees are regularly trained upon them, and thereby fully exposed to the light and heat of the sun, consequently are less liable to be injured by winds than standards. The fruits ripened upon espaliers are supposed to be intermediate in quality between those ripened upon walls and standards; but to obtain this effect, they should always run from east to west, and may be extended the whole length of the orchard or fruit-garden, or run in lines parallel to each other at the distance of 15 feet, so that the shadow of the one will not fall on the surface of the other. Espalier-rails are either constructed of wood or iron, and are of different forms.

Those of wood are in most general use, and so far as we know, are better than iron ones. The simplest kind, and which are much used in Scotland, is merely a straight row of stakes, driven into the ground at nine or twelve inches asunder, and from four to five feet in height, and joined and kept in a straight line at the top by a rail of wood, or thin plate of iron, through which a nail is driven at the top into the centre of each stake. If the wood used be larch, from trees cut out of the plantations in the process of thinning, the bark scraped off, and the ends being charred sunk in the ground, they will last for six or eight years, and often longer, and are perhaps the best sort of espalier-rail used, as the expense is trifling, and every purpose is attained that can possibly be by such as are put up at a great expense, and will be out of repair in much the same time. Larch or other wood, with the bark left on, will last longer, but it has not so neat an appearance, as the bark, after a time, will come off in pieces.

#### SELECTING TREES FOR THE FRUIT-GARDEN AND PLANTING.

As has been already noticed, a selection of good fruits is better than a long catalogue of names, the merits of which are not properly known. Future success depends upon a good selection, and the natural situation and soil are of too much importance to be overlooked. Such sorts should be selected as are known for their merits, either for early ripening, fine flavour, long keeping, or other properties, which may be considered as most useful to the owner. A certain portion of all, which are possessed of these properties should be planted, but a smaller proportion of the first sort. In the list of fruits given in this work, notice will be taken of the seasons in which they ripen, and the length of time that they will keep, and from them a proper selection should be made. According to the instructions given in the article of

public orchards, care should be taken to procure the trees from some eminent fruit-grower, as being less likely to meet with disappointment. Another important consideration is to have healthy trees, free from all appearance of canker, gum, insects, &c.; for this purpose, where it is found convenient, the selection should be made in summer, when most of their faults are more easily detected. It is a dangerous thing to introduce a tree infected with certain diseases, particularly such as are of the infectious sorts. It not only destroys the tree itself, but probably spreads over all the garden. As prevention is always better than cure, it is better to avoid planting a tree under suspicious appearances. Presuming that the ground has been properly trenched, drained, and previously ameliorated, proceed at the proper seasons, either in November,—for soils of a light description, or for soils of a strong and rather damp texture, in February or March,—to plant the various sorts of trees, as has been directed in a former part of the work.

In situations where, from a variety of circumstances, it may be found inconvenient or impossible to devote a separate piece of ground for a fruit-garden, then the usual mode of introducing them into the culinary garden must be adopted. There are many excellent examples of fruit-trees having been introduced either as espaliers planted along the sides of the walks, or as dwarf or half-standards, either along the sides of the walks, or in rows through the middle of the quarters. In both cases, they generally do well, for the ground having been previously made for the culinary vegetables, is generally pretty good for fruit-trees. Some give the preference to dwarf standards, some to espaliers, and others recommend a variety of stiff and unnatural forms of training, such as spiral-dwarfs, fusiform, conical, and concave or cup-shaped dwarfs. However fascinating these plans may appear, they are, like most of the French and Dutch modes of training, radically bad, and certain of defeating the

object in view, namely, that of having fine fruit and healthy trees.

Espaliers, if well trained, either fan-formed, or, which is more common, although less natural, horizontally formed, have a good effect in a kitchen-garden, and, by being planted from three to three and a half, or four feet from the walks, according to the size of the garden, will form an agreeable hedge or blind, by which the interior of the garden is concealed. The narrow borders may be planted, according to fancy, either with flowers or strawberries; or dwarf-standards, or Buzzelars, may be planted along the sides of the walks with pretty good effect, if well kept, and produce a great quantity of fruit in most seasons. Tall standard-trees should never be admitted into a small garden, as casting too great a shade; neither should espaliers be above four or five feet high, nor dwarf-standards too thickly planted, nor be allowed to attain too great a height. From six to eight feet may be taken for the extreme height. In gardens of larger extent, the espalier trees may be allowed from six to eight feet in height, but six feet will always have a better effect than if extended to a greater height.

The planting dwarf-standards, which are the best adapted to the soil and climate of North Britain, at least in most situations, observe the following directions by Mr Towers, an English writer of many valuable papers on Horticulture in the Quarterly Journal of Agriculture: If orchardists intend to plant the exact number of trees which will permanently furnish the orchard, the rows should be set 10 feet asunder, the trees to stand 10 feet apart in the rows, in quincuncial or alternate order, so that every tree of one row be placed exactly opposite the centre of the space between two trees of the rows on each side of it. In planting, all the roots should be so arranged as to take nearly a horizontal direction, about six or eight inches below the surface of the soil, and to prevent

them from sending down any perpendicular or tap roots. The second principle requires that the finely pulverized soil embrace, and be in very close contact with every portion of the roots. To secure the proper direction of the roots, every tree must be deprived of those which tap, leaving those only that extend horizontally, nearly at right angles with the ascending stem. The ground must be previously marked out, digging holes, the centres of which should be accurately determined. Each hole should be so deep as to permit the roots to lie four or five inches below the ground level, and of width sufficient to receive the entire tier without cramping or any degree of pressure. Any roots that are bruised, cut off the injured part. As each tree is placed in the middle of its hole, fine earth is to be sprinkled over every part of the roots, and when enough has been added to support the tree in its upright position, a little shaking or gentle lifting of the stem will cause the mould to trinkle among the roots. Soft pond or rain water should be poured forcibly over the whole space occupied by the roots, more than once during planting. As frosty weather approaches, littery manure may be laid around every tree to the depth of four inches, extending beyond the basin of mould. If a second orchard be intended, the trees may be planted at half the before-mentioned distance, &c.

#### FORMATION OF BORDERS FOR FRUIT-TREES.

As the best sorts of fruit capable of coming to perfection in this climate are all reserved for the walls of gardens, and indeed the principal object in building walls round gardens is really intended for the production of fruits, which without them would not ripen in this uncertain and variable climate, and as fences of less expensive materials would answer every purpose of protection and shelter obtained from walls, the preparation of the borders next the walls should be attended to with more attention than is generally

bestowed upon them. As our chief object is to produce fine fruit, we must first produce fine trees, and fine trees cannot be obtained in a soil not calculated for their growth.

Many vegetables will do very well in 15 or 18 inches of soil, but wall-fruits will not thrive long in soil less than two feet deep, if a yard deep, so much the better. Therefore, if the borders be not made from two to three feet deep, and from 12 to 15 feet broad, of good earth, and be laid dry and comfortable, we need not look for much success.

Apples, apricots, cherries, and figs, will do well in such a soil as this: three-fourths light loam, or sandy earth, and one-fourth strong loam or clayey earth. But peaches, pears, and plums require a stronger body of soil in order to have them in perfection,—viz. three-fourth strong loam, and one-fourth light loam, or sandy earth. The depth for the first class should be 30 inches, and for the second class a yard on the average, at the least if it be wished to have them produce their fruit in high perfection, and thrive for a long series of years.

Generally speaking, the soil for fruit trees should be moderately manured with the cooler dungs; such as that of cows or hogs, vegetable earth as above noticed, with the addition of a small proportion of lime, chalk, or marl. These, with the compost as specified above, should be well incorporated previous to planting. If the subsoil be wet and cankering, let the fruit-border be cleared out its whole length, to the depth and breadth before-mentioned. Lay the bottom in a sloping manner from the wall to the walk, giving it a fall of six or eight inches. Run a drain along by the junction of the border and walk, a few inches lower than the bottom thus formed, which shall be capable of completely draining off both under and surface water. It may be a rubble or a box drain, according to necessity.

Now, lay over the bottom thus formed and smoothed,

two inches of good earth—if loamy, so much the better—which pulverize, and pass the roller over; then an inch of clean pit or river gravel, which also pass the roller over; another inch of earth, as above, roll also; and, lastly, an inch of gravel, also as above. This should be done with the materials in a dry state, but now moisten the whole moderately with a watering-pot, and roll until the surface acquires a hard, shining consistency. Keep rolling and watering alternately, till the whole becomes firm, glazed, and till the earth and gravel be intimately mixed and incorporated. Thus may a bed be formed for the roots of fruit trees, much superior to that of stone or brick, and at expense infinitely less, of a nature more kindly, and which no root will penetrate. The compost-earth should now be thrown in, having been previously laid up in a ridge along the outer edge of the border, before the floor thus made gets damaged by wet or other accidents; and care must be taken that at no future period it be disturbed in digging or trenching the border.

#### ASPECTS FOR FRUIT TREES UPON WALLS AND ESPALIERS,

*With the distances at which they should be planted.*

A south or principal aspect should be occupied with figs, peaches, nectarines, the finer sorts of pears, and a few cherries, plums, and apricots. According to the late W. Nicoll, the following are the distances at which the different kinds of fruit trees may be planted on garden-walls, taking the medium height at 12 feet, and varying the distance accordingly; that is, for a low wall the more distant, and for a high wall the less:—Apples, 18 or 20 feet; apricots, 20 to 24; figs, 15 to 18; cherries, 12 or 15; nectarines and peaches, 12 or 15; pears 24 to 30; and plums, 18 to 20 feet.

For espaliers, or low walls of five or six feet:—Apples, 30; cherries, 20; pears, 30 to 35; and plums, 20 to 24 feet.

Abercrombie, upon the same subject, remarks, that upon walls of the above-mentioned heights, peaches and nectarines should be planted at from 15 to 20 feet apart; figs, 18 to 20, or more, as the bearing-branches are not to be shortened; apricots, 15 for the early sorts, and 18 to 24 for the later and freely-growing kinds; cherries, from 15 to 20; pears, from 20 to 24; apples, on dwarf stocks, 15, and if on free stocks, 30; plums, 15 to 35; mulberries, 15 to 20. Upon walls, he adds, of only nine feet in height, the distance from each tree should be increased one-fourth; and upon those only six feet high, the distance should be increased one-half; and so forth.

In planting the trees upon the wall, the root-end of the stem may be kept from four to nine inches from the foot of the wall for room to swell, and the point of grafting above the ground in every case.

#### PRUNING FRUIT TREES.

The art of pruning chiefly consists in being acquainted with the nature of bearing in the different sorts of trees, and in forming an early judgment of their habits and manner of producing their shoots and branches, as well as other circumstances, for which some rules may be given; but there are particular instances, of which it is impossible to decide but on the spot, and which depend chiefly on practice and observation. No rules can be laid down that are equally applicable to all trees or all situations. The objects of pruning are various; such as promoting growth and bulk, the renewal of decayed plants and trees, modifying the form, enlarging the fruit, promoting the formation of fruit-buds, lessening the bulk of the trees, adjusting the branches to the roots, and the removal or cure of diseases, &c.

### HEADING DOWN AND PRUNING DWARF APPLE AND PEAR TREES.

The point of grafting ought not to be more than six inches above the ground, and the shoot or shoots should ascend or branch out from that point. Suppose then, that only one erect shoot, nearly one yard long, be produced, then it will be necessary to cut back that shoot to the length of six inches above its origin, by which means three or four of the eyes remaining will be excited to send forth as many new shoots. If the tree has two branches, it is not so eligible as one with three or four branches, but is more fitted to become an espalier tree than an open dwarf. Trees with three or four shoots, well and regularly produced, are valuable: they may be so shortened by sloping cuts, made one half or a third of an inch above, and in the direction of a bud, so as to leave the shoot from six to twelve inches long, according to its strength, the weaker to be more curtailed than the stronger, because, by inducing the latter to break a great number of its buds, its strength may be more equally divided, and thus produce a true balance to the members of the tree.

Every tree should have a single main stem, from six to nine inches long, above the surface of the soil, and this stem ought to be that of the stock. The scion may branch off just above its insertion, but the few inches of clear stem tends much to add figure to the tree, and to facilitate the future operations of clearing, weeding, hoeing or light digging, and enriching the surface-soil.

The objects of pruning are, to produce a tree with a regular open head, the branches of which radiate as nearly as the habits of the tree permit from a central stem, obliquely ascending at a certain angle till they nearly meet the branches of the neighbouring trees.

The height of the trees should not exceed six or seven feet, and each branch ought to be covered with

fruitful spurs throughout its entire extent ; thus great productiveness will be effectually provided in a comparatively short period.

In respect to the form of the dwarf, and the proper regularity of a well balanced head, if this be effected at first, there will be no difficulty in keeping it so afterwards, by observing either to prune to that bud immediately on the inside, next to the centre of the tree, or that immediately on the outside. By this means, viewing it from the centre, the branches will be produced in a perpendicular line from the leaders ; whereas, if pruned on the right or left side of the branch, the young shoot will be produced in the same direction, so that if the branches formed round a circle be not thus pruned to the eyes on the right and left successively, a very material difference will be found, and the regularity of the tree will be destroyed in one single year's pruning. Those remarks apply not only to the leading buds, but those annual spring or late winter prunings which every principal branch will require till it attain the intended height, and the neglecting of which, would speedily fill the tree with useless ill-placed wood-shoots. It is in the scientific arrangement of these laterals, that the production of a majority of the fruit-bearing spurs depends.

#### PRUNING AND TRAINING APPLES AND PEARS ON WALLS AND ESPALIERS.

These sorts of trees being similar in their manner of bearing, that is, producing their fruit on short stubs or spurs, which issue chiefly from the sides, though sometimes from the ends of the branches, one mode of treatment in respect to pruning and training will answer both. On walls of more than six feet in height, fan training is to be preferred to horizontal training ; that is, spreading the branches out like a fan, fully-extended, instead of carrying a principal stem upright, and laying the branches from it in a horizontal direction on either side. Because, by the first method, a tree

can be made to fill its allotted space sooner by half the time, and the loss of a branch can be supplied with greater facility, at any period of its age than by the last method. But for trees on very low walls, or espaliers, the horizontal method may be practised with greater propriety, as they cannot be trained so handsomely on such, in the fan manner, as on higher walls.

The distance at which the principal branches should be laid in, is from nine to twelve inches, according to the nature of the tree, some growing more gross, both in wood and leaves, than others. Trees that have arrived at a full bearing state, and have filled the spaces allotted to them, require nothing further in respect to pruning, than to regulate their spurs, if much clustered, and to prune away the superfluous breast-shoots made in summer, if this has not already been done. Most kinds of pears make longer spurs than apples do, and they are also apt to grow more clustered, particularly in old trees. These should, therefore, be carefully thinned out; cutting away all the fore-right-stubs, on which there are none but wood-buds; retaining the fruit-buds only, more especially such as lie nearest to the wall. Apples often show fruit-buds on the bottom part of the breast shoots, shortened in summer; in which case, if the tree be thin of fruit-spurs, they should be retained, the better to insure a crop.

Some kinds of pears also produce fruit-buds in this manner, particularly in good seasons, and, of course, under similar circumstances, they ought to be retained; but otherwise, let them be cut clean off, that a profusion of useless breast-shoots may be prevented from rising next summer.

Trees that are still in training, and have not yet filled their spaces, require a different treatment. Their principal and leading shoots require to be shortened, as has been directed for young standards, in order to make them put out others to fill the wall or rail. This shortening must be in proportion to the strength of the shoots;

that is, strong shoots may be shortened one-third of their length; weak shoots, one-half, or two-thirds; and very weak ones should be cut in to the second or third bud. This operation will cause them to put out plenty of branches in spring, out of which a necessary number may be retained whereof to form the tree.

But, remember the side branches of horizontally-trained trees (that is, those whose side-branches are laid level on the right and left of the main stem) must on no account be shortened, except in the case of accidental bruises, or other misfortunes; but must be extended at full length until the tree has filled its place. The upright or leading shoot only is to be shortened; and that in order to make it put out lateral branches. If this leading shoot be strong, it may be headed back to 18 or 20 inches; but if weak, to 9 or 10 only. The necessity for this precision is, that a weak stem will only put out one pair of laterals, and a new leader. Hence the reason why a tree trained in this manner is so much longer in filling its place, than one trained in the fan manner, as noticed above.

Some kinds of pears, no doubt, if in very rich soil, will, while in a young and vigorous state, push out three pairs of laterals; and if this be expected, from the apparent strength of the tree, the stem may be headed at 30 or 36 inches, instead of 18 or 20, as above directed.

In pruning at this season, as well as at all others, it is of importance to keep a strict eye on the lower parts of the trees, whether they be young trees training, or old and fully-established ones, in order to see if there be any existing vacancy, or any probability of such soon happening. In which cases, if any good shoot be situated contiguously, it should be trained in either at full length, or shortened to a few eyes to force out as many shoots as may seem necessary; for due precaution should ever be observed in taking care to have a sufficient stock of young wood coming forward to fill up any vacancy that may occur, and for substituting a new set

of branches for such as are either decayed or stand in need of retrenchment. As the operation of pruning goes on, it is necessary to have the branches again, as soon as possible, re-nailed or tied to the wall or the espalier, taking particular care to train them in with great regularity. If horizontally, lay them in parallel to each other at equal distances throughout; and, if fan-trained, lay them in straight, allowing them greater space as they extend to the extremity of the trees, laying the principal branches first, and the smaller ones regularly between them, avoiding crossing any of them, and observing to make the opposite branches on each side range equally in the same manner and position.

The season for pruning old-planted and hardy trees extends from the leaf falling to the spring; but let the frost be mostly over before you prune the maiden and tender, and before the sap rise, otherwise the frost will penetrate the wounds and make a sore. But newly planted and grafted standards, when likely to be injured by high winds, should be cut down a little, and, at spring, cut off those pieces left clean, as before noticed.

At the end of March, or early in April, the trees that were planted in or about the preceding October should only now be headed down to four or five buds, as before-noted;—if a plant has two shoots, cut away the weaker, and treat the other as above. But if the plant is furnished with three shoots, which is much better for the horizontal mode of training, head down the middle one only, as above; if moderately strong, to 10 or 12 inches; if very stout, to four or five buds; and lay in the other two right and left, perfectly level.

Trees that are intended to be trained in the fan manner, having but one shoot, are to be headed down to four or five buds, if they be strong; and to three or four, if they be weak; in order that the wall or rail may be filled from the bottom. Those trees which have two or three shoots, may be headed down to four or five buds; from which, if they all flourish, a proper number are to be reserved for the formation of the tree. The newly-

planted trees, which are two or three years from the graft or bud, should now be well cut in; that is, the shoots of last year should be shortened back to a few buds on each, for the purpose of enabling them to push the stronger, and to produce shoots to fill the wall or rail from the bottom. Maiden trees, for standards or buzelars, should also be headed down; each shoot to from three to six buds, according to their strength.

WINTER PRUNING is the amputation of branches of trees, in order to repress too great growth, and to direct the sap to other branches. Of two adjoining and equal-sized branches of the same tree, if the one be cut off, that remaining will profit by the sap which would have nourished the other, and both the leaves and the fruits which it may produce will exceed their natural size. If part of a branch be cut off, which would have carried a number of fruits, those which remain will sit or fix better, and become larger. The objects of pruning them may be the promotion of growth and bulk, modifying form, promoting the formation of blossom buds, enlarging fruit, adjusting the stem and branches to the roots, renewal of decayed trees or plants, and removal or cure of diseases.

#### PRUNING AND TRAINING APRICOTS, CHERRIES, AND PLUMS.

Fan-training, for all these kinds, is to be preferred to horizontal training, even on low walls or espaliers, though in the latter way they are seldom planted, particularly apricots; but cherries and plums are found to do better as standards or buzelars. I shall, therefore, consider these trees as being trained in the former manner. The principal branches may be arranged at the distance of eight or nine inches, on a medium, according to their strength; taking as the extremes six and ten. Aged trees of all these kinds\* are apt to form their spurs in

\* I might here except Moor Park Apricot, and the Morella Cherry, which bear chiefly on the shoots of last year, and on close buds or spurs, formed on the second year-old wood. Those, particularly the latter, should be trained much in the same manner as Peaches,—which see further onwards.

large clusters, which in this case ought to be neatly thinned out; chiefly cutting away the plants farthest from the wall, and retaining those placed nearest to it, that the fruit produced on them may be benefitted by its influence. Spurs of apricots, in particular, and some of the finer sorts of plums, that are placed at a distance from the wall, although they may blossom very well, and even set their fruit, yet seldom ripen it; especially in a bad climate, or a bad season. If, therefore, the tree be in a healthy state, and if there be an appearance of plenty of fruit-buds on the shoots and branches of the last and former year, the extended spurs may be very much thinned away; as the fruit produced on such shoots as can be laid close to the wall will be much superior both as to size and flavour.

Along with the superfluous part of those clustered spurs, let the fore right shoots, and other spray of last summer, be cleared away, if that has not been done in autumn; observing always to cut close back to the old wood, and to make clean wounds, not ragging the edges of the bark. This latter precaution is more necessary in the pruning of stone than other fruits, on account of their aptness to gum and canker at every bruise.

If the use of the saw be necessary, from the strength of any branch to be lifted, or cut out, let the wound made by it be smoothed with the knife; and if, from the position of any such wound, it be apprehended that water may lodge, to the detriment of the tree, let it be laid over with a little tar, or any mild paint, preferring the former; observing to preserve the coating in a sound state, so as to exclude air and moisture, till the wound be perfectly whole and covered with fresh bark.

The leading shoots and branches of such trees as have not filled their spaces, and which are to be considered as yet in training, must be shortened, and otherwise treated much as directed above for apples and pears. But small shoots that abound with fruit-buds, and are well ripened to their extremities, may be laid in at full length. These may frequently be laid in between the

leading and other branches, there to remain as temporary, and only till they have ripened off their fruit. If any such were laid in last season, and still remain, let them now be cleared away. Season of winter pruning as above directed for apples and pears.

#### FIGS PRUNING.

The chief art in training the fig is, to keep every part of the rail full of young shoots; the plant naturally running into naked unsightly branches in the middle. Shoots, however, may be produced with facility by shortening. They also rise abundantly from the root, round the stem of the plant. Producing its fruit on the shoots of the preceding year, these, if well ripened and hardened by the sun, should not be shortened, but should be laid in at full length, and at the distance of 12 or 14 inches from each other.

When the tree arrives at a bearing state, the knife should be used with caution; for the more its branches are topped, a greater profusion of branches will follow in consequence; nor will such generally be fruitful, but soft and spongy. The most fruitful shoots of the fig are short jointed, round, and of little length in proportion to their thickness.

Season of pruning, February to April, according to the ripeness of the shoots.

#### TRAINING AND PRUNING NECTARINES AND PEACHES.

These trees ought to be trained in the fan manner only. It is not practicable to train them to any considerable extent horizontally, as they produce their fruit entirely on the shoots of last year; and because these often require to be shortened, and the older branches to be cut entirely away, in order to obtain a supply of young bearing wood. A peach tree, therefore, may be said to be always in training, inasmuch as there must be a constant cutting of old, and encouragement of young wood, in every part of the tree, even after it has filled

the space allotted to it. How near the older branches may be placed to each other is not very important. They may sometimes be pretty close, and sometimes more distant, according to the number and position of young shoots upon them. These, in a tolerably healthy and well regulated tree, should lie at the distance of five or six inches from each other. It is the regular management of the young shoots and branches, more than of the older ones, that produces health and beauty in a peach or nectarine tree; and which, in summer, exhibits a regularity of foliage, and in autumn, a display of handsome fruit, in every part of the tree, highly pleasing.

As said above, the young shoots of these trees often require to be shortened. This is to be understood of such as are hurt by frost, (not being fully ripened to their extremities,) bruises by accident, cankered or mildewed; and more particularly of those from which it is wished to produce a supply of other shoots, either to fill a vacancy, or for extension of the tree. Such as are strong and vigorous may generally be headed back one-third of their lengths; those less strong, one-half; and those very weak, back to two or three buds; observing always to cut at a wood-bud, which may be distinguished from a fruit-bud by its being long and flattish, the latter being short and turgid. On strong shoots, a wood-bud is frequently placed between two fruit-buds, and it is very proper to cut off such, generally cutting at half an inch above it.

In a tree extended to its full size, shortening of the young shoots is less necessary at or near to its extremities, unless hurt by frost, canker or mildew, than in the lower parts; because, the more we cut, the more the tree will grow; and as all trees naturally grow strongest at their extremities, it follows that we cut least there; and exercise the knife more freely in the lower and middle parts, in order to counteract this propensity, and obtain a regular supply of bearing shoots.

Unless for these reasons, the middle-sized, hard, and well ripened shoots that abound with fruit-buds, and

have a bold wood-bud at their extremities, need not be shortened, but may be laid in at full length. It often happens, on such, that there will be a wood-bud at the point, and only one or two at the lower end; the intermediate ones being all fruit-buds. It requires some care, therefore, to discriminate these, and some practice to know where to cut, if it were necessary to shorten such. To cut in the middle of the shoot would be useless, as no bud would push except that at the bottom; and although the fruit-buds might bloom, and the fruit might set, yet they would not ripen for want of nourishment, occasioned by the want of a leading shoot.

Generally speaking, it is not wrong to prune any kind of fruit tree, if we except the fig and the vine, at any day of the year.

It is customary to cover such tender trees as those in this climate on open walls, during winter with mats, broom, or spruce branches, in order to enable them the better to ripen their fruit in summer.

#### NAILING FRUIT TREES, AND DESTROYING INSECTS

At whatever season the operation of pruning is performed, whether in autumn, mid-winter, or spring, as soon as the trees are pruned they should be carefully replaced on the wall, if it be not intended to retard the buds, by keeping them detached, as long as is deemed necessary, from the wall.

Now train the trees neatly to the wall or trellis again. Old nails should never be used until they have been re-pointed; and if there be any suspicion of insects being on the trees or in the wall, the nails should be cleaned before using, which may be readily done by boiling them in water alone, or in a mixture of soap, sulphur, and tobacco. Use new shreds, which should be no broader nor longer than is necessary for the sort of tree intended to be nailed, and each size kept separate in the making, which will be found more convenient when they are to be used. Strong shoots of trees may be securely fastened to the wall with small pieces of tarred

cord, instead of shreds, being stronger and more durable, and not so liable to harbour insects. Observe to leave sufficient room in the shreds or ties; that is, as much as would admit of another shoot of equal size along with that laid in, provided it be one or two years old, vigorous, and healthy; and for the larger branches generally, as much room as will admit the finger easily besides the branch. In driving the nails, care should be taken to lay their heads, (which should never be broad) in a position sloping from the shoot, or branch, and above it, in order that it may not grow over them; and no more shreds and nails should be used than are absolutely necessary to keep each branch in its proper place.

The trees should, previous to nailing, be washed or anointed, both for the destruction and prevention of insects. This is an important business, and should not be neglected; and as no time in the year is so well calculated for the operation as winter, when the leaves are off, and the trees disengaged from the wall for the convenience of pruning—this operation can also be more conveniently and effectually executed. Many preparations and compositions have been recommended for this purpose. Sulphur and tobacco seem to be the two substances that the majority of gardeners use and recommend, with the addition of soap, probably more for its adhesive property, in making the others remain longer on the trees than they otherwise would; it is also of use as a cleanser and softener of the wood.

All young apple and pear trees in a bearing state should be examined both before and after their blossoms come out, and where the clusters are found to adhere or stick close together, they should be all opened carefully, and the caterpillars removed and destroyed.

All cankers and bruises upon the trees should now be cut clean out, and the parts covered with grafting-clay. The foliage should be looked over during summer, and where the leaves are found to curl or purse up, vermin are sure to be in the middle, and such leaves should be removed in time.

#### WATERING NEWLY PLANTED FRUIT-TREES.

Fruit-trees planted in or about the preceding October, should be headed down in March following, and the trees planted during winter or spring should not be cut in until the following spring, otherwise they lose a year's growth. Any of the fruit trees that have not been headed down in March, should be done early in April, and all newly planted trees attended to in regard to watering, which must be repeated as the state of the weather requires.

#### SUMMER DRESSING WALL AND ESPALIER TREES.

In performing this operation, some discrimination is necessary, so that no fruit buds be displaced, and that a sufficient number of wood buds be retained, and those placed in a proper position. All superabundant buds are to be rubbed off with the thumb, when they have attained the length of one or two inches, by which time a proper selection can be made. In regard to apples, pears, plums, and cherries, which produce their fruit upon spurs, those should not be disbudded until the young shoots have completed two or three joints, at which time they will be readily distinguished from the spurs, which only form a knot, furnished with a few leaves, and show no disposition to form a shoot. Nectarines and peaches may be operated upon sooner than most other trees, as they for the most part produce their fruit upon the young shoots of the last year's growth, and seldom, under good management, upon spurs. In proceeding in this operation, every part of the tree should be regularly gone over, and all fore-right wood displaced, leaving upon each shoot of last year's growth the uppermost, undermost, and one or two at regular distances between them, according to the length of the shoot, the strength of the tree, and other circumstances. Young trees, while in a state of training, should have their leading shoots carefully disbudded, as, at this period of their growth, a judicious arrangement of their shoots will tend to the formation of elegant and healthy trees, this

being the time when they can be modelled to whatever mode of training the cultivator may choose to adopt.

Upon this subject, Nicol justly observes:—Apples and pears, trained in the fan manner, may be treated very much as above; always observing to leave more shoots than may ultimately be necessary to lay in, for fear of accidents; that is, of trees in training. Trees that have filled the spaces, and are in a full bearing state, may be disbudded of most wood-buds that appear, except in places too thin, or the leading shoots of inferior branches. Wood-buds on the old spurs are always to be displaced, as only tending to enlarge them unnecessarily. Apples and pears trained horizontally, must be treated in a different manner from the above. The leading stem of trees yet in training, is the object of most particular care. The buds on the last year's shoots shortened as directed in (January) winter, must all be retained for fear of accidents, except those placed fore-right, till they have sprung a few inches, and it be seen whether enough will spring for laying right and left, of which to form the tree. Generally speaking, on the last year's shoot of the leading stem, the uppermost bud, the uppermost pair, the undermost pair, and two intervening pairs of buds should be retained, if the stem push so many; otherwise, one intervening pair. All wood-buds on the horizontal branches of trees thus trained, except the leading one, should be displaced.

The above operations should be commenced in May or June.

Train all shoots of apricots, nectarines, peaches, and plums (in July and August) closely to the wall, and continue doing so while they continue growing, even to the latest, and after all the fruit is gathered, in order that their shoots, which are to produce the next year's crop, may be perfectly ripened and matured. If otherwise, the flowers will be weak and few, and the fruit, in consequence, will be scanty.

In order to obtain fruit-spurs upon apple and pear

trees, which should be from one-half to two inches long, it is not an uncommon practice, though not a very seemly one, to snap over a number of their summer shoots at this time between the forefinger and thumb, at one-third of their lengths, and to let them hang by the bark in order to carry up the sap, till winter, when they are topped off as then directed, one-half or one inch from the branch.

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## SMALL FRUITS.

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### PRUNING GOOSEBERRIES AND CURRANTS.

THESE plants produce their fruit upon branches of several years' standing, or spurs arising out of the sides of these branches, and on the shoots of last summer; but the fruit produced on the latter is always largest. Some of them, therefore, should be retained annually. Cast an eye over the bush before you begin to prune, and with the saw or knife remove all the ill-placed and old worn-out branches, also those that crowd the middle of the bush. As numerous young shoots are annually produced in summer from the general bearers and old branches, they must now mostly be all retrenched, except those well placed ones where wanted to supply vacancies, or the places of those cut out. It is proper to leave some young shoots advancing in vacant places, to continue a successional supply of proper bearing wood, leaving a leader generally to each branch, either naturally at the end thereof, or if that would render the branches too long, shorten such to any eligible lower shoot for a leader; and let all the shoots, not eligible as above, be now cut clean out, either to the bottom, or to some lower fruitful branch or shoot, properly situated to supply their places close to the old wood, and let all decayed

or barren old branches be cut out, commonly leaving most of the proper shoots and branches at their full length, as shortening forces out a redundancy of useless wood next summer; so only practise shortening where any branches advance too long, or ramble away irregularly, or are of a low straggling or bending growth, reducing them to order by cutting them shorter, or prune down to some convenient lower shoots, and leave the general branches standing six or eight inches asunder, and the middle of the bush open as above observed, being careful to clear away all root suckers, and shoots from the bottom and lower parts of the stem.

Branch after branch should be pruned individually one after another, until the whole is gone over, as above directed. The season of winter pruning of these plants is from November to March, but the sooner done the better, and the ground about them rough-dug. As these, with raspberries and strawberries, are the best, hardiest, and easiest cultivated fruits Scotland can boast of, some care should be bestowed upon them. Therefore, these and raspberries should be all loosened about their roots at this time, and the juice of the dughill, or soap-suds mixed with any other rich water, poured about them; or if they be planted in sloping situations, a small trench may be opened along the roots of them after loosening as above, and the liquid manure poured at the higher end and allowed to run along the whole length of the line. This manure, if moderately enriched with animal water, is of much more importance to all fruit-trees and bushes, than any other manure that can be given them, as this will penetrate to the extremities of all the fibres which feed these plants; whereas, if rank dung is applied in spadefuls to the roots of trees or bushes, the greater part of it becomes maggots.

Gooseberries and currants are propagated by cuttings of the young shoots of last summer. Take those of the straightest and best varieties of the kinds wanted, moderately strong, from six to twelve inches long. The root ends are to be preferred; therefore, cut off the

weak tops, and rub away all the buds to three or four on the top of each shoot; if a portion of the joint be left at the root end, they will strike root the sooner. Dibble them one-third or half-way into the ground, in rows a foot asunder, any time from October to March, and keep them clear of weeds during summer; they will do to plant out the second or third year. Young bushes under training should be cut in, to within six or twelve inches of the stem, according to the strength of the shoots.

#### CATERPILLARS, HOW TO KILL ON FRUIT BUSHES.

Take a bushel of lime-shells, and slack two-thirds of it in the evening, and lay by the remainder in a dry place, to be used afterwards if necessary. Early next morning, while the dew is upon the bushes, turn over the lime, adding a little more water if not thoroughly powdered, and with a slater's harling trowel, or small shovel, dash the hot lime in small quantities on the lower parts of all the bushes infected, as far up as the vermin are. The lime must be poured hot, or it will not kill the caterpillars; and, if used in moderation, it will not hurt the foliage nor the fruit in the least.

Lime stones are of two kinds, the one falls readily into a very fine powder when slacked with water. It is English lime of this sort that should be used for killing vermin.

#### PRUNING RASPBERRIES.

These plants bear fruit only on the young shoots of last summer, and the same shoots never bear but once, and generally die in the following winter, a successional supply of young plants being produced from the same roots in the preceding summer; therefore, now prune away all old stems that bore last season, cutting them off close to the bottom; then of the remaining young shoots select from them five or six of the strongest on each main stool, cut away all the rest, and pull up all the straggling ones between the rows, and let the retained shoots be shortened by cutting off the weak bending

tops, then plait them loosely together and tie them at the top with small willow or tarred cord. They should be supported with stakes to which they should be tied at the middle and top, or tie or plait the points of one half of the shoots on the stools respectively with each other, so that each line may form a row of festoons or arches, by which means they are perfectly secured from the effects of the wind, &c. In this way you can hold the top of the arch between your left arm and side while you tie one of the ends of it. Cut off the tops after the arch is tied at each end. Season, November to March.

New plantations of raspberries are formed of strong young suckers, from any old plantation, in good perfection; prune their tops and any long straggling roots; plant them in rows three and a-half feet asunder, and three feet apart in the rows; they will bear next summer. Season, November to March.

#### GRAFTING OF FRUIT TREES.

The operation of grafting may be successfully performed upon trees of almost any age or size; although, no doubt, the more vigorous the tree or branches that are to be grafted, the greater success will attend the operation. But if properly done, it may be performed on trees of all ages and sizes with success. The modes of grafting are numerous; and in performing any of them it may be proper to inform the engrafter that the soft white substance, called the alburnum, which in trees is found between the liber or inner bark and the wood, which in process of time acquires solidity, becoming itself the wood;—while soft, it performs a very important part of the functions of growth, which ceases when the tree becomes hard. A new circle of alburnum is annually formed over the old, so that a transverse section of the trunk presents a pretty correct register of the tree's age, each zone making one year. The alburnum is found in large quantities in trees that are vigorous. It is this alburnum that takes hold in

grafting and budding; therefore, both the barks of graft and stock must be brought in close contact and kept in that position two or three months with a proper bandage, whatever mode of grafting is used.

#### IMPLEMENTS PROPER FOR THE WORK.

These are, principally, a neat small hand-saw, for cutting off the heads of large trees or stocks; a good strong knife, with a thick back, to make clefts in the stocks; with a sharp pen-knife, or budding knife, to cut the grafts with; and a grafting chisel, and small mallet.

Besides these tools, other sorts of materials are wanted in performing the business, such as bass-strings to tie the grafts with, selected from new mats, and steeped in water to make them more tough: and a quantity of good tough clay, which should be prepared a month before it is wanted, and kept turned and mixed, like mortar, every other day, in the following manner:—

A quantity of strong good clay, in proportion to the number of trees intended to be grafted, should be provided, and some new horse dung broken in among it; and if a little cut straw or hay be mixed with it, it will hold together the better. These should be well stirred together, putting water to them occasionally, in the manner of making mortar. The whole should be hollowed like a dish, filled with water, and kept every other day stirred. It should be carefully kept from being exposed to frost or drying winds, and the oftener it is wrought over the better.

Shoulder, ring, or crown grafting, is that in which the grafts are set in a circle or crown, and is chiefly practised on large trees, where either the head or larger branches are cut off horizontally, and two or more shoots or scions put in, according to the size of the branch or stem, which has to be dressed with the knife after the saw; a perpendicular slit is then made at the top of the stock, or the end of the branch cut off,

two and a-half inches downward, for every graft to be put on. In performing this work, an instrument made of bone, or boxwood, is used, about six inches long, and at one end cut flat on the inside two and a-half or three inches. It must be round on the outside, terminating with a shoulder or rest, and tapering to a sharp point, which is sometimes called the messenger. It is to be pressed gently down between the wood and bark of the stock, raising the bark on the one side only, and not ragging it in the least. The scions and grafts are then cut flat and smooth, one side to answer the length of the slit made in the bark. They may also have a small paring cut off the side of the part sloped, to fit the side of the stock on which the bark has not been raised. Every graft is then gently pressed down between the bark and wood, after the messenger has been withdrawn, till the bark of the cut side of the graft rest on the crown of the stock; and after the whole of the scions are inserted, they must all be secured very tight with bass strings, and clayed all over to exclude air and moisture, leaving always two or three eyes of the grafts uncovered, which will be sufficient for shooting. In putting on the clay, cover the crown of the stock, first drawing it a little upon the sides of it, to make it hold the better, and smooth with a little water when the whole has been clayed. This mode of grafting is generally performed from the middle to the latter end of April, after which the sap is in full circulation.

Cleft or slit grafting, which is performed on stocks and branches of smaller size, may be adopted with success where the bark or rind is not too thick, by which the inner bark of the graft will be prevented from joining that of the stock. In performing this sort of grafting, the head of the stock or branch must be cut off with a slope, and a slit made the opposite way in the top of the slope, deep enough to receive the scion or graft, which should be cut sloping like a wedge, so as to fit the slit made in the stock, care being taken

to leave that side of the wedge which is to be placed downwards much thicker than the other; and in putting the scion into the slit of the stock, great care must be taken to join the rim of the scion exactly to that of the stock—for, if these do not unite, the grafts will not succeed. When this method of grafting is used to stocks that are not strong, it will be proper to make a ligature of bass string, to prevent the slit of the stock from opening; after which the whole should be clayed over, to prevent the air from penetrating the slit so as to destroy the grafts, leaving two or three eyes of the scions above the clay for shooting. This mode of grafting is usually performed in March.

Whip or tongue grafting is the most generally practised by nurserymen, especially for small stocks, or branches of an inch, half an inch or less, as the scions much sooner cover the stocks in this method than the others. It is performed by cutting off the head of the stocks sloping—then making a notch in the slope towards the upper part downwards, a little more than half an inch deep, to receive the scion, which must be cut with the slope upwards, and a slit made in this slope like a tongue; which tongue must be inserted in the slip made in the slope of the stock, and the scion be placed on one side of the stock, so as that the two rinds of both scion and stock may be equal, and join together exactly; after which there should be a ligature of bass put round to fasten the scion, so as that it may not be easily displaced; the whole being afterwards clayed over as in the former method. It may be performed earlier than the others.

Shoulder or chink grafting is performed with a shoulder, and sometimes with a stay at the bottom of the slope. It is chiefly used for shrubs and ornamental trees, where the scion and stock are of the same size.

Cleft or crown grafting, is the method generally adopted by those who, by this plan, renovate old trees, or who, for fancy and amusement, engraft many

varieties on the same tree. If it be intended to renovate a tree, all the branches should be headed and grafted—whether it has been fan or horizontally trained, or a standard tree, they should not be all cut to equal lengths, but to different ones, that the new wood may issue not all at one part, in a crowded manner, but at various heights, in order that room may be given to train it properly. The branches may not be all cut in one year, but a third part or so, and the remainder the next and following years, and so on. Two, three, or four grafts, should be put on each branch, according to its size, so that, if two or three fail, the taking of one be insured; which is generally sufficient to leave, unless it be thought expedient to leave two on the larger branches, or on the stems of those trees which have been trained horizontally, and have been headed entirely down. In grafting on branches more than two inches diameter, crown grafting is the method most generally used; for smaller stems or branches, cleft grafting should be preferred. The season for grafting must always be regulated by the state of the weather. From the climate being so uncertain in the spring, it is better to defer it till the circulation of the sap be brisk, and the buds of the stocks begin to break, attention being paid that the weak shoots of tender trees will not admit of being so long cut as the more hardy, and that the operation should never be performed while it freezes or rains. You must begin earlier with cherries and plums, rather later with pears, and ending with apples. Should the clay begin to open or crackle it has to be smoothed over again.

Grafts or scions should generally be chosen from the young shoots of last summer's growth, and those from the outside or lateral branches are the best; although both recorded and experimental evidence show that wood of more than one year's, and, indeed, of several years' growth, will succeed. Sir A. Knight, the Baron Tschaudi, and others, have grafted young

shoots in leaf; and Van Mons, at Brussels, has grafted an entire tree, 15 feet in height, on the stump of another of similar diameter. But for general practice, the outside lateral shoots are preferred, because they are not so robust, nor so apt to run to wood, as those from the centre or top of the tree, nor so weak as those at its base, and under the shade and drip of the rest. Such shoots are found, from experience, to produce the truest specimens of the fruit of the tree from which they are taken.

An exception to this rule is to be observed where the trees are in a sickly state, when, of course, the grafts should be taken from the strong shoots in the centre, or near the top of the tree. The ends of each scion should be cut off, unless it be a sort which is wished to be propagated, and only one or two scions to be had. In all cases where there are plenty of scions, use only the middle part, rejecting both the top and base of the shoot; or if the shoots be long, and of a rare variety, they may be then cut into several lengths of six or seven inches each. They should be cut off the parent tree some time previously to their being used, experience having shown that it is necessary to allow the stock to have the advantage over the graft in forwardness of vegetation. Grafts may be collected in January or February, and kept at their whole length, laid in dry mould, in a situation where they are not exposed to either frost or much sunshine, till they be used; or they may be taken off in autumn, provided that the wood be properly ripened, and sent to any distance, having their lower ends packed in clay, rather dry than moist, and a covering of moss over all.

The greatest care should be taken in procuring grafts, so that they come not from trees infested with insects, or of diseased habits; and also that they be cut off the tree the sort of which is particularly wanted. After being cut, they should be immediately labelled, in a correct and legible manner, that no disappoint-

ment may occur. After having been at the expense and trouble to procure grafts from a distance, should they turn out to be different from what they were intended, such a disappointment will be great. To those who may object to the use of clay, the following composition will answer the purpose instead thereof:—Take one pound of pitch, one pound of resin, half a pound of bees'-wax, one quarter of a pound of hog's lard, a quarter of a pound of turpentine, and melt and mix them well together. This composition is kept in a fluid state by putting it in an earthen pot over boiling water. With a brush it is then spread evenly on sheets of moderately thin brown paper, which, when cold, is cut into slips about three-fourths of an inch broad. The scion being fitted to the stock, take one of these slips, warm it by breathing on it, and bind it round the graft, when it will be found to answer the purpose both of matting and claying. The clay is to be taken off about the end of July, or in August, and all the bandages slackened.

Dig the fruit tree borders. This will be serviceable to the trees, and destroy weeds; and the borders will appear neat, and be ready for sowing or planting with crops of small growth, or such as will not much exhaust the soil. Hoe the surface of such fruit tree borders as were dug in the foregoing months, and are not sown with crops such as radishes, spinach, lettuce, &c.

All fruit trees planted in autumn, or early in spring, should be protected from the effects of high winds, by being properly staked up as already directed, and also occasionally watered, which will be of much importance to their breaking strong, and taking properly to the soil.

#### GRAFTING OF TREES AND SHRUBS.

Grafting trees and shrubs is performed from the latter end of March to the latter end of April, beginning with the young trees, and finishing with the old ones, or as soon as the bark becomes loose and the sap in active circulation. This process is also appli-

cable to smaller plants at different periods of their growth, and consists in inoculating or joining one branch of a species to another, and thus producing a variety different from either. A grafted tree consists of two parts, the scion and the stock. The scion is a part of the living vegetable, which united or inserted in a stock identifies itself with it, and grows then as on its natural stem and roots. The scion and stock must be either of identical species, or of the same genera, or genera of the same natural family, otherwise the graft will not succeed. It was formerly a popular opinion that any scion would succeed on any stock. Thus Pliny, Varro, and Columella, speak of apples and vines grafted on elms and poplars; and Evelyn mentions, that he saw a rose grafted on an orange tree in Holland. The ancients acknowledge, however, that such grafts were of very short duration; and Professor Thonin remarks, that the result of numerous experiments made by him, proves that if any one of these grafts seem at first to succeed, they all perish in a very short period.

The periods of the movement of the sap in different species of trees, the permanence, or time of falling of their leaves, and the periods of maturation and qualities of the fruits, are circumstances to be taken into consideration in procuring grafts.

Grafting may be performed on all herbaceous vegetables with solid stems. Dahlia roots are frequently grafted in this country; and in France, melons have been grafted on cucumbers, love-apples on potatoes, and cauliflowers on cabbages.

Grafting may be performed with scions of the current year's shoots, or with those of several years' growth. The stock does not change the character of the species of the scion which may be grafted on it, although it materially affects the quality of the fruit. Some kinds of stocks are more adapted for grafting than others. The great art of grafting is to unite exactly the inner bark of the scion with the inner bark of the stock,

and thus to keep them in contact, till a union takes place.

#### BUDDING OR GRAFTING BY GERMS.

This is performed by taking an eye or bud of a li-  
queous plant attached to a portion of the bark, and  
inserting it into the bark of another stem. This pro-  
cess may also be performed with herbaceous plants,  
but not so successfully. Budding is performed any  
time from the beginning of July to the middle of Au-  
gust, regulated by the time at which the bud is formed  
on the axillae of the leaf of the current year. The  
buds are known to be ready by the shield or portion  
of bark to which they are attached easily parting with  
the wood. They should be gathered on a cloudy day,  
or in the evening, and used as soon as possible, al-  
though they may be sent to a considerable distance,  
preserved in moist moss.

In cutting off the bud, insert the knife half an inch  
below it, and cut upwards a slice of the wood along  
with the bark, to half an inch above the bud. The  
bud being thus disengaged, the woody part is to be  
carefully separated from the bark, and the bud exa-  
mined, to ascertain that it is sound and perfect. A  
horizontal slit is next to be made in the tree or stock,  
where the bud is to be inserted, and then another slit  
perpendicular, cutting in both cases through the bark  
into the wood, and forming an incision in the shape  
of the letter T. The bark in the perpendicular slit is  
to be gently raised a little from the wood on each side,  
and the lower portion of the bark of the bud slipped  
into the opening; the upper portion of the bark is  
to be cut across horizontally, corresponding to the  
horizontal cut or upper portion of the T, so as that  
the incised edge of both barks may come into exact  
contact. The wound is now bound round with a  
piece of wetted bass.

This operation is sometimes practised, and more  
successfully too, by reversing the incision, thus L, and  
gently pushing the bud upwards instead of downwards;

being more benefitted by the sap, which is on the descent at this season.

**SCALLOP-BUDDING** is performed by paring a thin tongue-shaped portion of bark from the stock, and applying the bud, without divesting it of its portion of wood, so as that the barks of both may exactly fit, and tying it in the usual way. These buds generally adhere in a fortnight or three weeks, and may be known to have done so by their fresh-grown appearance.

**PROPAGATING BY CUTTINGS** is extremely simple and easy in the case of many trees, as the willows, gooseberries, currants, and poplars, &c. ; but requires some management in the beaths, myrtles, and other shrubs. Cuttings are to be chosen from the side shoots of plants, especially those which show a tendency to droop towards the ground, and the proper time for doing this is when the sap is in full motion. The cuttings should contain a portion of last year's wood, or of wood so far formed, and after it has assumed its proper brown colour. Cuttings from herbaceous plants are chiefly taken from the low growths, but they will also succeed occasionally from the flower stems. The cuttings should be prepared so as that the lower ends terminate in a joint or bud when the leaves spring out, and the upper leaves should be left on the branch.

In plants difficult to strike, it is a general practice before cutting them off from the parent plant, to cut a ring round the bark, and after remaining on the parent branch for a short time till a callus is formed, they are cut off below the ring and inserted into earth. Tender cuttings, when planted in pots, should be placed near the sides (not in the middle), with their lower ends touching the bottom of the pot, or resting in sand or gravel. In this way they readily strike; whereas, if planted in the loam in the middle, they will be more apt to fail.

The cuttings should not be inserted to a great depth,

and a moderate degree of heat, moisture, and light, is preferable to any excess. A glass frame or hand bell cover promotes their striking very considerably, by tending to promote an equilibrium of atmosphere and temperature. The degree of heat necessary, depends upon the nature of the plants. In general, cuttings during the process of striking require less heat than the vigorous parent plant. Cuttings of deciduous hardy trees, taken off in autumn, should not be put into heat until spring; but should be kept dormant like the parent tree.

PROPAGATION BY PIPING.—*See Flower Garden.*

## CATALOGUE OF CHOICE FRUITS.

CHIEFLY ADAPTED TO THE CLIMATE OF SCOTLAND.

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### THE APPLE AND PEAR.

*Class 12th Icosandria.* This class consists of hermaphrodite plants, with twenty or more stamens fixed in in the calyx. It has three orders; *monogynia*, one style; *Di Pentagynia*, two to five styles; and *Polygomia*, styles many. They produce our most esteemed fruits; and no poisonous fruit has yet been found where the parts of the flower correspond with the characters of this class. To gardeners it is one of the most interesting of the Linnæan classes, containing a greater proportion of objects than any other which come under their observation and management. Its characters are well defined, and depend upon the insertion of a number of distinct stamens, exceeding twenty, into the inner surface of the calyx. The genera are extremely natural, and have been all studied with unusual attention. The medical powers of many plants of this class are not less active than the fruit is excellent.

*Example.*—*Pyrus* (from *Peren* Celtic, pear). Calyx five-toothed; petals roundish, Apple closed. Five celled, with five cartilaginous cells. *Api*, (Celtic) whence *apple*, in English. Natural order, Rosacea. *Pyrus malus* (apple-tree) is the most popular of British fruits. Being a native of our Highland woods, none can be brought to so high a degree of perfection with so little trouble, and of no other are there so many excellent varieties in general cultivation, calculated for almost every soil, situation, and climate, which our islands afford. Very good apples are grown in the Highlands and Orkneys, and even in the Shetland Isles, as well as in Devonshire and Cornwall. Some sorts are ripe in July, and others which ripen later, will keep till June. Unlike other fruits, those which ripen latest are the best. The tree attains a great age, is in general very prolific, and the timber is valuable for the turner, millwright, and cabinetmaker.

The Romans had twenty-two varieties, there is now several hundreds in Britain and France; and some excellent sorts from America. They are usually divided into dessert, baking, and cider fruits; the first high-flavoured, the second such as fall or became mellow in baking or boiling, and the third austere, and are generally fruits of small size. Besides this division, apples are classed as pippins or seedlings, pear-mains or somewhat pear-shaped fruits, rennets, or greens, speckled fruits, calvills or white skinned fruits, russets or brown fruits, codlings or falling fruits, and burknots, which grow readily by cuttings. Most sorts of apples form unseemly trees as standards, but are otherwise very ornamental in shrubberies, from their blossom. The crabs, and especially the varieties obtained from the Siberian crab, form much the handsomest heads, and have also more brilliant blossom. The apple may be propagated by layers, and many sorts by cuttings; but the usual mode is by grafting on crab-stocks, and for dwarfing on stocks of the Paradise apple.

*Pyrus communis* (common pear) is a fruit tree next in popularity and value to the apple tree. It is a greatly superior dessert fruit, but not so valuable for culinary purposes and the press. There are fewer sorts of good pears, in proportion to the number of current varieties, than of apples; but a few—as the jargonelles, bergamots, beurees, chaumontelles, &c.,—are most exquisite dessert fruits, and are much easier of digestion than the apple. Although a native of England, it arrives in greater perfection in France and the North of Italy than in the former country. The chaumontelles of Guernsey are in high repute, as are the St Germain's and other sorts of Picardy, and the beurees of Milan. The Romans had thirty-six varieties, and there are many hundreds in the French and British nurseries, most of them good for little. Professor Van Mons of Brussels, and M. Duquessie of Mons, fruited about eight thousand seedling pears, from which they obtained nearly eight hundred sorts worth cultivating. The varieties are divided into dessert and baking fruits, and also into butter or melting pears, beurees (French) baking pear *aevors* Fr., and perry, *poiree* Fr., fruits. The tree is grafted on seedlings of the same species, and for dwarfing and precocity on the quince. It is a handsomer upright growing tree than the apple, more durable, and the wood more valuable for the

turner and millwright ; but its blossoms being white, are less showy than those of the apple. *P. domestica*, or Irne service, and the other species of service, are very ornamental trees ; their leaves are mostly white underneath, and they are generally profusely covered with blossoms and fruit. Of *P. domestica* there are two varieties, the pear and the apple-shaped, cultivated in some parts of France and near Genoa, for their fruits. Those like the medlar and quince are not eaten until in a state of incipient decay. There are but few of the true service in English gardens, but the *P. hybrida* and bastard service are common, and their fruit, which resemble that of the mountain ash, is sometimes made use of. *P. acicuparia* and *Americana* are handsome trees for shrubberies ; the former very popular in suburban gardens.

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#### WINTER PEARS.—FINEST VARIETIES.

*Beurre d' Aremberge*, *Beurre Rance*, *Passe Colmar*, *glaut morceau*, &c., are adapted to the climate of Scotland ; but I conceive, that the new varieties raised by Sir T. A. Knight by cross impregnation of some of the richest and most esteemed pears, with the hardy swan's egg, would be found a real acquisition to Scotland.

These trees frequently bear fruit at two or three years from their graft, do not require a wall, and succeed as dwarf standards. As I intend to devote this article to the cultivation of dwarfs, I shall give a list of the pears alluded to, copied from a paper containing the character of the choicest kinds, sent to me by the President himself.—Mr Knight's hardy pear trees.

1. The *Monarch*, musky in a high degree ; excessively rich and sweet. Tree very thorny ; too luxuriant perhaps for the garden, but particularly suitable to the orchard. Season, of fruit, December and January.

2. The *Belmont*. Excellent melting, and extremely rich ; the tree bears when very young, even in the second year after being grafted ; colour of the flesh yellow, skin, very russet. Season, November.

3. *Garnon's Pear* : very fine, fruit large, weighing 1lb. when grown on a wall ; rich and melting, but it succeeds and bears freely as a standard. Season, October, November, and December.

4. *Althrop Crassanne*: fruit rich and melting, but not musky; tree thorny. Season, November.

5. *Winter Crassanne*: very large and excellent, judged by the committee of the Horticultural Society to be the best of the varieties. Season, January.

6. *Rouse Leuch*: tree very productive and apt to overbear itself; fruit large and fine. Season, January.

7. *The Dawnton*: Tree a free grower and very productive, fruit small but rich, and of fine flavour, and keeps long. Described and the fruit figured in the Horticultural Transactions of 1830.—Mr Towers.

#### AUTUMN PEARS,

##### *Arranged in their Order of Ripening.*

8. *Avora* or *August Muscat*, ripens the beginning of September. Skin smooth; colour whitish yellow; juice rich, sugary and perfumed; and is esteemed one of the best summer pears yet known. It is a great bearer.

9. *Salviati*.—Ripens about the middle of September. Colour red and yellow next the sun, white when shaded; flesh tender; juice sugary and perfumed.

10. *White Beurree*.—Ripens about the middle of September; keeps only a few days; a fine table pear.

11. *Rose-Water*.—Ripens about the latter end of September. Colour brown, skin rough; juice very sweet, tasting like rose-water.

12. *Keather*.—A Clydesdale fruit. Colour green; shape oblong. Hardy tree; fit for orchards.

13. *Elsine (Awl) haft*, or *Goodman*.—A Scottish fruit. Size small, long and flat at one end; colour green and yellow; flavour sweet, dry, and hard. A great bearer.

14. *Autumn Bergamot*.—Ripens in the beginning of October; keeps some weeks; flesh melting, and the juice highly perfumed. It is a great bearer, and is worthy of a wall upon an east or west aspect.

15. *Prince's Pear*.—Ripens about the end of September. Juice very high flavoured. It is a great bearer.

16. *Green Yair*, or *Green Pear of the Yair*.—Said to be indigenous to a beautiful seat on the river Tweed. Colour green; size small; sweet and juicy. Should be eaten off the tree; does not keep many days; it is a great bearer, and free grower.

17. *Monsieur John*.—Sometimes called *White*, and sometimes called *Grey Monsieur John*. The difference of their colour proceeding from the soil and situation in which they grow. Ripens in the latter end of October or beginning of November; juice rich and sugary; is upon the whole one of the best pears for this season.

18. *Red Doyenne*.—An old variety brought into notice by Sir T. A. Knight; colour red and pale green; is in eating in October and November. Great bearer and good fruit; tree extremely hardy, and excellently suited for cottage gardens. Mr. Salisbury mentions an old tree of this sort taken down at Strawhill, near Halifax, in 1779, which must have been above one hundred years old.

#### SUMMER DESSERT PEARS.

19. *Pear James'*.—A Scotch fruit; is the earliest native pear of this country; has little flavour; and keeps only a few days; is a good bearer. One tree is sufficient for a large garden; for smaller gardens, one or two grafts will be plenty, introduced upon another tree.

20. *Green Chissel* or *Hastings*.—Ripens about the middle of August; is a good bearer; is middle sized, and the fruit remains always green; grows closely to the branch; and often in long clusters.

21. *Red Muscadelle*.—Fruit large and beautiful; the colour yellow, striped with red; flavour rich. It sometimes produces two crops in a year, the first about the end of July, the second in September.

22. *Green Pinky*.—Fruit small and nearly round; of good flavour; originated at Pinky, near Edinburgh; is much esteemed in Scotland; great bearer, and a healthy tree.

23. *Pear Sauch*.—A Clydesdale pear. The fruit large and beautiful; the tree healthy; and a great bearer; is an excellent market pear.

24. *Farrow Cow*.—Another Clydesdale fruit. Large, flattened towards the eye of the fruit, with a short foot-stalk; a great bearer, and beautiful; colour red and yellow; flesh tender and musky; tree hardy, and of a pendulous habit.

25. *Jargonelle*, *Cuisse Madame*.—A French fruit; ripens in August. Fruit large; skin smooth; colour pale green; a good bearer, and good flavour. Tree healthy and vigorous, somewhat like the Windsor, and does best on standards in England; but is worth an east or west wall in Scotland,

or in any late situation. There are some very old trees of this sort in many parts of the kingdom which must have been early introduced.

26. *Crawford* or *Lammas*.—Ripens about the end of August; an esteemed Scotch fruit; should be eaten a few days after gathering; colour green, rather tinged with iron towards the sun, great bearer, and of a juicy good flavour, if not too ripe; keeps only ten or fifteen days. Tree vigorous, and grows in almost every situation; middle sized; fruit improved if on a wall.

27. *Hanging Leaf*.—An esteemed Clydesdale fruit. Fruit almost round; colour beautiful red and yellow; of a delicious sweetness. Tree hardy, and well adapted for the orchard.

28. *Scotch Bergamot*.—Fruit large; colour yellow and red; flesh tender and juicy.

29. *Musked Bonchretien*, *Gratioli*, *Cucumber*, or *Spinola's Pear*.—Colour red on one side and white on the other; pulp rather tender; juice a good deal perfumed. A great bearer and excellent fruit.

30. *Saffron*.—Well shaped fruit, large; tree hardy, and rather a good bearer.

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## CATALOGUE OF APPLES,

*Arranged as Dessert and Culinary Fruits.*

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### DESSERT APPLES.

1. *Pippin Downton*.—A seedling, by Knight; originated about 1804. Is a juicy fruit, and resembles the golden pippin; is fit either for dessert or cider; fruit small, round, and yellow; flesh firm and sweet; lasts from October till March.

2. *Pippin Elton*, or *Knight's Golden Pippin*.—A seedling, by Knight; originated about 1802. Excellent for dessert or cider; tree a great bearer; fruit middle-sized, gold-coloured, with spots; flesh firm and sweet. In use from October till February.

3. *Pippin, Balgonie*.—An esteemed Scotch fruit, and known by the name of the Fife golden pippin. Supposed to be the original golden pippin imported from England about the time that that esteemed fruit was in its perfection.

It inherits every virtue of the old golden pippin. Fruit middle-sized, round, yellow and green; flesh firm, juicy, and aromatic; keeps from October till May. Tree a great bearer, and hardy.

4. *Pippin Lemon*.—Fruit large oval, golden yellow; flesh firm and juicy; keeps from October till March. Tree vigorous, and a great bearer.

5. *Pippin Ribston*.—Originated at Ribston Hall, in Yorkshire, in 1760. One of the finest fruits we have; rather above the middle size, round and flattened; green, or dark green, when upon a standard, or much shaded; yellow and bright red, when upon a wall. In Scotland it is often planted upon the best walls, and becomes a fruit of the first class. Upon standards, it fruits freely; being in all situations, a great bearer. Keeps from November till March, and sometimes longer. It is not so fine a fruit when grown in England.

6. *Pippin, New Red, New Scarlet*.—Fruit beautiful and middle-sized; colour red next the sun, yellowish where shaded; keeps till March. Tree middling bearer.

7. *Pippin Dalmahoy*—An esteemed Scotch fruit; rather smallish, round, and green; flesh firm and aromatic; excellent table fruit; keeps from November till May. Tree slender, hardy, and a great bearer.

8. *Pippin Yellow Ingestrie*.—Resembles the golden pippin. A seedling raised in 1800, by Knight. Fruit middle-sized, round, and yellow; flesh firm and juicy. Tree large and handsome. Fruit keeps from October till February.

9. *Pippin, Red Ingestrie*.—Also resembles the golden pippin; a seedling raised in 1800, by Knight. Fruit middle size, round, red; flesh firm and juicy; keeps from October till February. The yellow and red Ingestrie pippins sprang from two seeds of the same apple, which occupied the same cell; their names are derived from Ingestrie, the seat of the Earl of Talbot. The Grange apple and Downton pippin also sprung from the same parents with the Ingestries—from the seeds of the orange pippin and pollen of the golden pippin. The original trees are at Wormsley Grange, Herefordshire.

10. *Pippin, Aslin* (original pippin; Arbroath pippin).—Supposed to have been first brought from France by the monks settled at Arbroath at the early period of the building of, or probably soon after that celebrated Abbey was

built. It is supposed to be the *aurea mala*, or original golden pippin. Fruit middle size; greenish yellow when shaded, golden yellow when exposed to the sun. Flesh softish, and very juicy; is not a good keeper. In favourable situations is a great bearer. Much esteemed in Scotland.

11. *Pippin, Padley's*—seedling raised in 1800. Fruit oval, prickly, and freckled; flesh richly perfumed; keeps from September till February. Tree hardy, and a great bearer.

12. *Pippin Kirkton, Cracked Pippin*. (A Scotch apple).—Fruit flat, middle sized, gold and russet; flesh firm and sweet; keeps from September till January. Tree a good bearer, small and hardy.

13. *Pippin, Orange*—Fruit middle-size conical, gold and red; showy at table; flesh firm, juicy and sweet; keeps from October till March. Tree large and very luxuriant; middling bearer.

14. *Pippin, Paradise*.—Fruit middle-size, and flat, red and green; flesh firm and juicy; mealy when too ripe; keeps from October till February. Tree smallish; a good bearer.

15. *Pippin, King of the Pippins*.—Fruit large, conical, gold streaked, white, and red; a beautiful fruit; flesh firm and juicy; in eating from January till March. Hardy upright growing tree, and an excellent bearer.

16. *Wood's New Transparent Pippin*.—Fruit small, flat, green and yellow; flesh firm and juicy; keeps from October till March. Tree hardy, and great bearer.

#### DESSERT PEARMAINS.

17. *Pearmain, Summer*.—Fruit middle sized, conical, green striped with red; flesh soft, juicy, and sweet having rather a peculiar flavour from almost every other apple. In use from August to October; should be eaten soon after gathering; soon gets mealy by keeping. Tree hardy and a good bearer.

18. *Pearmain, Loans*.—An esteemed apple in this country, as well as the last. Fruit larger than the last, oval, dull green where shaded, brilliant red where exposed to the sun; flesh firm and sharp; keeps from September till May. Tree middle-sized and a good bearer.

19. *Pearmain, Spanish*.—Fruit middle size, oblong, and showy, dark red; flesh firm and sharp; keeps from September till May. Tree large, and a good bearer.

20. *Pearmain, Lamb Abby*.—Supposed from seeds of the Newton pippin, 1805; recommended in the Horticultural Transactions, where it is figured. Fruit rather large, oval and pyramidal, yellow, green, and spotted red towards the sun; flesh crisp and aromatic; and exceeding fine fruit; keeps from September till April. Tree luxuriant and handsome; good bearer.

21. *Pearmain, Old English*.—Fruit middle sized, conical, red and yellow; flesh firm and juicy; in eating from January till March. Tree middle sized, and great bearer.

#### DESSERT NONPAREILS.

22. *Nonpareil, Scarlet*.—From seed at Esher, about 1550, in the garden of a small public-house. Fruit middle sized, flattened, russet and red; flesh firm and juicy; like all the other nonpareils high flavoured; in eating from September till March. Tree hardier than any other sorts; a great bearer; all this division requires a wall in most situations.

23. *Nonpareil, M'Donald's*.—From seed, raised in the Dalkeith gardens about 1806; much esteemed in Scotland, fruit small, round (the only round one in this division), fine eye, greenish and red; flesh firm, quick, and acid; keeps from December till April. Tree hardier than any of the nonpareils.

In the Horticultural Society's Catalogue, there are enumerated 30 sorts of nonpareils.

24. *Russet Dredge*.—Fruit small, round, russet streaks with red; flesh firm and juicy; keeps from November till July. Tree hardy, middle size, and good bearer.

25. *Rennet, Grey Guse*.—Of French origin. Fruit middle sized, round, grey; flesh firm and sweet; keeps from October till March. Tree middle size, and a good bearer.

26. *Calvell, Summer Red*.—Fruit small, oval, reddish white; flesh soft, juicy, and sweet; keeps from September till November. Tree hardy, middle size, great bearer.

27. *Calvell, Kemmer White*.—Same as last.

28. *Queening Kernel*.—Fruit large, angled, deep red and white; flesh firm and tender; an excellent cider as well as dessert fruit; keeps from October till April. Tree hardy, and a good bearer.

29. *Codling, Spring Grove*.—Fruit small, conical, pale green; flesh soft and juicy; keeps from July till September. Tree a great bearer.

30. *Black*.—Fruit middle size, conical, dark mahogany colour; flesh firm and sweet; singular fruit; keeps from September till April. Tree a great bearer.

31. *Carnation*.—Fruit middle size, oval, when exposed to the sun is a handsome strong fruit, green and red striped with carnation; flesh firm and vinous; keeps till May. Tree large, and a good bearer.

32. *Cadbury Pound*.—Fruit middle-size, oblong, pale green; esteemed good fruit; keeps from November till March. Tree free grower and great bearer.

33. *Charteraux Court Pendu*.—Of French origin; a fine flavoured fruit, beautiful carmine next the sun, often striped with yellow, and snowy white when shaded; flesh very tender and juicy; should be eaten off the tree. A good bearer, little known in England, much cultivated in Scotland, both as espalier and standard; keeps only a few weeks.

34. *Dredge's White Lilly*.—A beautiful apple of exceeding high flavour, and keeps good for the table till March.

35. *Fennaullet Gris* or *Anise Apple*.—Of French origin. Fruit middle-sized, of a grey colour; flesh tender, and has a spicy taste like anise seed; is ripe in September and October; does not keep. Tree small, but a good bearer, exceedingly well calculated for growing in pots or vases.

36. *Flower of Kent*.—Fruit large, round, yellow, showy; flesh tender and vinous; keeps from September till April. Tree strong grower, and a good bearer.

37. *Gravenstein Apple*.—This is esteemed the best apple in Germany and the Low Countries, and is well entitled to the high reputation it has acquired. Resembles the Ribston pippin in size, and not unlike it in form. Ripens in October and will keep till December, and may be fairly considered a rival to our Ribston pippin. Figured in the Practical Gardener. It is highly esteemed all over the north of Europe, and by them considered one of their best sorts. Fruit generally round, somewhat flattened, rather angular on the sides, eye sunk in a deep cavity, surrounded by several projecting folds or knobs; stalk very short, but deeply inserted; skin smooth, of a fine clear straw colour, streaked with red where exposed to the sun; flesh of a pale yellow colour, not very fine in texture; juicy and with a high vinous sweet taste.

38. *June Eating, Jenetin* (Geneton).—Fruit middle sized, roundish, yellow, sometimes reddish; flesh tender and juicy, rather sharp when not ripe; is apt to get mealy if over-ripe; should be eaten from the tree. Is one of our earliest fruits, and keeps for a week or so good. Tree of humble growth; great bearer. Is ripe often in the end of June, (hence the name,) and always in the beginning of July.

39. *Julien, or Early Julien*.—Is a very excellent early variety, ripening in the beginning of August: middle size; of an irregular form, with many ribs or angles on the sides, which becomes very prominent round the eye; skin of a uniform pale yellow; flesh approaching to yellow, firm, and crisp, having much the highest flavour of any of our early apples.

40. *Lady's Finger*.—An esteemed Scotch apple. Fruit middle sized, conical, rather long, approaching to cylindrical; yellowish where shaded, reddish where exposed to the sun; flesh delicate, juicy, and high-flavoured; keeps from October till December. Tree rather small, pyramidal, or upright, and a good bearer.

41. *Long Laster*.—Fruit middle-sized, angular, fine yellow where shaded, beautiful reddish colour next the sun; keeps till the middle of May.

42. *Margaret Apple, Red June eating*.—Fruit small conical, yellow where shaded, streaked with red towards the sun; flesh sweet and tender; ripens in the end of July, or beginning of September, and keeps for a few weeks. Tree hardy, making small willow-like shoots, is nearly as great a bearer as the Common June Eating.

43. *Non-Such*. (An esteemed Scotch apple, where it is often grown upon walls).—Fruit middle-size, green where shaded, beautiful striped with brownish red where exposed to the sun; flesh firm and juicy, with a pleasant acid; ripens in September, and keeps till October or November. Is more apt to shrivel in keeping than almost any other apple. Tree free grower and a good bearer.

44. *Oak Peg, Oaken Peg*.—Fruit middle-sized, oval, green and white streaked; flesh firm and juicy; is in eating from January till July. Tree rather twiggy, bardy, and a middling bearer.

45. *Poor Man's Profit*.—Fruit below the middle-size, oval, dingy coloured; propagated by cuttings readily; keeps till January. Tree bardy, very prolific.

46. *Grey Ledington*.—Fruit long, colour when ripe, yellowish green, hollow within, and when ripe the seeds make a rattling noise within when shaken; a good bearer, and tree extremely hardy; is in eating from November till January.

47. *Quince Apple*.—Fruit middle-sized, resembling a quince, (from whence the name,) yellow, rather red towards the eye; flesh firm, pleasant sharp flavour; is in eating from January till April. Tree middle-sized, and a good bearer.

48. *Royal George*.—Fruit large, oval, yellow and green, flesh firm and sugary; beautiful fruit; keeps well, is in eating from January till June. Tree handsome, and a great bearer.

49. *Ribston*.—(See *Pippin, Ribston*.)

50. *Spice Apple*.—Fruit middle-sized, angular yellow, flesh firm and sugary; in eating from January till March. Tree middle-sized; great bearer.

51. *Ward*.—Fruit under the middle size, flattish, fine red and yellow green; flesh firm and juicy; is in eating from February till July; a valuable apple. Tree slender, twiggy, and a good bearer.

52. *Petit Jean Apple*.—Fruit oval, slightly flattened at both ends, eye small, placed in a confined cavity, stalk short and deeply inserted; colour pale yellow, where shaded, of a bright red, where exposed to the sun; flesh very white, extremely tender, with a mild and agreeable juice; keeps till the end of the season.

#### KITCHEN, OR BAKING AND BOILING APPLES.

53. *Pippin, Kerry*.—Middle-sized fruit, roundish; colour greenish yellow; ripens in October, and keeps till February; described in the memoirs of the Caledonian Horticultural Society as a valuable fruit for kitchen purposes.

54. *Pippin, Isle of Wight*.—Fruit middle-sized, roundish; colour greenish yellow; ripens in October and keeps till March. Tree hardy and a good bearer.

55. *Pearmain Royal*.—Fruit large, roundish; colour red and yellowish green; ripens in November, and keeps till June. Tree middle-sized, free grower, and a great bearer.

56. *Pearmain Winter*. (Often known by the same name as last; originated in Herefordshire).—Fruit middle-sized; colour green and red; ripens in September, and keeps till

May; a much esteemed fruit. Tree large, and great bearer.

57. *Pearmain, Bell's*.—Fruit middle-sized, oblong; colour dull green and russet; ripens in October, and keeps till May. Tree handsome, and free grower; a great bearer.

58. *Codling French*.—Fruit large, conical, and ribbed; colour yellowish green; ripens in August, and keeps till January. Tree hardy; a great bearer, and is readily propagated by cuttings.

59. *Codling, Keswick. Carlisle Codling*.—Fruit small, but when a thin crop, about the middle size, ribbed and conical; colour bright green and white; ripens in July, and will keep till the beginning of December. Tree very hardy, and capable of being propagated by cuttings—probably the most prolific apple we have. The fruit is used when very young as well as when ripe.

60. *Hawthorn Dean, Codling Hawthorn Dean*. (Is said to have been introduced by, or originated with, the celebrated Drummond, of Hawthorn Dean, and takes the name of that romantic seat on the river Esk, near Goslin, in the neighbourhood of Edinburgh).—Fruit large; colour pale green, white where shaded, and beautifully striped with red where exposed to the sun; ripens in August, and will keep till January; but is apt to become shrivelled by the end of that month. Tree hardy, and, next to the last, the greatest bearer we have. It is a great acquisition to market gardeners and fruit growers. It is a hardy free grower, and not liable to disease. It begins, like the last, to bear the second year after planting. Were they both better keepers, they might be termed the most useful apples we have. It thrives in any situation, and will do better on a north aspect than any other apple yet known. In the gardens of cottagers and artizans, both these apples should find a place.

61. *Eve Apple*. (Of Irish origin).—Fruit small, round; colour red and green; ripens in October, and keeps till July. Tree hardy, and capable of being propagated by cuttings.

62. *Bovey Red-Streak*.—Fruit middle-size, rather flat-tish; colour deep red and white; ripens in January, and keeps till April; is altogether a good fruit. Tree hardy and a good bearer.

63. *Norfolk Beaufin*.—Fruit above the middle size,

round and flattened; colour deep red on the exposed side, pale green where shaded; in use from December till August. This is one of our most valuable kitchen apples, and possesses the properties of being a great bearer, excellent keeper, and good baker or boiler; is much esteemed in Norfolk, and is there dressed in a peculiar manner. Tree sufficiently hardy to stand in any part of the kingdom, and not subject to disease. Of all our keeping apples, none better merits a place in small gardens than this.

64. *Cal's Head*.—An esteemed Scotch fruit, large, oblong; colour grey, yellow generally, but when fully exposed to the sun, of a reddish cast; ripens in January, and keeps till May. Tree vigorous, grows to a great size, and an abundant bearer.

65. *French Crab*.—Fruit large, oval; colour deep green and red; will keep from one season to another; a valuable fruit, and should have a place in every garden. Tree of a handsome upright habit, and a great bearer.

66. *Kirk's Seedling*.—Fruit large, round; colour red and yellow; ripens in December and keeps till May. Tree of vigorous growth, and a great bearer.

67. *Minshul Crab*.—Fruit middle-size, roundish; colour yellow, with brown spots; ripens in September, and keeps till April. Tree vigorous grower, a great bearer, and valuable fruit.

68. *Transparent Crab*.—A Russian apple, often known by the name of the Moscow apple. Fruit rather small, round; colour transparent red; in use in September and October. Tree very small; a great bearer. The fruit much used for preserving.

69. *New Red Musk*.—Fruit large, round; colour pale red and green; ripens in December, and keeps till February. Tree hardy, and a good bearer.

70. *Seek No Farther*.—Fruit above the middle size; colour pale green, a little streaked with red; comes into use in January, lasts till May, but becomes mealy by the beginning of April.

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## PEACHES.

PEACH, *Amygdalus Persica*, *Linnaeus*.—belongs to the class and order *Icosandria Monogynia*, and natural order *Rosaceæ*.

Originally from Persia; introduced in 1562. In the United States of America, particularly in the middle and southern provinces, it is no uncommon circumstance for the owners of some of the peach orchards to be possessed of such a number of peach trees as are sufficient, after fermenting and distilling the juice, to produce from 50 to 100 barrels of peach brandy. The manufacturing of this liquor, and the feeding of hogs, being the principal uses to which the peach is applied in those countries. In the vicinity of Buenos Ayres, in South America, where firewood is scarce, peach trees are raised from the stone chiefly for the purpose of burning.

The Horticultural Society's Catalogue enumerates 224 sorts.

1. *White Nutmeg*.—Fruit small, round, white, juicy, sugary; is chiefly esteemed for being first ripe; ripens in July.

2. *Red Nutmeg*.—Fruit much larger than the last; round, bright vermilion; flesh white, red next the stone; is a great bearer, and ripens soon after the last; is esteemed a better fruit.

3. *Early Avant*.—Fruit large, red, has an agreeable flavour, and ripens in August.

4. *Early Anne*.—Said to have originated from seed at Pusey, in Berkshire, and named after Mrs Anne Dunch of that place. Fruit small, round; very white both in skin and flesh; rather rose-coloured when fully ripe and exposed to the sun; high flavoured; one of our best early peaches, and should hold a place upon the walls of every garden; ripens in the beginning of August.

5. *Early Purple, Pourpre Native*.—Fruit large, round; fine deep red or purple; flesh white, very red next the stone; juicy, and high flavoured; is an excellent fruit; ripens about the middle of August.

6. *Red Magdalen*.—Fruit large; fine red; flesh firm, white, very red near the stone; flavour exquisitely rich; ripens about the end of August. Tree extremely subject to mildew in all situations.

7. *Montauban*.—Fruit middle size; deep red, inclining to purple next the sun, pale towards the wall; flesh melt-

ing; rich juice; ripens by the end of August. Tree a great bearer.

8. *Noblesse*.—Fruit very large, round, pale yellow, inclining to red next the sun; flesh juicy and rich. It is a great bearer, and one of our finest peaches; ripens about the middle of September.

9. *Double Swalsh*.—Fruit very large. It is one of our finest large late peaches; ripens about the end of September.

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## NECTARINES.

NECTARINE, *Amygdalus Persica*, variety,—belongs to the class and order *Icosandria Monogynia*, and ranks in the natural order *Rosaceæ*. Is a variety of the peach. It is cultivated in all latitudes in which the peach is grown, and succeeds equally well in all.

1. *Fairchild's Early*.—Fruit smallish, globular; beautiful red colour next the sun; flesh firm, and highly flavoured; ripens about the beginning of August.

2. *Early Newington*.—Fruit above the middle size; fine red next the sun, yellowish on the other side; flesh exceedingly high flavoured, adhering firmly to the stone, and is supposed one of the finest of the family; ripens about the end of August.

3. *Red Roman*.—Fruit large size; dark red next the sun, yellowish next the wall; flesh rich and juicy; ripens about the middle of September; fine fruit.

4. *Murray*.—Fruit middle size, dingy red, often almost black next the sun, pale greenish yellow next the wall; flesh parting freely from the stone; juicy and high flavoured. Tree an excellent bearer; ripens about the end of September.

5. *Claremont*.—Fruit middle size; flavour excellent; ripens about the end of September.

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## APRICOTS.

APRICOT, *Prunus Armeniaca*, Linn.,—*Armeniaca vulgaris*,—belongs to the class and order *Icosandria Monogynia*, and ranks in the natural order *Rosaceæ*. Apricots have long been considered a part of the genus

*Prunus*, from which it is now thought more advisable to separate them. and make a new genus, under the name of *Armeniaca*.

This delicious fruit was originally introduced to this country, in 1548, from Armenia. The following are the more esteemed varieties at present in cultivation in this country :

1. *Early Masculine* or *Red Masculine*.—An old variety, cultivated here in Charles the Second's time ; fruit small, round, red towards the sun, and greenish yellow towards the wall, or where much shaded ; flesh tender and of rather a tart taste, for which it is esteemed, as well as its being the earliest apricot we have. Tree rather slender but an excellent bearer ; fruit ripens about the end of July.

2. *Algier*, or *White Algiers*.—Cultivated here before 1702 ; fruit oval, flattish at the ends ; straw coloured ; flesh juicy and high flavoured ; ripens from the beginning to the middle of August.

3. *Moor Park*, *Anson's*, *Temple's*, and *Dunmore's Breda*.—This has been long erroneously supposed the Abricot Peche of the French ; but that is a large tree, which may be raised from the stone without grafting ; it ripens late in August ; and the stone is so soft that a pin will pierce through it, and the kernel is bitter. Introduced by Sir Thomas Moore, from the Netherlands about 1700. This is one of the finest of the apricot family ; ripens about the end of August ; requires a good soil to bring the fruit to perfection ; is rather a shy bearer ; but one fruit is worth three of some of the others.

4. *Brussels*.—Introduced from Brussels in 1702. Fruit middle sized, oval, red with dark spots next the sun, greenish yellow in the shade ; flesh not liable to become mealy ; flavour good. Tree hardy, and well calculated for a standard ; it is a great bearer, and will grow in worse situations than any of the others. Fruit ripens about the end of August.

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## PLUMS.

PLUM, *Prunus Domestica*, Linn.—belongs to the class and order *Icosandria Monogynia*, and ranks in the natural order *Rosaceæ*.

Considered by botanists a native of, or naturalized to, Britain, and is taken up as such in all our native floras. It is found in hedges and thickets, but its original country is supposed to be Asia; and, according to Pliny, it was brought into Greece from Syria, and thence into Italy. Plums, of all stone fruits, are considered the most wholesome when ripe. When unripe, they are liable to produce complaints in the bowels.

1. *White Primordian*.—Fruit small, round, yellow flesh mealy, of little flavour; being our earliest plum is almost the only merit it has; ripens in July: is a great bearer.

2. *Morocco, or Early Damask*.—Fruit middle sized; red and blue; flesh juicy, and pretty well flavoured; ripens about the beginning of August.

3. *Great Damask*.—Fruit large, oval; blueish; flesh rich; ripens in August.

4. *Little Black Damask*.—Fruit smaller than the last; flesh rich, a good bearer; and ripens about the latter end of August.

5. *Orleans or Red Damask*.—Fruit large, rather round; red; flesh firm; ripens by the end of August; is much esteemed for culinary purposes. It is a hardy tree, and an exceedingly great bearer, either upon walls or standards.

6. *White Perdrigon*.—Fruit middle sized; pale yellow and red; flesh rich, perfumed; an excellent fruit, either raw or in sweetmeats; ripens about the beginning of September.

7. *Orleans, Wilmot's*.—Originated by Wilmot, an extensive market gardener, at Isleworth, 1808; larger than the old Orleans; round; dark purple; flesh rich and juicy; an esteemed fruit, and great bearer; ripens about the middle of September.

8. *Green Gage, Reine Claude*.—Fruit small, round; yellowish green, where ripened upon a wall exposed to the sun, becomes almost of a dark russet, and is the highest flavoured plum, and most useful for every domestic purpose we have. It ripens in September, and is both a hardy tree, and exceedingly good bearer. All the sub-varieties of this plum are good. The name of Green Gage is said to have originated by the family of Gage, in the last century, procuring from the monks of Chartreuse at Paris, a collec-

tion of fruit trees. When these arrived, the names of all of them were affixed upon them, except the Reine Claude, the name of which had been lost in the passage. The gardener, being from this circumstance ignorant of the name, called it, when it bore fruit, the Green Gage, from the green colour and the family in whose possession it was.

9. *Cheston* or *Matchless*.—Fruit small sized, oval; dark blue; flesh rich; ripens in September.

10. *St. Catherine*.—Is one of our best plums, either for the dessert, or culinary purposes; flesh juicy and sweet; a great bearer; hangs longer upon the tree than any other. It is frequently in gathering for six weeks together; ripens about the end of September.

*Blue Imperatrice*, or *Violet*.—Fruit small, oval; dark coloured; hangs long on the tree; flavour fine; is one of our best late plums; ripens in October.

12. *Coe's Golden Drop*.—Fruit large, oval; yellow; flesh firm, juicy, and high flavoured; keeps till the end of December; one of our most valuable late plums; is a good bearer; and ripens about the middle of October.

13. *Coe's Fine Late Red*.—Fruit nearly equal to the last.

14. *Red Magnum Bonum*, *Red Imperial*.—Fruit large, egg-shaped; red; when well ripened an excellent fruit; at all times useful for culinary purposes.

15. *White Magnum Bonum*, *White Imperial*.—Fruit large, egg-shaped; yellow; when well ripened an excellent fruit; luscious and showy; extremely useful for preserving; ripens in October; great bearer; deserves a wall in most situations.

16. *Downton Imperatrice*.—Originated by Knight in 1823, from a seed of the White Magnum Bonum, and the pollen of the Blue Imperatrice; resembles the Blue Imperatrice in shape, but is rather larger, and not so much lengthened at the stalk end. Skin thin; colour dull yellow; flesh also yellow; soft and juicy; stone small and flattish.

## CHERRIES.

CHERRY, *Prunus Cerasus*, Linn.,—belongs to the class and order *Icosandria Monogynia*, and are arranged in the natural order *Rosaceæ*.

The cherry is considered by botanists a native of Britain, and entered in all our British floras as such. The cultivated cherry is a native of Asia and Europe, and was brought by the Romans into Italy from Cerasus, a town in Pontus (from which it now takes its systematic name), 73 years before the birth of Christ; and was introduced by them into this country 120 years afterwards. Some suppose, that those introduced by the Romans were lost in this country, and that they were again introduced by the fruiterer to Henry the Eighth. Lidgate, a poet of the fifteenth century, says, that they were exposed to sale in the streets of London before his time, much in the same way that they are at present. The gum which exudes from the stem and larger branches, when wounded, is considerable, and resembles gum-arabic; it is supposed to be very nutritious. Hasselquist says, that more than an hundred men were preserved from starving, during a long-protracted siege, by letting small pieces of this gum dissolve gradually in their mouths; and that they lived nearly two months upon no other nourishment.

The bark of the Virginian cherry is used as a febrifuge in the United States.

The fruit of this tree, *Cerasa rubra, Anglica, salva*, possesses a pleasant, acidulated, sweet flavour, and are proper in fevers, scurvy, and bilious obstructions. Red cherries are mostly eaten as a luxury, and are very wholesome, except to those whose bowels are remarkably irritable.

1. *May Duke*.—Fruit middle-sized, round; red; flesh soft and pleasant; one of our best and most generally cultivated cherries; upon a wall and in favourable situations, it ripens about the middle of June. It is a great bearer, either upon a wall, espalier, or standard.

2. *Early May Duke*.—Is similar to the above but much smaller, and not by any means so useful a fruit.

3. *Arch-Duke*.—Fruit middle size, round, and higher in colour than the last; is ripe in June.

4. *Black Eagle*.—Originated by Knight in 1814, the

seed sown in 1806. Fruit large, rather round; beautiful dark red, covered with a delicate bloom; flesh firm, sweet, and high flavoured. Tree very luxuriant and hardy, an excellent bearer, leaves unusually large. The first produce of fruits from seed is not so fine as they will be after a year or two. A striking instance of this occurred with this cherry when first presented at the table of the Horticultural Society. It was then (being in an imperfect state from want of age,) thought by the Fruit Committee to be good for nothing. The fruit now rivals in richness of flavour as well as beauty, almost any cherry that we possess. A similar circumstance occurred with the spring grove peach, the first fruits of which were so harsh and austere, that the original tree was absolutely thrown away, and this would have been lost to us, had not by chance a bud of it been introduced into an old tree before the original showed fruit.

5. *Holman's Duke*.—Ripens in July.

6. *Black Heart*.—Fruit rather large, heart-shaped, and very black and glossy, often staining the hand while gathering it; flesh firm and sweet; much esteemed; rather shy bearer.

7. *Black Tartarian*.—Introduced from Russia by M. Fraser, in 1796. Fruit large, roundish, black; flesh firm; flavour good. Tree a good bearer; ripens beginning of July.

8. *Bigarreau*.

9. *Black ditto*.

10. *Turkey do*.

} Excellent cherries. Ripen in July.

11. *Harrison's Heart*.—Introduced from the East Indies, by Governor Harrison, in 1709, and first cultivated at Balls, in Hertfordshire. Some of the trees were by him presented to George the First, and planted in Kensington fruit garden, and continued above 100 years to produce excellent crops of fruit.

12. *White Heart*.—Fruit large, heart-shaped; a shy bearer; one of our finest flavoured cherries when ripe; ripens in September.

13. *Morello*, or *Milan*.—Fruit large, round; light red; becomes dark when very ripe, or on a south wall; flesh soft and acid. Ripens in September, and will keep till December. Generally planted as standards and on north aspects; when planted on a south wall, or trained over the wall from the north aspect to the south, is much improved

in size and flavour. It is the most useful cherry we have for culinary purposes, and is a great bearer.

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### GEANS.

In the Horticultural Society's Catalogues are enumerated various varieties of this class of cherries, but there are many more cultivated in Scotland. Some of them, although very small, are extremely high-flavoured. Geans may be introduced into the park, where their various habits will give a variety, and the beautiful red tinge which their decaying leaves assume in autumn, give a colour to the landscape highly interesting. The following are most worth cultivating:

- |                                                                                               |              |
|-----------------------------------------------------------------------------------------------|--------------|
| 14. <i>Black Hungarian.</i>                                                                   | } Very fine. |
| 15. <i>White ditto.</i>                                                                       |              |
| 16. <i>Lundie.</i> —It is cultivated at a seat of Lord Duncan's, near Dundee, of that name.   |              |
| 17. <i>Transparent.</i>                                                                       |              |
| 18. <i>White Swiss.</i>                                                                       |              |
| 19. <i>Castle Menzies.</i> —From a venerable seat of Sir N. Menzies, Baronet, in Breadalbane. |              |
| 20. <i>Large Black.</i> —Flesh of which is hard, and apt to crack; flavour good.              |              |
| 21. <i>Amber.</i>                                                                             |              |

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### FIGS.

FIG, *Ficus Carica*, Linn.—belongs to the class and order *Polygamia Diœcia*, and ranks in the natural order *Urticæ*.

Is a native of Asia; naturalised in the south of Europe, and forms trees as large as our apple-trees. It seldom acquires any magnitude as a standard here, although in the Isle of Wight there are some trees of considerable size. It is with us, as is the case in every part of Europe, a deciduous tree, while in tropical countries it is ever-green. It was introduced here by Cardinal Pole, in 1525, and still exists in the garden of the arch-bishop, in Lambeth. Some of these trees

cover a space of 50 feet in height and 40 in breadth. The trunk of one of them is 28 inches in girth and another is 21. They are of the white Marseilles sort, and bear delicious fruit. In the garden of the Regius Professor of Hebrew, at Oxford, is a fig-tree brought from Aleppo, and planted by Dr Pocock, in 1643; bears a black fruit, and is in a thriving state. Philip Miller introduced about 12 sorts from Italy; before his time, this fruit appears to have been little thought of, and scarcely cultivated. It is cultivated here merely for the dessert; but its cultivation becomes a matter of great importance to the inhabitants in fig countries, who not only derive a considerable profit by the exportation of this fruit, in the well-known form that it is met with in our shops, but also as an article of food, which they prepare in a variety of ways both in a ripe and unripe state. There are few tables in France and Italy which do not produce this fruit in some shape or other, either fried or stewed, or as an addition to their desserts. We are supplied chiefly with our preserved figs from Spain, the south of France, Italy, and the isles and shores of the Mediterranean sea. Figs should not be planted near meat-safes or larders, as they have the singular property to intenerate the contents sooner than may be desirable. Philips (in Pom. Brit.) relates an experiment made upon a haunch of venison, which had lately been killed, being hung up in a fig-tree when the leaves were on, about ten o'clock in the evening, and was removed before sun-rise in the morning, when it was found in a perfect state for cooking. A somewhat similar circumstance occurred to a gentleman, who had a fig-tree planted against the walls of his house, some of the branches of which were trained near the window of his pantry; during the whole of the summer he could not keep a bit of meat for many hours without its becoming almost putrescent; this occasioned many altercations between him and the butcher, till at length he betook himself to reason the

matter, and being a shrewd intelligent person, removed the cause by placing the branches of the fig at a greater distance. After this his meat kept as well as it did before the fig was planted.—*Practical Gardener.*

This tree is cultivated as a standard in those countries which produce the finest figs; and such as are standards in England, where the situation is favourable, are much more productive than when upon walls or espaliers in equally favourable situations.

French figs are, when completely ripe, soft succulent, and easily digested, unless eaten in immoderate quantities, when they are apt to occasion flatulency, pain of the bowels, and diarrhœa. The dried fruit, which is sold in our shops, is more pleasant to the taste, and more wholesome and nutritive. Applied externally, they promote the suppuration of tumours: hence they have a place in maturing cataplasms; and are very convenient to apply to the gums, and, when boiled with milk, to the throat.

1. *Brown Ischia.*—Fruit globular, with a pretty large eye, large; pinched in near the foot stalk; colour brown or chesnut on the outside, purple within; flesh sweet and high flavoured; containing largish grains. Ripens about the end of July or beginning of August. If planted upon a hot wall, will produce two crops annually. Originally from the island of Ischia.

2. *Black Ischia.*—Fruit short, middle-sized, somewhat flattened at the crown; colour black when ripe; inside colour deep red; flesh very high flavoured; ripens in August. An excellent bearer. Originally from the island of Ischia.

3. *Genoa, Large White.*—Fruit large globular, somewhat lengthened towards the stalk; skin thin; flesh high flavoured; colour yellowish when ripe; inside colour red; ripens about the end of August. Will, under favourable circumstances, produce two crops annually.

4. *Lee's Perpetual.* (Originated by the late Mr Lee.)—Is one of the best bearing figs that we have, and should be introduced into all fig collections.

5. *Italian, Brown Turkey.*—Fruit small; colour, both outside and in, brown; flesh rich and delicious. Is of slen-

der habits, and well calculated to force when planted in pots or small boxes.

6. *White Marseilles*.—Has been long cultivated in Britain. Is a good bearer, and high flavoured fig.

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## VINES.

VINE, *Vitis Vinifera*, Linn.,—belongs to the class and order *Pentandria Monogyina*, and ranks in the natural order *Viticeæ*. It is widely diffused over the warmer and temperate regions of the globe.

*Vitis Vinifera* is universally known for its fruit, and for producing the first liquor in the world; a liquor which, notwithstanding all that is said of its dangerous qualities, is yet eagerly drunk by all that can procure it, and preferred before all others by those who are unlimited in their means and choice. The grape vine is among fruits, what wheat is among the cereal grasses, or the potato among the farinaceous roots; and, like them, in every country where it will grow, is cultivated with pre-eminent care. In Britain, its culture is more confined to the garden as a dessert fruit; though formerly grown in many places for the wine-press. Besides the *V. Vinifera*, the *V. Labrusca*, (from *brusca*, the Hebrew for grape,) and *Laciniosa*, are all cultivated, and both are now so intermixed with the first species by hybrid products, that for all practical purposes they may be considered as only varieties.

The varieties of the grape in countries where it is grown for the wine-press, are almost as numerous as the vineyards, for as these for the most part differ in soil, aspect, elevation or otherwise, and as the wine is greatly the child of local circumstances, its habits soon become adapted to those in which it is placed. When it is considered that a vineyard once planted will last two or three centuries, it will readily be conceived that the nature of a variety may be totally changed during only a part of that time. The varieties most in esteem for wine making, are those with small berries,

and bunches, with an austere taste. The Burgundy, as modified by different soils and situations, may be considered the most general grape in France, from Champagne or Marne, to Marseilles and Bourdeaux. The best wine in Italy and Spain is also made from grapes of this description; but in both countries many of the larger sorts are grown, as being more productive of liquor.\* The sweet wines, as the Malmsey, Maderia, Constantia, Tokay, &c. are made from sweet berried grapes allowed to remain on the plants till ripe. That wine is the strongest, and has most flavour, in which both the skins and stones are bruised and fermented. The same thing is the case in making cider; but in both processes bruising the stones or kernals is often neglected.

The varieties of dessert grapes on the Continent are few: the best they have, the Muscats and Frontignacs, have been obtained from this country. The Chasselas or frame grape (our Muscadine,) is almost the only eating grape known in the Paris fruit market. In Britain we have not only the finest varieties, but we grow the fruit to a larger size and of a higher flavour than is grown elsewhere. This is owing to the perfection of our artificial climates, and the attention paid to soil and subsoil, and other points of culture.

The vine is universally propagated by cuttings, a foot or more long, with a portion of two year old wood, or short with only one bud, or one bud and half a joint, &c. Varieties without end are raised from seed, and it is thought that by propagating from the seeds of successive generations, some sorts may ultimately be obtained better adapted for ripening their fruit in the open air than now known. A seedling vine carefully treated will show blossoms in the fourth or fifth year; say that it produces a fair specimen of its fruit in the sixth year, then a new generation may be procured every sixth year.

\* And wine that to the heart of man  
Doth cheerfulness impart.—Psalm, civ, v. 15.

The vine will thrive in any dry soil, or in any soil with a dry subsoil; but it produces the best flavoured fruit among granite and calcareous fragments, and loamy soil in thin strata, with little manure, and when the vine is old and the berry and bunch small: on the contrary, the most luxuriant crops, large bunches and berries, in a good depth of friable loam, dry below, and richly manured with the strongest of animal manures.

There are three methods of pruning the vine in hot-houses; the fruit tree method, in which the plant is spread out in the fan manner, and treated like a common fruit tree; the long or young wood method, in which all the wood above a year old is cut out down to the shoot or stock; and the spurring in method, in which the fruit is produced from young wood grown annually from the sides of a main shoot or shoots of old wood. The two last methods are the best.

*Vitis Vulppind*, the fox grape, (so called from the foxy flavour of its berries,) is much cultivated in North America, of which country it is a native. Many improved varieties have been raised by the American gardeners, and have been sent to Europe under the name of the Bland, the Isabella, the Oswego Tokay, &c. &c.; but they are all tainted with the bad taste peculiar to the species, and can be in no estimation when even an early July grape is to be procured.

The juice or sap of the vine called *lachryma*, has been recommended in calculous disorders: and it is said to be an excellent application to weak eyes, and specks of the cornea. The unripe fruit has a harsh, rough, sour taste; its expressed juice, called *verjuice*, was formerly much esteemed, but is now superseded by the juice of lemons; for external use, however, particularly in bruises and pains, *verjuice* is still employed, and considered a very useful application.

Raisins are prepared by immersing the fresh fruit into a solution of alkaline salt and soap-ley made boiling hot, to which is added some olive oil, and a small

quantity of common salt, and afterwards drying them in the shade. They are used as agreeable lubricating acescent sweets in pectoral decoctions and for obtunding the acrimony in other medicines, and rendering them grateful to the palate and stomach.

My aged mother was long afflicted with sore eyes, and a boy of whom I had charge, was also similarly affected from his infancy. I applied to the late Dr. Ramsay in Dundee; when he sent me a small bottle of the lachryma, or sap of the vine, which healed the eyes of both, after two or three day's application. The boy got some internal medicine at the same time; he is still with me, and his eyes have never been affected since. The liquid requires to be shaken when to be applied, and laid over the eyes with a clean feather or linen rag. The application is by no means painful.

#### PRUNING AND TRAINING VINES ON THE OPEN WALLS.

It is a general practice of pruning vines on the open walls in spring, but as they are apt to bleed much, if that operation be delayed until the sap has risen, we deem it the safest way to perform it in autumn as soon as the leaves have fallen, and the wood is sufficiently ripened, or as soon after as convenient. Vines on the open walls, in favourable situations, are no unimportant part of the produce of the fruit-garden; and in situations where the fruit does not ripen in ordinary seasons, it is, in its unripe state, of some consequence to the owner, not only for the use of the kitchen, but also for the more important purpose of wine-making.

Vines, under such circumstances, may be trained and pruned under a variety of forms, and fancy may here be more indulged than with such as are in the vinery. As this plant, like some others, produces its fruit on the young shoots arising from the wood of the preceding season, it becomes necessary that that description of wood should be encouraged, and equally distributed over the whole tree; and as the

vine is apt to become naked, or thin of such wood towards the bottom, particularly under bad management, it is the more necessary to point out the necessity of counteracting that habit by a judicious use of the pruning-knife. However advantageous it may be in the management of vines under glass, to retain the shoots at same length, often of several feet, it is obvious that the same principle is not applicable to those in the open air. The practice of those, who cultivate vineyards for the purpose of wine-making, teaches us that cutting them short is advantageous, even in good climates; it is therefore more so with us in our less congenial one; and the success of those, who with us have carried this branch of horticulture to any extent, bears us out in the assertion. Vines in the open air break more regularly than when forced; therefore there can be no want of fruitful shoots, should the wood of the present year be shortened in at this time, to two, or often where the buds are strong, to one eye. However, the eye nearest to the old wood is often weak, and less likely to produce a fruitful shoot. Our practice in such cases, has been to rub off the eye nearest to the old wood, when weak, and to depend upon the next two for our supply. Where neatness is attended to in the minutiae, this practice we own will in time make the spurs more bulky, but the extent of the crop will be proportionable great. As the finest flavoured grapes are supposed to be produced at the extremities of the branches, or on those that are farthest from the root, training them in a serpentine form, will have that effect within the least space of wall. Indeed, by leading off a main branch under the coping, every unoccupied portion of the wall may be conveniently covered with the fruit and foliage of the vine.

In conformity to this idea, as well as to fill the empty spaces upon walls before the permanent trees fully extend themselves, a correspondent in the Horticultural Society's Transactions, proposes to train vines

horizontally under the coping of a garden-wall to a great distance, and by inverting the bearing shoots, the spaces between the other fruit-trees, and the top of the wall, could readily be filled up; and if different vines were enarched to the horizontal branch, the south wall of a large garden might be furnished with a variety of sorts from the stem and root of a single plant, the roots of which would not incumber the border in which the other fruit-trees are growing. "I have," he says, "an experiment of this kind now in progress in my garden. Within a few years past, I have gradually trained bearing branches of a small black cluster grape, to the distance of nearly fifty feet from the root, and I find the bunches every year grow larger, and ripen earlier, as the shoots continue to advance."

According to Knight's theory of the circulation of the sap, the ascending sap must necessarily become enriched by the nutritious particles it meets with in its progress through the vessels of the alburnum; "but I suppose," he adds, "that there are certain limits beyond which the sap would be so loaded with nutriment, that it could not freely circulate."

In pruning the vine at any season, or in any way, it is necessary to make the cut half an inch above the eye from whence the shoot is expected to spring; and it must be done in a sloping direction, to prevent the lodgment of moisture, which might tend to bring on decay, and consequently the ruin of the bud or embryo shoot. When the operation of pruning is completed, the shoots should be neatly nailed again to the walls, and they will require no further care till the season of summer-pruning arrives.

In regard to the method of training and fastening the shoots of vines on the roofs of cottages, Mr Latham of Aylesbury, recommends the following plan, by which the slating and tiling may soon be covered with the rich clothing of the grape tree. Take pieces of tin, six or seven inches in length, the

refuse of the tin-workers' shop will do, and at convenient distances turn it over the shoot intended to remain, and thrust part of the two ends between the tiles or slates. The weight of the incumbent tile or slate will be sufficient to keep the shoot in the place, so as not to be disturbed by winds.

#### DISBUDDING VINES ON THE WALLS.

The vines against the walls should be looked over about the end of April; they will, by that time, if a forward season, be advancing in shoots, and some of them showing fruit. The dressing or disbudding at this early season is to be performed with the finger and thumb, rubbing the shoots closely off.

Previously to the training of any tree, for the purpose of obtaining the greatest quantity of fruit, its mode of bearing should be first taken into consideration, and the object of the cultivator must necessarily be to obtain the greatest quantity of bearing wood, of an equal and proper distribution.

The vine is a creeping plant, throwing out the most luxuriant shoots at the extremity of its branches, where they are laid horizontally or perpendicularly. In training this tree, it is necessary to keep three principal objects in view: first, to cover the space allotted to it with fruit-branches, leaving room for both ripening the fruit, and the branches that are to bear fruit the succeeding year: secondly, to take off the top of each branch bearing fruit at the second or third joint above the uppermost bunch, except such branches as are destined to bear fruit the next year, which latter must be exposed and by no means topped; for if the sap be checked in these, many of their buds will burst the same season, and the fruit of next year be destroyed: thirdly, to take off all laterals as they arise, and any shoots which, though laid in for fruit, turn out unproductive, that the whole strength of the tree may be properly applied to the maturation of the fruit, and the wood for succeeding crops.

By early regulating the vines, the grapes will ad-

vance freely in their growth, become larger, more regular, ripen sooner, and be in greater perfection, than when the vines are suffered to run into confusion; besides, the work can be performed much sooner, and with much greater correctness, regularity, and beneficial effect, both to the vines and prosperity of the fruit.

The pruning must be constantly attended to throughout the season, and their shoots laid in, according to circumstances. Few insects injure the vine on the open wall. The red spider is its greatest enemy, but it may always be kept under by a plentiful supply of water, administered with the engine. The thrips sometimes attack them on the walls, but most generally on those leaves and shoots which have been injured by frost. Fumigation will rid the vine of this enemy, as well as of the fly.

As the season advances, many small shoots generally rise, one mostly from every eye of the same summer's shoots which were laid in a month or two ago; and the same small shoots must now, as they are produced, be all displaced, to admit all possible benefit of the sun and free air to the advancing fruit.

All other shoots, wherever placed, that have been lately produced, must also now be rubbed off close; and such shoots as shall rise any time this month, should, accordingly as they come out, be continually taken off, except where good sizeable shoots advance in or near any vacant parts where a supply of young wood appears necessary; in which case, it is proper to retain them, and have them trained in regularly.

All straggling branches should be nailed to the wall both to allow the sun to get in to the fruit, and to ripen the wood for next year. Where the bunches are too much shaded, some of the leaves should be picked off, but in doing so, take great care not to overdo it; leave the whole or most part of the foot-stalk of the leaf attached to the wood, and take as few as possible away, as the vine suffers much from

the loss of its leaves. The earlier grapes on favourable situations will begin to ripen in September, and should have the benefit of the sun as much as possible, and if the wasps or birds attack them, they should be protected from both by being put into thin crape, or gauze bags, putting one bunch only in each, and having the bags made of different sizes for that purpose. Such grapes as are not so forward, should be thinned out for good; it is of much importance that this be done in time; and also let them be well thinned to allow them room to swell, and the sun to ripen them.

The following are the more esteemed varieties at present cultivated.

1. *Hamburg Black*. (True).—Bunches large; berries large, oblong; colour black; pleasant and vinous flavour; a great bearer and one of the best grapes we have; figured in the *Practical Gardener* as being the most universally cultivated.

2. *Black Prince*.—Bunches large; berries very large, globular; dark brown, or black; one of our best grapes, and should hold a place in every vineyard.

3. *Black Damascus*.—Bunches largish; berries round and black. An excellent high flavoured grape, and well calculated for late crops.

4. *White Sweet Water, New Dutch*.—Bunches largish; berries large, round and white; one of our best white grapes.

5. *Muscat of Jerusalem, New*. (Originated by Miller, in 1738). Bunches large; berries very large, flavour excellent.

6. *Variiegated Chasselas*. (Originated by Sir T. A. Knight, prior to 1812).—Bunches middle-size; berry small, sometimes striped with green; natural colour black; leaves green during summer, but become towards autumn, beautifully variegated with red and yellow, particularly if planted in a light soil, or in pots. Plant very hardy, adapted for the open walls, and is a great bearer; flavour inferior, but well adapted for making wine. Fruit keeps long after it is separated from the tree, by being hung in a dry room.

7. *Wantage Grape*. (The original plant was discovered by Mr. J. Wilmont growing against the wall of a house

at Wantage, in Berkshire, where it had been raised from the seed of a dried raisin some years ago.)—It is a hardy grape, and well calculated for the open walls. The bunches are large; berries nearly round; colour approaching to that of the Grizzly Frontignac; of an excellent flavour, and a great bearer.

8. The *Alexandrian Cioutah Grape*. Originated by J. Williams, Esq., prior to 1820, from seeds of the parsley grape and pollen of the white muscat of Alexandria, but has none of the perfume).—The plant is a great bearer, and grows with great vigour. The berries, however, set thin on the bunch, but it possesses the good property of keeping without withering or rotting on the bunch, much longer than any other grape. It has been known to keep for three months after having been disengaged from the plant; namely from January till April.

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## GOOSEBERRY.

*Ribes Grossularia*, or rough gooseberry, and *R. Uva crisper*, or smooth gooseberry, belong to class 5th and order 1st, *Pentandria Monogyina*; consist of plants of five stamens not united. This class is distinguished from Syngenesia, (or 19th,) by its flowers being simple, while those of Syngenesia are compound. Example, *Ribes*. Petals five, and stamens inserted into the calyx. Style 2—fid. Berry many seeded, inferior. The gooseberry is a native of Scotland; Hamilton woods, and Drummie, near Blairgowrie. It is capable of great extension and improvement when assisted by means of artificial fecundation; that is, by destroying the stamens of a portion of the flowers, to be operated upon before arriving at maturity, and dusting the stigmas of these flowers, with the pollen of any other improved variety, when the plants are in full flower.

The seed thus produced, is to be preserved and sown the following spring, which will produce new varieties in abundance. The general mode of propagating the gooseberry is by cuttings, in the spring of the last

year's growths, and when properly cultivated, will keep the species genuine any length of time, thus raised by cuttings. It is generally raised as a dwarf-bush, or sometimes on espalier rails; one variety, the green gage, makes very neat half standards, and bears better in that state than as a bush. They require a loamy soil, an open airy situation, and yearly attention to pruning and loosening, and refreshing their roots with liquid-manures. The varieties of the gooseberry are very numerous, and yearly increasing in Lancashire, and other counties where the fruit is grown for prizes, by raising from the seed. These new varieties, however, are valued more according to the size of the berry, than its flavour or the prolificacy of the plant; so that few, so originated, are fit to be added to the table or kitchen fruit. Twenty-five penny weights is considered a great weight for a gooseberry, but some have been raised a few dwts. heavier.—*See the Manchester Gooseberry Book, published annually.* The climate of France, Italy, and Spain is too warm; and the summers of many parts of the north of Europe too rapid for their attaining a good size. They are, however, more in vogue in the latter countries, than they have ever been before; but as the quality of the fruit soon degenerates when the plants are not kept in high cultivation, it can never become very popular in countries where the pear, vines fig, and olive, grow freely, and which being planted and once established in the soil, grow and bear for ages with very little care.

The following are approved sorts for garden cultivation :

| WHITE.            | GREEN.       | YELLOW       |
|-------------------|--------------|--------------|
| Champagne.        | Champagne.   | Amber.       |
| Crystal.          | Chisel.      | Champagne.   |
| Early.            | Early.       | Golden Ball. |
| Large Early.      | Early Hairy. | Golden Drap. |
| Mountain of Snow. | Gage.        | Hairy Amber. |
| Walnut.           | Wilmot's     | Large.       |
| Fig.              |              |              |
| Snow.             |              |              |

## RED.

|                   |                 |
|-------------------|-----------------|
| Champagne.        | Crystal.        |
| Early Rough.      | Ironmonger.     |
| Little Red-bairy. | Raspberry.      |
| Rough Red.        | Early Black.    |
| New ditto.        | Wilmot's Early. |
| Small ditto.      | Warrington.     |
| Small Dark ditto. | Walnut.         |

Among these, Wilmot's Early Red deserves to hold a place in every garden. It is the earliest gooseberry we know, being ripe in June; and for culinary purposes, in May, is preferable to all others. We may add, that it is both a great bearer, and high flavoured fruit.

The Warrington, or Manchester Red, which is an improved variety of the old Ironmonger, has long been esteemed the best dessert fruit; and the bushes assume a perpendicular direction of growth, which occupies little space.

The Red Walnut is considered best for preserving whole, or drying.

To the above list we may add :

| WHITE.        | YELLOW.      | GREEN.     |
|---------------|--------------|------------|
| Royal George. | Upright.     | Gascoigne. |
| Orleans.      | Honeycomb.   | Goliah.    |
| RED.          | Sulphur.     | Globe.     |
| Nutmeg.       | Conqueror.   |            |
| Captain.      | Golden Knap. |            |
| Admirable.    |              |            |

Of these, the Green Gascoigne is much esteemed as the highest flavoured of all the greens, is very early, and an abundant bearer.

The Honeycomb is the best-flavoured yellow.

## CURRANTS.

*Ribes Rubrum*, (Common or Red Currant;) without thorns, erect, racemes, glabrous, pendulous, flowers nearly plain, petals obcordate, is also a native of Britain. The English name currant, is evidently from the similitude of the fruit to that of the grape of Zante, which dried, forms the Corinthians, or currants, of the shops. The fruit has an agreeable subacid taste, and is generally relished both at the dessert, and in pies and tarts. Equal weights of fruit and fine sugar, put over

the fire, yield a liquor which forms a most agreeable jelly, used as a sweetmeat, to eat with hare, venison, and Welch muttons, to flavour punch, and as a medicine. It is also much used for making wine, and is grown to a large extent for that purpose, in Essex, Kent, and about Pershore, in Worcestershire. The principal varieties are the white and pale, or Champayne; but any number of varieties may be produced by sowing the seeds; from which, however, none superior to those in general use have been hitherto originated.

The culture of the red currant is known to every countryman. It grows freely by cuttings of last year's wood, which should be of sufficient length, and all the buds rubbed off to three or four on the top to form a handsome plant, with a clean stem, ten inches high. It grows in any soil, but prospers best in one loamy and rich. The best flavoured fruit is produced from plants in an open free situation, but they will grow under the shade of walls and trees, and either as low bushes or trained against walls or espaliers. They bear from spurs, and therefore, in pruning, most of the young wood is cut to within two or three buds of that where it originated.

*R. Nigrum*, the black currant is a native here, and is common in most woods of Russia and Siberia, where a wine is made of the berry alone, or fermented with honey, and with or without spirits. In Siberia they make a drink of the leaves: these tincture common spirits so as to resemble brandy; and a few of them dried and mixed with black tea, answer all the purposes of the green material. Many persons in this country dislike the peculiar flavour of the berries of the black currant, which are therefore not much used in the kitchen or dessert, and seldom in wine making. They make a jelly or jam, in estimation as a gargle for inflammatory sore throats.

The culture of the black currant is similar to that of the red; but as it is less apt to bear on spurs than on

young wood, the shoots are not so much shortened in this as in the other. It is singular that no varieties have been raised of this species, nor will it produce hybrids, so far at least as has been tried, with the other cultivated sorts of Ribes.

The currant is a native of many parts of Europe, and found wild in several parts of Britain, growing on river banks, and like the gooseberry, never far from the habitation of man. The white currant tree is merely a variety of the red, the fruit of both is perfectly analagous; therefore what is said of the one, applies to the other. The red currant is abundantly cultivated in gardens, and from its grateful acidity, is universally acceptable, either as nature presents it, or variously prepared by art, with the addition of sugar. Considered medicinally, it is esteemed to be moderately refrigerant, antiseptic, attenuant, and aperient. It may be used with considerable advantage to allay thirst, in most febrile complaints, to lessen an increased secretion of bile, and to correct a putrid and scorbutic state of the fluids, especially in sanguine temperaments; but in constitutions of a contrary kind, it is apt to occasion flatulency and indigestion.

There are several varieties, differing in colour, size, &c., the principal of which are—

#### RED CURRANT.

Marsh-Mallow Leaved.

Common Red.

Large Red.

Large Bunched Red.

Large Dutch Red.

Dutch Red.

Striped Leaved. } curious

Variegated do. } .

Wilmot's Pale Red.

Champagne.

#### WHITE CURRANTS.

Common White.

White Dutch.

Pearl White.

White Crystal.

Large New White Dutch.

Of these, the Marsh-mallow leaved is the best, and with the Dutch reds and whites, common red and white, and Champagne, are most worth cultivating.

**BLACK CURRANTS.**—This fruit is probably a native of

this country; at all events, it is found in situations more remote from the dwellings of man than either the red currant or gooseberry. In Russia they make a palatable wine from the juice of this fruit sweetened with honey, and they also put them into brandy, as we do cherries. The leaves of the plant are a better substitute for green tea than any of the noxious ingredients usually employed to adulterate that article.—*M. Intosh.*

It affords larger berries than the red, which are said to be peculiarly useful in sore throats, and to possess a diuretic power in a very considerable degree. The leaves of the black currant are extremely fragrant, and have been recommended for their medicinal virtue, which Bergius states to be a grateful diuretic.

In the catalogue of the Horticultural Society, are enumerated five varieties, probably some of them may be the same. They are, The

- Wild Black Currant.
- Black Grape.
- Black Naples.
- Common Black, and
- Russian Green.

The common black is the only one generally cultivated.

## RASPBERRIES.

The raspberry is a native of Britain, and often found in woods rather moist, and almost always congregated or growing in masses together. Raspberries are recommended in gouty or rheumatic complaints. The fruit is wholesome, and the syrup dissolves the tartar of the teeth, and does not undergo the acetous fermentation in the stomach.—*M. Intosh.*

The fruit of this plant has a pleasant sweet taste, accompanied with a peculiar grateful flavour, on account of which it is chiefly valued. Its virtues consist in allaying heat and thirst, and promoting the natural secretions. A grateful syrup prepared from the juice, is directed for officinal use.—*Hooper.*

In the catalogue of the Horticultural Society they enumerate 23 sorts, some of which possess excellent

properties: of these the Antwerps, Canes, and a few others, are the most generally cultivated.

## ANTWERPS.

Double-Bearing Yellow.  
Late Bearing, *Kennel's*  
*Antwerp*.  
Red, or *Barley*.  
Yellow, or *White Antwerp*.  
Double-Bearing.

## CANES.

Common Red, *Old Red*,  
*Wild Red*.  
Rough.  
Smooth.  
Red.  
Brentford.

Twice, or double bearing, Red double bearing, Siberian, or perpetual bearing. William's double bearing red or Pitmaston.

## REDS.

Wordwood's Globo.  
Wilmot's Early.  
Malta.  
Taylor's Paragon, or  
Scarlet Paragon.

## VARIOUS.

Lord Exmouth.  
Prolific Early.  
Superb.  
Spring Grove.  
Barnet,  
Cornish.  
Victoria, an improved new  
kind.

## WHITE.

Old White.

The twice bearing ripens in July its first crops, and its second in October; but those of the last crop, unless in very fine autumns, seldom have much flavour.

## MULBERRY.

The common black mulberry is the only one cultivated in the garden as a fruit tree; but the fruit of some of the other species, especially *Mons Alba*, (the white mulberry,) are sufficiently good to merit a place in a fruit-garden of the first rank. The common black mulberry is native of Italy, and was introduced in 1548. It is the leaves of the mulberry tree that feed the silkworm. James the First intended to establish a silk manufactory in England, and it is conjectured that many of the old trees met with in the neighbourhood of London, were planted by that monarch. The fruit is very wholesome, and, like a few other fruits, do not undergo the

acetous fermentation in the stomach; but it is not universally esteemed, probably owing to its being seldom produced in perfection. They are sometimes planted upon walls, in which case, they produce great quantities of fruit, and extend their branches to an amazing distance. But when situations are favourable, they form an ornamental tree upon the lawn, and afford very good crops of fruit. One or two trees will afford plenty of fruit for an ordinary family, and may be procured in the nurseries, of a size sufficient to produce fruit the year after planting. This fruit has been found by Sir T. A. Knight to be much improved by being cultivated in pots under glass, and produces crops more abundantly under such circumstances than any other tree with which he is acquainted. The blossoms set equally well in different degrees of temperature, and the same degree of heat that will ripen the earlier varieties of grapes in the end of July, will afford perfectly ripe mulberries in June. Dwarf trees of this species of fruit, may be readily obtained (for this purpose,) by enarching upon a young stock the bearing branch of an old tree. Plants thus prepared have yielded above twenty dozen of mulberries in one season. The plants growing in ordinary sized pots, and not three feet high.—*M. Intosh.*

Mulberries abound with a deep violet coloured juice, which in its general qualities, agree with that of the fruits acido-dulces, allaying thirst, partly by refrigerating, and partly by exciting a secretion of mucus from the fauces; a similar effect is also produced in the stomach, where, by correcting putrescency, a powerful cause of derangement is removed. The bark of the root of this tree is said by Andrée to be useful in cases of teania (a genus of intestinal worms.) The London College directs a *Syrupus mori*, which is an agreeable vehicle for various medicines.—*Med. Dict.*

## STRAWBERRIES.

STRAWBERRY, *Fragaria*, *Linnaeus*,—belongs to the class and order *Icosandria Polygynia*, and ranks in the natural order *Rosaceæ*.

Botanists have disagreed whether the several sorts of cultivated strawberries are really distinct species of the genus *Fragaria*, or only varieties of one or two species. The *Grandiflora*, or pine; the *Virginiana*, or common scarlet; and the *Chiliensis*, or *Chili*, are supposed by Knight to be varieties of one species only, as they may be all made to breed together indiscriminately.\* They are natives of the greater part of Europe, particularly the north, and are found in the temperate regions of America. The fruit is held in high estimation, and is recommended to people of gouty and rheumatic habits. Patients afflicted with stone have found much relief from eating them largely; and it is supposed by some that the name *Fragaria* is derived from (*Frangans*), to break, as they are of efficacy in dissolving or breaking the stone; others derive the name from the fragrance of the fruit; and the English name of strawberry, from the practice of laying straw between the rows, to keep the fruit clean. Their juice dissolves the tartar of the teeth, and promotes perspiration.

They have been long cultivated in this country. The wood-strawberry must have attracted the attention of our ancestors at an early period. Their varieties, till of late years, were not numerous. They appear to have attracted the notice of the Horticultural Society, soon after its formation, and to some of the members of that society, we owe not only many of our finest sorts, but also the cultivation of them upon good principles. In the lists of the last century we had not more than 12 or 14 sorts. In the Horticultural Society's Catalogue, are enumerated 94; many of them are excellent fruits, and are only such as are cultivated in their garden. The French sorts

\* See Botany, class 12.

are not included in this list, as many of them are supposed to be the same as some of the English ones. Of this list, 44 are scarlets, 7 blacks, 19 pines, 7 Chilis, 7 hautbois, 1 green, and 9 Alpines.

Strawberries should be planted in rows, about two feet or thirty inches asunder, according to the sorts, and 15 or 18 inches apart in the rows, or in single rows as edgings to the alleys of the kitchen garden. The ground should be deeply dug for strawberries and well dunged in the trenches under the rows—as directed for cabbages. The young plants should only be used for new plantations; their leaves and roots should be trimmed previous to planting; they may be set in the rows in patches of three plants each. Season, August to April.

The ground between the rows should be rough-dug in autumn, and the plants, whether old or young, should be kept clear of all weeds during summer, and the runners kept within proper bounds.

Old scarlet, and Grove End scarlet, are the earliest; Kean's seedling is a great bearer, and, taking it altogether, the best strawberry in cultivation; the roseberry is a great bearer; the old pine is the best flavoured of all strawberries, though a shy bearer; Wilmot's superb has little flavour, but is remarkable for its size. For the margins of alleys, we would recommend, as having small leaves, and bearing the fruit on high erect stalks, which are not likely to be injured by the feet of persons walking along the alley, the prolific or conical hautbois, the large flat hautbois, the red and white alpine, and the red and white wood; the last four kinds, if regularly supplied with water, will continue in bearing all summer.

Among the new improved varieties may be mentioned the Swinton strawberry, but the high price has hitherto prevented it from being yet much cultivated.

The runners from the strawberry edgings must be constantly pruned off, as soon as they extend 6 inches from the plant over the walk, and from 12 to 14

inches over the borders, except when young plants are wanted to substitute for the old ones.

### C R A N B E R R I E S .

The *Oxycoccus Macrocarpus*, furnishes the cranberries sent from North America, and the *Oxycoccus Palustris*, those of Europe. The latter is a native of peat-moors, or heathy-moors, in many parts of the north of England, and Scotland, and the former is a native of similar places in North America. The latter is now also occasionally cultivated in our gardens; and is collected from its natural place of growth in vast quantities. In the north of Europe, great quantities of them are yearly preserved in bottles, and sent to Scotland, whence they are exported to different parts of the world. A great portion of them is annually brought to the London market. In this country they are mostly preserved and made into tarts. They are pleasantly acid and cooling, with which intention they are used medicinally in Sweden.

### N U T S .

Of nuts there are many names to be met with in the nursery catalogues; but those in the following list, are by far the most useful, and are in very general cultivation:—

#### WALNUTS.

|                        |                      |
|------------------------|----------------------|
| Tender Shelled.        | Round Early Oval.    |
| Thick Shelled.         | Double Large French. |
| Highflyer of Thetford. |                      |

Of these the Highflyer of Thetford, and Tender Shelled, are considered the best.

The unripe fruit, which has an astringent bitter taste, and has been long employed as a pickle, is the part which is directed by the London College, on account of its anthelmintic virtues; an extract of the green fruit is the most convenient preparation, as it may be kept for a sufficient length of time, and made agreeable to the stomach of the patient, by mixing it with common water.

## CHESTNUT.

The edible is supposed to be a native of England; like others originated by seeds, several varieties exist. Some ripening a few days earlier, and some attaining a larger size, than others. But of these none have been fixed upon by cultivators, or propagated for their respective merits. The fruit of this plant is much esteemed as an article of luxury after dinner. Roasting renders them more easily of digestion; but notwithstanding, they must be considered as improper for weak stomachs. They are moderately nourishing, as containing sugar, and much farinaceous substance.—*Med. Dict.*

## FILBERT.

|                        |                     |
|------------------------|---------------------|
| Spanish or Barcelona.  | Large Long Nut.     |
| Red-kernelled Filbert. | Common Hazel Nut.   |
| White-kernelled Do.    | Red-kernelled Do.   |
| Greet Cob-nut.         | Cossford.           |
| Frizzled.              | Constantinople Nut. |

Of these the common and red kernelled hazel nut are well known, and are often met with in great abundance among the woods. The Cossford and Frizzled are noticed in the Hort. Trans. and recommended as superior sorts. The Constantinople nut is not in very general cultivation, but has considerable merit, as well as the others.—*M<sup>c</sup>Intosh.*

The nuts of the hazel tree are much eaten in this country; they are hard of digestion, and often pass through the bowels very little altered; if, however, they are well chewed, they give out a nutritious oil. An oil is also obtained from the wood of this tree, which is efficaceous against the toothache, and been employed to kill worms.

## FRUITS NOT IN GENERAL CULTIVATION.

To this we may refer the Cloudberry, *Rubus Chamaemorus*; Common Bramble, *Rubus Fruticosus*; Spiked Currant, *Spicatum*; Dwarf or Arctic Bramble, *Rubus Arcticus*; Grey Dewberry, *Cassius*; Crowberry, *Empetrium*

*Nigrum*; Hisped Cranberry, *Oxycoccus Hispidulus*; and many of the genus *Vaccinium*, (Whortle Berry or Blaeberry) which possess great merit; and in sufficiently cold and heathy situations, would amply repay the expense of cultivation.

To the above we may add the Blood-Powered Currant, *Ribes Sanguineum*, the fruit of which is big flavoured, and extremely grateful to the taste. It is a hardy plant, and was introduced from North America in 1817. It remains covered with scarlet flowers three or four weeks of the spring, is easily propagated by cuttings, and is one of the best flowering shrubs that we have. There are a few sub-varieties.

The Cloudberry very much resembles the strawberry both in plant and fruit. Is a native of all the high mountains in Britain, growing in peat loam, between high hills, and is by the people of Scotland called Avenens. It is prepared into a jam, and is recommended to allay thirst, &c. in fevers, phthical diseases, haemoptysis, &c. As an antiscorbutic, it is said to excel scurvy-grass and other vegetables of that tribe in common use.—*Med. Dict.*

THE  
FORCING GARDEN.

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To accelerate, as well as to cultivate by artificial means, those fruits which are natives of more temperate or tropical climates, "constitutes one of the principal branches of modern gardening:" hence it becomes necessary to form climates suitable for their growth, and these climates are found in those erections generally denominated hot or forcing-houses. In regard to the period when the acceleration of fruits was first practised in this country, we have no certain information. Some suppose that the Romans hastened the ripening of grapes in this country under talc cases, similar to the modes used by them in Italy; while, on the other hand, it is the opinion of others, that no attempt had been made to force the ripening of fruit before the sixteenth century.

Parkinson and Gerarde both describe the practice of growing cucumbers and melons, by removing them into sheds or rooms at night, and exposing them in fine weather during the day. This seems to have been the most primitive mode, having been practised in Italy in the time of Tiberius, and probably was succeeded by merely covering with glass-cases, being in itself an improvement on the talc cases used by the Romans, as described by Seneca and Pliny. The

next step towards improvement, was the use of fermenting vegetable matter in the formation of hot-beds, and afterwards of hot-walls, and lastly of the construction of hot-houses, which took their rise about the end of the seventeenth century, and which are now arrived at that degree of excellence, that is not likely to be surpassed. In the time of Charles the First, melons were cultivated on beds of hot dung, without any other covering than occasionally a little straw thrown over them: according to Switzer and Lord Bacon, this practice had been in use for an unknown length of time.

In the time of Charles the Second, hot-houses, according to Daines Barrington, were erected, and all the fruits which we have at this day were cultivated, the pine only excepted, which was introduced in 1690. Switzer, in the beginning of the eighteenth century, not only erected hot walls, but also forcing-houses; the first plans of which, together with directions for their management, he published in 1717, in his *Fruit Gardener*. Little progress was, however, made in this branch of gardening till towards the middle of the eighteenth century, and since that time, the erection of hot-houses has rapidly increased, and their management upon scientific principles has kept pace with their increase; for which reason a garden is now considered as incomplete without several of those structures.

### EARLY CUCUMBERS.

Cucumbers and melons are forced in a variety of ways; some gardeners preferring common hot-beds, others dung-pits in their different modifications, and not a few have of late years grown them in pits heated by steam.

### JANUARY AND FEBRUARY.

In preparing to cultivate cucumbers and melons, either upon beds composed of dung only, or of fagots to be heated by means of dung-linings, it will be necessary, in the first place, to prepare dung where-

with to form a seed-bed. For this purpose, such a quantity of good fresh dung should be procured as will be sufficient, after being well fermented, to form a bed about five or six feet wide, and three and a half or four feet long, and about five feet high at the back, and four at the front, upon which to place a one-light frame, which will be sufficient for the purpose of rearing seedling cucumbers and melons for any ordinary family. The dung for this purpose should be under the process of fermentation for a sufficient time to allow the fiery heat and rank steam to be fairly exhausted, during which time it should be frequently turned over, and well mixed at each turning, so that the whole body of dung will heat equally when put up into the bed; this is of much consequence, as if not done before the beds are made and the seeds sown, it cannot be done afterwards, independently of which, the heat will be more permanent and equal. The length of time that the dung should be thus in a state of preparation, must be determined by the state of the weather, and the quality of the dung. In building the seed bed, let the dung be well shaken with a fork, and regularly laid up one course above another, and well beaten with the back of the fork, but not trodden with the feet. When it is of sufficient height, place the frame upon it, and put on the glass, which may be covered up with mats, either single or double, which will help to draw up the heat. When this is sufficiently up, level the surface of the bed, and to guard against accidents, from too much heat or noxious steam, let the whole surface be turfed over, the turfs being laid with the grassy side undermost, and beaten well with a spade or turf-beater, to render the joints as close as possible. Then cover the whole with any light mould, or rotten tan, to the thickness of six or eight inches, upon which to place the pots with the seeds. This covering should be as dry as possible, as it is much easier in spring to water, if too dry, than to render it dry, if too wet, the sun at this season having little

power to evaporate any superabundant moisture. The seeds may be sown in small pots, or shallow pans, filled with rich light mould, and covered to the depth of two inches, and placed upon the surface of the bed. As the heat rises, the pots or pans may be either plunged deeper, or still kept upon the surface, according as the heat of the bed may be more or less strong. The bed, from this time forward, must be regularly covered every night with mats, either single or double, according to the state of the weather and the heat of the bed. No air need be admitted, until the heat in the bed begins to rise, and the steam begins to appear; but, upon the appearance of steam, and the young leaves of the plants, care must be taken to tilt up one end of the sash, less or more, to allow the steam to pass freely off; this must not only be attended to during the day, but during the night also. If the air be very frosty, or the winds cold, then the ends of the mats should be allowed to hang over the opening, that the air may be broken, and not allowed to blow with force upon the tender plants. Throughout the day, when the light is tilted up for the admission of air, a thin piece of mat should be hung over the opening, for the wind to pass through before reaching the plants. In covering up at night, care should be taken not to allow the ends of the mats to hang over the sides of the frame, particularly after the linings may have been applied, for when this is not attended to, it often occurs that the noxious steam from the dung will be so confined that it cannot escape, and be thereby conveyed into the frames, and destroy the plants.

The temperature of the seed-bed should be kept up to from 65° to 75°, but a few degrees of difference are not of that importance which is usually attached to it; indeed, the plants will not hurt in any temperature varying from 60 to 80 degrees, provided the transitions from both extremes do not occur too frequently, and at the same time too suddenly. After the seeds are sown, the bed should be carefully watched, for fear of

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

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

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

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

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

or half plunged, according to the state of the heat in the bed. Keep up now a brisk heat, by means of linings round the sides of the bed, so that the temperature within the bed may be kept to about 60 or 65 deg. in the night, and a few degrees of rise in sunshine. The great objects to guard against at this season, are too much rank steam, and an excess either of heat or cold. Air should be admitted as freely as the weather will permit, that the plants may not be drawn up too weakly. The bed should not only be examined morning and evening, but also once or twice throughout the day, until the plants get a little stronger; if the roots be in danger of being destroyed by too much heat, take the pots up a little, and if too cold, plunge them a little deeper into the bed. As soon as the first seeds are above ground a few more should be sown as a substitute in case of accidents, and this sowing should also be succeeded by a third, and so on. In ten or twelve days after this seed-bed is put up, it is probable that the heat will be beginning to decline; this should be watched for, and, upon the least appearance of it, a lining of well-fermented dung should be applied to one or more sides of the bed, as may be judged necessary; this lining should be protected in the same manner as has been directed for the bed, by covering it round with reed-mats, long littery dung, or bean-haulm, which will not only keep the bed and lining perfectly dry, but will also prevent the wind from blowing the heat out of it. The lining thus put round, should be from fifteen to eighteen inches thick, and a few inches above the bottom of the frame. It should not, however, be built either too thick or too high at this time, lest it throw too much heat suddenly into the bed, and thereby endanger the plants. The inside should be examined, and a little fresh dry mould laid all round the inside of the frame, to prevent the admission of too much steam; for although a certain portion of steam is necessary for the welfare of the plants, so as to keep up a moist warm atmosphere, yet too much would be attended with danger; upon examining the bed in the morning, a sufficient

quantity of steam should be found to appear like a fine dew all over the plants, and hanging in beads upon the under side of the leaves. In ten or twelve days after the first lining is applied, it may be necessary to apply it to the remaining sides, which will revive the heat of the whole, and if covered over also with any dry littery matter, to resist the cold cutting winds, and cold rains or snow, it will keep up a sufficient heat for sometime longer.

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

When the plants are in full blossom, be careful to set the fruit, as it is called, which is effected by impregnating the female flowers with the farina of the male blossom, the cucumbers having male and female flowers separate on the same plant; the female or fruiting flowers being readily distinguished by having always the young fruit in embryo visible at their base. Apply the central part (the *anther*) containing the fertilizing yellow dust, to the *stigma* in the centre of the female blossom; it thereby fertilizes the embryo

fruit, which in a day or two will visibly swell fast in growth, and soon attain maturity for gathering.

The cucumber is a native of the East Indies, and abounds in many parts of the tropical world. In Egypt it is abundant, and has been so from the earliest ages; it is among the few fruits mentioned by the Jewish historian. It formed not only an article of luxury to the inhabitants of Egypt, but an article of general food, and is by them held in high esteem unto this day. It was introduced into Britain in 1573, and is now cultivated to an astonishing extent. Those who have not seen the waggon loads of them in Covent Garden market, will be surprised to hear of whole fields being annually covered with cucumbers, some of them have been known to furnish the London market with ten thousand bushels of pickled cucumbers in one week. In Germany and Poland barrels of cucumbers are salted and preserved in vinegar from one year to another. The names of varieties of cucumbers are numerous. The following are esteemed good:—

1. *Flanagan's*.—Nearly two feet in length, and of superior flavour and crispness; is an excellent bearer.

2. *Sparrey's*.—An excellent forcing sort, originated with Mr. Sparrey, late gardener to Lord Rodaey. Is an excellent early forcing one, and a good bearer for general crops.

3. *Early Long Prickly*.—From five to seven inches long; an excellent sort, both as a general bearer, and crisp eating fruit.

4. *Early Short Prickly*.—From four to five inches long; excellent for early forcing, and as good for ridging out for picklers.

5. *Kelly's Cucumber*.—An esteemed Scotch variety, well suited for forcing in pots; is a hardy free growing sort, and handsome fruit; from six to twelve inches in length.

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## MELONS.

The varieties of melons are very numerous; every gardener has his favourite sorts, suitable for the purpose for which he grows them; some prefer large

showey melons, and others small light flavoured ones. Small melons are always best flavoured, and for the most part the greatest bearers. The Persian melons have long been celebrated for their excellence. Few, however, of them had found their way to Europe, until within these few years, and that has been accomplished by the exertions of the Horticultural Society. These melons differ remarkably from those cultivated in Europe. They are altogether destitute of the thick hard rind, which renders one half of our finest melons useless, and are protected only by a skin so thin and delicate, that they are subject to injury from causes which would produce no perceptible effect upon the melons of Europe. Their flesh is extremely tender, rich, and sweet, and flows copiously with a cool juice, which makes them still more grateful. They are also abundant bearers, and their fruit is extremely beautiful. They are, however, found difficult to cultivate, as they require a very high temperature, a dry atmosphere, and a very humid soil. They will, however, not endure any undue supply of water over their leaves, for if too freely given, it will bring on spotting and canker; and in such cases, the plants often perish before they perfect their fruit. Those who have succeeded most in the cultivation of these fruits in Britain, have supplied their roots abundantly with water, without giving them any overhead; and by keeping up a high temperature, by strong linings, have been enabled to admit a considerable degree of ventilation. Care must be taken against damp, and when that appears, should if possible be removed; and if the vines, (tendrils), be impaired by it, apply hot lime in powder to the part affected. The fruit when set, should be placed upon tiles or bricks, as is often practised with our best European melons. Probably training them upon a trellice would admit of copious watering at the roots, without injuring the leaves and shoots with damp.

1. *Dampshia*, or *Zamshy*.—A rather curious fruit, of a nearly cylindrical form; said to be of excellent flavour and

will keep for some months hung up by the stalk, or in nets, in a dark room.

2. *Ispahan*, or *Sweet Melon*.—Is also recommended as a good fruit.

3. *Keiseng Melon*.—A beautiful egg shaped fruit, about eight inches long by five wide in the middle; colour pale yellow, beautifully netted all over; flesh nearly white, from one and a half inch to two and a quarter in thickness; high-flavoured, and resembling in texture a well ripened Beurre pear; rind firm, but so thin that all the fleshy part of the fruit may be eaten. It derives its name from the village of Keiseng, near Ispahan.

4. *Geree Melon*.—Shape oval, and in size measures eight inches in length by four and a half in breadth; sometimes netted, sometimes quite smooth; skin mottled with a dark sea green upon a pale ground; flesh an inch and a half to two inches thick; bright green; melting; very sweet, and high-flavoured. Inferior in flavour to no other melon, except the Keiseng above noticed. Is a good bearer. The seed of this melon has been disseminated under the name of the Ostrich Egg.

5. *Large Germek Melon*.—Fruit large and handsome, weighing from five to six pounds; shaped like a depressed sphere; usually six inches deep, but varying from seven to nine inches in breadth; surface sea green, so closely netted that it presents the appearance of *shagreen* leather; rind thin; flesh from one to two inches thick, green, becoming paler towards the inside; firm, juicy, rich, and high-flavoured; ripens early both in this country and in Persia. It is very prolific, and the fruit is the largest Persian melon we have in this country.

The description of the Persian melons in the above list, is from the Transactions of the Horticultural Society.

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## PINES.

The pine apple is considered a native of South America, although it is found indigenous in several parts of Africa in great abundance.

In the year 1541 Gerommo Benzono, an Italian, repaired to Mexico, where he resided until 1555, and on his return he wrote the History of the New World,

which was printed in Venice in 1568. In this work he passes a high eulogium on the pine apple, and declares it to be the "finest fruit on this good earth of God."

It is used principally as a delicacy for the table, and is also given with advantage as a refrigerant in fevers.

Like most other fruits of admired quality, there are many varieties in cultivation:—

1. The *Queen*, or *Old Queen*. to distinguish it from the next.—Fruit oval; colour golden; size middling, rather large; generally, under good management, attains the weight of from three to four pounds, sometimes more. Is the hardiest pine we have, and comes to its greatest perfection in much less time, and with much less trouble, than any other; has been brought to perfection in the short period of fifteen or eighteen months. It is more certain of showing fruit while young, and at a proper season, than any other.

2. *Ripley's New Queen*.—Is considered as a sub-variety of the last; is a more elegant fruit, and also fruits in equally short time. It is more generally cultivated now than any other. It is figured in the *Practical Gardener* as being the most useful sort for general purposes in cultivation; fruiting in the short space of fifteen or eighteen months, and possessing the merit of a handsome form; good size, and good flavour, and capable, with the other one mentioned, of being cultivated in perfection upon beds of fermented dung, or leaves in frames, with as little difficulty, and little extra expence to that required to grow early cucumbers.

#### FORCING VINES.

Attempts have been made to have crops of grapes ripe in March, by beginning to force in August, but after much expense and trouble, this practice has seldom realized the expectations of its most sanguine advocates. The time of ripening is not always early in proportion to the time of beginning to force. When the course of forcing coincides nearly with the natural growing season, ripe grapes may be cut in less than five months; when short days compose a third part of the course, in less than six months; when the course includes full half of the winter, it will require seven

months before we can calculate upon ripe fruit, and then it will be of an inferior quality. The best time to begin to force is the first of March, if the object be to obtain a good crop of well-flavoured grapes moderately early. In proportion as the state of vegetation is put in action before that time, the natural habits of a deciduous plant, and the unfavourable state of the weather, will leave a great number of obstacles, and discouraging contingencies to retard final success.

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

The border should, as directed for the interior one, be carefully forked a few inches in depth, merely to render the surface more porous, and capable of admitting the juices of the dung, but care must be taken

not to injure any of the roots that may be near the surface. About the beginning of the month, or indeed as soon as the operation of cleaning and washing the house are commenced, the sashes should be put on (if they have been at all removed), and shut up every night, as well as during heavy rains or snows during the day, but a sufficient circulation of air should be admitted during the day, either by the lights or by means of ventilators, to keep the temperature nearly equal to that out of doors, till towards the third week in the month, when it may be allowed to exceed the external temperature a few degrees. During the third week, slight fires should be made throughout the day to dry the flues, and if they raise the temperature in the house, give sufficient air to keep it within due bounds.

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

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

The able conductor of the *Gardeners' Magazine* makes the following excellent remarks upon Mr Shephard's practice: "The vines have been in a state of continued pine-apple heat for thirty, and some for nearly forty years, and during the whole time bearing excellent crops. The sorts are chiefly the Black Hamburg and Sweetwater, with some Muscats. Mr Shephard's general practice is to keep his

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

When the crop is over, and the wood perfectly ripe, the branches should be laid near the ground, and shaded till the recommencement of the forcing.

By this practice, they will be found to have accumulated excitability. The shade will have some affinity to the gloom of winter, which never fails to give vegetation increased energy. Plants which have been forced early will always have an inclination to bud at the accustomed time, whilst it is difficult to move those which have never been habituated to forward excitement, but the habit once induced will continue, and will enable the cultivator to procure fruit at any time.

*Mr. Sharp's method of cleansing the vine, and protecting it from insects.*—Two pounds of sulphur and half a pound of black soap, with a sufficient quantity of water, the whole boiled to the consistence of cream. The above has the recommendation of cheapness and simplicity, and has been found very effectual. The mixture is applied with a brush, in winter and early in spring, after the vines have been pruned and divested of their leaves.

#### FORCING PITS.

These may be 10½ feet, by 3 feet deep. A nine inch wall is built within the space, and serves to support the earth. The bottom ought to be paved, and made water-tight; and from it, draining tiles or iron gratings should carry off the liquid manure, by means of conduit pipes, to a reservoir, prepared for that purpose. The pits for forcing are built within a space nearly five feet wide, and of the same height at the back wall. They, however, admit of modifications.

Pits of this size have a decided advantage over larger ones for early work, as they keep up a quicker and a more lively heat, with much less expense, than if they were larger; because, the larger the pits, the stronger must be the lining. The range has 19 lights; it begins with two lights, and ends with the same; but the intervening space is divided into three lights each, all the divisions having openings between them of 12 inches wide, so that three, six, or more, lights, as required, may be worked in succession.

## AGRICULTURE.

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AGRICULTURE, like its twin sister, Horticulture, is a very ancient art; was much practised by the Jews, and the Mosaic law encouraged agriculture. It may be termed the principle which moves and supports every other trade in all civilized nations of the world. Those who practise agriculture, will sometimes find it very laborious, but healthy and light-some, as it corresponds to that degree of exercise which is the best preservative of health. It requires no hurtful fatigue on the one hand, nor indulges, on the other, indolence, still more hurtful. In the view of profit, agriculture is fit for every man.—In the view of pleasure, it is, of all occupations, the best adapted to a gentleman in a private station, though during a throng of work, the diligent farmer will sometimes be early and late in the field: but this is no hardship upon an active spirit. At other times a farmer who conducts his affairs properly, may have leisure hours every day to bestow on reading, on his family, or his friends.

Agriculture is equally salutary to the mind. In the management of a farm, constant attention is paid to the soil, to the season, and to different operations. A gentleman thus occupied, becomes daily more active, and is daily gathering knowledge: as his mind is never suffered to languish, he is secure against the disease of low spirits.

“ But what I chiefly insist on is, that laying aside ir-

regular appetites and ambitious views, agriculture is of all occupations the most consonant to our nature; and the most productive of contentment, the sweetest sort of happiness. In the first place, it requires that moderate degree of exercise, which corresponds the most to the ordinary succession of our perceptions,"—*Lord Kames*.

In every well governed state, agriculture has been duly honoured. In ancient Persia, a yearly festival was celebrated, in which husbandmen were freely admitted to the King's table; "From your labours," said the King, "we receive our sustenance; and by us you are protected. Being mutually necessary to each other, let us, like brethren, live together in amity." The great Emperor of China performs on the first of January, each successive year, and in presence of an immense concourse of people, the ceremony of holding the plough, to shew, that no man in his empire is above being a farmer. The island of Miletus, during many years, had been afflicted with factions: the government was settled by some wise men of Paros, a neighbouring island. These men having surveyed the island, and marked the possessor of every well cultivated farm, convoked an assembly of the people, and appointed these persons to be governors. "The person," said they, "who governs his private affairs with prudence and industry, is qualified to govern those of the public." The King of Tunis, invaded by a powerful enemy, promised to a neighbour who assisted him, the philosopher's stone. He sent a well constructed plough, terming it the philosopher's stone, because it would produce rich crops, to procure gold in plenty.

"In former times," says Lord Kames, in his *Gentleman Farmer*, "hunting was the only amusement of a British country gentleman. The practice of blood made him rough and hard-hearted; he led the life of a dog, or of a savage; violently active in the field, supinely indolent at home. His train of ideas were confined to dogs, horses, hares, foxes: not a rational idea entered the train; not a spark of patriotism: nothing done for the

public; his dependants enslaved and not fed; no husbandry, no embellishment, loathsome weeds round his dwelling, disorder and dirt within. Consider the present mode of living, the fertile fields and diversified scenes in every strath and glen in Britain. How delightful the change from the hunter to the farmer, from the destroyer of animals to the feeder of men! Our gentlemen who live in the country, have become active and industrious. They embellish their fields, improve their lands, and give bread to thousands. Every new day promotes health and spirits; and every new day brings variety of enjoyment. They are happy at home, and they wish happiness to all.

Nothing can tend to promote the health and vigour of the human frame, so much as a moderate degree of exercise in the open air; and adversity stimulates industry and perseverance. Thus while the native of the tropical regions was receiving from the unpurchased bounty of nature, his regular and plentiful supply of cocoa nuts, bananas, and bread fruit, and the berries of the lolos, and the produce of the thea, or butter tree, the Briton was obliged to earn his daily food, by the hard labour of each day; to chase the flying deer through the woods, or to dispute his prey with the boar or wolf. Thus by the severity of the climate and want of vegetable food, was the latent germ of active exertion unfolded and ripened into continued exercise, that, by the combined influence of luxury and necessity, has at length laid all the vegetable riches of the globe at our feet.

The knowledge diffused by the Quarterly Journal of Agriculture among the wealthy, and Chalmers' cheap publications through the lower classes, upon many subjects connected with husbandry, is a great acquisition to Britain. Having been myself a ploughman, perhaps I may also be able to contribute my mite upon the subject, by the assistance of others. The implements commonly used in husbandry, being already so well figured and described in the above works, the latter being within every one's reach, I will chiefly direct my

attention to economy, and Agricultural Botany: and first will begin with a course of cropping a Highland farm,\* where I have personally practised. Farmers themselves are sometimes ignorant of the course or rotation of crops followed in districts different from their own, which depends on soil, climate, or other circumstances connected with the farm. It has been said that industry is the father of genius: I think it may also be justly termed the mother of farming.

Many things crowd within the compass of a farmer's consideration when he is about to become a tenant of a farm, the principal of which are: the soil, climate, and localities, as regards roads, markets, &c., &c., and that the weight of the rent does not overbalance the whole.

A farm situated in the East Highlands of Perthshire, was rented at £2 per acre; the farmer was considered among the best in the district in which he lived; and his mode of cropping was simply this: fallow with green crop, (turnip and potatoes,) the latter ground ploughed with the seed furrow in autumn, and the turnip land so soon as it could be done after the crop was removed, and sometimes with a slight manuring of short dung. Second sown in the latter end of April or beginning of May, according to the state of the weather: the grain being Chester bear, or perhaps more seldom, potato oats, and sown out with red clover and Pacey's rye-grass. Third, one crop of hay, which was always very bulky, and of good quality. Fourth, ploughed in spring, not very deep, and sown with oats, which in every case proved a weighty crop. Fifth, ploughed rather deeper than after the clover in autumn, or in winter when open weather, and sown with oats again, which proved lighter than the crop after clover. Sixth, dressed for green crop in the usual way, on which all the manure was laid †; every

\* By this term I mean an elevation too high for the culture of wheat.

† I am told by several farmers from Forfarshire, that the above shift or rotation of cropping is now practised by them, and where lime has been applied, their crops of hay, in particular, have been more than doubled; corn crops are seldom light where the hay is weighty.

second drill of turnip being eaten by the sheep on the ground

A portion of the farm, not properly cleared of large stones, was enclosed with a stone fence, and laid down as permanent pasture for the milch cows, and of which two crops of oats were taken the last two years of the tack—being the period to which the tenant must look for the profit of his improvements. There was abundance of lime and peats upon the farm, and over the moss was found from  $1\frac{1}{2}$  to 2 feet of very rich soil, which being properly mixed with the dung of the farm, increased the quantity and quality of the manure considerably; where such advantages occur they should not be lost sight of. Two divisions of unimproved moors were set apart for summer pasture to the horses, and for rearing young black cattle.

The farmer having a numerous family, all of them young and not able to assist him in the labour of the farm, every thing had to be conducted by hired servants, and the strictest economy observed by the farmer himself, who laboured most assiduously, and wished every one about him to do the same; he not only conducted his labours in a most regular and orderly manner, but also maintained such a cheerful behaviour towards his people as induced them to be faithful in his absence as well as in his presence.\*

His funds having been very much reduced by bad crops and low cattle markets, prior to my entering his service as principal farm-servant, we had often recourse to secrecy and ingenuity in order to maintain our credit. Our laird, perhaps not over rich himself, demanded the rent when due, or a bill, which he discounted, and which, of course, had to be strictly attended to when due. A large quantity of the farm produce was often disposed of upon credit, and many of our customers were but slow payers.

\* This man is now among the most opulent farmers in the Highlands of Perthshire, one clear proof of the results of "Industry and perseverance properly directed."

## CHANGE OF SEED.

Changing the seed is so essential a branch in good husbandry; that sometimes an incoming tenant, who has taken a whole change of seed corn with him, has been astonished at the excellence of his first crops; even on much run out land.

On the above farm of 60 arable acres, from two to six bolls of seed corn were annually changed from early light soil; and were sown on part of the clover ley or after the green crop fallow, the produce of which was reserved for seed, and sown the following year.

## GENERAL ROTATION OF CROPS.

No branch of husbandry requires more skill and sagacity than a proper rotation of crops; so as to keep the ground always in heart, and yet to draw out of it the greatest profit possible. Difference of crops successively on the same field is always necessary in a right system of husbandry. Crops of the same kind, with very few exceptions, have an exhausting effect; and experience proves that different crops derive different nourishments from the same soil, so that there must be a regular round or rotation, involving, in particular, a change from grain to green crops. As vegetable and animal food are equally natural to man, it is admirable in Providence to adjust the soil we tread on so happily to our nature as to yield more food by a rotation of corn and grass crops, than if it were confined to either. Profit is the farmer's object; but he knows that to run out his farm by indiscreet cropping, is not the way to make profit. Some plants rob the soil, others are gentle to it; some bind, others loosen. The nice point is, to intermix crops, so as to make the greatest profit consistently with keeping the soil in order. In that view, the nature of the plants employed in husbandry must be carefully examined—*See Agricultural Botany.*

Difference of crops successively on the same peice of land, is essentially necessary in a right system of

husbandry. Crops of the same kind have an exhausting effect, and experience proves that there must be a regular round or rotation, involving in particular a change from grain to green crops. A material use of green crops occasionally, is to weed and clean the land, for the land being in open furrows, may be trenched or hoed in such a way as to extirpate the weeds that spring up. Some lands become so foul from negligent farming, and working it in wet weather, that the only method of cleaning them is by putting them through a course of potato and turnip cropping.

A soil has no choice in its plants; but fosters indifferently every kind—palatable, and unpalatable. In old pastures, nothing is more common than to see cattle every now and then putting out at the side of the mouth certain grasses; an evident proof that they are unpalatable. This is never seen in new pasture from choice plants. Therefore, to have pasture in perfection, let the field be laid down with one bushel of meadow fescue grass, one of meadow fox-tail grass, three pounds of sweet-scented vernal grass, a little ribgrass,\* with white clover. The farmer will seek no farther; with these let the land be so thickly sown as to exclude all other plants. Unless where this precaution has been used, it is a great chance to find old pastures that will give absolute satisfaction.

Where a farmer has access to no manure but what is his own farm's production, (the case under consideration,) there are various rotations of crops, all of them good, though not perhaps equally so. For example, one in clay, and one in free soil, each of the farms from 80 to 90 acres. As there are annually from 24 to 30 acres under hay and pasture, one plough with good horses, if in a favourable climate, will be sufficient to command the remaining 50 or 60 acres.

\* Ribwort, or ribgrass (*Plantago lanceolata*), is lately found to be an excellent remedy for the red-water and murrain, recently so prevalent among cattle.



For the next rotation, the seventh enclosure is taken up for corn, beginning with an oat crop, and proceeding in the order of the fourth enclosure; in place of which, the third enclosure is laid down for pasture, by sowing pasture grasses with the last crop in that enclosure, being barley. This rotation has all the advantages of the former.

Here the dung is employed on the turnip and potato crops.

*Rotations on Clay Soils.*—Clay soils are of various depths and fertility; and, like all others, differ materially according to the climate in which they are situated. All other circumstances being favourable, good clay soils are particularly adapted for the production of wheat and beans, and may be continued under these crops alternately, as long as the land can be kept free from weeds by drilling the bean crops. This is the most profitable course of cropping that can be followed, providing a sufficiency of manure be procured, and the drilled beans be alternately horse and hand hoed. The nature of the soil or other circumstances may render a crop of clover or rye-grass necessary occasionally for one year, and this can be succeeded by oats. This course may continue for six or eight years, or even longer, and will run thus:—  
1. Fallow; 2. Wheat; 3. Clover and rye-grass; 4. Oats; 5. Drilled beans; 6. Wheat. In this rotation, to procure full fertility and luxuriant crops, the soil ought to be recruited with manure every third or fourth year, the dung being first applied in the fallow year, and next to the bean crop. Whenever the soil gets foul with root weeds, which it will sooner or later do, another naked summer fallow must in most cases be resorted to, in order to extirpate the weeds; and this begins a new rotation.

Where circumstances are not favourable to the above rotation, the following may be advantageously substituted. It contains a variety of the crops usually cultivated, and by dividing the labour more equally

throughout the year, may be carried on with a smaller number of horses, and consequently at less expense : 1. Fallow ; 2. Wheat ; 3. Drilled beans ; 4. Barley ; 5. Clover and rye-grass ; 6. Oats ; 7. Drilled beans ; 8. Wheat ; after which a new fallow begins a new rotation. In this rotation it is absolutely necessary that the land should have dung twice or thrice if possible, to ensure abundant crops throughout the course ; and the proper periods of its application are—on the fallow before the first crop of wheat, on the clover stubble in the fifth year, and to the drilled beans the seventh year.

A favourite rotation on the strong lands of Essex is—1. Summer fallow, limed ; 2. Barley ; 3. Clover, first fed and afterwards kept for seed ; 4. Wheat ; 5. Beans, dunged ; 6. Wheat ; 7. Oats. It is a rule in Essex never to put wheat in a fallow. Although two successive crops of white corn are justly objected to, on the best principles of cultivation, yet upon land of this nature both wheat and oats are frequently taken either before or after each other, without doing material injury to the soil. On the strong soils in the neighbourhood of Edinburgh, clover is found not to succeed when sown along with wheat, on which account barley is taken after wheat, and the grass sown along with it succeeds well. In the colder parts of Scotland, beans will not ripen in some seasons, and in these districts the clay soils are uniformly thin and sterile. On such soils and situations, the following rotation may be found to answer :—1. Fallow, with dung ; 2. Barley, beans, or oats ; 3. Clover, cut in the first year, and depastured for two or three years ; 4. Oats ; and a new rotation begins. By this method, the rotation is kept up for six or seven years, a period quite long enough, as the pasture on these cold and meagre soils, after the second or third year, will be found of little value ; and after this, the soil will rather fall back than improve in fertility. But as already mentioned, from the practice of furrow-draining, to which, even in exposed situations,

these soils are subjected, a fallow crop of turnips is now superseding the naked summer fallow, which is of great advantage, as the rearing of cattle is the principal object in these secluded districts.

In the south of England, the farmers consider that a clover ley is the best preparation for a crop of wheat; while in the north of England, and in Scotland, clover is more commonly sown with wheat or barley, and followed by oats, both because the oats are almost invariably found to produce a large return after clover, and from the wheat being better placed in the succession immediately after the fallow.

*Rotation on Loams.*—Every soil intermediate between absolute clay and sharp sand, has received the name of *loam*. Clayey loam, and loamy soils, in the rotation of crops, may be ranked as clay soils, and cropped exactly in the manner already explained, even though they should approach to the nature of light lands, from which they only differ in degrees of quality. Rich loam is the most profitable and the most agreeable to cultivate of any description of soil, as it almost uniformly produces abundant crops of all kinds, and affords excellent pasture. The mode of its management depends upon the nature of the subsoil. If this be retentive, and not furrow-drained, the soil will require to be subjected to a naked summer fallow every six or eight years, to free it from root weeds; and in this case, the steps of the rotation will be similar to those already described as suitable for the best clay soils. When completely furrow-drained, or if the soil lies on a porous bottom, a fallow crop of drilled turnips or potatoes will be found an effectual cleaning, and from the great value of these roots, they are in every way preferable to naked fallow. The rotation may then be as follows:—1. Turnip fallow; 2. Wheat, on such parts of the land as are freed from the turnips in time for that crop, and barley or oats on the rest; 3. Clover and rye-grass; 4. Oats after grass; 5. Drilled beans; 6. Barley; 7. Clover and rye-grass; 8. Oats;

and this to be succeeded by turnips, or other green crop, to begin a new rotation. Some stop at the sixth crop, and make it wheat instead of barley, and then commence with turnips. To keep up the fertility of the soil, manure should be applied with the beans.

*Rotation on Light Lands.*—Light lands include all soils called sandy loam and loamy sand, which are merely gradations of the same. The general principles of management for this description of soil are precisely the same as those already described, and every rotation should be established on a well-wrought and well-dunged turnip fallow. The course of crops best suited for these light soils is—1. Turnips in drills; 2. Wheat or barley; 3. Clover and rye-grass; 4. Oats; and round again to a new rotation. On good turnip soils this rotation may be repeated indefinitely, provided the turnip crop be eaten on the ground, that the grass crop be pastured, or that the manure derived from the hay be returned to the ground. It will be necessary, however, to introduce occasionally the alternate system of pasturage, for without this, even with the most liberal treatment, it will be scarcely possible to keep up the fertility of the soil.

On good turnip soils, when what is produced on the farm is the only manure used, the following rotation may be found advisable:—1. Turnips; 2. Wheat or barley; 3. Clover and rye-grass; 4. 5. and, if necessary, 6. Pasture; 7. Oats; and round again. When manure is within reach, alternate white and green crops may be followed for a number of years, in this rotation:—1. Potatoes or turnips; 2. Wheat; 3. Drilled beans or peas; 4. Wheat or barley; 5. Potatoes or turnips; 6. Wheat or barley; 7. Clover and rye-grass; 8. Oats. The advantage of this course is, that it secures a good crop of clover, and it is practi-ed near Edinburgh for this purpose; but wheat occurs too often in the rotation.

In the vicinity of London, Edinburgh, and Glas-

gow, the rotations are frequently—1. Potatoes; 2. Wheat; 3. Clover and rye-grass. By some, the clover is followed by oats, and the rotation again begins; others end the rotation with clover. Even with the manure which these short rotations secure to the soil, occasional pasturage must be had recourse to, if the soil is in any way exhausted.

*Rotation on Sandy Soils.*—Sandy soils are such as approach to the nature of sharp sand, having so little clay in their composition that they possess no adhesive quality either in a wet or dry state. These soils require the most liberal cultivation, to produce either grain or green crops; for in the event of dry weather, they become so parched as to be unfit for the growth of almost any species of plant. The application of clay, marl, peat earth, and manure, will be found materially to improve the texture of such soils, and their constitution will be ultimately changed to a sandy loam. When well manured, sandy soils produce good crops of potatoes or turnips: if possible, the latter should be consumed on the ground by sheep or cattle. It is difficult to make these soils too rich, and, from their nature, all the manure given them, is soon consumed. Wheat, beans, or peas, do not succeed; barley, oats, and rye, are the only grain crops which yield a profitable return on these soils; and pasturage for a term of years is absolutely necessary. The following six years' rotation has been recommended for these soils:—1. Turnips, with dung, which are to be consumed on the ground by sheep; 2. Barley or oats; 3. 4. 5. Grass, pastured by sheep; 6. Rye or oats.

In land situated in exposed and remote districts, the only grains which are cultivated are early varieties of oats, bear or bigg, and potatoes, as a change of seed for the more genial and fertile grounds. The following course of crops, proportioning the quantity sown to the manure supplied to the turnips and potatoes, may be followed in such situations:—1. Oats from old ley; 2. Turnips and potatoes; 3. Oats, barley, or bigg, sown

with clover or grass seeds; 4. Hay; and then restored to pasture.

*Rotations according to the state of Culture.*—Having treated of rotations of crop under a variety of circumstances, we shall now consider the culture which arable land may require; and this may be—1. The restoration of land to fertility which has become exhausted by over cropping; 2. The management of land which has become very rich from being long in pasture; 3. The method of laying land for pasture which has been long under tillage; 4. The improvement of pasture-land by a short course of tillage.

To restore over-cropped land to fertility, the most liberal course of culture is necessary, and a tenant should therefore receive every indulgence from the proprietor. Where lime has been previously applied to the soil, it will not alone restore the ground to fertility. A summer fallowing with dung, or a fallow crop of turnips, and laying the land gradually down to pasture, are the true methods by which it may be brought back to fertility. If the turnips are consumed on the ground by sheep, bone dust may be advantageously used, especially if the soil is light and friable. If composed of thin clay, and manure not easily obtained, a series of years will be necessary to restore the land, as the pasturage will be thin and unproductive. On light soils, pasturage will be found the most suitable for their improvement.

With regard to land which has become rich from long tillage, little need be said, the method of management being simple and well known. Over-cropping must be avoided, and care taken to keep up, rather than diminish, its fertility.

At the late Highland Society's Agricultural meeting, at Aberdeen, the following rotations were recommended for the soil and climate of that district:—*First*—Strong heavy clay. Along the coast, and in a few places in the interior of the country, where the climate is favourable for the growth of beans and other leguminous

crops, the rotation generally followed is a six-course shift, viz.—first, grass; second, oats; third, beans and peas; fourth, wheat; fifth, fallow or green crop; sixth, barley, with grass seeds. This, while the price of grain continues high, is perhaps as profitable a course as can be followed; but it must be land of the first quality to continue long under this course of cropping.

*Second*—Heavy loams, or alluvial soils. Land of this description is perhaps the best and most valuable in the four counties, and may be managed under any rotation which land is worked upon, under the present improved system of agriculture. The four-course shift is, upon the whole, to be preferred, viz.—grass, oats, turnips, barley; or, if the climate is suitable, beans and wheat may be introduced; but in many districts in this country it is not thought expedient, even on the finest soils of this description, to cultivate beans or wheat, as, for want of climate, these grains seldom come to perfection.

*Third*—The third class consists of light loam, or old infield. This, provincially, is denominated turnip and grass soil. Experience has now fully proved that the best rotation for land of this quality is a six-course shift, viz.—three years in grass (all depastured by cattle or sheep); one grain crop, after breaking up from grass; then turnips, a proportion of which should be eaten off by sheep, where the climate and situation will permit; and the sixth year, barley or oats, sown down with grass seeds. In many places of this country and those adjoining, land of the quality and description referred to is still worked under a seven-course shift, which differs only from a six in this respect, that two grain crops are taken in succession, after breaking up from lea; but this system cannot be commended, and ought, as speedily as possible, to be given up, and a six-course substituted. Since the introduction, on so large a scale, of bone dust, as a manure for raising turnips, and the facilities which the farmer now has of disposing of his fat stock, many of the best agriculturists in these districts are turning their attention more to the cultivation of grass

and turnips, and, in place of three years, as suggested in the above rotation, allow their land to lie four or five years in grass, and when broken up, take only one grain crop, being now fully satisfied that their land will be more easily prepared for the succeeding crop of turnips, and with much less risk of a failure in that valuable and important crop. *Fourth*—The fourth class of soils is gravelly loam—what is locally called sharp land—suitable for grass and turnips. There is now, I believe, no longer a doubt among the best and most intelligent agriculturists of this district, that the six-course shift is the one best adapted for land of this quality—it being always considered beneficial to let the land remain in grass a year or two more, if, by doing so, the rotation is not otherwise disturbed. *Sixth*—The last class named is poor thin clays. This is perhaps the most unpromising and unproductive of all soils. No doubt, the introduction of frequent or paralled drains will do much towards the amelioration of these soils; but the expense is often so great, that tenants holding under leases of nineteen years' endurance are unwilling to embark so large a portion of their capital in what appears to them a hazardous enterprise. Without thorough draining this soil, no particular rotation can be prescribed for it. Under all circumstances, perhaps a five-course may prove the best and most advantageous.

*Summary of Rotations.*—The rotations, as it will be perceived, vary considerably, according to the nature and wants of the soil, yet all possess a general resemblance, and embrace alternations of green with grain crops. It is necessary, however, to mention, that the land in time is apt to be injured by an unvarying routine, and seems to require changes in the character of those green crops which are usually reckoned to be so beneficial. In other words, there is a necessity for a change of rotations. This is done by either changing the green crops in the rotation, or alternating one rotation with another. The latter plan, which is called shifting from one course to another, is adopted by many of our best agriculturists.

## CHOICE OF SEED.

In choosing seeds, there are three rules which should be attended to :—1. That the variety to be sown is suited to the soil and climate ; 2. The propriety of changing the seed ; 3. That the seed has the appearance of being sound. Every species of grain has varieties which differ from each other considerably. In many districts, the seed long used is still commonly sown, either from ignorance of better varieties, or fear that a change will not be attended with good consequences.

All seed should be allowed to arrive at full maturity before being sown, for the nourishment which the seed must yield to the plant in the first stage of growth can never be so great when this is not the case\*. The best cultivators choose the finest qualities of each species for seed ; sowing them on the land best adapted for their growth. Some varieties are remarkably attached to particular soils, and certain degrees of fertility and moisture seem to suit them best. Others require a greater degree and duration of heat, and frequently take four or five weeks longer to ripen. Early sowing of these sorts ought to be resorted to.

Too sudden a change in climate and situation is hurtful ; hence Yorkshire seed has been found to answer better in Scotland than that brought from Essex. Many varieties may be introduced gradually, which would not answer if the habit of the variety were not a little consulted. The particular varieties of grain will be described under their respective heads, and the soils to which they are best suited.

## SOWING.

The oldest established mode of sowing is by *broad-cast*, or scattering the grain from the hand over the

\* The oat and potato are exceptions to this rule. Many intelligent cultivators lift the potatoes intended for seed some weeks earlier than the general crops, being satisfied, from experience, that by this means the vigour and good qualities of the plant are much longer preserved, without the necessity of raising new varieties from seed.

land which has been prepared for it. But this plan is not so economical, or otherwise so valuable, as sowing in drills by machines. In Scotland, the usual method of sowing broadcast consists in the sower walking along the ridges, and, at very regular intervals, so as to keep time with his steps, throwing a handful of grain before him by a wide sweep of the arm. He carries the grain in a sheet, which is slung round his neck and is open to the hand in front. A servant attends, to afford fresh supplies as wanted.

#### CULTURE OF WHEAT.

Wheat is the most important of all the grains, and its varieties are numerous. Among those now in cultivation, the following may be enumerated:—The bearded, the Dunglass, the golden ear, the velvet ear, the egg shell, the hedge-wheat, the Essex dun, the the Kentish yellow, the white and red Essex, the Mungoswell's, the Burwell red, the Hunter's, and the Georgian. A general division of wheats is made into white and red, with several shades between, and summer and winter. Winter wheat may be brought into the nature of summer, by altering the time of sowing. If winter wheat be sown at the period for putting summer wheat into the ground, in the course of two seasons the winter will become of a similar habit as the summer, and the same process will bring a summer wheat to be a winter one.

In general, the fine white wheats are preferred to the brown and red; but the latter is most profitable for wet adhesive soils and unfavourable climates, on account of its hardiness, and ripening early. A red wheat, of great productiveness, has been recently introduced into Scotland from Mark Lane.

The variety of wheat most profitable to be produced must depend upon the nature of the soil, as land which has produced an indifferent crop of one may yield an abundant crop of another kind; and land is frequently found to yield better crops if the varieties be alternately

changed. It has been observed, that a mixture of grain produces the heaviest crops, and that mixed flour makes the best bread.

The richer description of clays and strong loams are the best adapted for the production of wheat; but if properly cultivated and well manured, any variety of these two soils will produce excellent crops of this grain. Good wheat land ought always to possess a large quantity of clay and little sand; for although light soils may be made to produce good crops, yet the strong clay lands in general yield the heaviest grain. Sandy soils, being deficient in firmness, do not afford sufficient support to the roots of plants such as wheat, which do not sink far into the soil. There are light soils, however, made from decomposed granite, felspar, or clay-stone, compounded with vegetable matter, which produce excellent wheat.

“The season for sowing wheat is necessarily regulated by the state of the land, as well as of the season; on which account it is not always in the farmer's power to choose the moment he would prefer. After fallow, as the season allows, it may be sown from the end of August till the middle of November. On wet clays, it is proper to sow as early as possible, as such soils, when thoroughly drenched with moisture in autumn, are seldom in a proper state for harrowing till the succeeding spring. In the opinion of many experienced husbandmen, the best season for sowing wheat, whether on fallow, rag-fallow, or ploughed clover stubble, is from the beginning of September to the 20th of October; but this must depend on the state of the soil and weather. In East Lothian, on dry gravelly loams, in good condition, after a clover crop, and well prepared, wheat has been known to succeed best when sown in November. After drilled beans, whenever the season will admit of ploughing and harrowing, wheat may be sown from the middle or end of September to the middle of November; after this season, the sowing of wheat ought not to be hazarded till the spring quarter returns.

After turnips, when the crop is consumed or led off, and the ground can be properly ploughed, wheat may be sown any time betwixt the 1st of February and the middle of March; and it is customary to plough and sow the land in successive portions as fast as the turnips are consumed. It is only on turnip soil of a good quality, verging towards loam, and in high condition, that winter wheat, sown in spring, can be cultivated with success. When circumstances are favourable, however, it will generally happen that such lands, when wheat is not too often repeated, will nearly produce as many bushels of wheat as of barley. The wheat crops, therefore, on the average of seasons, will exceed the value of the barley crop considerably; hence its culture is an object which ought not to be neglected.—(*General Report of Scotland.*)

#### RYE.

Rye is usually sown on light soils, and does not require so much care as wheat; it suffers less by being sown on the stubble of another corn crop, or upon its own, and it is not unusual to grow it on the same land two years in succession. This grain is frequently sown to be cut for soiling, instead of winter tares, and in England it is frequently used for early sheep-feeding, cut green, without obtaining a grain crop from it. It is extremely useful to breeding flocks, as it comes forward earlier than tares, and affords good food when other sustenance is scarce. Sometimes it is sown on the margins of fields of other grains, to protect them from poultry, which do not use it as food, and will seldom go amongst it.

#### BARLEY.

Barley is a much hardier grain than either wheat or rye. There are six varieties of this grain, distinguished by the number of rows in the ear, four of which are cultivated in Britain. The kinds which have been recently introduced into Scotland are the Chevalier, Annat, and other sorts; but the two-rowed and four-rowed, call-

ed bere or bigg, have been most extensively cultivated, In its culture, barley requires a clean, rich, mellow loam, moderately retentive; and on clays, tempered with sandy mould, or containing a certain portion of chalk and sand, it is found to succeed well. On poor wet soils it is never successful; and every kind of land on which it is cultivated should be well wrought and thoroughly pulverised. If the preceding crop has been wheat, the land should undergo three ploughings before barley is put into the soil. Barley usually follows turnips in the rotation, but it is found to grow very well after potatoes. It is thought best to have the turnips eaten on the ground when this can be accomplished; and if preceding crop has been potatoes, the land should be well ridged up, in order to have it as dry as possible. The application of lime and earth, earth and dung, or urine, is thought of great advantage to the barley crop, and even to plough in the turnip leaves is beneficial. If the plough is not sufficient to pulverise the land properly, the barrow and roller ought to be used to accomplish this. In most cases, more than one ploughing is given, but after a winter furrow the grubber may be used instead. When turnips have been consumed on the ground, it is much trodden down, and will require two ploughings; if this is not given, the soil should be well harrowed and rolled. If grass is sown along with barley, the land should be harrowed after the roller has passed over it, which covers the grass seeds. Barley should be sown as soon after ploughing as possible, when the land is fresh and moist, in order to obtain equal and speedy vegetation. The best season for sowing barley is from the beginning of April to the middle of May; but it has been sown a month after this with success. The bere or bigg sort is sometimes sown in October, and called winter barley.

In Scotland, clover and rye-grass are sown immediately after barley, and the seeds are covered by the last barrowing; a light grass harrow being sometimes used for the purpose. Rolling is practised by some

immediately after, while others prefer allowing the plants to come above ground; the small clods in this case act as a shelter to the plants, which is of great service in frosty weather.

#### OATS.

The oat is suited to climates which are too cold for wheat or other grain crops, and therefore thrives in high regions better than in low-lying countries. When land is broken up, either from a state of nature or from pasture, oats form the first crop, as they may be repeated for a series of years without injuring the soil. They are also the best crop to follow clover; and are sometimes sown with clover and grass seeds. They often follow potatoes and green crops, and in either of these cases, the land should be well ridged up in the winter. When the seed is sown, the land should be completely harrowed, and then rolled across the ridges. A mixture of oats is generally sown along with tares, to prevent them from falling and rotting on the ground. In this state they are cut green, and form an excellent food for cattle and horses. A change of seed from hot to cold, and cold to hot is always to be recommended; and the quantity of seed must depend on the nature of the soil and the variety to be sown. On poor soils, from the plants not spreading, oats should be sown thick. The Hopetoun, and many other varieties, do not tiller out, and therefore require more seed to be sown. The quantity of seed necessary, varies from four to seven bushels per English acre, and broadcast sowing is generally practised.

The usual time of sowing is from the beginning of March to the end of April: early sowing is to be preferred, as the grain is of better quality; but late sowing produces the greatest bulk of straw. Sowing in autumn has been practised with success in some parts of Ireland, the seed being put in early in October; but this is only done on dry sandy loams. This period of sowing is not likely ever to become common in Scotland, from the coldness of the climate. Scotland and

Ireland seem better adapted for growing oats than England, and in the former countries greater attention is paid to their cultivation than in the latter, where the poorest soil and the worst tillage are thought sufficient for them. The produce differs materially according to the soil, climate, and the fitness of the particular variety for the land. The maximum quantity, soil and climate being favourable, may be estimated at seventy bushels, and the minimum twenty bushels per acre; the average being about four quarters. Oat straw is preferred to any other as fodder for cattle, as it is considered more nutritive.

#### GREEN CROPS.

No farming can be said to be perfect unless it involves a due alternation of *green* with *grain* crops. The more foul the land is with weeds, green crops of the drill kind are the more necessary, because, in the course of cultivating green crops, we have an opportunity of hoeing and trenching the land, not once but repeatedly, and of thus exhausting the seeds of weeds lodged in the soil. By administering manure, and this mode of cleansing, the necessity of *fallowing* is in a great measure obviated. But green crops also fulfil the important purpose of feeding live-stock and producing manure. The constant exhaustion of the soil, be it even very fertile, demands a periodical nourishment, and this is best done by means of live animals. It is customary, on the well-organized farms of Norfolk, East-Lothian, &c., to manufacture manure on a large scale by means of *soiling*; that is, feeding cattle in houses or an open yard with turnips, the cattle at the same time treading on the waste straw of the farm, and thus using up a material that would be otherwise lost. Sheep are also turned into pens on turnip-fields, to eat up the turnips from the drills, and the droppings greatly enrich the spot. It is customary in Scotland for low-country farmers to buy cattle lean at the end of autumn, and sell them fatted to a certain

extent in spring ; and all this trouble is taken only for the sake of their manure. We shall now mention what constitutes the principal green crops.

*Beans* require the same sort of soil as wheat, namely, heavy clays, and should be sown in drills. Some suppose that beans exhaust the soil ; but this is scarcely probable, from wheat always yielding a good crop after them. In preparing the ground for beans, it ought to be ploughed after harvest, or early in winter, that the soil may be mellowed with the winter frosts. The furrow should be deep, but, before sowing, the land should be drained of its superabundant moisture. Sow as soon as winter is over, or never later than the end of March in Scotland. Four bushels of seed to the acre are sufficient ; but it is common, for the sake of improving the fodder, to mix peas with the beans, to the extent of one bushel of peas to six of beans. Beans require frequent weeding with the horse-hoe. The crop, if late, should be carried to another field to dry, and thus leave the land for operations necessary for the wheat crop.

*Peas* grow best when mixed with beans, as they by that means gain a support for their slender trailing stalks. They, however, grow on a poorer soil than beans, such as a sandy loam, and neither too moist nor too dry. They are improved by lime and marl manures. Drilling, as in the case of beans, is greatly preferable to broadcast ; and from four to five bushels of seed per acre is reckoned a proper allowance. The early kind of peas may be sown at any time till the end of May, but the late must be sown in February or March.

*Tares* are a valuable crop, both for soiling and feeding cattle. Tares are of two sorts, winter and summer. The seed of the summer tares should be put into the ground at intervals, from the end of March to the end of May, so as to furnish successive cuttings. The winter tares require to be sown in September or October ; and in early spring it is a very valuable food for cattle and sheep.

*Clover and Rye-grass.*—These are the most valuable artificial grasses that can be grown by the farmer. They should never be sown except when the land is in the best condition; if possible, with the crop immediately following a summer fallow, or after turnips or potatoes. Thus, in all well-manured and well-dressed land, clover and rye-grass are mixed with the crop of grain, being either sown at the same time, or at a suitable period after. When the grain crop is cut in harvest, the tops of the young clover are perhaps cut at the same time, but this is of little consequence; the great bulk of the grass crop comes into maturity among the remaining stubble, and is then either scythed for hay or for feeding animals in a green state. When sown on land on which grain has been sown, it is customary to roll the ground, to assist in covering the light seeds. Great care requires to be employed in choosing proper kinds of clover and grass seeds, as there are many worthless sorts.

Many farmers, on purpose to prolong the rotations, and prevent the too frequent repetitions of the clover crop, substitute a crop of peas or tares after the barley, sowing the clover after the wheat or barley in the next rotation, which makes the time between the two clover crops to be seven instead of four years. The crop of peas they consider as by no means remunerative, yet, from the additional crop of clover reaped in the second rotation, they find themselves compensated for the deficiency in the peas. Surface applications are now administered on an extensive scale in improved districts, for the sole purpose of procuring an abundant crop of clover and rye-grass. Soot is one of the ingredients which is applied to the greatest extent, and it has uniformly the effect of strengthening and forwarding the crop. Liquid manures are also extensively used, and the urine of the cows is collected with great care, for the purpose of being applied to the soil. Liquid manures are much more lasting in their effects, and seem better adapted for clover than soot. Saltpetre is likewise

much used, and forms an excellent top-dressing for seedling grasses. It is by such means as these that the agriculturists of the Netherlands have been able to keep up the fertility of their lands, in the cultivation of clover, through time immemorial; and those, therefore, who neglect such measures, have themselves to blame when their clover crops fail. The whole of the agriculture of the Netherlands rests upon the cultivation of clover, which not unfrequently yields a heavy crop the first year, two and even three abundant crops the second, and, if allowed to stand another year, will yield a good crop, and afterwards be excellent pasture for cattle, till ploughed up to receive wheat seed.

*Turnips* yield a most profitable crop for the maintenance of live-stock; and they are also useful as a green crop, by permitting an effectual cleansing of the land from weeds. The leaves being large and spreading, they afford a shade which retains the moisture, and tends to decompose any vegetable matter in the ground. Turnips are divided into various classes, in each of which there are several varieties. The Swedish or yellow turnip is now preferred to most others, and yields the heaviest crop. It requires to be sown early, or from the beginning of April to the end of May; the seed should be given liberally, or at the rate of about three pounds per acre. In all cases, the sowing ought to be in drills, to permit an effective hoeing when the crop is getting up. After being sowed on a well-ploughed field, the roller must be employed to press all smooth on the ridges. The plants will in general make their appearance about ten days or a fortnight after they are sown, according to the quality of the soil and the state of the weather. When the leaves are about two inches high, a horse-hoeing is given between the ridgelets, to cut up the weeds close to the plants. The hand-hoe is then introduced, to thin the crop, leaving plants standing at intervals of from eight to ten inches apart, the Swedish kind being somewhat wider. This distance is thought quite sufficient to ensure plants neither too large nor

too small in size. The soft turnip, when allowed too great a distance, is apt to become very large, and its nutritive juices are found to be quite lost. The Swedish and other hard turnips should be allowed sufficient room to become as large as possible, for their nature is such that there is no fear of their ever being over bulky. The hand-hoeing and thinning are generally performed by women and boys, and three expert hoers will go over an acre a-day. A few days after the hoeing, a small swing-plough is used to make small ridglets between the rows; and when weeds are still in abundance, it will be necessary again to horse or hand hoe the ground, which levels the intermediate ridgelet. On wet soils, the earthing up is very beneficial, as it allows the free discharge of superabundant moisture; and when the weather is frosty, the earth is an excellent protection to the plants. Turnips may either be consumed on the fields where they grow, on grass fields, in fold-yards, or in feeding-houses; and in the vicinity of large towns they are sold to cowfeeders. A cheap and expeditious mode of lifting turnips has been practised in Ireland. The tops are first shaved off with a scythe, and given to young cattle, and the bulbs are ploughed out of the soil, which being afterwards harrowed, they are left entirely free of the ground. The turnips are then gathered into carts, commencing at the top of the field and going regularly down, so that none may be bruised; and it is calculated that six labourers will lift an acre of turnips by this method in a day. *Mangel wurzel* is now introduced with advantage as a variety in green husbandry, and, as a food for cattle, supersedes turnips.

*Potatoes.*—Crops of this valuable plant usually enter into a course of husbandry, particularly in the neighbourhood of populous towns, where a ready market can be obtained. The usual period of planting in the British islands is the end of April or beginning of May, for the late and more common sorts. The early kinds, which are not kept for permanent stock, are planted in March. The potato harvest is in October or beginning

of November. It has been customary to plant by sets or cut peices of the potato, each having an eye or point of germination; but the numerous failures of the crops have introduced the practice of planting the tuber whole, which is preferable. They are sometimes planted, a cut and a whole one alternately.

A correspondent in the Gardener's Magazine relates the following experiment which he made in 1828, with the view of testing the comparative advantages of planting whole or cut sets:—"I planted four plants, containing two eyes each; four, the crowns containing perhaps five or six eyes each; four, small whole potatoes (what are here termed chats); four large whole ones, (or what are termed ware potatoes). Now, for the weight of the produce of each kind: the produce of the first four roots weighed 8 lbs.; that of the second four, 11 lbs.; that of the third four, 15 lbs.; that of the fourth four, 16 lbs. I think this will make clear to any one that the reverse of what is generally practised ought to be followed, namely, to plant crowns, or whole potatoes, in lieu of a plant with two eyes. This is the second trial I have made, not having been so particular in the first experiment as in the second, the difference being sufficiently obvious to the eye.

In the large farms of Scotland, they are set in drill furrows (previously well manured), at a distance of one foot or fifteen inches apart, and six inches of earth is turned over upon them by the horse-hoe. When the plants appear above the surface, the furrow is taken from the drills and hand-hoed; they are afterwards earthed up as may be required. Potatoes are very susceptible of diseases, which cause failures of crop; but there is reason to believe that this arises from some kind of mismanagement, as, for example, producing again and again without change of seed, lifting of the seed after frost, rot from wet seasons, heating of heaps after lifting, &c. The preventives of disease, likely to be most successful, are frequent changes of seed, bringing seed from quite a different soil, not too frequent

cropping from the same land, spreading out to dry after lifting, and careful protection from frost during winter, planting whole tubers, or when cut, dusting the sets with newly slacked quick-lime (see p. 119). They are best preserved in pits, a layer of potatoes and earth alternately to a height of five feet, and finally covered with earth, or bog mould, on the top and sides. This is considered the condition most natural to the potato, and is found to succeed well.

#### MANURES.

By repeated cropping, the best soils become exhausted of their fertile properties, while naturally indifferent soils require the administration of certain qualities, before they will yield a due return to the labours of the husbandman.

Manures are of two classes, both of which have distinctive characters, and perform different offices in the economy of vegetation. The first of these comprehends all animal and vegetable decomposing matter, and is principally employed in feeding the plant, augmenting its size, and sustaining the vital energy. The second operates more on the soil and decomposing matter, than in directly contributing to the support of the vegetable. The first kind has been called animal and vegetable, and the second fossil manures. Under this second class are ranked not only lime, marl, and gypsum, but sand, gravel, fat moss, and clay, so that all the meliorations which are effected on soil by blending and compounding the original earths, are compressed within its limits.

The animal and vegetable manures, which are putrescent in their nature, are foremost in importance and dignity. They consist of certain elementary parts of animal and vegetable substances, elaborated by a natural chemical process in the course of the decomposition or decay of the bodies. The excrementitious matter, or dung of all animals, is no other than the remains of the vegetable or animal food which has been received into the stomach, undergone there a

partial dissolution, and been thrown out as unserviceable for the further nutrition of the system. From this universal decay of organised matter, and its conversion into fluids and gases, it would seem that animal and vegetable substances, and excrementitious matter, are resolvable into each other, and are only different parts of the same original principles. The essential elements of them all are hydrogen, carbon, and oxygen, either alone, or in some cases united with nitrogen. Conveyed by liquids or moist substances into the ground, these elements are sought for by the roots of plants, and so form the constituent principles of a new vegetation. Inasmuch as flesh consists of a greater concentration of these original elements than vegetables, the manure produced by carnivorous animals (man included) is always more strong in proportion to its bulk than that discharged by animals who live only on herbage.

Whatever be the value of the elementary principles of manures, practically they are of no use as manure till they are disengaged by putrefaction. It may be further observed that putrefaction is in every instance produced by the elementary principles being set at liberty either in a fluid or volatile state. If a quantity of stable dung be piled into a heap, and freely exposed to all varieties of weather, it soon heats and emits a stream of vapour, which is often visible as a cloud over it. These vapours, and also the odours sent forth, are gases escaping, and the heap is constantly diminishing in weight and volume; at the end of six months, if there have been alternate moisture and warmth, not above a fourth of the original essential material remains to be spread on the field; there may be in appearance nearly as much substance, but it is comparatively of little value—the real manure is gone, and what remains is little better than a mass of unputrified rubbish.

It may be safely averred, that no principle connected with agriculture is so little understood or thought

of as that which has been now mentioned. We therefore crave the most earnest attention to it by every reader of these pages. Generally speaking, the excrementitious matters thrown to the dung-hill are treated with perfect indifference as to the effects of exposure and drainage away in the form of liquids. It cannot be too strongly stated, that this is a gross abuse in farming. The putrescent stream contains the very essence of the manure, and should either be scrupulously confined within the limits of the dung-hill, or conveyed to fresh vegetable or earthy matter, that it may impart its nutritive qualities.

A knowledge of this important truth has led to the practice of making compost dung-heaps, in which the valuable liquids and gases of different kinds of manure are absorbed by earth, or some other substance, and the whole brought into the condition of an active manure for the fields. Hitherto, it has been customary to speak of dung-hills, but there ought to be no such objects. The collection of manure from a farm-yard and offices should form a *dung-pit*, not a *dung-hill*; and the manner of making and managing the contents of this pit on the best principles is well worthy of our consideration.

*Farm-yard Manure.*—The situation of the dung-pit should be near the stables and cow-houses, and placed so low that all streams of urine from them should flow at once into it, so that nothing be lost. It may be three or four feet deep, and of a size proportionate to the stock of cattle usually kept by the farmer. It is not necessary that it should be built round with a wall, or have a perpendicular descent, as it may slope gently inwards, and deepen gradually towards the centre. It should, if possible, be covered by a roof, to prevent the action of the sun. If the bottom be found firm, impervious, and capable of containing the juices, no further trouble is requisite, and the work is complete; in many instances, however, it will be necessary first to puddle with clay, and then line the bot-

tom with flag-stones. Into this pit, earth with refuse straw, should be brought, and strewed over the bottom and sloping sides, to the thickness of from nine to twelve inches, and this will form an inferior layer to absorb all that portion of the liquid manure which naturally runs to the bottom. The pit is now prepared to receive all kinds of animal and vegetable manure, which, when brought, should be always laid evenly over the surface. In Scotland, such dung-pits are common, and in the course of accumulation, a young or wintering stock of cattle is allowed to go at large upon the whole; the animals being at the same time fed on a proper allowance of straw. Care is also taken to mix, in laying on, the dung brought from the cow-house, stable, and piggeries, so that the rich excrement of the well-fed animals may be incorporated with that of a poor description from others. It is likewise of the utmost importance, though too frequently neglected, to convey to the pit the entire liquid refuse of the farm-yard, provided the quantity be not so great as to make it advisable to have a separate pit for its reception.

*Liquid Manure, Bone-Dust, &c.*—The urine of cattle is of great value as a manure, and this is so well known to the farmers of Belgium, that they use tanks for collecting the liquid from the cow-houses, and thence they pump it up, and pour it over the land at the proper season; and may be applied between the rows of green crops in a growing state. When mixed with vegetable refuse, moss, or earth, it forms an excellent compost. It is deeply to be regretted that so little is known on this subject; and such is the carelessness of farmers and cottagers, that the urine from their cattle-stalls is in most cases suffered to go completely to waste. The value of night-soil and human urine as manures is equally great, but both are much neglected in British agriculture.\*

\* This subject merits the notice of the police commissioners of most towns, where the waste of this species of manure is im-

Without entering minutely into details on this point, it may be stated, that the offensive odour of all excrementitious matter may be neutralised by an intermixture of gypsum, or lime and earth, and in this state be used as most valuable manure. Bone-dust is now used as a highly nutritious manure on light soils; and it is reckoned that 100 bushels are equal to 40 cart-loads of farm-yard manure. Common sea salt, when judiciously administered in moderate quantities, on arable land at the time of fallowing, has been found of great value for its manuring and cleaning properties. It promotes fertility, is a remedy against smut and rust, preserves the seed from vermin, and is particularly useful in increasing the produce of grass lands.

*Guano.*—The sterile soils of South America are manured with a substance called guano, consisting of urate of ammonia and other ammoniacal salts, by the use of which a luxuriant vegetation and the richest crops are obtained. Guano is the excrement of sea-fowl, accumulated for centuries on the ground; being collected by the natives, it is now imported into Britain by merchants for the use of agriculturists. The increase of crops obtained by its application to land is said to be very remarkable.—*Chambers' Information.*

*Lime.*—Sir John Sinclair observes, that there is no mineral or fossil manure so generally used in Great Britain as lime, or one from the use of which so much benefit has been derived; and Lord Kames says it is a profitable manure, and greatly profitable when it can be got in plenty within a moderate distance. Lime is calcined by coal, wood, and peat; and for this purpose coals are by far the best material, as by them the process is more effectually performed—the lime not only being of better quality, but also a third of the labour is saved in breaking the lime-stone. Coals are

mense. Due attention to its preservation could not fail greatly to increase one branch of revenue. Where open drains lead from these dung dépôts, they are a great nuisance, and a fertile source of disease to the neighbourhood.

now driven from Perth to the distances of 15, 30, and even 40 miles, for the purpose of burning lime-stone. The different lines of railroads now intersecting the country will farther tend greatly to facilitate this operation. There is a stretch of lime-stone in front of the Grampians, all the way from Aberdeenshire to Argyleshire, the greater part of which is of a light and dark blue colour, and some of it glittering white. These kinds of limestone fall readily into powder when slacked with water after being calcined. The kind of lime-stone found in the low country is of a dun or brownish colour, and falls more slowly into powder that is not so fine.

The burning of lime is now greatly modified, owing to the improved kilns or furnaces used for that purpose. These, as all lime-kilns ought to be, are situated by the side of a rising bank, or sheltered by an artificial mound of earth, which is made to correspond with the level of the two sides and back part of the kiln. The front is left exposed, wherein the arch or door is formed, on both sides of which the two flues are placed for supplying the kiln with the requisite air when the lime is burning; when these flues are to be opened or closed as occasion may require. The kiln is of an oblong form, from five to five and a half feet wide at bottom, and gradually widening towards the middle height, and then contracting again a little towards the top. The diameter at the middle is nine feet, and some inches less at top. In front, at the height of four feet, the arch is thrown which was formerly left open to admit a cart to carry out the lime, the space being built of raw lime-stones, plastered with mud the time the kiln was burning, but it is now contracted, having cast-metal doors made to fit, the same as an oven. At the proper distances on each side of the arch or door the flues are formed, one foot by nine inches, and are made so as to run parallel to the inside of the kiln, and communicate with the inside at the distance of four feet from the inside of the arch, and at the

height of a foot and a half from the floor of the kiln, by a small vent so wide as to admit a man's arm to reach to the bottom of the flue in order to lift any shells that may chance to fall in there while emptying the kiln. From the mouth of this small chimney is left a little track all the way up to the top, which is four inches by two inches in depth, which must be left open in the course of filling the kiln, by placing flat pieces of lime-stone against it.\* There are three similar apertures in each side of the inside of the kiln, and one in the middle of the inner gable. They are all at equal distances; the inner side-flue being four feet from the inner end, where one of the flues terminates, the other is carried on to the vent in the gable-end. The kiln here described is 24 feet long and 12 feet high, and may be seen at Gourdie lime-works, 15 miles north of Perth. When the kiln is to be filled, three apertures, or drains, are formed the whole length of it, upon the bottom; these openings may be about the dimensions of the flues, and are indeed flues, and open to the outside of the arch, or doors. These apertures are covered with convenient pieces of lime-stone, with sufficient openings between to permit the fire to catch the coals laid over them, which must be of the largest pieces, and somewhat shattered, that they may catch the fire more equally and readily when thirst underneath, by means of a pole, kept for that purpose. When the fire appears to be too strong, and likely to run the lime into a solid mass instead of calcining, all the flues must be shut up close with sod or turf, and afterwards opened or closed as the process of burning may seem to require. In these new plans the kiln is allowed to cool before the calcined lime is taken out, and not kept constantly filling, burning, and drawing, as was the practice with the old kilns. There are three kilns in operation, one filling, one burning, and the third

\* The tops of these small vents are to be closed so as to regulate the admission of air, as occasion may require, when burning.

discharging its contents of calcined lime. The old plans consumed a boll of coals for every three bolls of calcined lime; whereas the new plan produces six or seven bolls on an average, for every boll of coals used, and is much better calcined. I would not, however, recommend the above plan where peat is the principal fuel, and where lime is required only in small quantities for private use.

When the kiln is to be burned with peats, great care is also requisite to lay the bottom well, as in the former kiln. For this purpose dry wood is cut in proper lengths and placed upon stones previously laid for that purpose, forming a sort of large horizontal grate, open below, where the fire is to be afterwards applied; over this a layer of peats is laid, from one to two feet thick, according to their quality (for burning lime, two or more years' old peats are sometimes used). Then over the peats is laid a layer of lime-stone, in pieces about the size of a man's fist. The layers of stones may be a foot or more in thickness, three or four peats are always placed on end in the centre of each layer of stones, to let the fire communicate from one layer of peats to another. The refuse or dross of the peats is laid round the wall, between it and the layers of stones. When the kiln is filled to the top of the wall, the process is carried up in a conical form by building turf around the layers of peat and stones as they are laid on, until it terminates in a narrow point. The largest kilns used in the Highlands for burning lime by peats and wood are 12 feet high; and the greatest or middle diameter is from 11 to 12 feet, and bottom diameter 5 or 5½ feet, and will burn 200 or 300 bolls of lime at one fill.

In erecting a lime-kiln, it is necessary to select such stones (when bricks are not used) as are best adapted to stand excessive heat, for building the inside. A large *sway*, or crane, is made and fixed in the centre at the bottom, and secured by a pole at the top, which being turned round as the building advances, serves as a rule for the form of the inside of the kiln.

The most certain method to ascertain whether any sort of stone is capable of being reduced to lime by calcination is as follows:—Drop on it a little sulphuric acid, aquafortis, or spirit of salt; all stones on which these, or any other strong acid, effervesces, will burn to lime; and the stronger the effervescence, the better the quality of the lime-stone. Shell-lime, of the best quality, when properly calcined, will measure out to thrice the quantity; and when to be used for cement, will admit of thrice its quantity of sand. Lime is frequently used in composts, and with much success where fat-mud, scourings of ditches, or loamy-earth can be obtained. This last method is by far the safest for liming gardens, or any light gravelly soils.

Lime is spread upon land at various seasons, and by different methods, and the operation of it depends on its intimate mixture with the soil; therefore, the proper time of applying it is when it is perfectly powdered, and the soil in the highest degree of pulverization.

As the particles of powdered lime are both small and heavy, they quickly sink to the bottom, if care be not taken to prevent it. In that view, it is a rule that lime be spread and mixed with the soil immediately before sowing, or along with the seed. In this manner of application, there being no occasion to move it till the ground be stirred for a new crop, it has time to incorporate with the soil, and does not readily separate from it. Thus, if a crop of drilled turnip or cabbage be intended, the lime ought to be spread immediately before forming the drills, or at the time of first hoeing. With respect to wheat, the lime ought to be spread immediately before seed furrowing. If spread earlier, before the ground be sufficiently broken, it sinks to the bottom. If a light soil be prepared for barley, the lime ought to be spread after seed furrowing, and harrowed in with the seed. In a strong soil, it sinks not so readily to the bottom; and therefore, before sowing the barley, the lime ought to be mixed

with the soil by a brake. Where moor is summer fallowed for a crop of oats next year, the lime ought to be laid on immediately before the last ploughing, and braked in as before. It has sufficient time to incorporate with the soil before the land be stirred again. Lime is not unfrequently spread among the green crops at the time of first hoeing, and upon the potato ground after the crop is taken up, and turned over with the seed-furrow without delay. Lime is also an ingredient in composts of different kinds. The quantity to be laid on depends on the nature of the soil; as stated by Lord Kames, upon a strong soil, 70 or 80 bolls of shells are not more than sufficient, reckoning 4 small bushels to the boll, termed wheat measure, nor will it be an over dose to lay on 100 bolls. Between 50 and 60 may suffice on medium soils; and upon the thin or gravelly, between 30 and 40 according to his lordship's statements. It is not safe to lay a much greater quantity on such soils; from 25 to 30 bolls is the usual quantity laid on in the Highlands, and the farmers consider themselves well paid on the reception of three crops after liming. The good effects of lime will benefit the land for twelve years at a medium, after liming, if not ill managed. It is an unsafe practice, though formerly common in the Western counties, to lime a pasture field immediately before ploughing, as it is turned to the bottom of the furrow, from which it is never fully gathered up. The proper time for liming a pasture field, intended to be taken up for corn, is a year or two at least before ploughing; it is washed in by rain among the roots of plants, and has time to incorporate with the soil. Lime is applied, for the most part, to land when in fallow, or under preparation for turnip, but sometimes also at the time grass-seeds are sown along with a spring-crop. If the object be pasture, there is no better method than this last. Lime naturally sinks, and it requires a large quantity to incorporate thoroughly with every part of the soil as deep as the plough goes; a very small quantity, about 60 or 80

Winchester bushels per acre, has a powerful effect in promoting the growth of fine pasture grasses, where it is kept as much as possible on the surface, by being harrowed in along with the grass-seeds, as has been already noticed.

*Shell-marl*, as a manure, is managed in every respect like powdered lime; with this difference only, that a fourth or a fifth part more in measure ought to be given. Its beneficial effects continue much longer. The best marl in Strathmore is that of Logie, by Kirriemuir, the property of Colonel John Kinloch, Esq. of Kilrie.\* It is sold at about 9d. per boll, allowing eight cubit feet to the boll.

Clay and stone marls, with respect to agriculture, are the same, though different in appearance. Both lime and marl are laid upon pasture for destroying heath and moss. Some muir ground, covered with heath, was so treated by the late J. Rutherford of Ashintully, 40 years ago, which was converted to a rich green pasture, and remains so still.

We shall conclude this department of our subject by a brief exposition, by Dr. Buckland, of some points in which Geology gives light to Agriculture. It was delivered at a social meeting of the Nithsdale Agricultural Society at Thornhill, Dumfriesshire, on the 15th September 1840, when the learned Dr. was present as a guest while on his way to attend the meeting of the British Association at Glasgow. The following abstract of his remarks were given in the *Dumfries Herald*:—  
 “The stomach of the animal was a laboratory, by which hay, grass, and corn, were converted into roast beef; but how were animals in their turn, and other substances of the earth, to be changed into corn, grass, and hay, that necessary pabulum, without which, all the succes-

\* This marl contains upwards of 90 per cent of carbonate of lime. Last year some experiments were made as to the effect of burning it with dried peat. The result, a mixture of lime and peat ashes, in the cases in which it has been tried, gives promise of being a most valuable manure. We understand the proprietor has resolved to prosecute the manufacture, and is already prepared to supply any demand which may arise for it.

sive generations of the earth would grow lean and die? Here the geologist and the agriculturist met. The two great points for the improver to secure were, *first*, dry land; and, *secondly*, the necessary compound of the four or five elementary substances which enter into the composition of every good soil. From chemical and mineralogical analysis, it had been found that, in alluvial land, confessedly the most fertile of all, the main component parts were *lime*, *silex*, *iron*, and *magnesia*, with some *manganese*; and therefore, of course, it became the chief feature of all improvement of the land, to secure the proper proportions of these ingredients, so as to produce as nearly as possible a result the same as alluvial soil, in which they were found in most efficient combination. *Silex* entered into the composition of every thing, though it was deficient in the slate countries. There was more of it in oats than in any other grain. The oat-fed Scotchman had more flint in his body, than the natives of any other country; and hence, no doubt, the great superiority of the Scotch regiments. (Much laughter.) *Manganese* was comparatively a rare ingredient, but there was not a man sitting in that room with hair on his head who had not *manganese* in him. But no matter where, and in what proportion these substances were found, nature had given us the limestone to make up or correct almost every other ingredient of soil. The learned Professor then minutely pointed out the *rationale* of the use of lime. In Lincolnshire, an agriculturist, in improving a peat bog, had induced every property of soil upon it, but without adding lime. The first season of crop there was plenty of straw with husks upon it, but no corn. He was admonished of the deficiency; added lime; and next year had the finest oats in the country. This was quite parallel with the enterprising experiments of his own friend, Sir Charles Menteth, who had converted a useless peat bog into a meadow worth L.4 an acre."

# AGRICULTURAL BOTANY.

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## GRAMINEÆ.

MR. LOUDON observes that the order of grasses is the most natural of all that systematic botanists has contrived; it is also the most numerous in species. The inflorescence is very much alike throughout the orders; and the floral envelopes, which are bractæ in a progressive state to the form of calyx and petals, offer few striking characters by which the genera can be characterised. The general habit of grasses is so familiar to every one, that it may be passed over in silence. They are remarkable for exhibiting, in no case, properties that are actually poisonous; possessing, on the contrary, in almost all cases, wholesome and nutritive qualities. These latter are especially obvious in their seeds, which always contain a farinaceous substance, mixed with a certain proportion of glutinous matter. No one is ignorant of the various and important uses of the seeds of wheat, rye, barley, oats, maize, rice and others, and in general of all the larger kinds of grass. It must, however, be remarked, that if the smaller sorts are not employed in like manner, it is merely on account of their minuteness, and not on account of any difference in their nature. It is also to be noted, that the particular uses for which the seeds of certain grasses are employed, are not peculiar to them, but may be obtained from all the others, with

slight modifications. Thus beer is made not only from barley, but from wheat; spirituous liquors not only from our European cerealia, but also from rice. But it must be remarked, that a singular exception to the generally wholesome properties of grasses appears to exist in *Lolium temulentum*, the seed of which is reported to be narcotic and inebriating, and even poisonous; there is no doubt, however, that these qualities have been greatly exaggerated; for, in the first place, they disappear in bread or beer manufactured from *Lolium temulentum*; and, secondly, in times of scarcity people have frequently lived upon it. But even supposing all that has been stated upon the subject to be true, this plant will still be found to be little different from wheat, when long exposed to wet; so well, indeed, is this known by country people, that a belief exists, that in wet summers wheat is actually transmuted into rye grass. The exciting properties of the oat, which are unusual in this order, have been found to reside in the husk and not in the seed, and to depend upon the presence of a minute quantity of an aromatic principle, analogous to Vanilla, lying embedded in the envelope of the seed, capable of being extracted by aid of alcohol. As to the deleterious effects of the ergot of rye, these do not depend certainly upon any such property in the rye itself, but is caused either by the ergot disease, or, as is believed, by the parasitic fungus, from the attack of which it arises. Now let us pass from the seeds of Gramineæ to their stems, and we shall find a no less remarkable uniformity of nature in them. They all contain, especially before flowering, a sweet sugary mucilage, which varies in quantity in different species. The sugar cane, in which this is found in greatest abundance, not only constantly exists in the most favourable condition for producing it, as it rarely flowers, but is also one of the largest grasses known. The maize also abounds in sugar; and the same substance is secreted in such abundance by the *Sorghum saccharatum*, that attempts have actually been made in Italy

to cultivate it as the sugar cane. The creeping roots of grasses, which are generally mucilaginous and demulcent, are sometimes used in medicine; but they are of more importance for retaining in banks the sand of the sea shore, so as to form artificial cliffs on flat coasts, to restrain the inroads of the sea. The stems of *Cymbopogon Schœnanthus*, the leaves of *Andropogon citratus*, the roots of *Andropogon Nardus*, and the whole plant of all the species of *Anthoxanthum*, exhale an aromatic odour, and possess slightly tonic properties. The agricultural grasses have been practically and scientifically experimented on by Mr Bishop, at Methven Castle, to whose collection I am indebted for an hundred different species.

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WHEAT, BARLEY, AND OATS—THE KING, QUEEN, AND PRINCE  
OF AGRICOLA'S ROYAL IMPROVED GRASSES.

WHEAT.

WHEAT, botanically *Triticum*, (from *Tritum*, rubbed; ground into flour), belongs to the class and order *Triandria Digynia*, and ranks in the natural arrangement *Graminæ*. Glume two-valved, many-flowered, shorter than the spikelet: the valves nearly equal, beardless, or with one beard inclosing the flowerets. Paleæ two, one of them being bearded from the end. Seed inclosed in the paleæ, rarely otherwise. This is by far the most important genus of the *Graminæ* as including the wheats, the flour of which is universally allowed to make the best bread in the world. There are 27 species in cultivation, 7 of which are agricultural grains of this country, with their sub-varieties, such as Mungoswells, Hunter's White, Uxbridge, Whittington, Blood Red, Hickling, and other approved sorts. *T. aestivum*, summer wheat, and similar sorts, are most probably variations of the same species. It is certain that winter wheat sown in spring will ripen the following summer, though the produce of succeeding generations of spring sown wheat is found to ripen better. Awned and beardless wheat change and run into each other on different soils and in different climates; and even the Egyptian is known to change in this country to

the single-spiked common plant. There is a sort of summer-wheat, apparently a distinct species from those above mentioned, the agricultural treatment of which, as well as the general appearance, is similar to that of barley. The straw is short and soft, the ears awned, small, and easily thrashed, and the grain may be sown in May and reaped in August or September. It is very subject to the black disease, and though it has been tried in a number of places, has never come into general cultivation. A variety from India, called hill wheat, and another from the Cape of Good Hope, have also been tried with no better success. But the hill wheat, and, we believe, the hill barley also of the northern provinces of India, has been cultivated with success in Germany, under the direction of the Arch-duke John of Austria. *T. monococum* (one-grained wheat), grown in Switzerland, is of similar appearance. *T. spelta* (spelt wheat) appears a distinct species, and more hardy than common wheat; it has a stout straw, almost solid, with strong spikes, and chaff adhering firmly to the grain, which is light, yields but little flour, and makes indifferent bread. It is grown in Switzerland in elevated situations, where common wheat would not ripen; also in Bavaria, and other parts of Germany. It is sown in spring, and ripens in July and August. Of the common wheat there are many varieties, but the most prominent are the red and white grained, and the spring wheat which is generally red. The Hertfordshire reds and whites, woolly-eared, awned, and nearly fifty other names, are merely sub-varieties of the red and white. Wheat answers best when treated as a biennial, though it does not remain above one year in the ground. Provided the soil be well prepared and dry, and the grain sown in time, the plants do not suffer from the greatest cold of our climate, or even that of Russia. In the latter country, and in the northern counties of Britain, where the fields are covered with snow, but retaining a temperature of from thirty to thirty-two degrees, the plants are found to vegetate and establish their roots firmly in the soil. The snow is not thawed off till the weather is decidedly warm in spring, when the plants make rapid progress, apparently more so than in warmer climates, owing to the greater duration of sunshine above the horizon in those latitudes in spring and summer.

Wheat, like all culmiferous plants, may be said to have two distinct sets of roots—the seminal or tap-root, and the coro-

nal or surface-root—the former proceeding from the embryo, and the latter from the first joint of the stem. The former seem intended to nourish the plant while young, to fix it to the soil, and to penetrate into the subsoil for water; the latter to search along the surface, among the lighter materials of the soil, for nutritive particles. There is, in the Bank-sian Museum, a stalk of wheat of ordinary length, with a tap-root six feet long, which had penetrated into a subsoil of limestone brush, and was taken up in digging a drain. It grew on the estate of J. Fane, Esq. at Wormley, in Oxfordshire, in 1818. M. Sageret, a scientific French agriculturist, found that when wheat, or any of the other grains, were etiolated immediately after germination, by growing too rapidly, or being sown too thick, the first joint, from which the coronal or surface-roots proceed, is raised above the ground, and, in consequence, either throws out no roots at all, or so few as to nourish it imperfectly, in which case it either dies before it comes into flower, or before the grains are matured. This accurate statement of what takes place is well calculated to show the bad effects of sowing winter wheats too early, or spring corn too late, and grasses in general too thick. Animal substances, and especially bones and urine, are the best manures for wheat, as containing much gluten, a substance found in a greater proportion in that grain than in any other. Next to animal manures, lime is important, as tending to the same effect by chemical combinations. Wheat is almost everywhere cultivated, both in the temperate and torrid zone, to the 45th degree of north latitude, and the height of 2,000 feet above the level of the sea in southern latitudes.

The insects and diseases which attack the wheat are various. The grubs of chaffers and beetles, as well as wire-worm (the larva of different species of *Tipula*), attack the roots; the wheat fly (*Tipula tritici*), the ears; the smut or black, the grains; and the mildew, rust, or blight (different names for the same disease), the whole plant. Sir J. Banks determined the mildew to be produced by the growth of a minute fungus on the straws and chaff of the plant; and Dr. Cartwright (*Phil. Mag.* Oct. 1820,) ascertained it might be destroyed by watering with salt and water. The smut converts the farinaceous part of the grain into a black powder, and is supposed to be prevented or lessened by steeping the grain previously to sowing in any strong saline mix-

ture. It is not easy, however, to cure diseases in the vegetable kingdom; and therefore the grand objects of the cultivator ought to be to procure healthy seed, and apply judicious culture.

With the view of preserving the grain from these most injurious disorders, it is customary to prepare the seed by steeping or pickling it in a kind of saline brine, or diluted urine. Steeping or pickling is performed after the seed has been washed, by allowing it to lie for a time amongst stale urine, diluted with water, or salt brine, of sufficient strength to float an egg. The seed is put into tubs, containing as much liquid as will cover the grain a few inches, and allow it to be well stirred, so as to bring all the light grains to the surface, which are skimmed off as long as they continue to rise. Another way is to put the seed into baskets, which are immersed in the water, and easily taken out, and can be conveniently placed over an empty tub to drain. The seed is left for three or four hours in the chamber lye, or full six hours in the pickle, after which the liquor is drawn off, and the wheat spread thinly on the floor of the granary, where it is well sprinkled over with quick-lime slaked in the liquid. About half a peck of limo is sufficient for a bushel of wheat, and it should be well stirred, so that every grain may get a portion. If the seed is to be drilled, it should be passed through a coarse sieve after being limed, which will facilitate its progress through the machine. The grain will thus be quickly dried; and it should not lie more than six hours in the heap, then be spread out, and used the following day.

Some caution should be used in having the lime properly slaked, for if this is not done, too great a heat may be raised, which will destroy the vegetative principle. Doubts have been expressed of the efficacy of lime, and a solution of copperas is used on the Continent instead. Dry powdered lime would certainly have no effect, but when newly slaked it is very efficacious, as has been proved from experiment. It was found that a steep of limo-water alone, in which wheat was immersed for four-and-twenty hours, proved a powerful preventive of disease, while the good effects of unmixed brine were very inconsiderable.

Of the two kinds of stools mentioned, urine is thought the most efficient, and it should be used neither too fresh

nor too stale, as in the first state it is ineffectual, and in the second injurious. The seed should be sown as soon as dry; for if allowed to lie in sacks or heaps beyond a day or two, the lime may be very hurtful. Another steep, which is recommended by Sir John Sinclair, and is much used in Flanders, France, and Switzerland, is a weak solution of the sulphate of copper, or blue vitriol. The modes of using it are as follow:—

Into eight quarts of boiling water put one pound of blue vitriol, and while quite hot, three bushels of wheat are wetted with five quarts of the liquid; in three hours the remaining three quarts are added, and the wheat is suffered to remain three hours longer in the solution. The whole should be stirred three or four times during the six hours, and the light grains skimmed off. After the wheat is drained, slaked lime is thrown on it to facilitate the drying. Another way of using it is to dissolve five pounds of the sulphate of copper in hot water, and add as much cold water to this as will cover three bushels of wheat. The wheat is allowed to remain five or six hours, or even longer, in the liquid. After two or three bags, of three bushels each, have passed through the liquid, one pound more of the sulphate for each bag should be added; and after twelve bags or so have passed through, new liquid will be required.

To this we may add, that sowing the land with salt is considered an excellent means of preventing liability to any of those fungous disorders.

The uses of wheat are well known. The grain yields a greater proportion of flour than any other; for, while 14 lbs. of barley yield 12 lbs. of flour, and of oats 8 lbs. the same quantity of wheat yields 13 lbs. It is also more nutritive, 1000 parts of barley yielding 920, of oats 743, and wheat 955 soluble parts; of these the gluten of wheat is 90, of barley 60, and of oats 87. (*Davy, Ag. Chem.* 138.) Gluten is so essential an ingredient in bread, that the panary fermentation cannot go on without it, and hence the inferiority of that article in wet seasons, when wheat is blighted or ill ripened, and the advantage of having a stock of old grain, or of grain from the South of Europe, especially of the Mediterranean isles and coasts.

Starch is made from wheat by steeping, and afterwards beating it in bempen bags. The mucilage, being thus

mixed with the water, produces the acetous fermentation, and the weak acid thus formed renders the mucilage white. After settling, the precipitate is repeatedly washed, and then put into square cakes. In drying, the cakes separate into flakes, as found in the shops. Starch is soluble in hot water, but not in cold; and ground down, it makes an excellent hair-powder. Its constituents are—carbon, 43·55; oxygen, 49·68; hydrogen, 6·77=100.

The straw of wheat, from dry chalky lands, is manufactured into hats, for which purpose the middle part of the tube, above the last joint, is taken, and being cut into lengths of eight or ten inches, these pieces being split, are used to form the plait. The operation of plaiting is performed by females and children, who plait it into ribbons from one to three inches broad, and these are afterwards sewed together on blocks or moulds, beginning at the crown, in various shapes, according to fancy or fashion. The best straw is produced on the chalky soil about Dunstable, where plaiting is a common occupation. Other grasses afford culms which have also been used and manufactured into much finer and expensive work than those of wheat and rye. Leghorn hats are made from the straw of a bearded variety of wheat, not unlike rye. It is grown on poor sandy soils on the banks of the Arnon, between Leghorn and Florence, expressly for this manufacture. It does not grow above 18 inches in length, is pulled green, and bleached like flax on the gravelly bed of the river. The straws are not split, as in England, which renders the plait tougher and more durable. The value of wheat straw, for thatching, litter, saddlery, and other purposes, need not be mentioned.

*Wheat, Turkey.*—The Turkey wheat is a native of America, where it is much cultivated, as it is also in some parts of Europe, especially in Italy and Germany. There are many varieties, which differ in the colour of the grain, and are frequently raised in our gardens by way of curiosity, whereby the plant is well known. It is the chief bread-corn in some of the southern parts of America; but since the introduction of rice into Carolina, it is but little used in the Northern colonies. It makes a main part, too, of the food of the poor people in Italy and Germany. This is the sort of wheat mentioned in the book of Ruth, ii. 14, where it is said that Boaz treated Ruth with parched ears of corn dipped in vinegar. This method of eating the roasted ears of Tur-

key-wheat is still practised in the East. They gather in the ears when about half-ripe, and having scorched them to their minds, eat them with as much satisfaction as we do the best flour-bread. In several parts of South America they parch the ripe corn, never making it into bread, but grinding it between two stones, mix it with water in a calabash, and so eat it. The Indians make a sort of drink from this grain, which they call *bici*. This liquor is very windy and intoxicating, and has nearly the taste of our sour small-beer; but they do not use it in common, being too lazy to make it often, and therefore it is chiefly kept for the celebration of feasts and weddings, at which times they get intolerably drunk with it. The manner of making this precious beverage is, to steep a parcel of corn in a vessel of water till it grows sour, then the old women being provided with calabashes for the purpose, chew some grains of the corn in their mouths, and empty them, saliva and all, into the sour liquor, having previously drawn off the latter into another vessel. The chewed grain soon raises a fermentation, and when this ceases, the liquor is let off from the dregs, and set by till wanted. In some of the islands in the South Sea, where each individual is his own lawgiver, it is no uncommon thing for a near relation to excuse a murderer, for a good drink or hutt of *bici*.

Botanists have been solicitous to discover the original climate of the wheat plant, but without much success. The original climate of plants left to nature cannot be a secret; but in countries well peopled, the plants mentioned are not left to nature; the seeds are carefully gathered and stored up for food. As this practice could not fail to make those seeds scarce, agriculture was early thought of, which, by introducing plants into new soils and new climates, has rendered the original climate obscure. If we can trace that climate, it must be in regions destitute of inhabitants, or but thinly peopled. Anson found in the island of Juan Fernandez, many spots of ground covered with oats. The Sioux, a very small tribe in North America, possess a vast country, where oats grow spontaneously in meadows and on the sides of rivers, which make part of their food, without the necessity of agriculture. While the French possessed Port Dauphin, in the island of Madagascar, they raised excellent wheat. That station was deserted many years ago, and wheat to this day grows naturally among the grass in great vigour.

In the country about Mount Tabor, in Palestine, barley and oats grow spontaneously. In the kingdom of Siam, there are many spots where rice grows, year after year, without any culture; and it does so at present about Mount Etna. Some of the Sicilian wheat is of recent introduction into Britain. Wheat is not a native of this country. No farmer is ignorant that foreign seed is requisite to preserve the plant in vigour.

#### BARLEY.

Barley (*Hordeum*, from *hordus*, heavy,) belongs to order second, having two styles, spikelets, one flowered, three together, the two lateral often barren. Glumes two, subulate. Palea two, the lower bearded. Scales two, stigmas feathery, seed coated with palæ. *Bara* is the Celtic for bread, whence the English words barn and barley; as beer is a slight alteration of the appellation of barley, in that tongue *BERE*. There are now twelve different species of barley cultivated in this country:—1st, Common or spring; 2d, giant; 3d, celestial; 4th, six-rowed; 5th, two-rowed; 6th, beardless; 7th, naked; 8th, spelt barley; 9th, rye like; 10th, Nepal; 11th, flattened; and 12th, black barley. These three last are new varieties, introduced from Nepal and the South of Europe in 1817, 1818, and 1819. The other cultivated species are from Sicily, the Levant, and Tartary; but the native country of barley is unknown. *H. vulgare*, common or two-rowed barley is that in general cultivation, and of this the rath-ripo and Thanet are preferred as varieties. *H. hexastichon*, or six-rowed barley, is the bear or bigg, sometimes called Chester bear, chiefly cultivated in the North of Scotland, and in Denmark and Sweden. *H. distichon*, or two-rowed, has thin husks, and is preferred for malting. *H. zeoeriton*, sprat or spelt barley, and sometimes called Moseovy barley, has short broad ears, long awns, and short coarse straw, and is not much cultivated. Barley was cultivated by the Romans as a horse corn, and also for the army; and the gladiators were called *Hordiarii*, from their feeding on this grain. In the South of Europe they have sometimes two crops in one season—one sown in autumn, and cut in May, and another sown in spring and cut in autumn. In Lapland two months, and in England nine weeks, elapse between the sowing and the cutting of this

grain. Malt is the chief purpose for which barley is cultivated in Britain, but it is also made into flour and pot and pearl barley. In order to understand the process of malting, it may be necessary to observe, that the cotyledons of a seed, before a young plant is produced, are changed by the heat and moisture of the earth, into sugar and mucilage. Malting is only an artificial mode of effecting this object, by steeping the grain in water, and fermenting it in heaps, and then arresting its progress towards forming a plant by kiln-drying, in order to take advantage of the sugar in distillation for spirit, or fermentation for beer. The chemical constituents of mucilage and sugar are very nearly alike; in the process of malting a part of the mucilage or starch is converted into sugar, so that the total quantity of sugar, and consequently the source of spirit, is increased. Of pot barley there are two sorts—pearl and Scotch, both produced by grinding off the husk, and the former variety by carrying the operation so far as to produce roundness in the kernel. It is used in soups (broths), gruels, and medicinal drinks. Barley, when ground into flour, forms a light pudding or pottage, which, spread out in thin cakes, and slightly toasted, forms a breakfast-bread much esteemed in Scotland. It is brought to table hot from the baking-plate, and eaten with butter and honey, or cream and sugar. When made into hasty-pudding or porridge, it makes a very light and wholesome supper. *H. murinum*, squirrel-tail grass, a native of Britain, is common by way-sides, and its awns or heads are so injurious to the gums of horses in the Isle of Thanet, that one of the greatest recommendations of an inn is in its having "bay without any mixture of squirrel-tail grass." *H. pratense*, or meadow barley, is also a native of this country. It resembles rye, and to this professor Martin observes, the name rye-grass belongs, and not to lollium perenne, which is ray (from *Iraye*. Fr.) Grass.—(Encyclopædia of Plants.) Barley is extremely nutritious and mucilaginous, and in common use as a drink, when boiled, in all inflammatory diseases and affections of the chest, especially when there is a cough, or irritation about the fauces. A decoction of barley with gum is considered a useful diluent and demulcent in dysury and stranguary. Amongst the ancients, decoctions of barley were the principal medicine as well as aliment in acute diseases.

## OATS.

OAT.—*Avena* (from *aveo*, to covet; because cattle are so fond of it) belongs to class third, order second; triandria, three stamens; digynia, two styles; and natural order *gramineæ*. Glumes membranous, two; seven flowered, longer than the flowerets. Lower palea twice torn, or with the upper bifid-toothed, sometimes eroded; having at the back a plaited twisted beard; scales ovate; seed coated furrowed; panicle compounded loose. *A. sativa* is the common cultivated oat; and *A. nuda* and Tartarica are also sometimes cultivated. Of the first species there are numerous varieties, some more permanent, as the white and black; others temporary, as the Potato oat, Hopetoun, Early Angus, Coupar Grange, Dun, White Tartarian, Black Tartarian, Early Cumberland, &c. No botanist has been able to ascertain satisfactorily the native place of this or of any other of our cultivated grains.

The best variety of oats produced in Great Britain is unquestionably the *potato oat*. Of this kind the first plants were discovered growing accidentally on a heap of manure, in the county of Cumberland, in company with some potato plants, the growth of which was accidental; and it is to this circumstance that the distinctive name of this variety is owing. The plants of which these are the produce, must have been fecunded when in flower by the pollen of some other improved variety, which frequently happens by the action of winds, when growing together and in flower at the same time. To an occurrence thus purely accidental, and which well might have passed unnoticed, we are indebted for decidedly the best and most profitable variety we possess of this useful grain. It requires to be sown on land in a good state of cultivation, when the grains, on ripening will be found large, plump, and firm, often double, and of a quality which insures for the corn a higher price in the market than is given for any other variety. It also yields an abundance of straw. Potato oats form almost the only kind now cultivated in the North of England and the Lowland districts of Scotland.

*A. fatua* (or wild oat, a native of Britain) is counted a distinct species; but some think the naked Tartarian, common, and wild oat, originally the same. The wild oat is remarkable for the length of time the grain will lie in the soil and retain its vegetative powers; its awns are sometimes

used as hygrometers, and its seed as artificial flies in fishing. Where it abounds naturally, it is an inveterate weed.

The oat, in an agricultural point of view, is a grain only calculated for cold climates such as the land of Mountains, Glens, and Heroes. (Tir nan Beann nan Gleann, s'nán Gaisgib.) But in Italy and France, and even in the southern counties of England, the ears are small and husky, and afford little meal; the panicle is open, and the foot-stalks of the ears small, and in July and August the heat dries them up and obstructs the progress of the sap to the grain. On the other hand, this naked, airy panicle is better for drying after rains and dews than the close spikes of wheat and barley, which, while they serve to guard the ears from the extremes of heat in warm climates, are apt to rot or become mouldy (covered with fungi) in cold moist countries or seasons. The grain of the oat, though chiefly used as food for horses, is also more or less a bread-corn in every country where it is generally cultivated; fourteen pounds of grain, yield eight pounds of meal. In some places, as Yorkshire and Aberdeenshire, the meal is ground nearly as fine as flour; in others, as Edinburgh, it is made of coarser quality (called brose meal). The kernel, freed from the husk, and entire, is used for gruels, and forms an article of commerce with Embden, Bremen, and some other towns, where the grains are grown to a large size on the variety known as the Friesland oat. The fine powder which is produced by the operation of grinding the corn, or making grist, forms a jelly, the sowens of the Scots, and furmerty of the Irish, an agreeable and wholesome food. Water gruel from a coarse oatmeal, is esteemed a cooling laxative drink. *A. nuda*, the naked or hill oat, or peck corn, when ripe, drops the grain from the husks. It was generally cultivated in Worlidge's time in the north of England, Scotland, and Wales. The kernel, or grain, thrashes clean out of the husk, and need not be carried to the mill to be made into meal or grist. It was made into meal by the lower classes, by drying on the hearth, and bruising in a stone mortar, called "clach a' bhraun," as still practised in the Highlands of Scotland, in Lapland, Ceylon, China, and in every country under certain circumstances of civilization.

In the low country of Scotland, the quern mills, as they were called, now no longer in use, may be seen neglected

or dilapidated by the doors or about the gardens of cottages and villages where they were formerly in use. *Avena sterilis*, or animal oat, a native of Barbary, introduced in 1640, is sometimes grown as an object of curiosity, on account of its singular hygrometrical properties. After the seeds have fallen off, the strong beard is so sensible of alterations of the atmosphere, as to keep them in a comparatively spontaneous motion, when they resemble some grotesque insect crawling on the ground. In Scotland and some of the northern counties of England, oats form the chief food of the inhabitants. They are much used in Germany, but in Norway oat-bread is a luxury among the common people. Gruels made with the flour or meal, called oatmeal, digest easily, have a soft mucilaginous quality, by which they obtund acrimony, and are used for common drink and food in fevers, in inflammatory disorders, coughs, hoarseness, roughness, and ulceration of the fauces; and water gruels answer all the purposes of Hippocrates' pison. Externally, poultices of oatmeal, vinegar, and a very little oil, are good for sprains and bruises. Stimulent poultices, for tumors, &c. of a gangrenous tendency, are made of oatmeal mixed up with the grounds of strong ale.

#### RYE.

Rye common, *Secale cereale*. This grain, of which there is probably only one species, affords a grain next in value to the wheat for making bread, and is generally used for this purpose, alone or mixed with wheat, throughout Germany and the north of Europe. It is a native of Crimea, and the time of its introduction is uncertain. It is hardier and earlier than wheat. Like it, will ripen if sown in spring, but better if treated like winter wheat. Its grain yields 792 of soluble matter, of which 645 are mucilage, 190 gluten, and 38 sugar.

According to Loudon, there are three sub-varieties of this grain—viz., 1st, winter, or biennial; 2d, spring; 3d, composite; and the brittle and distinct species introduced in 1816, all natives of Tauria: also, oriental from the Levant in 1807.

#### PERENNIAL GRASSES CULTIVATED IN GREAT BRITAIN.

*ANTHOSANTHUM ODORATUM*, (from *anthos*, a flower; and *xanthos*, yellow; the spikes being yellow. Sweet scented

spring-grass; belongs to the class and order Diandria Digynia, and natural family Gramineæ; panicle spiked, oblong, flowers upon partial stalks, and longer than their awns. Stamens only two, in which particular it differs from all other grasses. This grass has the valves of the calyx sprinkled over with minute yellow dots, similar to those of black currant-berries; hence, possibly its peculiar scent. It is this grass which gives the peculiar smell to meadow-hay; that made from rye-grass or other sown grass having no such odour. It is one of the earliest flowering grasses, grows on dry soil, but prefers one moderately dry, and should always form a portion of the grass-seeds sown on lawns and pleasure grounds. Stillingfleet recommends it being sown with a view to improve the flavour of mutton. But its seeds are collected with so much difficulty that they are too costly to be sown in any great quantity. Localities, meadows, woods, and pastures; abundant; often very alpine. Mr. Wilson observes, that the germen is spurred at the base, and that there is no scale there, as in most gramineæ. The seed might be collected by children, and sold to seedmen to good advantage. This grass belongs to the 2d class and 2d order.

CATABROSA AQUATICA, (*Catabrosis*, food.) water-whorl grass; belongs to class 3d and order 2d, having three stamens, and two styles, and is undoubtedly the sweetest of the Scottish grasses. It has not hitherto been mentioned by botanists as indigenous to this country. Panicle diffuse, with whorled patent branches, upper spikelets pendulous, leaves broadly linear, obtuse; culm, or rather caudex of the root, very long, branched, floating, jointed, and sending from the joints fibrous radicles below; culm above a foot or more long, stout, with short broad leaves; calyx scarcely nerved, thin and membranous, broadly oval, obtuse; corolla of a thick texture, brownish green, white and diaphanous at the blunted extremity. A tuft of this grass in flower resembles the colour of grouse; it is much relished by cattle, and they will not allow it to flower where they have access to it. Water fowl are fond of the young shoots and seeds; it is introduced into decoys by throwing plants of it in the water with a sinker tied to them. Localities—Wardend-moss, parish of Alyth, and near Ruthven print-field. Flowers in June, July, and August.

BENT GRASS, *Agrostis* (the Greek name for all grasses.

*Agros*, a field) *A. Stolonifera*, or creeping florin, so much recommended by Dr. Richardson, but respecting which the opinion of practical men is still unsettled, and, on the whole, rather unfavourable than otherwise. It seems to suit the soil and climate of Ireland, and to be more productive and nutritive there than anywhere else. In the account of the Woburn experiments on grasses, it is observed of florin, that it appears to possess merits well worthy of attention, though perhaps not so great as has been supposed, if the natural place of its growth, which is heavy loam, and habits, be impartially taken into the account. It is called quitch, quick, &c., like the common couch-grass, from the length of time it retains its vital powers. Like other plants, which propagate themselves abundantly by extension of their parts, it rarely bears seeds, and is therefore propagated by cuttings of the stems laid along drills an inch deep, and slightly covered with soil. *A. vulgaris*, fine bent grass, which in dry arable land is called the black quitch, is the most common and earliest of the bents, but inferior to several in produce, and the quantity of nutritive matter it affords. The bents are generally rejected by the agriculturist, on account of their lateness of flowering; but this circumstance, as Sinclair observes, does not always imply a proportionable lateness of foliage. The fine, or common bent grass, is in leaf by the middle of April. The florin is two weeks later, and alba and its two sub-varieties, three weeks later. In the south of France and Italy, the poor people collect the stolons of different species of bent grass by the road-sides, and hedges, and expose them for sale in the market-places, in small bunches, as food for horses.

FOX-TAIL GRASS, *Alopecurus*, (*Alopec*, a fox; *oura*, a tail.) *A. pratensis* is one of the best of meadow grasses, possessing the three great requisites of quantity, quality, and earliness, in a superior degree to any other. It is often fit for the scythe by the middle of May; it flowers twice a year, and gives more bulk and weight of hay than any other grass. At Woburn, the produce was nearly three-fourths greater from a clayey loam than from a sandy soil, and the grass from the latter was of comparatively less value in the proportion of four to six. What is almost peculiar to this grass, *Poa pretensis* and *Anthoxanthum odoratum*, the value of the grass of the latter much considerably exceeds that of the crop at the time of first

flowering. The jointed, and most of the other species of this genus, except the wild, which is annual, are valuable grasses both for hay and pasture.

**CAT'S-TAIL GRASS, *Phleum*,** (Greek name for Typha, applied by Linnæus to this plant. *Phleum pratense* (and its two sub-varieties, the smaller and the greater), timothy-grass, so named from Timothy Hanson, who brought it from New York and Carolina, about 1780, varies much in size according to soil and situation, and the root becomes bulbous in very dry ground. Opinions are different as to its merits. Dr. Walker (Rural Economy, Hebrides, ii, 27), thinks it may be introduced into the Highlands with good effect. At Woburn, its comparative advantages were considered very great. It produces a fine foliage early in spring, and is very much relished by horses and cattle in pasture or as hay, which, as it flowers late, may be cropped till an advanced period of the season, without injury to the crop of hay. Unlike the meadow fox-tail grass, the value of the grass as hay, when the seed is ripe, is to that when it is in flower, as 10 to 23. *P. nodosum*, or knotted sort, has gibbous joints, which might have been expected to be sugary like those of florin, which, however, is not the case, as Sir H. Davy found them to be less nutritive than those of *P. pratense*, in the proportion of 8 to 28.

**COCK'S-FOOT GRASS, *Dactylis*,** (*Dactylos*, a finger; finger grass). The division of its head may be fancied to resemble the fingers, and the large cluster at the bottom the thumb of an animal. *D. glomerata*, Rough Cock's-foot grass, is of early and rapid growth, and considered valuable as a pasture grass on light soils from the quantity of herbage it affords. It comes in from the time the turnips are over, till the meadows are fit for grazing; but old and dry, or made into hay, neither horses nor cattle are fond of it. To reap the full benefit of this grass, it must be kept closely cropped. It has been of late strongly recommended by Mr. Cope of Holkham.

**FESCUE GRASS, *Festuca*,** (from *Fest*, pasture or food, Celtic). This genus affords some valuable hay and pasture grasses. *F. ovina*, the sheep fescue, has a fine short sweet foliage, well adapted to the masticating organs of sheep, and for producing delicate mutton: it is totally unfit for hay, and, according to Sir H. Davy's experiments, it does not possess the nutritive powers generally ascribed to it.

It is an excellent grass for lawns, requiring little mowing, and forming so thick a turf as to suffer few intruding plants. It should be sown about the middle of August, on ground nicely prepared, open, and not too light or dry. The same remarks will apply to the red and the amethystina, or blue, species of fescue grass.

**HARDISH FESCUE GRASS**, is a good grass either for hay or permanent pasture; hares are remarkably fond of it. Its produce in the spring is not very great, but the quality is fine, and the quantity is considerable at the time of flowering.

**MEADOW FESCUE GRASS**, (*F. pratensis*). This, in appearance and qualities, nearly resembles the rye-grass, and, indeed, is reckoned by some to have several superior qualifications. It is larger and more productive in leaves; it is strictly perennial; is very hardy, and will thrive not only in very wet, but also in dry ground. It produces numerous seeds, which are easily collected, and which readily germinate when sown. It is late of flowering, however, as it does not put forth its panicle till the middle of June. It differs from the tall fescue grass in being of a much smoother and more succulent quality. Meadow fescue is one of the six grasses (*sweet spring grass, meadow fox-tail grass, poa pratensis, trivialis or common meadow grass, crested dog's tail grass, and the meadow fescue.*) recommended before all others for laying down meadows or pastures, on soils either moist or moderately dry. According to the Woburn experiments, the value of this grass at the time the seed is ripe, is to that of the grass at the time of flowering, as 6 to 18; one proof among many others, of the advantage of cutting all grasses when in flower, rather than later. W. Salisbury says, "if land, intended for meadow, could be laid down with one bushel of meadow fescue, one of fox-tail grass, 3 lbs. of sweet-scented spring grass, a little *holcus lanatus*, or soft grass, with white clover, the farmer will seek no farther."

The **TALL FESCUE** differs little from the meadow fescue, but in being larger in every respect. The produce is nearly that of the former, and the nutritive powers superior, in the proportion of eight to six.

**SPIKED FESCUE** greatly resembles the rye-grass in habit and place of growth; it has excellences which make it greatly superior to that grass, for the purposes either of

hay or of permanent pasture. It improves in proportion to its age, which is directly the reverse of rye-grass.

GLAUCCOUS FESCUE, cut at the time of flowering, exceeds in value the same grass cut when the seeds are ripe, in the proportion of 6 to 12; a strong proof of the value of the leaves and culm in grasses intended for the scythe, and the loss, as we before observed, of leaving them for the sake of the seed, when they become dry and wiry. After this grass, and indeed most others, are in flower, the root-leaves neither increase in number nor in size; but a total suspension of increase appears in every part of the plant, the roots and seed-vessels excepted.

TRICUSPIS, (a word signifying three points, in allusion to the structure of its flower.) This grass is called Red-top in the Southern States of North America, from whence it was introduced in 1820. Prush says, "a most excellent grass. I have seen mountain meadows in Pennsylvania, where they mow this grass twice a year, producing most excellent crops each time, without manure or any other trouble than the mowing, lasting for the space of sixteen years without the least decline in the crops, the soil at the same time being a very indifferent one."

MEADOW GRASS, (*Poa*, signifies grass or herbage.) Smooth stalked, *P. pratensis*, from a creeping root. The foliage of this grass begins to shoot and assume a beautiful verdure very early in spring. The seeds are borne on a panicle of a light and graceful structure. This grass delights in rather a dry situation, and hence keeps green in long continued drought better than other grass; yet it will also thrive in a moist locality. It is seen growing on the top of a dry wall, and flourishing in a wet meadow. It only flowers once a year, while some of the other grasses are running to seed very frequently; from this circumstance it is well adapted for lawns, where smoothness and uniformity of appearance are desired. It flowers from May to June.

ROUGH STALKED MEADOW GRASS, (*poa trivialis*.) In appearance this grass is very like the preceding, yet there are some marked distinctions. The *poa pratensis* has a very smooth stalk, the *trivialis* a rough one, which is very perceptible when the latter is drawn across the fingers, and which arises from a number of little sharp setae or points placed on the leaf. The *trivialis* has a long pointed mem-

brauc at the base of the leaf; the pratensis a short blunt one. Curtis considers *P. trivialis* as one of our best meadow and pasture grasses, especially for moist soils and sheltered situations. On dry exposed situations it is not productive, and, as Sir J. Sinclair has observed, dies off in the space of four or five years. Contrary to what is the case in almost all other grasses, the hay of this species is of most value cut when the seed is ripe. It and *poa annua* are almost the only grasses that will thrive in grass plots in towns and small confined situations. The narrow-leaved meadow grass is a valuable grass for permanent pasture, being of rapid and early growth, but the stalks and leaves being subject to the rust, it is obviously unfit for hay. The late flowering meadow grass ranks among the most valuable of grasses. According to the Woburn experiments, it produces the greatest abundance of early foliage next to the narrow-leaved sort. It prefers a clayey soil, and flowers late. *Poa nemoralis*, or the wood sort, is well adapted for growing under trees.

**POA ANNUA**, Suffolk grass. It perishes by the severity of the Swedish winter; and upon that account is classed among annuals by Linnæus. But though retained as such by all our modern botanists, it is perennial in Scotland. It is a diminutive plant, and the more it is trodden and cropped the more it spreads; being the most common in all temperate climates, and perhaps in the world. Called by the country people natural grass.

**CRESTED DOGSTAIL GRASS**, (*cynosurus cristatus*.) It grows naturally in most dry situations, but will not thrive in meadows that are very wet. It flowers about the middle of June, and produces but little foliage; its stems are dry and wiry, which are the "*win'le-straes*" of the country people. It is found abundantly in sheep pastures, and those animals are very fond of it while young. It is well fitted for lawns.

**RAYE OR RYE GRASS**, *darnel lolium*, (from *lolæ*, Celtic; *lolium*, Latin.) Of *L. Perene*, or perennial rye grass, there are 12 sub-varieties in cultivation, besides the original, with the Italian, and the improved Italian from a selected plant; these being of more recent introduction, are dearer than the others. The above are perennial sorts, are of shorter growths than the annual, and on dry soils will last four or five years; on rich soils

longer; and the annual, or rather biennial, which is tall and larger in all its parts than the perennial, after producing one bulky crop, dies off at the root, or at least sends up no after math. After all that has been affirmed of other grasses, none appears so well adapted as the annual rye-grass for producing a bulky crop of hay, with or without red clover; or better adapted than the perennial variety for sowing down with white clover, to afford three or more years' pasture in the rotation of what is called convertible husbandry, or the alternate corn and grass culture. Cocksfoot grass, and woolly grass, (*holcus*) may afford a greater bulk on poor soils, but are far inferior to the rye grass in regard to nutritive qualities. Sir H. Davy found the value which this grass, cut at the time it is coming into flower, bears to that when the seed is ripe, to be as 10 to 11. Pacey's perennial variety, raised in Staffordshire, has long been in reputation, and there is another new and improved variety raised in Bedfordshire, known as the Russell rye grass. These, with Stickney's, Devon evergreen, and several perennial sorts, together with annual varieties, are all sold by the nurserymen in Perth and Dundee; of these, Pacey's is considered the best.

**HOLCUS.** (from *helho*, to extract,) **SOFT GRASS.** Is a native of Britain, growing in corn fields and meadow pastures. It was a popular notion among the ancients, that the leaves of the plant they called *boleus*, which seems to have been a grass of some kind, had the property of extracting thorns from the flesh. *H. mollis* is distinguished by its creeping roots, which, when once in possession of the soil, as Mr Sinclair observes, can hardly be again expelled without great labour and expense. It is the true couch-grass of light sandy soils, and underground stolones have been found five feet in length, the growth of a few months only. These root-shoots contain a very considerable quantity of nutritive matter, which has the flavour of new made meal. Pigs are very fond of the roots, and dig them up with eagerness; but the herbage is disliked by cattle, more than that of any other species of the genus, being extremely soft, dry, and tasteless. The best mode of banishing this weed from light arable lands, is to collect the roots with a fork after the plough.

*H. lanatus* has a fibrous root, and grows on all soils, from the richest to the poorest, but attains to the highest degree

of luxuriance on light moist peaty soils. Cattle prefer almost any other grass to this; it is seen in pastures with full grown perfect leaves, while the grasses that surround it are cropped to the roots. Its nutritive matter consists entirely of mucilage and sugar; while the nutritive matters most liked by cattle are either subacid or saline. Mr Sinclair suggests, that this grass might probably be made more palatable to cattle, by being sprinkled over with salt.

*H. avenaceus*, the *Avena elatior* of Linnæus, Curtis, and Host, is a bulky productive grass, eaten by horses, cattle, and sheep, but less nutritious than many other grasses. It pushes rapidly after being cropped; and, though later in flowering than many other species, produces an early and plentiful supply of herbage in the spring. These properties would entitle it to rank high as a grass adapted for the alternate husbandry, but its nutritive matter contains too large a proportion of bitter, extractive, and saline matters, to warrant its cultivation, without a considerable admixture of different grasses; and the same objection extends to its culture for permanent pasture. It is always present in the composition of the best natural pastures, and, as before-mentioned, is eaten in common with other grasses. It does not, however, constitute a large proportion of the herbage, but rather the least of any of the more valuable grasses that have been mentioned. This grass, and *triticum repens*, are the two species eaten by dogs to excite vomiting. One variety has bulbous roots, and is a noxious weed in arable lands.

There is a species of this grass which often proves fatal to horses in the mountain ranges of the Grampians. The animal is affected much in the same manner as horned cattle are after eating too abundantly of wet clover. As there is generally rime on the ground in these districts in the mornings, it is probably owing to this cause, rather than to anything pernicious in the grass. Ruminating animals are never hurt by it. A feed of corn, before turning the horse to the grass, is the best preventive.

The foregoing grasses, except the first and last-mentioned, belong to the third class and second order, and natural family Gramineæ.

**RIS GRASS**, *Plantago* (*Planta*, the sole of the foot; similarity), belongs to the class and order Tetrandria, 4th, monogynia, 1st, and natural family Plantagineæ.—

Is a native of dry pastures in many parts of Britain, and has been long employed in agriculture as an herbage plant. It had gone out of repute, until its virtues, as a cure for the disease among cattle, called red-water, and murrain, has recently been discovered. Where it abounds naturally, it is a certain indication of a dry soil. Haller attributes the richness of the milk in the Alpine pastures to this plant, and *Alchemilla vulgaris*, (common lady's-mantle), but Linnæus says cows refuse it. This, every shepherd knows to be the case, as far as respects the flower-stalks. Zappa, of Milan, and A. Young, speak in high terms of it. The seed is now much sought for in Forfarshire, on account of its virtues as a preventive in the diseases of black cattle.

*Class 17.*—Diadelphia (*dis* twice; *adelphos*, a brother.) It is divided into four orders—viz. Pentandria, five stamens; hexandria, six stamens; octandria, eight stamens; and decandria, ten stamens. This class essentially requires, as its name implies, that the stamens should be in two separate parcels. With regard to the importance of diadelphous plants, as applicable to the purposes of mankind, they may be said to hold the very highest rank; all the numerous varieties of pulse, whether eaten by man or cattle, (pease, beans, haricots, lentils, and others), are all produced by diadelphous plants. The best of our artificial grasses, such as clover, nonsuch, cow-grass, lucerne, sainfoin, &c., belong to various diadelphous genera.

*CLOVER*, *Natural family, Legumenosæ*. Example *Trifolium*, trefoil, clover (from *tres*, three, *folium*, leaf); three on stalk; comes under order 4th. This is a very extensive genus, and includes the two most valuable herbage plants adopted in European agriculture. *T. repens*, the white clover, *T. pratense*, the red clover: natives of Britain. Notwithstanding all that has been said of the superiority of lucerne to clover, and of the excellence of sainfoin, and various legumenosæ of the pea kind, yet the red clover for mowing, and the white species for pasturage, are, and probably ever will be, found to excel all other plants in these respects. The yellow clover, *T. procumbens*, or annual, and the cow or meadow clover, *T. medium*, are also in cultivation, but are far inferior to the others. The meadow clover is a useful addition to the other sort in laying down permanent pastures: the yellow grows on poor soils,

but the herbage is not much liked by cattle. So congenial is calcareous matter to clovers, that the mere strewing of lime on some soils will call into action clover-seed, which, it would appear, have lain dormant for ages; at least this appears the most obvious way of accounting for the well-known appearance of white clover in such cases. The time of sowing seeds is generally the spring, during the corn-seed time, or from February till May; but they may also be sown from August till October; and when they are sown by themselves,—that is, unaccompanied by any corn crop, this will be found the best season, as the young plants are less liable to be dried up and impeded in their progress by the sun, than when sown alone in the spring, and remaining tender and unshaded during the hot and dry weather of July. In the operation of sowing, some consider it best to sow the clover and rye grass separately, alleging that the weight of the one seed and the lightness of the other are unfavourable to an equal distribution of both. The quantity of seed varies from 8lb. to 14lb. and sometimes 16lb. per acre, according to the intention of the crop, the quantity of grass-seeds sown, &c. Some give a top-dressing of soot, gypsum, lime, peat or wood ashes, in March, or earlier. Gypsum has been particularly recommended as a top-dressing for clovers, and the other herbage legumes, because, as their ashes afford that substance in considerable quantity, it appears to be a necessary ingredient of their food. Nitrate of soda is now used for this purpose. The saving of clover-seed is attended with considerable labour and difficulty. Clover will not perfect its seed, if saved for that purpose, early in the year; therefore it is necessary to take off the first growth either by feeding or with the scythe, and to depend for the seed on those heads that are produced in the autumn. The produce in seed may generally be from three to four or five bushels per acre; when perfectly clean, weighing from two to three hundred weight. But there is great uncertainty in the produce of clover-seed, from the lateness of the season at which it becomes ripe; and the fertility of the soil is considerably impaired by such a crop: yet the high value of the seed is a great inducement to the saving of it in favourable situations.

The late Mr. Rutherford of Ashintully introduced the culture of red clover in the East Highlands of Perthshire, forty years ago. Although it grew naturally in every *baulk* and meadow, the tenants there were so ignorant as to state to

that gentleman that it was nonsense to think it would grow in such a climate; to which he replied, that he would soon change the climate. It is now cultivated in that district with the greatest success. It contains a large quantity of saccharine principle, and is the best food that can be given to work-horses. "Many a summer," says Lord Kames, "for seven or eight weeks running, have my horses been daily employed in carting lime-stone from a quarry fifteen English miles distant, fed on red clover only; and at the end of the season, were as plump and hearty as at the beginning." There are many plants which prove highly deleterious to cattle, under certain circumstances, the same plants at other times being not only harmless but highly nutritive. Thus, cattle should never be turned out hungry on a field of red clover on a rimey morning, or when it is wet, or in high wind, when the clover is young and fresh; neither upon low marshes, meadows, nor about ditch and hedge banks, when rime is on the grass, as in this case the cattle will not discern poisonous plants, such as hemlock, fool's parsley, the hurtful crowfoot (*ranunculus sceleratus*), &c., but eat them among other grasses.

The taking of the clover, or clover and rye-grass crop, is either by using green for soiling, by making into hay, or by pasturing. It is observed, in the Code of Agriculture, that it is a most important point to ascertain in what cases cutting or feeding is most beneficial. If fed, the land has the advantage of the dung and urine of the pasturing stock; but the dung being dropt in irregular quantities, and in the heat of summer, when it is devoured by insects, loses much of its utility. If the dung, arising from the herbage, whether consumed in soiling, or as hay, were applied to the land in one body and at the proper season, its effects would be more beneficial. The smother of a thick crop, continued for any time upon the ground, greatly tends to promote its fertility; and it has been pretty uniformly found, after repeated trials upon soils of almost every description, that oats, taken after clover that has been cut, either for soiling or hay, is superior to the crop taken after clover pastured by sheep.

The produce of clover hay, without any mixture of rye-grass, on the best soils, is from two to three tons per acre, and in this state, in the London market, it generally sells 20 per cent. higher than meadow hay, or clover and rye-grass mixed. The weight of hay from clover and rye-

grass, varies according to the soil and the season, from one to three tons per English acre, as it is taken from the tramp-ricks; but after being stacked, and kept till spring, the weight is found to be diminished, 25 or 30 per cent.

The value of clover and rye-grass hay, in comparison with the straw of beans or peas, may be in the proportion of three to two; and the finest straw of corn crops, in the proportion of two to one.

One acre of red clover will go as far in feeding horses or black cattle, as three or four of natural grass, and when it is cut occasionally, and given to them fresh, it will probably go much farther, as no part of it is lost by being trod down.

**SAINFOIN**, (*Hedysarum*.) *Onobrychis Sativa*, (*onos*, ass; *bryche*, to gnaw), belongs to the class and order Diadelphbia Decandria, (17th and 4th.)—Is a native of chalky pastures in Britain, and a deep-rooting perennial, with branchy spreading stems, compound leaves, and showy red flowers. It grows naturally in many parts of Europe, but never found but on dry warm chalky soils, where it is of great duration. It has been long cultivated in France and in other parts of the Continent, and as an agricultural plant a good deal in England, in chalky districts; and its peculiar value is, that it may be grown on soils unfit for being constantly under tillage, and which would yield little under grass. This is owing to the long and descending roots of the sainfoin, which will penetrate and thrive in the fissures of rocky and chalky under-strata. Its herbage is said to be equally suited for pasturage or for hay; and eaten green it is not so apt to swell or hove cattle as the red clover or lucern. Arthur Young says, that upon soils proper for this grass no farmer can sow too much of it; and, in "the Code of Agriculture," it is said to be one of the most valuable herbage plants we owe to the bounty of Providence.

The usual duration of sainfoin, in a profitable state, is from eight to ten years. It usually attains its perfect growth in about three years, and begins to decline towards the eighth or tenth year on calcareous soils, and about the seventh or eighth on gravels. There are instances, however, of fields of sainfoin which had been neglected and left to run into pasture, in which plants have been found upwards of fifty years from the time of sowing. It has

been cultivated upwards of a century on the Cotswold hills, and some roots of it have been traced down into stone quarries from ten to twenty feet in length, and in Germany Von Thaer found them attain the length of sixteen feet. In general, the great enemy to the endurance of sainfoin is the grass which accumulates and forms a close turf on the surface, and thus chokes up the plant.

**BIRDSFOOT TREFOIL**, (*Lotus major* and *coroniculatus*), greater and common, belong to the same class and order as the above. These are perennials, natives of Britain, and have yellow flowers, are very suitable to sow with white clover and cow grass, in laying down lands to permanent pastures. Dr Henderson has written a good deal in their favour; Miller is against them; but Sinclair, in his work on the British grasses, found it a valuable ingredient in meadows, especially where the soil was rather moist.

**LUCERN**, (*Medicago Sativa*), common cultivated, belongs to same class and order as the above, and natural arrangement *Leguminosæ*. It is a native of meadow pastures in England, is a deep-rooting perennial plant, sending up numerous small and tall clover like shoots, with blue or violet spikes of flowers. There are no varieties of the lucern deserving the notice of a cultivator. What is called the yellow, or Swiss lucern, is the *medicago falcata*, a hardier and coarser plant, common in several parts of England, but not cultivated anywhere excepting in some poor soils in Switzerland.

The soil for lucern must be dry, friable, inclining to sand, and with a subsoil not inferior to the surface; unless the soil be good and deep it is in vain to attempt its cultivation. The preparation of the soil consists in deep ploughing and minute pulverization; and in our opinion, the shortest way to effect this is to trench it over by the spade to two or three feet in depth, burying a good coat of manure in the middle, or at least one foot from the surface. This is the practice in Guernsey, where lucern is highly prized.

The climate for lucern, as already stated, must be warm and dry; it has been grown in Scotland and Ireland, and might probably do well in the southern counties of the latter country, but in the former it has not been found to answer the commendations of its admirers: season of sowing is as early as can be done in the spring, if the plants are to be transplanted out in the garden method, let it be done about the beginning of August.

The manner of sowing lucern is either broadcast or in drills, and either with or without an accompanying crop of corn for the first year. Broadcast, and a very thin crop of harley, or rather spring corn, is generally, and in my opinion, very properly preferred. The quantity of seed, when the broad-cast method is adopted, is said to be from 15 to 20 lbs per acre, and from 8 to 12 lbs if drilled. The seed is paler, larger, and dearer than that of clover; it is generally imported from Holland, and great care should be taken to procure it plump and perfectly new, as seed, two years' old, does not come up freely. The same depth as for clover will answer. The after culture of lucern sown broad-cast, consists in harrowing, to destroy grass and other weeds, rolling after the harrowing, to smoothe the soil for the scythe, and such occasional top-dressings of manure as the state of the plants may seem to require.

The top-dressing given to lucern may be either of the saline or mixed manures. Ashes are greatly esteemed, and gypsum and liquid manures of any kind.

The produce of lucern, cut three times in a season, has been stated at from three to five and eight tons per acre. The soiling of one acre is sufficient for three or four cows during the soiling season, and a quarter of an acre, if the soil be good, for all sorts of large stock, for the same period; or half an acre on a moderate soil.

The use of lucern is the same as of clover, and the principal and most advantageous practice in the application of lucern is that of feeding horses, neat cattle, and hogs; but as a dry fodder, it is also capable of affording much assistance, and as an early food for ewes and lambs, may be of great value in particular cases. All agree in extolling it as food for cows, whether in a green or dried state.

The nutritive product of lucern, according to Sir H. Davy, is two and three-tenths per cent., and is to that of the clovers and sainfoin as 23 to 39. This result does not very well agree with the superior nutritive powers attributed to lucern; and is one proof, among many how little the analysis of the chemist agrees with the experience of the farmer.

To save seed, the lucern may be treated precisely as the red clover, and it is much easier threshed, the grains being contained in small pods, which easily separate under the flail, the thrashing machine, or the clover mill.

*M. lupulina*, hop-trefoil, sometimes called shamrock, and in Norfolk, black nonsuch, is cultivated occasionally along with the perennial clovers, and sometimes confounded with the common yellow clover, which is an annual and much smaller plant. Its treatment is the same as that of the white clover; but its herbage is little relished by cattle, and both it and the yellow clover are going fast out of repute.

The snail and hedgehog meducks are sown as border flowers for the curiosity of their pods.

**LENTIL TARE.** *Ervum Lens*, belongs to the class, order, and natural family of the clover, and is a legume of the greatest antiquity, being in esteem in Esau's time, and much prized in Eastern countries ever since. In Egypt and Syria, they are parched in a frying-pan and sold in the shops, and considered by the natives as the best food for those who undertake long journeys. There are three varieties of lentils cultivated in France and Germany; the small brown, which is the lightest flavoured, and the best for haricots and soups; the yellowish, which is a little larger, and the next best; and the lentil of Provence, which is almost as large as a pea, with luxuriant straw, and more fit to be cultivated as a tare, than for the grain as human food. A dry, warm, sandy soil is requisite for the lentil; it is sown rather later than the pea, at the rate of a bushel or a bushel and a half to the imperial acre; in other respects its culture and harvesting are the same, and it ripens sooner. The produce of the lentil in grain is about a fourth less than that of the tare; and in straw it is not a third as much, the plants seldom growing above a foot and a half high. The straw is, however, very delicate and nourishing, and preferred for lambs and calves; and the grain, on the Continent, sells at nearly double the price of that of peas. Enhoff obtained from 3840 parts of lentils 1260 parts of starch, and 1433 of a matter analogous to animal matter. The cultivated species of tares are natives of France and the south of Europe, with pale blue and purple flowers, introduced in 1548 and 1596.

**VETCH,** *Vicia Sativa*. The winter and summer tare, belong to the same tribe with the bean. Fetch, or vetch, is a valuable agricultural plant. Some consider the winter variety as a distinct species; but Professor Martyn proved, by cultivating both, that they were not very distinct varie-

ties. The winter variety is sown in September and October; and the summer, at different periods from February to June, for successional cuttings. The soil requires to be in good heart, otherwise they will produce but a poor crop of herbage. On a good soil they will yield ten or twelve tons, which is found excellent food for milch cows and working stock. The crop is seldom left to ripen its seeds, but when seeds are wanted; the only use made of them is for sowing, or feeding pigeons.\*

The BROAD and SAW-LEAVED VETCHES are cultivated in Germany in the same manner as our tare. They are natives of France and Hungary, introduced in 1596 and 1723. The bush vetch is perennial, and a native of Britain, and has been recommended to be sown among clover for mowing.

CHICKLING VETCH, *Lathyrus sativus*—belongs to the class and order Diadelphia Decandria (17 and 4), and natural family *Leguminosæ*. *L. sativus* is frequently sown in Switzerland for soiling horses. In several parts of the Continent, a white, light, pleasant bread is made from the flour of this pulse, but it produced such dreadful effects in the last century, that the use of it was forbidden by an act of George, Duke of Wurtemberg, in 1671; and this not being observed, was enforced by two other edicts under his successor Leopold, in 1705, and 1714. Mixed with wheat flour in half the quantity, it makes a good bread, that appears to be harmless. But bread made of this flour alone has brought on a most surprising rigidity of the limbs in those who have used it for a continuance; insomuch that the exterior muscles could not by any means be reduced, or have their natural actions restored. These symptoms usually appear on a sudden, without any previous pain; but sometimes they were preceded by a weakness about the knees. Baths, both hot and cold, fomentations and ointments of various kinds, have been tried, without effect; so that it is regarded as incurable, and, being neither very painful nor fatal, those who are seized with it submit to it with patience.

\* Amongst other interesting remains discovered in the ruins of Pompeii, was a loaf of bread imprinted with the baker's name, and the quality of the bread; by which it would appear, that the flour of the vetch, with a mixture of the whiter flour of some other grain, had been employed in the preparation of the more common kinds of bread, in use at the time of the destruction of that city.

Swine fattened with this meal, lose the use of their limbs, but grow very fat lying on the ground. A horse fed on the dried herb was said to have had his legs rendered perfectly rigid. Kine are reported to grow lean on it; but sheep not to be affected. Pigeons, especially young ones, lose the power of walking by feeding on the seed. Poultry will not readily touch it; but geese eat it without any apparent damage. In some parts of Switzerland, cattle feed on the herb without any harm. It would be worth enquiring, therefore, whether the soil may not contribute something to the ill qualities of the plant. It is remarked that the seed from a strong, fat, moist soil, is much more deleterious than from a light dry one.

Fabroni, from Florence, in 1786, says, that the government there has cautioned the peasants against the use of *Lathyrus sativus*; swine having lost the use of their limbs, and become pitiable monsters by being fed on this pulse exclusively. The peasants, however, eat it boiled, or mixed with wheat flour, in the quantity of one fourth, without any harm. It grows three feet high, and is a native of the south of Europe, introduced in 1640.

The poisonous *Lathyrus* from Barbary, is *L. semine punctatæ* of Casp. Barchin, and seems to be only a variety; for in the crops of *L. sativus* in Italy, they find black seeds striped with white, as in the African seed. Fabroni suspects it to be a hybrid between *L. sativus*, and *cisera*, for the flower and seed partake of the characters of both; having a black seed marked with white; and a white banner with a red keel to the corolla (Fabroni's Letters in MS.), *Banks*.

SWEET PEA, *L. odoratus*, is one of our most esteemed border annuals, and is extensively grown in pots for decorating chambers and windows. *L. trigitanus*, *articulatus* and *annus* are also sown as border annuals. *L. tuberosus* produces tubers on the roots, like those of the earth nut; these are sold in the markets of Holland, like those of *orobus tuberosus* and *trapa natans*, and their flavour is highly esteemed.

BROAD-LEAVED EVERLASTING PEA, *L. latifolius* is a very showey plant for shrubberies, arbours, and trellis work, and yields a great quantity both of green fodder and seeds, which some botanists have suggested might be applied to agricultural purposes.

PEA.—*Pisum Sativum*.—See *Systematic Catalogue*, p. 105.

THE BEAN—*FABA* (*Phago, to eat esculent*).—Belongs to class and order Diadelphia Decandria (17, 4). *F. vulgaris*, common garden bean, is a native of Egypt, and said to have been introduced by the Romans. Pods subsessile, subternate. Leaves and stipules serrate. Is another member of that comprehensive natural order, *Leguminosae*, (from *Legumer, lego, to gather*, so called because they are usually gathered by the hand). All kinds of pulse are so called. The flowers are papilionaceous (or butterfly-shaped); their colour is white, or white tinted with bluish purple; a black spot is on the wing of most of the varieties, though one or two are free from it. The flowers are peculiarly and most gratefully fragrant. It is a well-known legume, both of the garden and the field. The garden varieties are numerous; the earliest is a small-seeded variety, the Mazagan, and the largest is the Windsor. Beans are planted at the various times in which pease are sown; but the late sowings of beans do not answer so well as those of the pea. When the ground is properly pulverized and in good heart, they succeed well when transplanted; and where a first crop is injured by insects, if the stems are cut down to the ground in their flowering season, they will send up a succession of shoots which will bear a crop. In this way, according to some, the bean may be rendered perennial, as it is certain the Scarlet Kidney Bean may be, by merely protecting the roots from frost. The field bean, of which there is a larger and smaller sort, the latter called *ticks*, is sown in drills by a machine, so as to admit of horse-hoeing, and otherwise ploughing or stirring between the rows. By this means a large crop is produced, and the land cleaned and brought to a better state for a succeeding corn crop. Beans are excellent food for hard-working horses, and for fattening hogs for bacon. The flour of beans and pease is more nutritive than that of oats, but not less easy of digestion. A bushel of beans is supposed to yield 14 lbs. more of flour than a bushel of oats, and a bushel of peas 18 lbs., or, according to some, 20 lbs. A thousand parts of bean-flour were found by Sir H. Davy, to yield 570 parts of nutritive matter, of which 426 were mucilage or starch, 103 gluten, and 41 extract, or matter rendered insoluble during the process.

*F. equina*, HORSE BEAN, sub-variety of the above, is found to be excellent food for horses when, blended with a considerable quantity of bran. The garden varieties ear

rather numerous; but three or four of them are sufficient for any family. Some are esteemed for their precocity, others for their fertility or excellence of flavour. The small early Mazagan (is indigenous to Mazagan, a Portuguese settlement on the African coast), which may be sown for the earliest crops in October or November, and thence to the end of February, in a warm and sheltered situation, open, however, to the sun.

**THE LONG POD.**—The name expresses the appearance of the pod, which abounds with seeds of medium size. It is a sure and prolific bearer; though not esteemed for its flavour; it is cultivated everywhere on account of its hardihood and fertility; and as it is suitable to the cottager, by bringing abundant crops at an early period, the absence of a high flavour is deemed a secondary consequence. The seeds are sown in rows  $2\frac{1}{2}$  feet asunder, and two or three inches deep, four or five inches apart. Seed-time extends from the middle of February to the second week of May. The Sandwich is a good and fertile bean. The Broad Windsor is not prolific, but the best as respects flavour, except it be the New Long Pod, being of recent introduction, and the best I have yet seen. The pods are straight and well-formed, each containing from seven to ten seeds. When the flowers begin to decay on the lower part of the stalks, two or three inches should be nipt off their tops.

**INDIAN CORN,** *Zea Mays*, the common, and *Z. Curagua*, Valparaiso cross corn, to which a sort of religious reputation is attached, on account of the grains, when roasted, splitting regularly into the form of a cross. The word maize is the denomination of the vegetable among the South Americans. Of the well known Indian corn, *Z. Mays*, there are numerous varieties, some of which are sufficiently hardy to thrive in the climate of Britain. Both the species are natives of America and Chili, introduced in 1562 and 1821. They belong to the class and order Menoecia Triandria (21 and 3d), and natural order Gramineæ.

**CABBAGE.**—*Brassica* (*Bressic* or *Breskan*, Celtic name signifying 'Brittle') belongs to class 15—*Tetradynamia Silignosa*, and natural order *Cruciferae*, having six stamens, of which four are longer than the rest. To this tribe belongs the turnip, Swedish turnip, rape, &c. The *Brassica Oleracea*, var. *Capitata*, or common white cabbage, grows in cliffs on the sea shore in England, and seems to have been

one of the earliest vegetables which attracted the attention of man. There is scarcely an instance, in the vegetable kingdom, of a plant that produces varieties so different in appearance and qualities as the *B. oleracea*. Comparing the original plant as it is found on our shores with wavy sea-green leaves, no appearance of a head, and flowering like wild mustard or charlock, with the red cabbage or cauliflower, the difference is astonishing. An eminent writer in the *Quarterly Journal of Agriculture* (Mr Towers), recommends the culture of cabbages in the field as a rotation of cropping. Few vegetables run into a state of putrescency so quickly as cabbages; they ought, therefore, to be used immediately after cutting. In Holland and Germany the inhabitants have a method of preserving them by cutting them into slices, and sprinkling salt and some aromatic herbs among them. This mass is put into a tub, where it is pressed close, and left to ferment, when it is called *sour crout*, or *sawer kraut*. These, and all pickles of cabbage, are considered wholesome and antiscorbutic. It was by the use of sour kraut, whenever opportunity offered of gathering the wild plant, that Captain Cook succeeded in preserving the health of his seamen from the ravages of the scurvy, which had previously been so fatal in long voyages. Cabbage seeds should be sown in four feet wide beds, if in cold or elevated situations, about the 26th or end of July, in intermediate localities about the 5th or 10th August; and on warm borders, or favourable localities, between the 12th and 20th of August. In loose dry soil the seeds should be trod in.

**RAPE**, *Brassica Napus*, belongs to the cabbage tribe (15th class). It is an oil plant, and is extensively cultivated in agriculture.

**TURNIP**.—*Tetradynamia* (*tetra*, four; *dynamis*, superiority of four stamens); stamens six, four of which are longer than the rest. It is divided into two orders, siliculosa (*silicula a silique*, or short round pod), and siliquose (*siliqua a silique*, long taper pod.) This class consists, with the exception of *Cleome*, entirely of the natural order Cruciferae, and has lately been the subject of the most acute and successful investigation of many botanists of celebrity.

*Example*. *Brassica*, *siliqua*; roundish, style small, short, obtuse; seeds in one row; calyx closed. *B. Rapa* (COMMON TURNIP), is a native of Britain; root caulescent,

orbicular, depressed, fleshy; radical leaves lyrate, scabrous,—those of the stem nearly entirely smooth. In the wild state little better than wild mustard or charlock. Borders of fields and waste places. Fl. April, May, and June, biennial, varying exceedingly in height according to soil. Upper leaves amplexicaul, ovato-acuminate, subglaucous; all more or less toothed. Flowers yellow, rather large. Prefers a light soil, which should be well manured; if the dung is well fermented so much the better for the garden turnip; in the field, where it is buried in drills, more littery dung will succeed. The field culture of the turnip is become an important part of the agriculture of light soils.\* The best mode, whether in the garden or the field, is by drills, as in Berwickshire and Northumberland, where are pro-

\* There is a disease to which turnips are liable, called "fingers and toes." The fibres or tap-roots of the turnip, or both, thicken; and knobs of every conceivable shape are formed, then swell and crack, and of course begin to putrefy; this goes on, and the plants disappear rapidly, until a field of promising turnips are not worth five shillings per acre. Those plants with the most fibrous roots stand the attack best. Every conceivable variety of opinion has been mentioned as the cause of this disease. Certain fields being subject to attack, the progress of the plants from sowing time forward were narrowly watched. The first thing observed before they were fit for hoeing, was several ash-grey coloured flies, resembling the house fly, but somewhat larger. On examining the nervures of the leaves, eggs of two flies resembling the fly-blows of the *muscidae* were discovered. In a week, maggots were formed, which crawled into the ground and attacked the root of the plant. A puncture, however slight, will cause a flow of sap to come to the place, and a tubercle or excrescence is formed. In this the maggot festers. Six or eight at one plant have been detected; these continually gnaw it until they destroy it or change into pupæ, and the plant putrefies and dies. They emerge from the pupæ and assume the fly form; some in the same season, but a greater proportion of them in the ensuing year, to spread again the work of destruction. The fly is supposed to be the *Anthomyia brassicae* of Bouch. The length of it is about three lines, colour ash grey; male fly has an indistinct black mark on the back; the wings are transparent. A prevention of their ravages has only been found in a summer fallow. It seems to banish the parent flies, which otherwise are of still habits; whereas the frequent succession of turnips encourage the flies and perpetuate the evil. Would not a slight dusting of powdered lime over the plants prevent or cure this evil?

duced crops of triple the weight of those grown in the broadcast manner in Norfolk. In the latter county a crop weighs from 5 to 15 tons per acre; in Northumberland from 25 to 30 tons; and in Ayrshire and other parts of Scotland as many as 60 tons have been raised on the statute acre. In the glens of Athole, 35 years ago, the farmers there had not thought of thinning their turnip crops. In this country they were first cultivated near Stonehaven by Robert Barclay, Esq. of Ury, as an article of field-culture, and that enlightened gentleman brought their culture to very great perfection during his lifetime. The Brassica tribe is capable of great extension and improvement by cross-impregnation, which sometimes takes place by chance, and new and improved varieties are produced by the action of the winds, by the working of bees, by carrying the pollen or fructifying meal from one plant of the same tribe to another species of the same family; which ought to be selected for seed when found to be of an improved variety. The best sorts for a garden are the early white Dutch, and the yellow Maltese or golden turnip, with the yellow Altringham. They are accounted a salubrious food, demulcent, detergent, somewhat laxative, and diuretic; but liable in weak stomachs to produce flatulencies; and prove difficult of digestion. The liquor pressed out of them, after boiling, is sometimes taken medicinally in coughs and disorders of the breast. The seeds are occasionally taken as diuretics; they have no smell, but a mild acrid taste.

MUSTARD, *Sinapis*, belongs to class Tetradynamia (15th), and natural arrangement *Crucifera*. There are two kinds—sown as agricultural seeds; the *nigra* or common, with its sub-variety, the turgid, and the *alba* or white mustard, which are all annuals, and natives of corn-fields in Britain. Our English word *mustard*, and the French *moutarde*, are modernizations of *mustrum ardens*, hot must; the sweet must of new wine being one of the ingredients of the French mustard for the table. The seed of all the species are hot, acrid, and will afford an oil by expression, and a powder or meal by drying and grinding, which might serve as the condiment mustard. The common (*S. nigra*), is more particularly adapted for the latter purpose, though it is often mixed with the seeds of *S. alba* and *arvensis* (or charlock), and often with those of the cabbage and radish tribes. Both the white and common mustards are grown as small salads, to be eaten

with cress; they are sown as thick as the seeds will lie, in pots or boxes, or in the area of forcing-houses in the winter season and forced, or in beds in the open air, and cut as soon as the seed leaf is fully expanded. For flour of mustard, or for the seed, for oil, or medicinal purposes, both the white and black sorts are sown in the fields, in rich well pulverized soil, in March or April, and kept free of weeds. The crop ripens in July and August, and is either threshed immediately, or stacked like other grain. It is, like other oleiferous seeds, exhausting for the soil, and such seeds as drop and are buried, retain their vegetative powers for an unknown length of time; so that where mustard has once been sown, it will come up occasionally for a century or more afterwards. White mustard has been sown with complete success in order to extirpate the wire worm. If the seeds, Dr. Cullen observes, be taken from the plant and ground, the powder has little pungency, but is very bitter; by steeping in vinegar, however, the essential oil is cooled, and the powder becomes exceedingly pungent. In moistening mustard powder for the table, it may be remarked, that it makes the best appearance when rich milk is used; but the mixture in this case does not keep good for more than two days. The seed of both the black and white mustard are often used in an entire state medicinally. Half or a quarter of a wine glass of mustard seeds, swallowed fasting, about five in the morning, is the most powerful tonic and strengthener of the digestive organs which is known.

**SOLANUM TUBEROSUM, (Nightshade), Potato.** See Systematic Catalogue, page 117.

**CARROT, *Daucus*, (Dais to make hot),** belongs to class 5, order 2d, and natural arrangement *Umbeliferae*. *D. carota*, common cultivated carrot. Fruit elliptic oblong, compressed transversely. Seeds with four rows of flat prickles, and rough intermediate ribs. Calyx obsolete, petals inversely heart-shaped, unequal fl. separated; biennial, and a native of Britain; found in chalky pastures about the borders of fields and embankments, in almost every part of the kingdom. The effects of cultivation have, as in the cabbage, entirely altered its appearance. In its natural state, it is small, hard, and dry, of a white colour, in which case the seeds are used medicinally. In the cultivated state, the root becomes large, succulent, and of a red, or yellowish colour. We have no certain data to denote the precise time

that carrots were first cultivated in this country; but in the time of Henry the Eighth, Hume, the historian, says, that neither "salads, carrots, turnips, nor other edible roots, were produced in England." Previously to that time, these vegetables were imported from Holland and Flanders. The leaves of carrots were held in esteem by the ladies, even of the gay court of Charles the First, for Parkinson, the Botanic gardener of that monarch, informs us, that they "wore them in their bonnets instead of feathers."

The carrot is not an article only of garden culture, but is extensively cultivated in the fields for cattle. There are several varieties; the largest and best adapted for field or garden culture is the Altringham, named after a village in Cheshire, where it originated. The early horn and orange are also good garden sorts. The seeds do not retain their vegetative powers more than a year, for which reason the cautious cultivator ought to prove them before sowing. The last week of March and first of April is the best season for sowing a main crop. On farms where a deep sandy loam or moss occurs, few crops of the root kind afford a more valuable return. In Norfolk and Suffolk they are a good deal in use as a field crop, and especially near Lowestoft, in the latter county.

The root scraped and applied in the form of a poultice, is an useful application to ulcers, cancers, and putrid sores. The seeds, which obtain a place in the *Materia Medica*, have a light aromatic smell, and a warm acrid taste, and are esteemed for their diuretic qualities, and for their utility in calculus and nephritic complaints, in which an infusion of three spoonfuls of the seeds in a pint of boiling water, has been recommended; or the seeds may be fermented in malt liquor, which receives from them an agreeable flavour, resembling that of lemon peel. The boiled root is said, by many, to be difficult of digestion; but this is the case only when the stomach is weak. It contains a considerable quantity of the saccharine principle, and is very nutritious.

The following method of cultivating this valuable root is recommended by Mr. Scott, many years land-steward to Admiral Elliot of Mount-Tiviot, Roxburghshire, and to General Robertson of Lawers, Perthshire:—

"The crop which Mr. Scott preferred to precede carrots was *a/s*, for the following reasons:—1<sup>st</sup>, the carrots formed a part of the same field with other green crops; and 2<sup>d</sup>, They were more of

certain not to be injured by the worm when they were taken after a corn-crop than after the ley or grass one. Mr Scott prepared the ground by means of a trench-ploughing as soon after harvest as the oats were carried off the field; it lay in that state till the end of February, then it was wrought with the plough and harrows to a loose mould, and was afterwards formed into ridges 30 inches wide, and from 16 to 18 deep. These were formed by going twice round in the same furrow, somewhat similar to trench-ploughing, which raises the top to the above height from the bottom; by this method all the surface-mould is accumulated. The manure which Mr Scott preferred was a well-prepared compost of peat-moss and dung, about ten tons to each English acre, regularly spread in the bottom of the drills. In doing of this, care should be taken not to break down the ridges; for, if this is done, the dung may be left too near the top of the ridges or surface, and the carrots would grow short, and full of fingers or branched roots; whereas, when the dung is laid full 16 or 17 inches deep, not a single fork-rooted carrot will be seen,—a singular proof of the advantage of laying dung deep, at least for carrots.

“After the dung is spread, according to the above-mentioned direction, the drills are split down, and raised up the same way as before, going twice round every ridge, in order that there may be fully 16 inches from the dung, all of good mould. The dung being at the bottom makes the tap-root of the carrot push immediately down, and swell to an enormous size, the roots being often 16 inches in girth, and 18 or 20 inches in length.

“Before sowing the seed a rut is made along the top, about four or five inches wide and three deep, by means of a hoe, to allow room to the plants to stand along the top of the drills similar to double rows. At Lawers, the crop, in 1810, was 33 tons and 70 stones Dutch, produced from less than a Scotch acre and a half of ground.

“The best way to preserve carrots is to top them close by the head of the root, and lay them gently down in a heap within a house, and covered with bog mould or dry sand. They should be turned over once a month, picking out the spoiled ones, which attention will make them keep sound till the end of April.

“The second thinnings of carrots afford great relief to young pigs, as at that time no potatoes can be had. In short no food is so good for young animals of all sorts as carrots; and, when good seed can be obtained, no crop will repay so well the expense of cultivation on a moss soil.”

PARSLEY, (*Apium Petroselinum*), belongs to the class and order Pentandria, Digynia (5th and 2d), and natural family Umbellifera. Is a native of Sardinia, and introduced

in 1548. This species is a well known seasoning herb, and it is also sown among pasture grasses as likely to counteract the liver rot in sheep.

FLAX, *Linum usitatissimum*, common lint, belongs to the class and order Pentandria Pentagynia, 5th and 5th, and natural family *Caryophyllæ* (A)—Native of Britain, found in corn fields, and a well-known thread or clothing plant, which has been cultivated from the remotest antiquity for its cortical fibres, or boon, which, when separated from the stalk, or harl, as it is technically called by the growers, forms the lint and tow which is spun into yarn, and wove into linen cloth. The seeds are sown on good loamy soil, frequently after potatoes, and sometimes on lea ground. It thrives best in land recently limed and in good heart; broadcast in April. During summer, weeds are carefully removed; and when the plant is in full flower, or (if seed be desired) when the seed capsules are ripe, it is pulled up by the roots, the capsules are torn off by a ripping-comb, and the stalks tied in bundles and carried to a pond or lint-dam: into this water the bundles or sheaves are laid root-end undermost, and kept under the surface by branches of trees with stones placed upon them for two or three weeks, according to the softness of the water, till an appearance of decay or softness is indicated by the bark, on the stalks being rubbed between the hand; they are then taken out and spread on the grass or stubble for a fortnight, or a sufficient time, until the alternate dews and heats accelerate the progress of decay; it is next taken up, and, when quite dry, tied into bundles and stacked till sent to the lint mill or flax-cleaner. Some cultivators do not steep the flax in water, but only spread it on the surface of the grass-ground, which is called dew-rotting, and has nearly the same effect as the other; but the more recent practice, not yet, however, very general, is neither to steep or dew-rot, but to dry, bind, and stack, and afterwards to separate the fibre by machinery. By this process the fibre is obtained of much greater strength; there is less loss of seed, less demand for labour at a busy season, and the refuse of the operation forms an excellent food for cattle and horses: that is, the seed vessels either with or without the seed. Boiled linseed is a very superior food for young calves when given them with warm milk. The machines for breaking and cleaning flax are worked by hand, and the

best at present is considered to be that of Bundy. The process of steeping and spreading flax has the further effect of bleaching it; when the machine is used, the bleaching process is effected by steeping in hot water and soft soap. Flax seed yields, by expression, a valuable oil; in powder, it is much used in poultices; and the refuse, after pressing for oil, forms a cake to feed broken-winded horses, fatten cattle, and for manure. Persons subject to the stone or gravel are often relieved by drinking a decoction of linseed.

HEMP, *Cannibis Sativa*, common. The hemp is a manufacturing plant, of equal antiquity with the flax. It grows to a great height in rich soils under a warm climate; in some parts of Italy it has been found 18 feet high. The common height in Lombardy and the Bolognese territory is twelve feet; in this country it seldom exceeds six feet: yet the fibre of the British hemp is no finer than where it is three times the length. The culture, management, and uses of hemp are nearly the same as those of flax; but the male and female flowers being on different plants, and the male plant decaying long before the female, the former requires to be pulled up as soon as the setting of the seed in the female shews that they have effected their purpose. Hemp is sown on well prepared loamy soil, about the end of April. The male plants are generally pulled about the beginning of July, and the females four or five weeks later, when they have ripened their seeds. The plants being tied in bundles, are watered and bleached in the same manner as flax; or they are dried and stacked without going through this process, and the fibres separated when wanted by the flax-breaking machine, of recent invention; or by steeping in hot water and soft-soap. The produce of hemp in fibre, varies from three to six hundred weight per acre; in seed, from eleven to twelve bushels. The fibre produces a cloth stronger than that from flax, and the best of all cordage and ropes. An oil is extracted from the seeds of hemp, which is used in cookery in Russia, and in this country by painters. The seeds themselves are reckoned good food for poultry, and are supposed to occasion hens to lay a greater quantity of eggs. Small birds, in general, are very fond of them, but they should be given to caged birds with caution, and mixed with other seeds. A very singular effect is recorded, on very good authority, to

have been sometimes produced by feeding bullfinches and goldfinches on hemp-seed alone, or in too great a quantity; viz. that of changing the red and yellow on those birds to a total blackness.

The hemp belongs to the class and order *Dioccia Pentandria* (22d and 5th), and the natural order *urticeæ*. It is a native of India, time of introduction uncertain.

**Hop**, *Humulus Lupulus*, common hop, belongs to the same class, order, and natural family as the hemp.

The hop is a native of Britain, and has been cultivated in Europe an unknown length of time for its flowers, which are used for preserving beer. Its culture was introduced from Flanders in the reign of Henry the Eighth. Though indigenous to Scotland and Ireland, it is little cultivated in those countries, owing to the humidity of their autumnal season. Like other plants of this sort, the hop bears its flowers on different individuals: the female plant, therefore, is only cultivated. There are several varieties grown in Kent and Surrey under the names of Flemish, Canterbury, Goldings, &c., the first is the most hardy, differing little from the wild or hedge hop; the Goldings is a very improved and highly productive variety, but more subject to blight than the other. The hop prefers a deep loamy soil with a dry bottom; a sheltered situation, exposed to the south west, but at the same time, not so confined as to prevent a free circulation of air. The soil requires to be well pulverized and manured previously to planting. In hop districts, the ground is generally trenched with the plough or spade. The mode of planting is generally in rows, six feet apart, and the same distance in the row. Five, six, or seven plants are generally placed together in a circular form, and at a distance of five or six feet from each other. The plants or cuttings are procured from the most healthy of the old stools; each should have two joints or huds; from the one which is placed in the ground springs the roots, from the other the stalk. Some plant the cuttings at once where they are to remain, and by others they are nursed a year in a garden. An interval crop of beans is generally taken the first year. Sometimes no poles are placed at the plants till the second year, and then only short ones of five or six feet. The third year the hop generally comes into full bearing, and then five or six poles from fourteen to sixteen feet in length, are placed to each hill. The most durable timber for poles is that of Spanish chestnut, which is much grown in Kent as coppice wood for that purpose. The after culture of the hop consists in stirring the soil, and keeping it free from weeds; in guiding the shoots to the poles, and sometimes tying them for that purpose with withered rushes;

in eradicating the superfluous shoots which may arise from the root, and in raising a small heap of earth over the roots to prevent any more from rising.

Hops are known to be ready for gathering, when the chaffy capsules acquire a brown colour, and a firm consistence. Each chaffy capsule or leafy calyx contains one seed. Before these are picked, the poles, with the attached stalks, are pulled up, and placed horizontally on frames of wood, two or three poles at a time. The hops are then picked off by women and children. After being carefully separated from the leaves and stalks, they are dropped into a large cloth hung all round within-side the frame on tenter hooks. When the cloth is full, the hops are emptied into a large sack, which is carried home, and the hops laid on a kiln to be dried. This is always done as soon as possible after they are picked, as they are apt to sustain considerable damage both in colour and flavour, if allowed to remain long in sacks in the green state in which they are pulled. In very warm weather, and when they are pulled in a moist state, they will often heat in five or six hours; for this reason kilns are kept constantly at work, both night and day, from the commencement to the conclusion of the hop picking season. The operation of drying hops is not materially different from that of drying malt, and the kilns are of the same construction. The hops are spread on a hair-cloth, from eight to twelve inches deep, according as the season is dry or wet, and the hops ripe or immature. When the end of the hop stalks become quite shrivelled and dry, they are taken off the kiln and laid on a boarded floor till they become quite cool, when they are put into bags.

The bagging of hops is thus performed: in the floor of the room where hops are laid to cool, there is a round hole or trap, equal in size to the mouth of a hop-bag. After tying a handful of hops in each of the lower corners of a large bag, which serves afterwards for handles, the mouth of the bag is fixed securely to a strong hoop, which is made to rest on the edges of a hole or trap; and the bag itself being dropped through the trap, the packer goes into it, when a person who attends for the purpose, puts in the hops in small quantities in order to give the packer an opportunity of packing and trampling them as hard as possible. When the bag is filled, and the hops trampled so hard as that it will hold no more, it is drawn up, loosed from the hoop, and the end sewed up, other two handles having been previously formed in the corners in the manner mentioned above. The brightest and finest coloured hops are put into packets or fine bagging; the former are chiefly used in brewing fine ales, and the latter by the porter brewers. But when hops are intended to be kept two or three years, they are put into bags of strong cloth, and firmly pressed so as to exclude the air.

The stripping and stacking of the poles succeed to the operation of picking. The shoots or hind being stripped off, such poles as are not decayed are set up together, in a conical pile of 300 or 400, the centre of which is formed by three stout poles bound together a few feet from their tops, and their ends spread out.

The produce of no crop is so liable to variation as that of the hop; in a good season an acre will produce twenty cwt.; in a bad season none; or only two or three cwt. From 10 to 12 cwt. in a season, is considered a tolerable average crop. The quality of hops is estimated by the abundance or scarcity of an unctuous clammy powder which adheres to them, and by their bright colour.

The expenses of forming a hop plantation are very great; but once in bearing, it will continue so for ten or fifteen years before it requires to be renewed. The hop culture in England, like that of the culture of the vine in France, is only calculated for cultivators of considerable capital, who can retain the produce from years of abundance to years of scarcity. It is calculated on an average, that the hop crop fails almost entirely every fifth year, when the price will rise from two to thirty pounds per cwt. To those who can cultivate and preserve the hop with the view to such a rise, few crops will be equally profitable.

The hop is peculiarly liable to diseases; when young, it is devoured by flies of different kinds; at a more advanced stage it is attacked by the green fly, red spider, and other moths, the larvae of which prey often upon its very roots. The honey dew often materially injures the hop crop; and the mould, the fire-blast, and other blights injure it at different times, towards the latter period of the growth of the plants.

It is the floral leaf, or bractæ of this plant, that is dried and used in various kinds of strong beer. Hops have a bitter taste, less ungrateful than most of the other strong bitters, accompanied with some degree of warmth and aromatic bitter, and are highly intoxicating. The hop-flower also exhales a considerable quantity of its narcotic power in drying; hence those who sleep in the hop-houses are with difficulty roused from their slumber.

The use of hops in brewing is to prevent the beer from becoming sour, and this is the grand purpose for which it is cultivated. But the young shoots both of the wild and improved hops are eaten early in the spring as asparagus, and were formerly brought to market for that purpose. The stalks and leaves will dye wool yellow. From the stalks a strong cloth is made in Sweden, the mode of preparing which is described by Linnæus in his *Flora Suecica*. A decoction of the roots is said to be as good a sudorific as sarsaparilla; and the smell of the flowers is soporific. During the illness of George the Third, in 1787, a pillow filled with hops was successfully employed to procure sleep, after other opiates had failed to produce that effect.

The following Hay and Pasture Grasses for improving the soil, are enumerated in the Catalogue of Mr Turnbull, seedsman, Perth, where Agriculturists and others may obtain the proper seed for laying down land into grass:—

- ACHILLEÆ** Millifolium—Yarrow, or 100 leaved grass.  
**AOROSTIS** Stolonifera—Florin grass.  
     Vulgaris—common creeping Bent.  
**ALOPECURUS**—Foxtail grass.  
     ... agrestis—sleoder.  
     ... pratensis—meadow.  
**ANTHOXANTHUM**—Veroal grass.  
     ... .. Odoratum—sweet scented.  
**ARRHENATHERUM** avenaceum—tall oat like grass.  
**AVENA** flavescens—yellow oat grass  
**BRIZA** Media—common quaking grass  
**BROMUS** arvensis—field brome grass.  
     ... mollis—soft annual brome-grass  
**CYNOSURUS** cristatus—crested Dogstail.  
**DACTYLIS** Glomerata—Cocksfoot.  
**FESTUCA** duriuscula—hard fescue grass  
     ... prateosis—meadow fescue grass  
     ... ovina—Sheep's grass  
     ... ruhra—creeping rooted grass  
**HOLCUS** laeatus—Yorkshire fog  
     mollis—creeping rooted soft grass  
**LOLIUM** Italicum—Italian rye grass  
     Perenne—Perennial do.  
     ... .. Pacey's perenoial do.  
     ... .. Stickoey's do.  
     ... .. Devoo evergreen do.  
     ... .. Several other sorts.  
     Annual variety.  
**MEDICAGO** lupulina—Trefoil "yellow"  
     ... sativa—Lucern  
**ONOBRYCHIS** sativa—cultivated Sainfoin  
**PHELUM** prateose—Timothy or Catstail grass  
**PLANTAGO** lanceolata—Ribgrass  
**POA** Aonua—annual meadow grass, (Suffolk grass, not  
     annual, but perennial in Scotland).  
     ... pratensis—smooth stalked do;  
**POA** trivialis—rough stalked meadow grass  
     ... nemoralis—wood do.  
     ... nervosa—Hudson's Bay do.  
**POTERIUM** saquisorba—Burnet  
**TRIFOLIUM**, prateose—red clover; do. perenne—(perennial  
     or Cowgrass); repeos—white clover; minus—suckling do;  
     incarnatum—scarlet do.

# BOTANY.

## SEXUAL SYSTEM OF PLANTS.

According to the Linnean system, all plants are furnished with flowers, either conspicuous or inconspicuous. The plants with conspicuous flowers are arranged according to the number and position of their stamens and pistils; those with inconspicuous flowers are arranged according to the situation of the flowers on the plant, or according to other circumstances in the plant itself.

To discover the name of a plant by the Linnean system, therefore, all that is necessary for a beginner is, to possess a specimen of it in flower, and to be able to know its different parts by the names given them by Botanists. To discover the class, order, and genus of a plant, it is only necessary to be able to distinguish and name the different parts of the flower.



These parts are: the calyx or cup, (*fig. 1. a.*) which is that leaf, or those leaves, by which the flower is usually enclosed when in bud, and which, when the flower is expanded, appear under it. The Corolla (*corona*, a crown) is the coloured leaf, or leaves, of a flower, (*fig. 1. b.*) The stamen (or first principle of any thing) is the thread-like process, or processes, immediately within the leaves of the corolla (*fig. 2.*): It consists of two parts, the filament or thread (*a*), and the anther (*b*); this anther contains what is called the pollen or fructifying meal (*c*). In the centre of the flower is the pistil (*fig 3*): it consists

of three parts, the germen, or rudiments of the fruit or seed (*a*), the style (*b*), and the stigma or summit (*c*), which crowns the style, and is destined to receive the fructifying pollen.

The pistil and stamen are the essential parts of a flower. The corolla or calyx may be wanting, and yet the flower may be termed perfect, because the absence of those parts is no obstacle to reproduction. Even the style and the filament may be absent, without preventing the formation or ripening of the fruit; and there are many flowers which have the anther sitting close to the corolla, &c. without a filament, and the stigma to the germen without a style; but the anther, the stigma, and the germen are essential.

The seed is contained in the pericarp or seed-vessel, which is the germen when grown to maturity. The name of seed-vessel varies according to its form, substance, &c.; but the word pericarp (*peri*, about, *karpon*, a fruit) is applicable to all its varieties. The receptacle is the base or medium which connects the other parts of the fructification. (Magazine of Natural History, vol. i. p. 233.) The organs of fructification are quite plain and conspicuous in

**GALANTHUS, SNOWDROP,\*** (from *gala*, milk; *anthos*, a flower; colour) class six, order one; Hexandria Monogynia, six stamens, one style; nat. arrangement, Amaryllidæ; sepals three, concave; cup formed of three small emarginate sepals; stigma simple. *G. nivalis*, snowdrop. Localities—woods, orchards, meadows, pastures, &c., in very many places in England, Scotland, and Ireland; but, Dr Hooker says, scarcely indigenous. Fl. Jan. Feb. Ma.; per.; bulb ovate; leaves smooth, two broadly linear, glaucous green; flowers solitary, drooping, elegant, rendering this plant a general favourite. *G. plicatus*.—Fl. Ja. Ap.; a native of Crimea, introduced in 1818; semi-double, leaves plaited; double and sweet scented varieties of this lovely plant have recently been obtained.

“ Like pendant flakes of vegetating snow,  
The early herald of the infant year,  
Ere yet the advent'rous crocus dares to blow,  
Beneath the orchard houghs thy hinds appear.”

**NARCISSUS, DAFFODIL,** (from *narke*, stupor; effects of the smell of some of the varieties); sepals six, equal; cup funnel-shaped, of a single leaf; stamens inserted within the cup. This is an extensive genus of great beauty; indigenous to the different states of Europe; some species very fragrant, and all of them of the easiest culture. They also force well either in pots of earth or in glasses of water. Their forcing may be greatly accelerated by

\* A beginner should commence with the sixth, and not the first class of the Linnean or artificial arrangement. The organs of fructification in the former being more plain and conspicuous.

retarding the bulb one season in an ice-house. Many fine hulks of this genus are annually imported from Holland, and some from Naples, especially the *Italicus*, which grows round that city in great beauty.

*N. Poeticus*, (narcissus of the poets): spatha mostly single-flowered, nectary very short, concave, membranous, and crenate at the margin; leaves with an obtuse keel. Grows on heathy open fields on a sandy soil; said to be wild in Norfolk and Kent. Fl. May; per. Its beauty and delicious odor have recommended it to general culture. Smith says, this is the true narcissus of the Greek writers, as clearly described by Dioscorides. "Consider the lilies of the field how they grow."

*LILIVM*, Lily, (from *li*, whiteness, Celt.; flowers); oat. arrangement, *Liliaceæ*; sepals six, campanulate, with a longitudinal honey-line and generally reflexed; valves of the capsule connected by a mesh of hairs. This is a splendid genus, all the species of which are considered border flowers of great beauty. The more common sorts, species, and varieties, will thrive in any soil and situation, even under the shade of trees. The Canadiana, Pomponian, Philadelphia, and martagoos, are somewhat tender, and require the protection of ashes or rotten bark in winter. They are generally planted in borders, and need not be taken up oftener than every three or four years in September, and replanted six inches deep in October following. None of the species can be safely transplanted after they have pushed leaves, without weakening them so as to prevent their flowering for several years. This remark, indeed, will apply to most bulbous-rooted plants. Mr. Griffin of South Lambeth, whose superior skill in the cultivation of bulbous plants is well known, has been in the practice of keeping the *Lilium Japonicum* in pots, protected by a greenhouse or garden frame; but he thinks they thrive best in the former. He places the bulb in twenty-four sized pots, not lower than an inch from the surface of the mould, which is composed of about two-thirds peat and one-third loam, the bottom of the top being covered to the depth of two inches, with broken pieces of tile and rough siftings of peat. The plants are kept entirely from frost, and are watered very little when in a dormant state, for they are then very impatient of wet in excess. The pots kept in the greenhouse are placed at a distance from the fire, to prevent the mould drying quickly. Mr. S. Brooks grows them in a brick pit, which he can cover with mats or glasses at pleasure; but he says, "It appears to be sufficiently hardy to endure our winters, as I have had a bed of them two years in the open ground without protection." The roots of the common White Lily (*Lilium Candidum*) are extremely mucilaginous, and chiefly used, boiled in milk and water, in emollient and suppurating cataplasms to in-

flammatory tumours. These lily roots afford a good substitute, in times of scarcity, for bread. The distilled water has been sometimes used as a cosmetic. (See Class 6.)

### CLASSIFICATION OF PLANTS.

CLASS 1. Monandria, one stamen (*monos* one, *aner* a man); two orders; monogynia, one style (*monos* one, *gyne* a woman); Digynia, two styles (*dis* twice, *gynia* a woman).

This class, which is not large, contains chiefly exotic plants; and of these the tribe of Scitamineæ is considered one of the most beautiful families of the vegetable kingdom. The useful productions are chiefly the Ginger, Cardamom, and Turmeric, spices highly esteemed, and in general use wherever they are known and can be procured.

Examples.—*Maranta arundinacea*, flower white, culm branched herbaceous, two feet high; leaves ovate, lanceolate, somewhat hairy underneath. It is called Indian Arrowroot, because its thick fleshy root was thought to extract the poison from wounds inflicted by the poisoned arrows of the Indians. In the West Indies, it is used as an alexipharmic, to resist the force of poisons. Washed, pounded, and blanched, it makes a fine powder and starch, and may be used as food, resembling in many respects the salep. A light loamy soil suits all the species; which, though tender, are readily propagated by dividing the root. It is a native of South America, and introduced in 1732; belongs to the natural family Cannææ.

*Salicornia*, Glasswort, S. herbacea (marsh), is an annual, grows on the sea shore in Britain. It is gathered when in flower (August and September), and pickled in salt and vinegar, like samphire, for culinary purposes. The whole plant has a saltish taste, and is greedily devoured by cattle. All the species, excepting the *S. Arabica*, native of Arabia, abound on the shores of the Mediterranean, and are there burnt for soda, which is much used in the manufacturing of soap and glass, especially at Marseilles.

*Hippuris vulgaris*, common marestail.—Leaves whorled, 10-12, linear acute. The flower of this plant is one of the simplest among perfect plants; it has only one stamen and one pistil, unprotected by either calyx or corolla, and it produces only one seed. The situation of the leaves in whorls is not usual in European plants, except in the stellate of Linneus. The flowers in the beginning of summer are mostly hermaphrodite, but in autumn many of them are female. This plant is reported to assist in purifying the putrid air of marshes. It is eaten by wild ducks.

CLASS 2.—Diandria, two stamens. Orders—monogynia one digynia two, trigynia three styles (*tris* thrice, *gynia* a woman)

This class, which is not large, and so entirely artificial that no other characters than those of the Linnean definition can be assigned to it, contains some elegant and fragrant plants, belonging to the natural families of *Jasminæ*, *Scrophularinæ*, and *Labiata*; examples of the two latter orders are speedwell and sage; extensive tribes, chiefly of hardy herbaceous plants. The most useful of the class are the pepper and the olive. The jasmine is used in perfumery; the sage and rosemary in cookery; and the privet and syringa for garden hedges. The native plants in this class have two stamens, and one or two pistils; the flowers are larger, and their parts more distinct, than in the first class.

Example.—*Rosmarinus officinalis*, common rosemary; natural family *Labiata*; flowers purple (January and April); leaves sessile. *Ros marinus* (two Latin words signifying dew of the sea). The shrub grows in the southern parts of Europe, in the vicinity of the sea. It yields, by distillation, a light-pale essential oil, of great fragrance, which is imparted to rectified spirit. It was formerly recommended for strengthening the nervous system, relieving headaches, &c. as well as to strengthen the memory. Hence the allusion of the poet, "there's rosemary, that's for remembrance." Rue, in former times signified grace; and rosemary repentance. Rosemary was considered as an emblem of fidelity in lovers; it was worn at weddings and funerals, and on the latter occasions is still, in some parts of Wales, distributed among the company, who throw the sprigs in the grave along with the corpse. It is the principal ingredient in Hungary water, and is drunk as tea for headaches, and by nervous persons. It prefers a lean dry soil, or rubbish of old buildings; and when it has established itself on a wall, will resist the greatest cold of our winters. (See sweet-scented vernal grass, sage, and page 121.)

CLASS 3. Triandria, plants of three stamens, and one, two, or three pistils; one, monogynia; two, digynia; three, trigynia; including a considerable number of very beautiful plants, and a few useful in medicine. This class contains the most important natural family *Graminæ*, in the whole circle of vegetation;—the family of the grasses, with which the Author of Nature has so beautifully carpeted the surface of this globe, and which affords the greatest part of the food of man, and all the phytivorous animals. And in proportion to their importance in the economy of Nature, the solicitude for their propagation and preservation has been most amply expressed; they produce seeds in abundance, and the cropping of their leaves, and the treading on them, only tend to spread and increase their roots. (See Wheat, Poa annua, &c.)

Example.—*Valeriana*, valerian. *V. dioica* has usually the stamens and pistils in separate flowers, situated on different

plants. This species, and *v. officinalis*, or the great wild, are considered medicinal; and are prescribed in hysterical cases and habitual costiveness. Cats are delighted with the roots, which are said to smell like the true cat-thyme; and rat catchers employ them to draw rats together, as they do oil of anise. The garden valerian has something of the same qualities. The two former species are natives of Britain, and the latter of Germany, introduced in 1597.

CLASS 4. Tetrandria, four stamens, and orders as above. The plants in this class are distinguished from those in didynamia (14), by their four stamens being of equal lengths, and their flowers being of distinctly different natural orders. Some of the plants of this class possess medicinal qualities. The madder affords a spirituous tincture, formerly used as a stimulant and deobstruent; it is also much used in dyeing, and forms a considerable article of commerce. The cheese rennet (*Gallum verum*) possesses similar properties. The bruised plant is sometimes put in milk intended for cheese to give it a flavour and colour. The leaves were formerly considered an efficacious remedy in epilepsy.

*G. aparine* (Cleavers). Is reckoned to purify the blood, and for that purpose the tops are an ingredient in spring broth. The expressed juice of the herb, taken to the amount of four ounces or a quarter of a pint night and morning, during several weeks, is very efficacious in removing many of those cutaneous eruptions which are called, though improperly, scorbutic. The seeds have been substituted for coffee. The roots, like those of most of the species, will dye red; and eaten by birds, tinge their bones of that colour. It is a very troublesome weed, particularly in young hedges, but being an annual is easily eradicated.

*Asperula odorata*, sweet-scented wood-roof, is a native of our woods, has a pleasant scent, like vernal grass; it imparts a grateful flavour to wine, an agreeable perfume to clothes, and preserves them from insects. It is eaten by cattle and horses, and from containing an acid principle, with much fixed alkaline salt, has been thought useful in obstructions of the liver and biliary ducts.

CLASS 5. Pentandria, five stamens. Orders six, Monogynia; one style, digynia, trigynia, tetragynia, pentagynia, five styles, Polygynia; one of the most extensive of the Linnæan classes, and containing about a fifth part of all phænogamous plants,—or such plants as are visibly furnished with sexual organs. Plants of five stamens not united. This class is distinguished from Syngenesia (19) by its flowers being simple, while those of the latter are compound. If we except the genus *Ribes*, there are few native plants belonging to the class which bear berries fit for eating; and all the *monopetalous* plants, with five stamens, whose fruit is

a berry, have been found to be poisonous. Indeed, a very considerable number of the plants in this class possess active properties, and several of them are very strong poisons; such as the deadly nightshade, bitter-sweet, thorn-apple, henbane, hemlock, common water Dropwort, &c. However, the intrepid and ingenious research of Baron Stoerk could turn their deleterious properties to salutary purposes; for by a series of bold and well conducted experiments, correctly marked in their results, he converted the qualities of these potent herbs into ineffable blessings to the human race; and the most excruciating pains that flesh is heir to have been speedily relieved, sight given to the blind, and many obdurate cases of rheumatism, cancer, &c. (diseases before deemed irremediable), have been completely cured by preparations of these invaluable plants.—Examples.—(See *Carrot, Parsley, Potato, &c.*)

*Rhus*.—Derived from the same root as *Rosa*, *rhudd*, in Celtic, signifying red, on account of the colour of the fruit. Sumach, its English name, is an alteration of *simâq*, its name in Arabic. (*Forsk.*) In some of the species of this genus, the flowers are hermaphrodite; in others, as *R. elegans*, pentaphyllum, and *Toxicodendron*, the male and female are on separate plants. In *R. Toxicodendron*, they are polygamous males, being mixed with the hermaphrodites. The species from the Cape of Good Hope rarely flower in this country, and are chiefly cultivated for the sake of their foliage, which is neat, and not susceptible of injury from bad management.

*R. Coriaria* is used instead of oak bark for tanning leather, and it is said that that of Turkey is chiefly tanned with this plant. The seeds are in common use at Aleppo at meals to provoke an appetite. Both leaves and seed are used in medicine as astringent and styptic.

*R. japonica* in China affords an oil by bruising the berries and boiling them in water: they use it as a varnish, but it does not keep its polish so well as the oil of *R. vernix*, which affords the true Japan varnish.

Dr. Fresnoi has endeavoured to prove the efficacy of this plant when administered in cases of paralysis and other diseases. Amongst other cases, he relates that of a girl in Flanders, subject to fits, who had laid some flowers in her bed-room. "Next day she told me she had undergone a great change; that she had no fits, and slept much better. Next day, the flowers being removed, and the window opened, the convulsions reappeared; on their being again introduced, the fits disappeared; which proved plainly it was the effect of the flowers."

PHLOX, (*Phlox, flame; flower.*) five stamens, 1 style; capsules 3-celled; corolla hypocrateriform, with curved tube stigma trifold. This contains 48 species, 16 of them are of recent

introduction; they are all natives of North America only, and are the handsomest in cultivation. They consist of most elegant border flowers, valuable for blossoming late in the season, and for their lively colours of red, white, pink, and purple, &c., while the majority of plants that flower in autumn have yellow, and generally syngenesious blossoms. Most of the species delight in a rich moist soil, or loam, or leaf mould, or peat. The dwarf species are admirably adapted for pots, or a select rock-work. They require some protection in severe winters. Natural arrangement *Polemoniaceae*. Nothing is yet known of their properties.

*MYOSOTIS PALUSTRIS*, (*Scorpidis*), *Scorpion Grass*. Forget-me-not.—This plant will grow any where, and varies more than most plants with situation. On dry walls and rubbish, it is dwarfish, rough, and hairy, not rising when in flower more than two or three inches; in muddy ditches it is smooth all over, of a shining light green, and two or three feet high. In common soils, as in a garden or loamy corn field, it assumes an intermediate character. Linnæus considers the plant as deadly to sheep. In gardens it does well in pots in the shade, or treated as a hog-plant, then which few better deserve the name of pretty. It is a well known sentimental flower, and considered to be the emblem of friendship in almost every part of Europe, from the circumstance of its being the first plant that appeared in flower around the warrior's grave, at Waterloo—hence the familiar appellation "Forget-me-not."

CLASS 6. Hexandria.—In this class the flowers have six stamens, all nearly of same length, and one to four pistils; but none of the genera have four petals like those we find in *Tetradynamia* (15).

It is divided into four orders, *Monogynia*, one style; *Digynia*, two styles; *Trigynia*, threestyles; and *Polygynia*, many styles. More than three-fourths of the plants included in this class belong to the first order, viz. *Monogynia*. This class contains the most beautiful of the herbaceous plants of our gardens, and an idea of it is easily acquired by beginners, who cannot select better specimens to begin with than that of the Snowdrop, which is so welcome on account of its earliness, and is regarded as an allusive picture of purity and innocence; the Narcissus is the Lily of the Field mentioned in Scripture; also the Lily, which is always considered as the emblem of whiteness; and the Star of Bethlehem, or *orinogalum* (from *orinth*, a bird, and *gala*, milk, so called from the colour of its flowers, which are like the milk found in eggs). The last is an extensive genus, all ornamental; colour white; two or three species are yellow and green, &c.; sepals six; erect persistent, spreading above the middle; filaments dilate at base or subulate; capsules roundish, angular, three-celled; seeds roundish, naked. Flowers ramose or corymbose; bractæas membranous. Nat. ord. *Asphodeleæ*. In the 24th verse of the 6th chapter of the 2d

Book of Kings, we are not to understand that the dove's dung there mentioned was the excrement of a bird, but the roots of the *O. Umbellatum* (common Star of Bethlehem). They are still much used as a food in the Levant. Dr. Hooker thinks this plant scarcely a native of Britain. I found it last summer about a mile north from the old Bridge of Almond, which appeared to be perfectly wild. Its roots are about the size of a pigeon's egg. It has a lance-shaped green strip on the back of the perianthum. Fl. April, May, and June; perennial; 8-10 inches high; leaves linear acuminate, flowers reach to the same height with the upper ones, thus forming a corymb, each having a membranous lanceolate bractea; segments of the perianthum green, with a white margin, and white within.

*O. SQUILLA* is the official squill; a native of Spain, Sicily, and Syria, growing on the sea-coast, and introduced in 1629. It has a bulb almost as big as the human head, pear-shaped, and tunicate like the onion. From the middle of the root arise several shining leaves a foot long, and two inches broad at their base, lessening all the way to the top, where they end in points. They continue green all the winter and decay in the spring; then the flower-stalk comes out, rising two feet high, naked about half-way, and terminated by a pyramidal thyrse of white flowers.

The Squill, is one of the few medicines known in the early ages of Greece, which is still held in great estimation. It is very nauseous, intensely bitter, and acrimonious, without any perceptible smell. It is poisonous to several animals. If much handled it excoriates the skin, and in large doses, frequently repeated, it excites nausea, and strangury, bloody urine, and hæmorrhoids, with fetid inflammation and gangrene of the stomach and bowels. Under proper management, however, it is a medicine of great practical utility. In dropsy it has long been esteemed the most certain and effectual diuretic with which we are acquainted, and it is usually employed in asthma. The red-rooted variety is supposed to be more efficacious than the white, and is therefore still preferred for medicinal use.

**CLASS 7. Heptandria.** Plants of seven stamens. A small class, of which Parinarium, which is a good tropical fruit, and the valuable horse-chestnut, are the only remarkable genera. There is only one native genus in it, viz. *Trientalis Europæa*; oval-leaved; winter green; flower white; leaves lanceolate, entire. Sir J. E. Smith says, "Few persons have seen the fruit of this plant, and it was most unaccountably mistaken, even by Linnæus and Gærtner. The valves of the ripe capsule become concave externally, convex and polished within, and have been taken for a permanent corolla. But they are opposite to the calyx leaves, which the segments of the corolla are not. The beautiful

tonics of the seeds were supposed to be the skin of a dried herry, and are not faithfully represented by Gærtner."—(English Flora, vol. ii. p. 208.)

*Æsculus Hippocastanum*, common horse-chestnut. The nuts or capsules are large and mahogany coloured, and have often occasioned regret that they are not edible, like those of the Spanish chestnut. Deer eat them greedily, and may be seen watching about the trees for their fall, during windy weather. In Turkey, they are ground and mixed with horse provender. According to some, swine and sheep may be fattened on them; and poultry, when they are boiled. They are of a saponaceous nature, and broken and steeped in hot water might save soap, where that article is excessively dear. It is a native of Asia, and introduced in 1629.

CLASS 8.—Octandria (*okto* eight, *aner* a man.)—The plants of this class have eight stamens, and one, two, three or four pistils. Some of the *Ericas* (beaths) are much admired for their beauty; and *Daphne* is an active alterative medicine.

Example.—*Daphne*. Flowers sessile axillary; leaves lanceolate; branches simple. This is a genus of diminutive shrubs, mostly evergreens, of great beauty and fragrance in the flower, and with a peculiar velvet texture in the leaf. It is mentioned by Linnaeus, as a characteristic of the genus, that the terminating buds of the shoots produce leaves, and the lateral ones flowers. This affords a hint to the cultivator to be sparing of his knife.

D.—*Mezereum* (Mezereon), with its two sub-varieties, are natives of woods in England; and are old inhabitants of the shrubbery, and deservedly much admired for their fragrance and precocity (being in flower from February to April). They thrive well in loamy soil; and will grow in the shade, and even under drip of other trees. The mezereon is a native of all parts of Europe, from Lapland to Sicily; but was first received from Elbing, before it was observed to be a native. The roots of it acquire a very large size in proportion to the branches, and have more the character of the fusiform, or ramose roots of a herbaceous, than of a ligneous vegetable. They are remarkably hot and acrid; and have loog, and in most countries, been a popular topical application for the toothache. The whole plant is extremely acrid, especially when fresh; and if retained in the mouth, excites great heat and inflammation, particularly of the throat and fauces. The berries are red, resembling cranberries; and when swallowed prove a powerful poison, not only to man, but to many quadrupeds—(this is a hint to nurses). Both the bark and berries of Mezereon, in different forms, have been long used externally in cases of obstinate ulcers, and ill-conditioned sores. In France, the bark is used as an application to the skin, which, under cer-

tain management, produces a serous discharge without blistering, and is thus rendered useful in chronic cases of a local nature, answering the purpose of what is called a perpetual blister, while it occasions less pain and inconvenience. In our own country, the Mezereon has been principally employed in syphilitic cases. The branches make a good yellow dye. The roots and other parts of the spurge laurel possess similar qualities to those of the Mezereon.

CLASS 9.—Enneandria, nine stamens (*ennea*, nine). One of the smallest of the Linnean classes; containing, however, three important genera; the Laurel, famous for the valuable spices it produces, and for the beautiful foliage of its insipid species; the Cashew nut, well known at the tables of the great or luxuriant; and the Rhubarb, one of the most valuable of medicines. The class itself is extremely unnatural, and the assemblage of genera most incongruous; orders, 1st, 3d, and 6th.

*Rheum*, Rhubarb.—All the sorts of commerce, known under the names Turkey or Russian, and East Indian or Chinese, grow on the declivities of the chain of mountains in Tartary, which stretches from the Chinese town Sici, to the lake Kokonor, near Tibet. The soil is light and sandy; and the Bucharians assert that the best grows in the shade on the southern side of the mountains. Rhubarb, however, is also cultivated in China, in the province of Chen-See, where it is called hai-houng. In Tartary, the roots are taken up twice a-year, in spring and in autumn, and after being cleansed and decorticated, and the smaller branches cut off, the body of the root is divided transversely into pieces of a moderate size, which are placed on tables, and turned three or four times a-day, during five or six days. A hole is then bored through each piece, by which it is hung up to dry, exposed to the air and wind, but sheltered from the sun. In about two months, the roots lose seven parts in eight of their weight, and are fit for the market. In China, the roots are not dug up till winter; and the cultivators, after cleaning, scraping off the bark, and cutting them, dry the slices by frequently turning them on stone slabs heated by a fire underneath; after which, the drying is completed by hanging them up in the air, exposed to the greatest heat of the sun.

Rhubarb has been cultivated in different parts of Britain, with a view to drying the root for medical purposes, with the most perfect success; but such is the prejudice in favour of the foreign article, that sufficient demand was not obtained to encourage the cultivator. The only point in which British culture was rather deficient, was in the drying; but that a little experience would soon overcome. (See page 122.)

**BUTOMUS, FLOWERING-RASH.**—A native of Britain, found in ditches, two feet high; flowers pink, in handsome terminal umbels.

This is the only plant of the class *Enneandria* that grows wild in Britain. It is an elegant aquatic. The corolla varies in different shades of red, or purple mixed with white, and is sometimes entirely white. The stem at bottom and the peduncles at top are often tinged with red. The number three is evidently predominant in the fructification; the corolla being doubly tripetalous, the stamens thrice three; the pistils six; the capsules six, in a hexagonal form, the involucre three leaved.

**CLASS 10.**—*Decandria* (*deka* ten, *aner* a man) ten stamens, and one, two, three, or five pistils. This is the last of the Linnean classes in which the stamens are distinct, and bear any determined relation to the other parts of the flower. It is composed of portions of a considerable number of natural orders, of which the most important is *Leguminosæ*, with which the class is usually made to commence. These are of two kinds: those which are papilionaceous, and those which have a regular expanded flower. The former are remarkable in their kind for bearing distinct stamens combined with a papilionaceous corolla. The greater part are natives of New Holland or the Cape of Good Hope, a very few of the northern hemisphere; and all of them ornamental plants. Of those with regular flowers, the most beautiful genus is the *Bauhinia*, which, in the latitudes of the tropics, constitutes the most formidable obstacle to the passage of human beings through the woods, which are interlaced in every direction by the climbing or leaning stems of these and other plants commonly called *Lianes*. The most extensive genus is *Cassia*, the species of which are little esteemed as objects of ornament, but of material use in medicine—the famous senna being the produce of at least three species. The *Hæmatoxylon* and *Swietenia*, the one producing logwood and the other mahogany, are included in this class, as are the important quassia drug, and the beautiful tribes of *Kalmias*, *Rhododendrons*, and *Andromedas*.

The second and succeeding orders are chiefly occupied by the most important of the genera of the natural family of *Caryophyllæ*, the whole of which have lately been remodelled and arranged, under the direction of Decandolle, by M. Seringe, an ingenious Swiss botanist. Of this order the most extensive genus is *silene*, and the most beautiful *Dianthus*, out of which the fine carnations, pinks, and picotees of the florist have been obtained (See p. 172).

**CLASS 11.**—*Dodecandria*, (*dodeka*, twelve, *aner*, a man). Orders six. *Monogynia*, *Digynia*, *Trigynia*, *Tetragynia*, *Pentagynia*, *Dodecagynia* (*dodeka*, twelve, *gyne*, woman.)—This is a small incongruous class, containing no extensive genus of importance except *Euphorbia*. Some botanists have

been of opinion that it ought to be cancelled, but it is probable that Linnæus understood the application of his own principles as well as some of his more pretending followers, and it is certain that if the Linnæan plan can be made to act successfully, its artificial arrangement must be rigorously observed. Euphorbia and Reseda, which are usually referred hither, should more properly be referred, the former to Monœcia, and the latter to Polygamia.

Example.—*Reseda Odorata*, MIGNONETTE, is a well known and universal favourite. The flowers are highly odoriferous, and there are very few to whom this odour is offensive. The plant is in great demand in London for rooms and placing in balconies, and forms for these purposes an extensive article of culture among the florists and market gardeners. The plants are in many cases sown and transplanted into pots, three or four plants to a pot four inches in diameter. To obtain plants for blowing from December to February, a sowing should be made in July in the open ground, and the plants potted in September. The crop for March, April, and May, should be sown not later than the 25th of August, the plants from this sowing will not suffer by exposure to rain, whilst they are young; they must, however, be protected from early frosts, like the winter crop; they are to be thinned in November, leaving not more than eight or ten plants in each pot; and at the same time, the pots being sunk about three or four inches in some old tan or coal ashes, should be covered with a frame, which it is best to place fronting the west; for then the lights may be left open to the evening, to catch the sun whenever it sets clear. The third, or spring crop, should be sown in pots, not later than the twenty-fifth of February; these must be placed in a frame, on a gentle heat, and as the heat declines the pots must be let down three or four inches into the dung-bed, which will keep the roots moist, and prevent their leaves from turning brown, from the heat of the sun, in April and May. The plants thus obtained, will be in perfection by the end of May, and be ready to succeed those raised by the autumnal sowing.

*R. odorata frutescens*, if left to itself, hardly appears a distinct variety, but trained against a wall or to a stick, it and also the common mignonette, may be made to assume a frutescent character. According to Sabine, the tree mignonette is to be propagated from seeds sown in spring; it may also be increased by cuttings, which will readily strike. The young plants should be put singly into small pots, and forwarded by the heat of a gentle hot-bed, but they will grow well without artificial heat. As they advance, they must be tied to a stick; taking care to prevent the growth of the smaller side shoots, by pinching them off, but allowing the leaves of the main stem to remain on for a time to support and strengthen it. When they have attained the height of about ten inches or

more, according to the fancy of the cultivator, the shoots must be suffered to extend themselves from the top, but must be occasionally stopped at the ends, to force them to form a bushy head, which by the autumn will be eight or nine inches in diameter, and covered with bloom. Whilst the plants are attaining their proper size, they should be shifted progressively into larger pots, and may ultimately be left in those of about six inches in diameter at top.

The well known HOUSE LEEK, *Sempervivum tectorum*, is another familiar example of this class.

CLASS 12.—Icosandria (*eikosi*, twenty, stamens many, perigynous, or inserted into the calyx). Orders—monoögyia, pentagögia, polygögia. This class consists of hermaphrodite plants, consisting of two sexes, with twenty or more stamens fixed in the calyx. They produce our most esteemed fruits; and no poisonous fruit has yet been found where the parts of the flower correspond with the characters of this class. (See apple, pear, strawberry, and the rose.)

ROSA.—Rose, belongs to class and order Icosandria Polygögia, and natural family Rosaceæ. Calyx urecolate, five cleft, fleshy, contracted at orifice; petals five, groins long, hairy, included in the flesh tube or calyx. The rose tribe is most extensive, and is no less interesting to the cultivator. It is the queen of flowers; the badge of Old England; and, in the language of flowers, a rosebud with its thorns, is a symbol of hope in the midst of fear, and is tendered by the lover to express that sentiment. A modern invention, of Dutch origin, in the culture of roses, is that of forming standards by budding on stocks of any of the hardy woody-growing sorts, as the dog-rose, *R. canina*; or the tree-rose, *R. villosa*. They are budded at different distances from the ground, according to taste, and the purpose in view; and form, after a few years, handsome round heads, which flower freely, and preserve the variety a longer time than in plants raised from cuttings or layers. They are particularly valuable for shrubberies and lawns, where the culture at the root required by dwarf roses could not be given; and if omitted, would occasion the degeneracy of the variety. The colours are red, white, yellow, purple, striped; simple, or in almost numberless shades and mixtures; the flowers are single, semi-double, and double. The odour is universally grateful. The rose is cultivated in every garden, from that of the humblest cottager upwards. Some species, such as *Centifolia*, *Damascea*, &c., are also cultivated by commercial gardeners on a large scale, for distilling rose water, and for making attar, or essential oil of roses. Six pounds of rose-leaves will impregnate, by distillation, a gallon of water strongly with their odour; but 100 lbs afford scarcely half-an-ounce of attar. The rose is also used in medicine. It is found

to be a pleasant and useful laxative for children, and to obviate costiveness in adults. The petals are directed for medicinal use; they are of a pale red colour, of a fragrant odour, which to most people is extremely agreeable; and therefore, the species, generally, are much used as nosegays. Dr Hooper remarks, however, that, in some instances, they have, under certain circumstances, produced alarming symptoms. The petals impart their odorous matter to watery liquors, both by infusion and distillation. The smell of the oil greatly resembles that of roses, and is therefore much used as a perfume. It possesses very little pungency, and has been highly recommended for its cordial analeptic qualities. These flowers also contain a bitterish substance, which is extracted by water along with the odorous principle, and remains entire in the decoction after the latter has been separated by distillation, or evaporation.

*Rosa Gallica*, or the red rose, is also a native of the South of Europe, and valued for its astringent qualities, which are most considerable before the petals expand; and therefore are then chosen for medicinal use, and ordered by the pharmacopœias in different preparations, as those of a conserve or confection, a honey, an infusion, and a syrup. The infusion of roses is a grateful cooling sub-astringent, and useful in hæmoptysis, and other hæmorrhagic complaints; its efficacy, however, depends chiefly on the acid.

To produce strong flowers, roses require some attention to pruning. Old wood should be yearly cut out, and the young shoots thinned and shortened according to their strength, and whether number or magnitude of flowers be wanted. Those sorts which send up numerous suckers, should be taken up every three or four years, reduced, and replanted: and most sorts, excepting the standards, will be improved by the practice, provided attention be paid to remove a part of the old soil and replace it by new. The points of the shoots of the more delicate sorts of roses are very apt to die, when pruning is performed in winter or spring; to avoid the consequence of this evil, many give a second pruning in June, or do not prune the tender sorts at all till the beginning of that month. A very good time for performing the operation is immediately after the bloom is over, cutting out the old exhausted wood, shortening shoots that have flowered to a good bud, accompanied with a healthy leaf, but leaving such shoots as are still in a growing state till October.

- *MYRTUS*, Myrtle, (*Myron*, sweet ointment, fragrance,) natural family *Myrtacea*. Class 12 and 1.

The common myrtle is a well known popular shrub, which has been in English gardens for an unknown length of time; evidently from what Gerard and Evelyn say, before the invention of green-

houses, and probably in that case preserved by covering or housing in rooms. It was a great favourite among the ancients, for its elegance and evergreen sweet leaves. It was sacred to Venus, either on this account, or perhaps because it flourishes most in the neighbourhood of the sea. Myrtle-wreaths adorned the brows of bloodless victors, and were the symbol of authority for magistrates at Athens. Both branches and berries were put into wine, and the latter were used in the cookery of the ancients. The myrtle was also one of their medicinal plants. All parts of it are astringent, but it is discarded from modern practice.

The myrtle affords a remarkable instance of the effect of climate upon vegetation. With us it is but a small shrub, but in Van Dieman's Land it attains the height of 200 feet, and has a trunk from 30 to 40 feet in circumference.

CLASS 13.—Polandria (*polys*, many), stamens many, hypogynous, or inserted under the ovary.

This class agrees with the last in having hermaphrodite flowers, with an infinite number of stamens, which neither cohere in any part of their length, nor are distributed in distinct parcels; but it is distinguished by the stamens being inserted distinctly from the floral envelopes, immediately under the ovary, into what has been called the *receptacle*, by Linnæus and his followers; *torus*, by Mr Salisbury; and *thalamus*, by some other botanists. In this class, 20 or more stamens are fixed to the receptacle. The situation or insertion of the stamens constitutes the essential and characteristic distinction between the 12th and 13th classes; particular attention should be paid to this circumstance, as the greater number of the plants in the 13th class are poisonous.

Example—*Cimicifuga*, bugwort, *c. serpentaria*, and *fœtida*, black snake-root, natives of North America and Siberia. The former is used with much success by the native practitioners in North America, for curing the dangerous bite of the rattlesnake. Tall leafy herbaceous plants, with the appearance of *Actæa*.

CLASS 14.—Didynamia (*dis*, twice; *dynamis*, power: superiority of two stamens); two orders; Gymnospermia (*gymnos*, naked; *sperma*, seed); Angiosperma (*aggeion*, a vessel; *sperma*, seed).

This class consists of plants with four stamens, two longer than the others, and one pistil. The orders are formed upon the presence or absence of a covering to the seeds;—the flowers in the first order are all ringent—in the second order they are most frequently personate, or resupinate. The virtues of the gymnospermious plants reside principally in their leaves; they are aromatic, cephalic, and resolvent;—the plants in Angiospermia possess active medicinal properties; some of them, as the *digitalis*, are poisonous in very small doses, and the rest require to be administered with caution.

**FOXGLOVE ; DIGITALIS** (Digitale, finger of a glove ;) form of flower : calyx 5-parted ; Corolla campanulate, ventricose, 5 fid Capsule ovate, 2 celled. Dry banks, ditch and hedge sides, in hilly and especially subalpine and rocky countries ; belongs to the 14th class, 2d order, *Didynamia* Angiospermia, and natural order Scrophulariæ ; biennial ; flowers July and August, purple and white 3 to 4 feet high. The latter is said to be much more powerful, in medicinal qualities. They are the most stately and beautiful of our herbaceous plants, and have obtained great reputation as a medicine. Its large tall spike attracts not only the botanist and florist, but is even conspicuous enough to be introduced in the painter's landscape of such scenery. It is a violent poison ; but also a valuable plant in medicine. The leaves are the parts of the plant used. They should be gathered when the plant is in flower, and those only which are fresh, selected. The leaf stalks and mid rib should be rejected, and the remaining part be dried either in the sunshine, or on a tin pan or pewter dish before the fire, or the plant be hung up, each leaf separate, in a warm kitchen. Practitioners ought annually to obtain a supply of the recent leaves, and dry them themselves ; as in the herb shops they are often so ill dried as to appear black, in which state they are useless. The powder should be kept in closely stopped opaque phials. Foxglove is directly sedative and diuretic. It weakens the force of all the vital functions ; and by a proper exhibition of it, the frequency of the pulse may be diminished any number of pulsations, and regulated at the pleasure of the practitioner : whilst at the same time it admits, to a certain extent, of the employment of such medicines as increase the firmness of the arterial action, and give tone to the habit. When given to the full extent of which the system can admit, the pulse intermits, and vertigo, indistinct vision, and nausea, with vomiting or purgag, occur ; and if, after these indications, the quantity be still increased, or if any considerable portion of the recent herb be inconsiderately swallowed, it produces delirium, hiccough, cold sweats, convulsions, syncope, and death. The leaves of this plant have a bitter nauseous taste, but no remarkable smell. They have long been used externally to ulcers and scrofulous tumours with considerable advantage. When properly dried, their colour is a lively green. The tincture has been supposed to be the best form of administering digitalis, when the remedy is designed to act as a narcotic ; it is also more manageable in its dose and more uniform in its strength, than the dried leaves. Besides its narcotic effects, fox-glove acts as one of the most certain diuretics in dropsy, apparently from its power of promoting absorption. It has frequently succeeded when other diuretics have failed. " A man at the age of forty, must either be a fool or his own physician."—*Hawkins*.

CLASS 15.—Tetradynamia (*tetra*, four; *dys*, two; *nema*, a filament). Stamens six—of which four are longer than the rest.

This class consists, with the exception of *Cleome*, entirely of the natural order Cruciferae; and has lately been the subject of the most acute and successful investigation of many botanists of celebrity. Mr Brown led the way to the improvements which have been made in the genera, in the second edition of the *Hortus Kewensis*, in which, discarding the uncertain and unnatural characters derived from variations in the floral envelopes, he took a new course, and by indicating with great precision the curious modifications of the seeds and seed-vessels, led the way to an entirely new arrangement of the class.

The difference between the genera with a long pod (*siliquosa*), and those with a short one (*siliiculosæ*), has given rise to two orders in the Linnean system. But these are not only ambiguous, but interfere so much with a distribution of the genera, according to their natural affinities, that they have been rejected by modern botanists, and the divisions of M. Decandolle, depending upon variations in the relative position of the various parts of the seed, have been substituted.

The plants of this class have always been celebrated for their antiscorbutic qualities. These seem to reside in an acrid, oily, volatile principle, not yet determined by chemists, and varying in the degree of abundance in which it is found in different species. It is particularly abundant in the seeds of mustard and garden rocket, in the roots of the horse-radish, and in the foliage of the *Lepidium latifolium*, which, administered inwardly, acts powerfully upon the gastric organs, or applied externally, inflames the skin and operates nearly as severely as blisters. A slighter degree of acrimony is found in the foliage of the scurvy-grass, the roots of the garden-radish, &c.; and these, therefore, operate more gently, and perhaps more safely, when eaten, scarcely at all when applied outwardly. Whatever the degree of acrimony may be in these plants, they all appear, when eaten, to produce some specific action upon the digestive organs, and thence upon scorbutic humours; for which reason the horse-radish, water cress, radishes, and even cabbages, are eminently antiscorbutic. They are also admitted by physicians as diuretic, sinagogue, and diaphoretic. It is only when the acrid principle is diffused over a considerable quantity of fleshy and watery substance, that cruciferous plants become eatable, as in the leaves and stems of cabbages and sea-kail, and in the roots of radishes and turnips. Even in these plants, the proportion of acrid principle is much diminished by exclusion from light. Plants of this class are also remarkable for containing azote above most vegetables; for which reason ammonia is generally evolved in their fermentation or putrefaction; to which circumstance it is possible

that the two remarkable phenomena are to be attributed, viz. that cruciferous plants contain a greater portion of nutritive matter than most herbaceous plants; and that they require either a very rich soil, manured with animal substances, or at least a situation near the habitations of men. The embryos of all these plants are filled with oil. The seeds of *Camelina sativa*, *Brassica campestris*, some species of Rocket, &c. are cultivated in many parts of Europe for the sake of their expressed oil, which is used either for culinary purposes, or for lamps.

Cruciferous plants are chiefly natives of temperate climates, those which are found within the tropics being in all cases mountain plants, and are nearly all cultivable in the open air; they are mostly found in open sandy plains; some on the tops of the highest mountains at the utmost limits of vegetation. Nine hundred species are now described, of which not more than twenty-two are to be found in the works of Hippocrates, Theophrastus, Dioscorides, or Pliny.—(See cabbage, cress, radish, turnip, &c.)

CLASS 16.—*Monadelphica* (*monos*, one; *adelphos*, brother). Seven orders, Triandria, Pentandria, Heptandria, Octandria, Decandria, Dodecandria, Polyandria.

This class is distinctly characterized by the filaments being united together throughout the whole or a part of their length; and for the most part consists of plants belonging to the natural orders of *Malvaceæ*, and *Geraniaceæ*. Of the former, the major part are of little moment; consisting in a great measure of weeds or worthless shrubs of various parts of the world. Among them, however, are some plants both of interest and ornament, especially the beautiful *Astragalus*, and the various species of *Bombax* and *Hibiscus*. The *Gossypium*, so important as producing the material of cotton, and the *Adansonia*, or Baobab tree of Africa, remarkable for its immense size, and use as an article of food, are found in this class. The *Geranium*, *Camellia*, and *Passion-flower* are also genera of much beauty—the latter yielding the well-known West India fruit called the *granadilla*. The *Camellia* is a most splendid genus, two species of which produces the *bohea* and *green Teas*; and belongs to the seventh order in this class.

ALTHAEA, Marsh Mallow (*Altheo*, to cure—medical qualities) belongs to class 16th, order 8, *Monadelphica Polyandria*, styles numerous. Calyx double, *Extra-foliaceus* of 6-9 leaved; *Capsules*, numerous, circularly arranged, one-seeded; natural arrangement, *Malvaceæ*.

A. *Officinalis* (common marsh mallow), leaves soft and downy on both sides, cordate or ovate, toothed entire or three-lobed, peduncles axillary, many-flowers, much shorter than the leaves. Flowers in August and September, perennial, 3 to 4 feet high, remarkable for the dense, exquisitely soft, and starry pubescens

of the leaves and stems; flowers 3-4 together, on axillary stalks, large, pale rose colour. The emollient properties of this plant (*Grumaine* of the French) are well-known to physicians as a remedy for catarrhs and pulmonary complaints. A decoction of the leaves forms a useful fomentation in external abrasions, and in cutaneous eruptions, accompanied with a sharp ichorous discharge. The mucilaginous matter with which this plant abounds, is the medicinal part of the plant; it is commonly employed for its emollient and demulcent qualities, in tickling coughs, hoarseness, in dysentery and difficulty and heat of urina. It relaxes the passage in nephritic complaints, in which last case a decoction is the best preparation.

The wild mallows, so much recommended in Whyta's *Modern Farrier* for healing green wounds, is the *malva moschata*, musk mallow. It is a native of this country; and has pink, and sometimes white, flowers.

CLASS 17.—Diadelphia (*dis*, twice, *adelphos*, a brother). Stamens united in two separate parcels; four orders: Pentandria, Hexandria, Octandria, Decandria.—*See Clover, and following articles.*

CLASS 18.—Polyadelphia (*poly*, many; *adelphos*, brother). Stamens united into several parcels; four orders: Decandria, Dodecandria, Icosandria, Polyandria.

It is one of the smallest of the Linnean classes, characterised by the cohesion of the filaments in several parcels. It almost wholly consists of plants remarkable either for their beauty, or importance otherwise. From the *Theobroma*, the nutritious substance which forms the basis of chocolate is procured. *Malaleuca* and its allies are among the most elegant of New Holland plants. The genus *Symplocos* contains a plant useful as a dye. To *Citrus* belong the orange, lemon, lime, and all their delicious varieties; and the *Loasa* consists of some of the most ornamental and curious of our garden annuals.

By some botanists this class is distributed among others, especially *Icosandria* and *Polyandria*.

Example.—*Hypericum*, St. John's Wort. Calyx five-parted; petals five; filaments many, in three or five parcels; capsule superior.

The species are chiefly under-shrubs, generally with dotted leaves, and almost without exception with yellow flowers—being all very ornamental. The hardy species are useful for the fronts of shrubberies. *H. calycinum* soon spreads over a considerable surface, and being ever-green, and growing under the shade, it is well adapted for covering bare spots under trees, and at the base of walls, where few plants will thrive.

*H. perforatum* was formerly used in external wounds and hæmorrhages as a balsamic, and was reputed to have other medicinal

properties. The semi-transparent dots on the leaves are the receptacles of an essential oil. The flowers tinge spirits and oils of a fine purple colour; and the dried plant, boiled with alum, dyes wool of a yellow colour. The common people in France and Germany gather it with great ceremony on St. John's day, and hang it in their windows as a charm against storms, thunder, and evil spirits; mistaking the meaning of some medical writers who have fancifully given this plant the name of *Fuga Dæmonum*, from a supposition that it was good in maniacal and hypochondrical disorders. In Scotland, it was formerly carried about as a charm against witchcraft and enchantment.

*H. humifusum* is one of the prettiest little plants of the genus, and well adapted for growing in pots.

*H. Androsæmum*, called *Tustan* (from *Toute-saine*, Fr.), from its bruised capsules being formerly applied to fresh wounds; because the fresh capsules give a blood-coloured juice. These are all natives of Britain.

CLASS 19.—SYNGENESIA. Stamens 5. Anthers united by their edges. This is one of the most extensive and best defined of all the Linnean classes. Its essential character depends, as its name indicates, upon the adhesion of the anthers or male organs of the flower into a single tube. It comprehends the whole of the *Corymbifera*, *Cichoracæ*, and *Cinarocephalæ* of Jussieu; and, with the exception of *A. cicarpha*, nothing else. The genera constituting the order *Monogamia* of Linnæus are excluded by Linnean botanists of the present day.

In addition to the cohesion of the anthers, upon which this class immediately depends, it is further characterized by the flowers; commonly called florets, being clustered together in heads, and inserted upon a common receptacle, which is surrounded by an involucre, commonly, but very improperly, termed calyx. The few genera, such as *Kuhnia*, *Euxenia*, *Acicarpa*, &c., in which a union of anthers either does not exist at all, or in a very incomplete degree, are therefore retained in *Syngenesia*, because of their congruity in the structure of their inflorescence.

In a popular point of view, *Syngenesia* may be considered interesting in a high degree. It abounds in plants of ornament, all of which are, without exception, of easy cultivation. It is not necessary to particularize the merits of the brilliant varieties of the *Dahlia*, or of the Chinese *Chrysanthemum*, which are the chiefest ornament of every autumnal garden; nor to point out the beauty of the various tribes of *Aster*, *Helianthus*, *Coreopsis*, *Xeranthemum*, or *Gnaphallum*. These, and an hundred others, must be familiar to every lover of gardening. It is, however, worth remarking; that nearly all *syngenesious* plants are autumn flowers. In the tropics, many become trees of considerable dimensions; in temperate climates, they are mostly herbaceous, or low bushes.

With regard to the qualities of syngenesious plants, considered economically or medicinally, it may be stated, that, whatever they may be, they consist in a bitter principle, and an oily secretion. But these vary in particular tribes. In some the bitter is combined with a resinous principle, by which its powers are increased in different degrees. In those plants in which the resin is found in small quantities only, and mixed with a bitter or astringent mucilage, tonic, stomachic, febrifugal properties seem to be acquired, as in the camomile, the golden rod, the feverfew, and the *Eupatorium perfoliatum*; and the stimulent powers of these plants appear to increase in proportion as the resin is abundant. Some kinds are anthelmintic, as the wormwood and tansy; others are emmenagogue, as the feverfew, the yarrow, and various kinds of wormwoods. Certain species possess sudorific qualities, as *Eupatorium*, the yarrow, the wormwood, and the marigold; others, again, are powerful diuretics, as *Liatris*; while stimulating powers exist in considerable activity in others, as in the *Sneezewort* and *Arnica*. The *Spilanthus*, *Antbemis*, *Pyrethrum*, and some others, excite salivation. The *Eupatorium Ayapana* of Brazil, and the *Guaco* of Peru, which is another species of *Eupatorium*, are most powerful alexiterics. According to the analysis of Mr. Braconnot, the wormwood owes its bitterness to an extremely bitter animalized matter, which forms a little less than one fifth of its weight; the same chemist also states that plant to contain a volatile oil, and an acid, apparently new, which is found in combination with potash. Before the perfect development of the leaves, the bitter principle is so much diluted with insipid mucilage, that the young shoots of some of the thistle tribe, the *Cardoon*, for example, are used for culinary purposes; and it is probable, that it is owing to the small proportion that the bitter bears to the whole mass, that the receptacle of the artichoke, of the *Onopordum*, and of the cotton thistle, is found fit for food. The corollas of the *Cardoon*, and of many thistles, have the power of curdling milk. The juice of the lettuce and other cichoraceous plants, is milky, bitter, astringent, and narcotic. In a wild state, the narcotic principle is so abundant, that the inspissated juice of *Lactuca virosa* has been used as a substitute for opium, and with much success. But under the effect of cultivation the mucilage is so much more abundant than any other substance, that the same species often form well-known articles of wholesome and agreeable food. And, indeed, under any circumstances, wild or domesticated, the young shoots, when the narcotic principle is scarcely developed, are frequently eaten with safety; it is for the same reason, namely, the incomplete formation of the bitter principle, and the superabundance of mucilage, on account of the absence of light, that the blanched leaves of cardoons and chicory, and the white roots of the *Scorzonera* and the *Salsafy*, are sa-

pable of being eaten without inconvenience. The seeds of all syn-  
 genesious plants abound in oil, which is expressed from those of  
 the *Madia* of Chili, the *Verbesina sativa*, and the common sun-  
 flower. Owing to the difficulty of procuring this oil in a pure state,  
 its virtues are not ascertained with much accuracy. They are  
 generally believed to be slightly purgative and diaphoretic.

**DAHLIA.**—Named after Andrew Dahl, a Swedish botanist, and  
 pupil of Linnæus. Continental botanists call the genus *Georgina*.  
 This genus grows in Mexico, and in sandy meadows, and till the  
 peace of 1814 was more cultivated in France than in England: at  
 present it is one of the most fashionable hardy plants. Though its  
 leaves are coarse, resembling those of the common dwarf elder, yet  
 the flowers are showy, and continue in beauty till late in autumn.  
 The plants grow freely in any soil or situation; but the poorer the  
 ground is, the smaller the size of the plant, and the earlier and  
 more abundant the flowers. The single-flowered varieties of *D.*  
*superflua* are almost without end; the double varieties of both  
 species are less numerous. Any number of the former may be  
 raised from seeds, which ripen in abundance, and if sown in Feb-  
 ruary on artificial heat, and transplanted in the end of April, they  
 will flower in the July or August following. The double varieties  
 are increased by dividing the roots, or by graftings or cuttings;  
 they may also be sometimes raised from seeds. A very general way  
 in which both kinds are propagated is by cuttings. They may be  
 either taken from the root-shoots in spring, or the tops of the young  
 shoots early in summer; the lower end of each cutting should be  
 cut smoothly off in the middle of a joint, and all the leaves left on,  
 excepting those that would be buried in planting the cutting. If  
 planted in sandy soil, on a gentle bottom heat, and covered with a  
 hood-glass, they will soon strike root, and produce both flowers and  
 tubers the same autumn. The double sorts are grafted on tubers  
 of the single varieties, much in the manner of whip-grafting, but  
 without a tongue. There must be no buds on the tubers; cut off  
 a slice from the upper part of it, in a sloping direction, and make,  
 at the bottom of the part so cut, a ledge whereon to rest the graft;  
 next, cut the scion sloping to fit, it should contain two joints, and  
 be cut so that one of these be at the bottom of it to rest on the ledge;  
 from that joint the scion will occasionally put forth roots; from  
 the other the future stem will be formed. Having tied the graft,  
 clay it as in common grafting, then put the root in fine mould,  
 burying half the graft, and place the pot in a gentle moist heat  
 under a glass. If this be done in March, the plant may be shifted  
 into a larger pot in April, and planted out in the end of May.

As the *Dahlia* is a bulky plant, it requires either to be grown in  
 a very large pot, or in from three quarters to a yard and a half of  
 surface. They look well in rows, or occurring singly in a shrubbery.

The treatment of the Dahlia bears a considerable resemblance to that of the potato, and the marvel of Peru; as soon as the frost has blackened the tops of these three plants, their roots require to be taken up, and kept in a dry place, where the frost cannot get at them, till spring. About April they may be divided, and planted in the open air where they are to flower; or, what is more common, planted in large pots, and forwarded in heat till the middle of May, when they may be turned out in the plots where they are finally to remain. In this case they will flower a month or six weeks earlier than by the other method, and will, in general, continue flowering till they are destroyed by frost. Some care is requisite to preserve the roots sufficiently moist and plump to maintain the living principle, and yet not to rot, shrivel, or freeze them. The safest mode is to plant them in pots or boxes of dry earth, peat earth (bog mould), or shelling seeds dry from the mill, and place them in a shed or cellar, or under an ample covering of litter thatched over.

Grafting is a mode of propagating rare herbaceous vegetables, which has been long practised on the Continent. The cutting, intended for the graft of the Georgina, should be strong and short-jointed, having on it two or more joints or buds; it must be also procured as soon in the season as possible.

Perhaps seeds obtained from those particular florets of the disc which have altered their form, may have a greater tendency than others to produce plants of double flowers. Sow in March or earlier, in a heat of about 60°, and the plants may be picked out in pots, and kept in a moderate temperature till the end of April. In the end of this month the whole may be planted out and protected during the night with a covering. Seedlings thus treated will blow in July, and continue in perfection until autumn, but the first frost takes the same effect on these flowers as on the potato, or kidney bean. Artificial fecundation of the flowers may be practised in this manner: The flowers intended for this process should be covered two or three days previous to their expansion, in order to prevent their being fecundated by other flowers through the agency of bees or the wind. When the flowers are sufficiently expanded, a camel hair pencil is saturated with the pollen of the flower, whose colour or form is desired, and with this each separate floret of the parent flower is touched, the protecting covering being continued eight days after this operation. This fecundation requires to be repeated for two or three days, according to the weather, as the florets do not expand at once.

*Senecio vulgaris*, common groundsel, (*Senex*, old man; naked receptacle like a bald head, that is when the seeds are carried off by means of the down attached to it.) *Senecio vulgaris* is esteemed emollient and resolutive. It is employed in spitting of blood, in

the form of a poultice, and against the gont and hæmorrhoids. It is given to horses suspected to be troubled with worms.

*Senecio Jacobea*, common ragwort, (by the country people *weebus*,) is a troublesome guest, as it never fails to infest rich pasture fields: it is not only a robber, but overshadows the grass and renders it unwholesome. I am at a loss, however, says Kames, whether to call it a weed or an useful plant. As it bears no seed till the third year of its growth, it cannot propagate in land under tillage; in pasture-land it dies, indeed, after dropping its seed, but new plants spring from that seed and have a succession without end. Many things in appearance noxious, have been found useful; of which this plant is an instance. The same means will prevent its noxious effects, and make it profitable. Ragwort was never seen in a field pastured with sheep. Why? because that animal is excessively fond of it. This I first saw proved upon the haughs of Clova, for no sooner is a flock of sheep brought down from the hills, than they run across a field in a few minutes, picking all the ragwort leaves they can find out of the earth. Therefore, in every pasture-field, for some years after it is laid down, there ought to be a proportion of sheep. They prefer ragwort before any other vegetable; and experience pronounces that every food is wholesome which an animal is fond of. Lincolnshire sheep do best, because a fence sufficient for horned cattle is more than sufficient for them. Sheep are also singular with respect to other food. They are fond of the tender shoots of broom and whins, and no less so of the fruit of the horse-chestnut.

CLASS 20.—GYNANDRIA (*gyne*, a woman; *aner*, a man). Three orders: Monandria, Diandria, Hexandria.

The plants of this class bear flowers, with stamens situated on the style, or upon a receptacle stretched out in form of a style which supports both stamens and pistils. There is a preparation of the root of the *Orcis Mascula*, which is an article of diet, and accounted very nutritious. *Discorides*, and many others since his time, affirm that this root possesses aphrodisiac qualities, and hence one of its names, *satyrion*.

CLASS 21.—MONOGECIA (*monos*, one; *oikos*, house). Orders: Monandria, Diandria, Triandria, Tetrandria, Pentandria, Hexandria, Polyandria, Monadelphia. Males and female organs in distinct flowers, but upon the same plant.

Example.—Larch, *Larix*. Male anthers 2-celled; female scales imbricated in a round cone, bracteate at base, winged, deciduous. Pericarp attached to inside of scale. Stigma hemispherical, cupped, glandular. Cotyledons 5-9.

*L. Communis*, *Mélèze*, Fr., *Lerchenbaum*, Ger., and *Laricio*, Ital., is a deciduous tree, and there are two or three species or varieties not yet distinctly ascertained. There is a variety with red

and another with white flowers; one with a cinerous bark, called the Russian larch, and one with pendulous branches. *L. pendula* and *L. microcarpa* are considered species or sub-species; the timber of both is said to be harder than that of the common white larch; but these trees have never yet had a fair trial in this country. As there are a few large specimens at Dunkeld and Athole, seeds can now be plentifully obtained, and from their progeny a practical estimate may be formed of their merits in this country. The red larch trees on the Athole estates do not contain one third as many cubic feet of timber as the white larch of the same age. The wood is so ponderous that it will scarcely swim in water. The timber of the white larch has been as much extolled as that of the cedar, and with much more reason. The rapidity of its growth is not less remarkable than the durability of its timber. Both have been experimentally proved in the Highlands of Scotland.

Even Scotia's rocks, with trees are spread,  
And wave green forests on their lofty head.

It was stated by the Duke of Athole, that on mountainous tracts there, at an elevation of 1500 or 1600 feet, the larch, at eighty years of age, has arrived at a size to produce six loads (300 cubic feet) of timber; appearing in durability, and every other quality, to be likely to answer every purpose both of civil and naval architecture. The tree will arrive at a timber size in almost any situation or soil. Sang, a forest manager of extensive practice, has paid great attention to this tree. "It bears," he says, "the ascendancy over the Scotch pine in the following important circumstances: that it brings double the price, at least, per measurable foot; that it will arrive at a useful timber size in one-half, or a third part of the time, in general, which the pine requires; and, above all, that the timber of the larch, at thirty or forty years old, when it has been planted in a soil or climate adapted for the production of perfect timber, is in every respect superior in quality to that of the pine at 100 years old. In short, it is probable, that the larch will supersede the Scotch pine in most situations in this island, at no very distant period."

The chief objections to the timber of the larch are its liability to warp and twist; but this Monteath and others have proved may be effectually prevented by barking the trees in spring while growing, and not cutting them down till the following autumn, or even for a year afterwards. This is also said to protect the timber from being attacked by the dry rot. The bark of the larch is more than half as valuable as that of the oak in tanning; turpentine is extracted from it in the Tyrol by incision; but that being always injurious to the timber, can never be recommended for adoption in this country.

The failure to which the larch has been liable for the last 10 or 15 years, is attributed by some people to the great drought of 1826; and by others to the cold springs. But neither of these is probably the real cause; it was supposed, that the larch, like wheat,

being an exotic, would require fresh importations of seed from its native climate, to continue the plant in vigour; yet the nursery-men of Perth have been in the practice of importing seed from the Tyrol for the last twenty years, and have fully ascertained, that the plants raised from that seed, are as liable to injury as those raised from the seed gathered in this country.

The common white European larch was introduced from Germany in 1629; the Siberian variety in 1824; the Danian from Davuria in 1827; the black pendulous, from N. America in 1739; and the red small tufted in 1760.

CEDAR OF LEBANON, *Cederbaum*, Ger., and *Cedro*, Ital., is unquestionably the most celebrated tree of the genus, and not less remarkable for the irregular grandeur of its form. The general character of its shoot, even when the tree is young, is singularly bold and picturesque, and quite different from that of every other species of the tribe. It is a native of the coldest parts of the mountains of Lebanon, Amanus, and Taurus; but it is not now to be found in those places in great numbers. Mandrell, in his journey from Aleppo to Jerusalem, 1696, could reckon only sixteen large trees, though many small ones; one of the largest was twelve yards six inches in the spread of its boughs. The forest of Lebanon never seems to have recovered the havoc made by Solomon's four score thousand hewers; so that we have now, as Professor Martyn observes, probably more cedars in England than there are in Palestine.

From the branchy head of this tree, and its aversion to pruning, it is not likely ever to become valuable as timber in this country. When planted for that purpose, it should, as Saeg recommends, be sown in groves, and thus by proximity drawn up with few branches. Much has been said on cedar timber, which borders on the miraculous; as far as experience has gone, it is greatly inferior to that of the common larch, or the wild pine. The great use of the cedar, is to plant singly on lawns, or in the margin of plantations, where one or two specimens will give force and character to the dullest front of round-headed trees.

CLASS 22.—DIOECIA (*dis*, twice; *oikos*, house). 14 orders: Monadria, Diandria, Triandria, Tetrandria, Pentandria, Hexandria, Octadria, Enneandria, Decandria, Dodecandria, Icosandria, Polyandria, Monadelphina, Gynandria. Male and female flowers upon different plants. (*See hop, hemp, and spinage.*)

JUNIPER, common (*Juniperus communis*), belongs to the class and order Dioecia Monadelphia (class 22) and natural order Coniferæ.—Is a native of many parts of Britain. On the sides of hills its trunk grows 15 feet high; but on the tops of rocky mountains, and on bogs, it is a tufted shrub. In our shrubberies it forms a respectable-looking conical bush, grouping and combining very well with cypresses, and various species of the pine and fir tribe. It is easily transplanted, and bears cropping.

Grass will not grow beneath it, but the meadow oat grass is said to destroy it. The wood is hard and durable; the bark may be made into ropes, excellent baskets are made of its roots; and ardent spirits, impregnated with the essential oil of these berries, forms the true juniper water or gin. Juniper berries require to remain two years on the tree before they are fully ripe. In distillation with water, they yield a volatile terebinthinate oil, of a greenish colour, on which their virtue depends. The flavour and diuretic properties of Hollands depend on this oil. It is also supposed to be used for flavouring English gin; but for this purpose oil of turpentine is used. Medicinally, juniper berries are diuretic and cordial. They have been long known as a remedy in hydropic affections; but they cannot be depended on alone, although they form an excellent adjunct to fox-glove and squill. The tops yield the same essential oil as the berries, and may be therefore substituted for them.

CLASS 23.—POLYGAMIA (*polys*, many; *gamos*, marriage). Two orders: Monœcia, Diœcia. Flowers either male, female, or hermaphrodite, upon the same or different plants.

This class differs from the two preceding in having not only the sexes in different flowers, upon the same individual as in Monœcia, or upon separate individuals as in Diœcia, but also combined in one flower, mixed among those which are unisexual. It may, therefore, be considered to contain those genera which are in a state of transition from the common hermaphrodite structure to absolute, unisexuality.

To the first of its orders are referred several grasses, which are excluded from the early classes on account of the separation of their sexes; it also contains the numerous tribe of Mimosas, so well known for their properties as objects of food, of ornament, of medicine, or of curiosity. The maple is also stationed in the first class, as are a few genera of palms.

The most important genera of the second class, besides the poetical Palmetto, are the ash and the fig. Gleditscha and Ceratonia, two families of Leguminosæ, are valuable, the former for its light, airy, elegant foliage, and the latter for its sweet pods, which are used in Spain, in great quantities, as fodder for cattle.

For example, See Holcus, p. 306.

CLASS 24.—Second grand division. Plants with inconspicuous flowers, (CRYPTOGAMIA.) Reproductive organs scarcely visible; so that they have not been distinctly described. Cryptogamia (*kryptos*, concealed; *gamos*, marriage). 11 orders: Gonopterides (*gonos*, seed; *ptêris*, fern), Poropterides (*poros*, pore; *ptêris*, fern), Filices (*filix*, a fern), Hydropterides (*hydro*, water; *ptêris*, fern), Schismatopterides (*schisma*, a cleft; *ptêris*, fern), Stachyopterides (*stachys*, a spike; *ptêris*, fern), Musci (*muscus*, moss), Hepaticæ

(*Hepar*, a liver), Algae (*alga*, sea-weed), Lichens (Greek name), Fungi (*fungus*, a mushroom).

This class differs essentially from all the preceding in the peculiar conformation of the organs of reproduction, which are not formed of male and female parts, like those of the higher classes of plants, but are of a nature altogether different, consisting either of buds under a particular form, or of vessels containing vegetable substances analogous to seeds, but differing in not being the result of impregnation, and in having the power of striking root indifferently from any point of their surface. The internal composition of these vegetable substances, which are denominated sporules, is, on account of their extreme minuteness-unknown. Willdenow describes Cryptogamous plants to be vegetables without any visible flower, and differing from other plants in their external characters, in which respect they also differ from each other. By more modern botanists they are said to be distinguished from other plants by the absence of lymphatic vessels, and of pores of the epidermis; but the latter character has been disputed, and neither apply to the three first orders of Cryptogamia.

This is a most extensive genus of plants, probably containing as many species and varieties as are comprehended in all the rest of the vegetable kingdom, few of them yields food to man, and still fewer are cultivated. We append, as an example, the method which seems to be mostly approved of, for cultivating the common edible mushroom, and which is a tolerable type of its class.

**AGARICUS (*Agaric*).** *Psalliota campestris*, common edible mushroom, so called from *Monacern*, the French name of another edible kind. It is found all over Europe, the north of Asia, and of Africa, and in North America. Of all the species of agaric, one only has been selected for cultivation in our gardens; viz. the *A. campestris*, or common mushroom or champignon. The gills of this species are loose, pinky red, changing to a liver colour, in contact with the stem, but not united to it; very thick set, irregularly disposed, some forked next the stem, some next the edge of the pileus, some at both ends, and in that case generally excluding the intermediate smaller gills. The pileus is white, changing to brown when old, and becoming scurfy; regularly convex, fleshy, flatter with age, from two to four inches, and sometimes nine inches in diameter, and liquefying in decay; the flesh white. The stem is solid, white, cylindrical, from two to three inches high, half an inch in diameter; the curtain white and delicate. When this mushroom first makes its appearance, it is smooth and almost globular; and in this state it is called a button. This species is esteemed the best and most savoury of the genus, and is much in request for the table in England. It is eaten fresh, either stewed

or boiled, and preserved either as a pickle or in powder; and it furnishes the sauce called ketchup. The field plants are better for eating than those raised on artificial beds, their flesh being more tender; and those who are accustomed to them can distinguish them by their smell. But the cultivated ones are more slightly, may be more easily collected in the proper state for eating, and are firmer and better for pickling. The wild mushrooms are found in parks and other pastures, where the turf has not been ploughed up for many years; and the best time for gathering them is August and September. Dr. Withering mentions four varieties.

The greater number of mushrooms brought to market are of natural growth on old rich pastures; and it would appear that, without providing a similar kind of soil full of decaying matter, the plants cannot be raised. The method of procedure is very peculiar. The mushrooms are not sown in the form of seeds, for they have no observable seeds, but by spawn, or portions of their substance, mingled in the prepared soil. Mr. Rogers in his work, *The Vegetable Cultivator*, to which we would refer for much useful information on kitchen gardening, describes the process of mushroom culture which he says is that approved of by the Agricultural Society. We extract a few passages for the sake of general information.

"In June or July take any quantity of horse droppings (the more dry and high fed the better), mixed with short litter, one third of cow's dung, and a good portion of mould of a leamy nature; cement them well together, and mash the whole into a thin compost, and spread it on the floor of an open shed, to remain till it becomes firm enough to be formed into flat square bricks; which done, set them on an edge, and frequently turn them till half dry; then with a dibble make two or three holes in each brick, and insert in each hole a piece of good old spawn, about the size of a common walnut. The bricks should then be left till they are dry. This being completed, level the surface of a piece of ground, under cover, three feet wide, and of sufficient length to receive the bricks, on which lay a bottom of dry horse-dung, six inches thick; then form a pile, by placing the bricks in rows one upon another, with the spawn side uppermost, till the pile is three feet high; next cover it with a small portion of warm horse-dung, sufficient in quantity to diffuse a gentle glow of heat through the whole. When the spawn has spread itself through every part of the bricks, the process is ended, and the bricks may then be laid up in a dry place for use.

Mushroom spawn, made according to this direction, will preserve its vegetative power many years, if well dried before it is laid up, but if moist, it will grow and exhaust itself. The next subject to be treated of is the preparation of the dung for the bed; and for this purpose none answers so well as that of the horse, when taken fresh from the stable; the more droppings in it the better.

About Michselmas is the general season for making mushroom beds (though this may be done all the year round). A quantity of the dung mentioned should be collected, and thrown together in a heap; and as this heat generally proves too violent at first, it should, previously to making the bed, be reduced to a proper temperature by frequently turning it in the course of a fortnight or three weeks; which time it will most likely require for all the parts to get into an even state of fermentation. During the above time, should it be showery weather, the heat will require some sort of temporary protection, by covering it with litter or such like, as too much wet would soon deaden its fermenting quality. The like caution should be attended to in making the bed, and after finishing it. As soon as it is observed that the fiery heat and rank steam of the dung are gone off, a dry and sheltered spot of ground should be chosen on which to make the bed. The place being determined on, a space should be marked out five feet broad, and the length (running north and south) should be according to the quantity of mushrooms likely to be required. If for a moderate family, a bed twelve or fourteen feet long will be found (if it takes well) to produce a good supply of mushrooms for some months, provided proper attention be paid to the covering.

On the space marked for making the bed a trench should be thrown out, about six inches deep; the mould may be laid regularly at the side, and if good, it will do for earthing the bed hereafter; otherwise, if brought from a distance, that of a more loamy than a sandy nature will be best. Either in the trench, or if upon the surface, there should be laid about four inches of good dung, not too short, for forming the bottom of the bed; then lay on the prepared dung a few inches thick regularly over the surface, beating it regularly down with the fork; continue thus, gradually drawing in the sides to the height of five feet, until it narrows at the top like the ridge of a house. In that state it may remain for ten days or a fortnight, during which time the heat should be examined towards the middle of the bed, by thrusting some small sharp sticks down in three or four places; and when found of a gentle heat (not hot), the bed may be spawned; for which purpose the spawn bricks should be broken regularly into pieces about an inch and a half or two inches square, beginning within six inches of the bottom of the bed, and in lines about eight inches apart; the same distance will also do for the spawn, which, in a dung ridge, are best put in by one hand, raising the dung up a few inches, whilst with the other the spawn can be laid in and covered at the same time. After spawning the bed, if it is found to be in that regular state of heat before mentioned, it may be earthed. After the surface is levelled with the back of the spade, there should be laid on two inches of mould—that out of the trench, if dry and good, will do; other-

wise, if to be brought, and a choice made, that of a kindly loam is to be preferred. After having been laid on, it is to be beaten closely together, and when the whole is finished, the bed must be covered about a foot thick with good oat-straw, over which should be laid mats, for the double purpose of keeping the bed dry and of securing the covering from being blown off. In the course of two or three days the bed should be examined, and if it is considered that the heat is likely to increase, the covering must be diminished for a few days, which is better than taking it entirely off. In about a month or five weeks (but frequently within the former time, if the bed is in a high state of cultivation) mushrooms will most likely make their appearance, and in the course of eight-and-forty hours afterwards they will have grown to a sufficient size for use; in which case the author recommends that instead of cutting them off close to the ground, they be drawn out with a gentle twist, filling up the cavity with a little fine mould, gently pressed in level with the bed."

As mushrooms may be said to cost no more than a little trouble, manure, and space for growth, at what an inconsiderable cost might not this excellent vegetable be abundantly procured! No product of the gardeo has hitherto been less attended to, and few afford so high a relish, in their substantial form, or as ketchup.

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## PROPAGATION AND CULTURE OF FLOWERS AND HERBS, &c.

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SLIPS are shoots taken from the root or collar of a growing plant, stripped off with a small portion of the root attached, and require no preparation but cutting off the portion of bark smooth and close to the stem. Slips are generally taken off in March, but they will also succeed in autumn.

PIPINGS are cuttings of pinks and carnations, and, indeed, are applicable to all plants having jointed tubular stems. They are prepared by taking a shoot that has nearly done growing, and holding the root end of it in one hand, below a pair of leaves, and with the other pulling the top part above the pair of leaves, so as to separate it from the root part of the stem at the socket, formed by the axils of the leaves, leaving the part of the stem pulled off with a tubular or pipe-like termination. Hence the name of pipings, and when they are thus separated,

they are inserted in finely sifted earth or sand, and a hand-glass is fixed firmly over them until rooted. Some florists cut off the tips of the leaves of pipings, but others plant them entire; and they grow equally well under both modes of treatment.

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

In **BUDDING**, a young shoot of the present year's wood is cut off in the end of July or August, or perhaps, if the season should be very moist, the first week in September; and incisions are made longitudinally and across, on each side, above and below a bud, so that the bud may be cut out, attached to an oblong piece of wood and bark, pointed at the lower end. The leaf is then taken off, but the foot-stalk is left on.

Then separate the bark, with the bud attached, from the wood; and on the nicety of this operation much depends, as if any wood be left in the bark, the bud will not take; generally, however, if the sap is in a proper state of movement, the wood comes out easily, without leaving the smallest particle behind. The bud is now to be examined on the side that was next the wood, and if it appears fresh and firm, it is likely to take, but if it looks shrunk and withered it had better be thrown away, as it will not grow, and a fresher one selected. Then put on the bud as directed in the fruit garden, page 181. This is an operation that requires the greatest nicety and exactness, for unless the inner bark of the bud fits quite closely to the soft wood of the stock, it will never grow. This operation is completed by binding the two parts together with a strip of new bass mat, which in the case of rose trees is sufficient: but buds on apple and pear trees are sometimes wrapped round with wet moss, which is tied on by shreds of bass matting. In all cases the strips of bass should be left long enough to be tied with a running noose or knot, that the ligature may be loosened

and tied again without altering the position of the bud as soon as it begins to grow. The ligature should not be loosened till the bud begins to put out leaves; and then it should be retied, only a little slacker than before, until the bud is firmly united with the stock.

Budding should be performed in moist, or at least in cloudy weather, not earlier than the last week in July, nor later than the first week of September; always joining closely the bark of the bud to the wood of the stock, without wounding it or ragging the bark: and if these points are attended to, there is little danger of success.

HERBACEOUS GRAFTING, means grafting with the brittle wood of the current year, in opposition to common grafting, which is always performed with firm wood, frequently of several years' growth. This sort of grafting is now generally used for trees of the fir and pine tribe, which only a few years ago, it was thought impossible to graft at all. The proper time for this kind of grafting, is when the young pine-shoots have made about three parts of their growth, and are still so herbaceous as to break readily between the fingers, like a shoot of asparagus. The shoot of the stock is then broken off about two inches below the point, and all the leaves striped off for nearly two inches more, except two sheaths of leaves, which are left, one on each side, close to the top. The shoot is then split with a very thin knife between the sheaths of leaves left on, and the scion, having had its lower extremity prepared, by stripping off the leaves, and cutting it into the shape of a wedge, is inserted as in cleft grafting, and the parts are bound together with list, or with a strip of thin woollen cloth. A cone of paper is then put over the whole to protect it from the sun and rain, and the graft is seldom found to fail. Sometimes this kind of grafting is applied to annual plants. The period chosen should be when the plant is in its greatest vigour, and is just going into flower. The flower stem is then cut off close to a leaf, and a slit is made in the stem downwards. The scion is then taken off near the root of the plant, and the end being cut into a wedge-shape is inserted in the slit. The wound is then bound up with strips of cloth spread with grafting wax, and the leaf taken great care of. When the graft begins to grow, this leaf, and all the shoots below it, are taken off. In this manner artichokes have been grafted on cardoons, and cauliflowers on cabbages with great success. Tomatoes

have also been grafted on potatoes in this manner, the potatoes perfecting their tubers, and the tomatoes their fruit at the same time; and it is said that the ripening of the latter was much accelerated. This mode of grafting was invented by the Baron Tschandy, a gentleman residing at Metz, and the principal point in it which requires attention, is the preserving a leaf, or two leaves, at the extremity of the stock, to serve as nurses to the graft.

INARCHING, OR GRAFTING BY APPROACH, is the simplest of all ways of grafting, and is certainly the only one practised by nature. In forests, two branches rub against each other in windy weather till the bark of both become wounded; a calm ensues, and, while it lasts the wounded branches lying across each other adhere and grow together. I have seen examples of this, which is called inoculation, in the beech, the hornbeam, and the birch; probably mankind derived the first idea of grafting from observing instances of this kind. Inarching, as practised in nurseries, closely resembles layering. A branch is bent and partly cut through, and the heel thus formed is slipped into a slit made downwards in the stock to receive it. The parts are then made to meet as exactly as possible, and are bound together with bass mat, and covered with grafting clay, as in common grafting. In five or six months the union will be complete; and the inarched plant will be ready to be separated from the parent, which is done with a very sharp knife, so as to leave a very clean cut, and not a bruised one. If the head of the stock was left on when the plant was inarched, it is now cut away, and the plant is ready for removal. It is however, customary to keep on the engrafting and ligature for a few weeks, till the plant is firmly established. This mode of propagation is very commonly practised with camellias and magnolias; and it is usual in nurseries to see a fine new kind of camellia surrounded by a sort of frame, on which are placed several pots of stocks of the single red, at different heights, for the convenience of attaching to them several branches of the choice kind, to undergo the process of inarching. In most of these cases the head of the stock is retained, and the scion introduced at the side; but as soon as the graft has taken and has pushed out a sufficient number of leaves to carry on the elaboration of the sap, all the branches of the inarched ones are cut away.

Grafting wax is generally made of equal parts of turpentine, bees' wax, and resin, with a little tallow, melted together and thoroughly incorporated. This is thinly spread on cotton cloth and used in strips like cerecloth.

**ART OF PROPAGATION BY SUCKERS, &c.**—Sending up suckers, forming offsets and throwing out runners, are all natural modes of propagation, that require but little aid; and if all plants produced these, it would only require to separate the offspring from the old plant, and to replant in suitable soil. But all plants do not throw up suckers like the raspberry, spirea, lilac, &c. Offsets are only formed on hulbs, and runners are pushed out by strawberries, and some other plants. A sucker generally forms fibrous roots of its own, which may be striped off the old plant and planted like a rooted cutting, and cut the head down to a few joints of the ground.

Offsets are young bulbs which form by the side of the old one, and only require breaking off, and planting in proper soil.

Runners are shoots springing from the crown or collar of the plant, which throw out roots at their joints; and which only require dividing from the old plant, to be replanted for a new plantation when required.

**LAYERS** differ very little from runners, but here the art of the cultivator is required to make them push out roots. The more common way of doing this is to cut half through, and slit upwards, a shoot from a growing plant, putting a bit twig between the separated parts to keep it open; and then to peg down the shoot, so as to bury the joint nearest to the wood in the earth; when the returning sap, being arrested, will afford such abundance of nourishment as to force it to push out a mass of fibrous roots, and to send up a leading shoot.

The only art required in layering is to combine the most effectual means of intercepting the returning sap, so as to produce as great an accumulation of it as possible, at the joint from which the roots are to proceed. For this purpose, sometimes a ring of bark is taken off, care being taken that the knife does not penetrate into the wood; and at others a wire is twisted firmly round the shoot, so as to pinch in the bark; or a knife or any sharp instrument is passed through the branch several times, in different directions: in short anything that wounds the shoot, so as to throw an

impediment in the way of the returning sap, and yet not to prevent the passage of the sap that is ascending, will suffice.

Layering is a very common way of propagating plants; and in nurseries often every shoot of a tree or shrub is thus wounded and pegged down. In this case, the central root is called a stool, and the greater part of deciduous trees have a tendency to send up a number of new stems when cut down. The seasons for performing the operation of layering are February and March, or early in April, before the new sap begins to rise, or in June or July, or early in August after all the ascending sap has risen. In most cases the layers are left on twelve months, and often two years, before they are divided from the old plant, in order that they may be sufficiently supplied with roots. In nurseries, the ground is prepared round each stool by delving, and sometimes by manuring; and the branches are laid down neatly, so as to form a radiated circle round the stool, with the ends rising all round about the same height.

Curries differ from layers, in being removed without roots from an established plant; and as the current of the ascending sap is stopped at once by this operation, they generally require shading, which layers do not; and also, sometimes bottom heat, to induce them to put out roots. The branches most suitable for making cuttings are those which grow nearest to the ground, particularly those that recline on it, as they have commonly the greatest tendency to put out roots; and the side shoots are considered more suitable than those which grow strongest at the upper part of the plant. The best season for making cuttings is summer, when the sap is in full motion; as the descending sap is then most likely to form the ring or mass of accumulated matter from which the new roots are to spring. It is already stated above, under the head of layers, that it is from the joints only that roots can be expected to grow; and hence, in making cuttings, the shoot is divided at a joint; and it is reckoned best to choose the joint at the point of junction between the young wood and the wood of the previous season. The cut should be quite smooth; for if the shoot be bruised, the returning sap will be prevented from reaching the joint in a proper quantity to effect the desired end.

Some plants are more adverse to strike as cuttings than others; but some, such as the spiræa, the willow, the cur-

rant, and gooseberry ; and the vine (*See Fruit-Garden,*) will throw out roots not only from the ring, but from every part of the stem. These plants do not require so much care as to cutting off at a joint ; and in fact, will send out roots from whatever part may be put into the ground, yet, even they succeed best when properly prepared at the proper season, which is early in spring.

The cutting being taken off, (I allude to flowers in general,) and the division at the joint being made perfectly smooth, the greater part of the leaves should be cut off close by the stem, with a sharp knife ; and a hole being made in the soil, the cutting should be put in, and the earth pressed close to its extremity, or it will never send out roots. When these are put into a pot they should form a circle round the side, and resting against it, or over against the bottom, as in either case they will be found to strike more readily.

Cuttings that are liable to be injured by moisture, such as heaths, &c., are stuck in pots filled entirely with fine white sand ; but as there is no nourishment derived from sand, most cuttings do best with their lower ends in earth, and with only sand about an inch or two deep, at the top of the pot, to keep the stem dry, and to keep it from rotting. A few leaves to elaborate the sap, in the case of herbaceous plants, or evergreen trees and shrubs, are essential.—*See page 182.*

The principal evergreen herbaceous plants are, pinks, carnations, sweet williams, thrift, saxifrages, especially *S. crassifolia*, &c. The bulbs should be chiefly hyacinths, which are at once some of the most beautiful and the most fragrant of flowers ; but the bed should be bordered with crocuses, aconites, and snow drops ; and should contain also polyanthuses, narcissus, and other kinds of bulbs sold in the seed shops. Among the fixed herbaceous plants, some flowering in every month throughout the year ought to be chosen ; for example, the Christmas rose for January ; the *hepatica* and the primrose for February ; *Arabis albidæ* and rosea for March ; *Aquilegia grandiflora* for April ; Tenore's candy tuft for May ; lupines and cocks-purs for June and July ; *liatris corymbosa* for August ; pentstemon and phloxes for September : and asters and dwarf dahlias for the remainder of the year, till they are destroyed by frost. This, or any other selection, may be varied or changed at pleasure, by consulting the catalogues.

Both in borders and beds it is desirable to place the lowest plants next the walk, and the tallest at the greatest distance from it, so as to produce a sloping surface of vegetation; in which mode it will be found that the most effectual display is made; the green foliage of the plants not yet come into flower, or that of the plants which are gone out of flower, contrasting advantageously with those in full bloom.

The following is a list of the climbing shrubs for covering the summer-house, part of the boundary wall and porch, part of walls of the house, &c.:—Honeysuckle (*Caprifolium*), common training honeysuckle, of sorts from 3d. to 2s. each; Virgin's Bower, and Atragene, 1s. to 3s.; Barbary Boxthorn, 6d. to 9d.; the Duke of Argyle's tea tree, 4d. to 6d.; *Jasminum Officinale*, the common jasmine, 4d.; *Ampelopsis hederacea* (ivy-like, or the five-leaved ivy), 4d. to 9d.; *Rosa multiflora*, and Greviller, 1s. 6d.; the many-flowered, and Greville's rose, *Wistaria*, *Consequana*, Loudon's *Consequas* (*Glycine sinensis*), 2s. to 3s. 6d.; Giant Ivy, and Ayrshire rose of sorts double, 1s. to 1s. 6d.

CONCLUSIVE REMARKS.—In Gardening, the principle of fitness, or the adjustment of the means to the end, may be applied to the situation of the garden. To the fitness of its soil for the vegetables to be cultivated; to the fitness of the forms of the compartments for carrying on the process of cultivation; to the fitness of the culture of the different articles cultivated, and the particular purposes and seasons for which they may be intended; and so on.

The rules which in Gardening are derived from this principle of fitness, are that in the latitude and climate of Great Britain, the best aspect for a Kitchen and Fruit Garden is a declivity to the south-east, south, or south-west; and the best soil for general purposes is a sandy loam; that the best form of compartments is a square, or parallelogram; and that the best form of culture is in drills; and so forth.

## THE ART OF MAKING BASKETS.

Osier weaving is among the simplest of all arts; even the blind manage it perfectly. The chief thing to be attended to is to cut the willows at the right season, and to temper them properly when to be woven into the different kinds of work. They may be cut in the end of August or September, and stripped of the bark while the sap is in circulation without boiling; from this time to April they require boiling if intended for white baskets. The most proper time in all the year is to cut early in spring, as soon as the sap is up and the bark loose. They should be stripped of the bark immediately after being cut, or tied up in bundles and their root ends put in water to keep them fresh till peeled. The basket-makers have an iron comb which they fix into the ground, and draw the rods through it and strip them at once. This may be effected by a piece of wood split in the form of sugar-tongs, with two slices taken off each limb to make it catch the bark the better while the rods are pulled through it. If the osiers are not to be woven soon after being peeled, they should be well dried and tied up in bundles, and the different sizes kept by themselves and laid past in a dry place till wanted for use. In this state they will keep for years; and when to be made into baskets they are steeped in cold water for several hours previous. Those for the finer work should be wrapped up in a piece of woollen cloth previously well soaked in water; the root ends are left out to be drawn one by one as they are woven.

To make an improved English basket, with an oval bottom, which is the first part formed, take six sticks of the root ends of the strongest willows, or of any other kind of wood, and of proper dimensions, from six to nine inches or more long, and lay them down upon the ground in pairs, two or more inches asunder; the outside one of each end is to be afterwards bent out like an inverted parenthesis, )||(|. Then take three stout willows, which plait with their root-ends six or more inches beyond the cross sticks or rods, and in the same direction, to serve afterwards as warp or ribs; then plait other three willows, of the same dimensions, with their root and top ends in the opposite direction, which are all pressed close to the middle of the cross ribs; then

plait the top ends of the willows in the usual way, till you have three above and three below each pair of cross ribs, and the three root pieces at both the ends. Now

the four outside cross ribs are bent forward thus 

and also two of the three root ends of the plaited willows which are left for ribs  are bent back, after which the

osiers are plaited in pairs, and crossing twice over and below the two bent ribs at the four corners, to hold them in this position. The ribs being now divided into sixteen in number, the cross bars in the middle are left close. The bottom is now finished to the desired size by plaiting the willows in pairs, and crossing between all the ribs but the mid cross ones. All the ends are now cut in close to the woven osiers, thus . Thirty-two stout and equal sized osiers are required for ribs, which are prepared in the manner of making grafts, by cutting a slice off their root ends and another off the side, ending in a sharp point. The hollow side of the bottom is laid undermost, and the 32 ribs are pushed in two or three inches, one by one on each side of the bottom ribs. Then the hollow side is turned uppermost, and four stout willows are plaited all round the bottom, thus forming a ring or legging to serve as a safeguard to the bottom of the basket, the hollow side with the ring is turned below, as at first, when all the ribs are to be pierced in the centre, close to the bottom, with a sharp pointed knife or brog, this is to make them bend upright more easily without breaking. The ribs are now all taken up and tied at the top; then they are walted round at the bottom by plaiting three or four stout willows three times round to hold them all firm in this position, when they may be slacked at the top. The ribs are all now a little bent outward, and woven to the proper height by single osiers not more than half the strength of the ribs, beginning with the root end, and always advancing one rib with each osier towards the right hand as the process goes on.

The basket being deep enough, it is walted round once or twice with three or four stout osiers. This is done by fixing in the osiers one after the other, and plait the first put in, or back one, always first, and proceed as if plaiting with one willow. The mouth plait is formed by bending

down all the upright ribs. Thus, begin at a side, but towards the left hand, and bend down the ribs one by one, on the inside of two ribs, and take it out betwixt the second and third rib towards the right hand, proceed in the same manner till you have taken down five or more rods according to the size of the basket, and strength of the rods; these five rods being all on the outside of three or four, and round the inside of the first rod on the left not taken down, and close behind the last rod taken down, which last is to remain as it is, till the plait is finished; proceed in the same way till you come to the first taken down, then join your plait by cutting the finishing rod an inch and a half beyond the rib where it should end, point and thrust it down close on the back of that rib, and finish your plait in this way, joining where the bow is to be fixed.

After some practice all the ends should be cut off the ribs an inch beyond the upright rib, where it is to terminate, when this bit is bent and thrust down close on the left of that upright rib, and the next rib is bent down on the inside of two, and taken between them and the third standing one as before, and over the one with its end thrust down; this way is much stronger and neater, as none of the cut ends are seen. The mouth plait being finished, all the rod ends are pruned off close.

Then a stout rod is bent into a bow, and both ends of it being pointed, is pushed down close by the side of two ribs, one on each side of the middle of the basket, four long willows are next pointed, two of them are thrust down on the left of the bow at each end, twist and plait them one by one, over the bow from left to right, and from right to left under the bow, and so on to the other end; then take the twisted rods over the outside of the mouth plait, from left to right, and draw it to the inside under it where all the ends are to remain till the four are plaited; then plait them back in the same manner to the other end, that is eight plies, and fix them by drawing them through between the plaits, and the work is finished by cutting all the ends close off.

A laundry basket is made nearly in the same way as the above, but four cross bars are requisite for the bottom, and from 8 to 16 stout rods are woven upon them as above described, 42 ribs are required; in weaving the sides, all the root ends of the rods should be pointed, and thrust down an inch or two close by the right side of the ribs, and

taken across the outside of two ribs instead of one at the commencement of each osier, as they require to be strong for these large haskets, and thus forming a circular ring from bottom to top; and as each rod is plaited on they should be knocked down close and firm by a rod of iron or a mallet. In plaiting the mouth, the ribs are taken down on the inside of two, and the outside of five, and on the inside of one as above, and so on. In fixing the handles at both ends, one or two stout rods are required for each, with their root ends pointed. They are rendered pliable by bending and drawing across your knee several times, they are then fixed by the root ends at the proper places, the other end is taken right across and down through the centre of the rim, bent up and plaited over from left to right, as above directed for small baskets.

An underfoot, or square bottom, is made by laying down four or five bars or rods length ways, the outside ones being round, as they have to be afterwards pierced to fix the lower end of the ribs; these four or five bars being placed at equal distances, they may be tied on one end to a rod placed across them to hold them all in the proper position, they are then woven across with single osiers to the requisite size, then two osiers are plaited on each end; then cut the bars close, and fix in the necessary number of ribs, and proceed to weave in the usual form; but in plaiting the mouth one or two rods are cut, half plaited, at the turn of each corner, and so forth.

All the tools necessary for the above work is only a knife and willow peeler; but for making fine work, a splitter and a pair of dressers are required.

During the time of weaving the sides of these baskets, they are placed upon their bottom, with a weight within to hold them steady. The rods should all be selected of the same size for the different parts of the basket

# GLOSSARY

OF

## BOTANICAL TERMS.

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### A

- A*, in composition, signifies without, as *Aphyllus*, without leaves ;  
*Acaulis*, without stem.
- Abbréviate* (*abbreviare*, to shorten). Used in comparative descriptions, to indicate that one part is shorter than another.
- Aberrant*, deviating from the natural or direct way ; applied in Natural History to species or genera that deviate from the usual characters of their neighbours.
- Abortion* signifies an imperfect developement of any given organ.
- Abraded*, rubbed or worn off.
- Abstergent*, cleansing, having a cleansing quality.
- Accessory*, something added to the usual number of organs, or their parts.
- Accretion*, the growing of one thing to another.
- Accumbent*, lying on, prostrate, supine ; this term is employed in Cruciferæ, to signify a radicle, which lies upon the edge of the Cotyledons.
- Acetose*, needle-pointed ; fine and slender with a sharp point.
- Acetous*, sour, tart, acid.
- Ascetarius*, any thing belonging to the salad tribes of vegetables.
- Acetous*, something that produces acidity.
- Acicular*, needle-shaped.
- Acinaciform*, scimitar-shaped.
- Acini*, the small stones in grapes, strawberries, &c.
- Aculeate*, being furnished with aculei or prickles, as distinguished from spines.
- Aculei*, prickles, sharp hard processes of the epidermis falling off when old ; by which character they are distinguished from spines, which do not fall off.
- Acuminate*, taper-pointed.
- Acutangular*, having sharp angles.
- Adnate*, adhering to a thing. Anthers are called adnate when they are attached to the filament by their whole length.

- Adult*, the full-grown of any thing: full-grown leaves are adult leaves.
- Æruginous*, having a colour like that of ærugo or verdigris.
- Agglomerated*, collected into a heap or head.
- Aggregate*, gathered together; usually applied to a dense sort of inflorescence.
- Akenium*, a hard pericarpium, containing a single seed, which does not adhere to it; it is the same as the *Lioœao nux.*
- Albumen*, the substance under the inner coat of the testa, surrounding the embryo; it is sometimes absent.
- Alexipharmic*, that which counteracts poisons, antiodotal.
- Alkalescent*, having the properties or effects of alkali.
- Alveolate*, resembling a honeycomb.
- Amentum*, a catkin; mode of inflorescence.
- Amplexicaul*, stem-clasping; the base of the leaf surrounding the stem.
- Amylaceous*, having the properties of starch.
- Anastomosing*, uniting, or inoculation, of vessels.
- Androgynous*, producing both male and female sexes on the same root, or in the same flower.
- Anfractuose*, full of turnings and winding passages.
- Angular*, composed of, or furnished with, angles.
- Angulo-dentate*, angularly toothed, or angular and toothed.
- Annulations*, rings, or circles.
- Anterior*, growing in front of some other thing.
- Anthelmintic*, capable of killing worms.
- Antheriferous*, bearing anthers.
- Anti-scorphulous*, antiscorbutic; efficacious against scurvy.
- Antiseptic*, efficacious against putrefaction.
- Aperient*, having a slight purgative quality.
- Apetalous*, being without petals.
- Apex*, the summit; generally applied to anything terminating in a point.
- Apthous*, resembling something covered with little ulcers.
- Apiculate*, terminating in an apiculous or little point.
- Apiculous*, a small point. This term is generally used when the midrib projects beyond the leaf, forming a little point, or when a small point is very suddenly and abruptly formed.
- Apophysis*, a swelling beneath the theca of a moss.
- Appendix*, that which is attached.
- Appressed*, placed close upon something else; when hairs lie flat upon the surface of a plant they are said to be appressed.
- Approximated*, near together.
- Apterous*, without wings, or the membranous margins which botanists call wings.
- Aquatics*, growing in, or belonging to, water.

- Arboreous*, being a tree, as distinguished from frutescent or shrubby.
- Arborescent*, having a tendency to become a tree.
- Arcuate*, curved or bent like a bow.
- Areolæ*, little spaces or areas on the surface of a thing; the surface of crustaceous lichens is often cracked in every direction; the spaces between the cracks are the areolæ.
- Areolated*, the adjective of the last term.
- Aridity*, dryness.
- Arillate*, having that peculiar appendage called the Arillus. The term is only applied to seeds.
- Arillus*, a process of the placenta adhering to the hilum of seeds, and sometimes enveloping them.
- Aristate*, bearded, as the glumes of barley. Many grasses.
- Aroma*, the spicy quality of a thing.
- Articulation*, the place where one thing is joined with another, another word for joint.
- Asci*, small tubes in which the sporules of Cryptogamic plants are placed.
- Ascigerous*, bearing asci.
- Assurgent*, rising upward.
- Attenuate*, made thin or slender.
- Auriculated*, having an ear-like base.
- Awns*, the beard or arista of corn.
- Axil-flowering*, flowering in the axilla.
- Axilla*, literally the armpit; in plants applied to the angle formed by the union of the leaf and stem.
- Axillary*, placed in the axilla.
- Axis*, the line, real or imaginary, that passes through any thing.

## B

- Baccate*, berried, having a fleshy coat or covering.
- Bagged*, resembling a bag or sack.
- Ball*, the round central part of the flower of the *Stapélia*.
- Bands*, or vittæ, are the spaces between the elevated lines or ribs of the fruit of umbelliferous plants.
- Barred*, crossed by a paler colour in spaces resembling bars.
- Beak*, any thing which resembles the beak of a bird; hard short points.
- Bearded*, having long hair like a beard.
- Beardletted*, having small awns.
- Biscuspidate*, twice pointed.
- Bidentate*, double-toothed, or having two teeth.
- Biennial*, a plant is said to be biennial which it requires two seasons to mature its fruit, and then dies.
- Bifarious*, placed in two rows.
- Bifid*, half divided in two; two cleft.

- Biglandular*, double-glanded.  
*Bilabiate*, having two lips.  
*Bilobed*, divided into two lobes.  
*Binate*, growing two together.  
*Bipartite*, capable of being parted in two.  
*Bipinnate*, a mode of foiliation; twice pinnate.  
*Bipinnatifid*, twice pinnatifid, a mode of foiliation.  
*Bisaccate*, having two little sacks, bags or pouches.  
*Biscutate*, resembling two bucklers (*scuta*) placed side by side.  
*Biternate*, divided in three twice over.  
*Bi-tri-crenate*, crenate twice or thrice.  
*Bi-tri-pinnatifid*, pinnatifid twice or thrice over.  
*Bi-tri-ternate*, growing in threes, twice or thrice over.  
*Bivalved*, two valved.  
*Blanching*, made white by being grown in a dark place.  
*Bland*, fair, beautiful.  
*Blight*, a vague term, signifying a pestilence among plants caused by the attack of insects or of parasitical fungi, or by some endemical affection of the atmosphere.  
*Blistered*, having the surface raised as the skin is when blistered.  
*Bole*, trunk of a tree.  
*Boragineous*, of or belonging to the natural order Boraginæ.  
*Brachiate*, having arms or branches usually placed opposite to each other, nearly at right angles with the main stem, and crossing each other alternately.  
*Bracteate*, furnished with bractææ.  
*Bracteolæ*, little bractææ.  
*Bractææ*, small leaves placed near the calyx.  
*Branchlets*, small branches.  
*Bristles*, rigid hairs.  
*Bulbiferous*, bulb-bearing.  
*Bulbous*, having bulbs.  
*Bulbs*, underground buds resembling roots, and consisting of numerous fleshy scales placed one over the other.  
*Burry*, covered with hooked stiff hairs, like the heads of Bur or Burdock.  
*Byssoid*, having the appearance of Byssi.

## C

- Caducous*, falling off soon.  
*Cæsious*, gray.  
*Cæspitose*, growing in little tufts.  
*Calcarate*, spurred, or spur-shaped.  
*Calcareous*, chalky, or growing on chalk.  
*Calceiform*, formed like a little shoe.  
*Calli*, small callosities, or rough protuberances.  
*Callous*, hardened.

- Calycine*, of or belonging to a calyx.  
*Calyculated*, having hracteolæ resembling an external or additional calyx.  
*Calyptra*, literally an extinguisher; applied to the body which tips the theca of a moss, and the like.  
*Calyptrate*, having a covering resembling an extinguisher.  
*Calyptriformis*, shaped like a calyptral.  
*Campanulate*, bell shaped.  
*Canaliculate*, channelled or furrowed.  
*Cancellate*, latticed; resembling lattice-work.  
*Canescent*, hoary, approaching to white.  
*Capillary*, very slender; resembling a hair.  
*Capitate*, growing in a head.  
*Cupitular*, growing in small heads.  
*Capituli*, small heads.  
*Capituliform*, formed like a small head.  
*Carbonised*, burned to a coal.  
*Carina*, a keel like that of a boat; also the two lower petals of papilionaceous flowers.  
*Carinate*, keel shaped.  
*Cariopsis* a one celled, small, indehiscent pericarpium adhering to the seed which it contains, as the grain of grasses.  
*Carious*, decayed.  
*Carminative*, medicines which promote perspiration.  
*Carnose*, fleshy.  
*Carpella*, the small parts out of which compound fruit are formed.  
*Carpology*, the science which treats of the structure of fruits and seeds.  
*Cartilage*, gristle.  
*Cartilaginous*, gristly.  
*Cataplasm*, a plaster, or more properly a poultice.  
*Catarrhal*, of or belonging to a cold.  
*Cathartic*, purgative.  
*Catkin*, inflorescence of the natural order Amentáceæ.  
*Caudate*, tailed, being like a tail.  
*Caudex*, the trunk or stem.  
*Caducula*, a small membranous process on which the pollen of orchideous plants is fixed.  
*Caullescent*, acquiring a stem.  
*Cauline*, produced on a stem.  
*Causticity*, having a burning quality.  
*Cautery*, that which burns.  
*Cellular*, composed of cells.  
*Centimetre* is a French measure equal to 4 lines  $\frac{432}{1000}$  or near  $4\frac{1}{2}$  lines.  
*Centuriæ*, hundreds.  
*Cephalic*, medicinal to the head.

- Ceraceous*, wax-like.
- Cernuous*, nodding, drooping, or pendulous.
- Chaffy*, bearing processes resembling chaff.
- Chalaxa*, a spot on the seed, indicating where the vessels of the raphe terminate.
- Channel-leaved*, folded together so as to resemble a channel for conducting water.
- Charring*, blackening by fire.
- Ciliae*, hairs like those of the eyelash.
- Ciliary processes*, like eyelash hairs.
- Ciliated*, eyelash-haired.
- Ciliato-dentate*, toothed and fringed with hairs like eyelashes.
- Cinereous*, ash-coloured, gray.
- Circinately*, curled round like a sharp crook.
- Cirrhiferous*, bearing tendrils.
- Cirrhose* or *Cirrhous*, tendrilled.
- Clammy*, viscid, sticky.
- Clathrate*, latticed, divided like latticework.
- Clavate*, club-shaped.
- Clavulose*, clubbed, or having club-like processes.
- Clavus*, a name for the ergot, a disease in corn.
- Claws*, the taper base of a petal.
- Clinandrium*, that part of the column of orchideous plants in which the anther lies.
- Clypeate*, shaped like a Roman huckler.
- Cobwebbed*, covered with loose hairs, as if with a cobweb.
- Cochleate*, resembling the shell of a snail.
- Cohering*, connected.
- Collapsion*, the act of closing or falling together.
- Columnella*, the axis of the fruit of mosses.
- Columnar*, formed like columns.
- Comminuted*, pulverised or pounded.
- Comose*, this term is used to express a kind of inflorescence, which is terminated by sterile bractes.
- Compact*, close, solid.
- Complicate*, folded together.
- Complicato-carinate*, folded together so as to form a sort of keel.
- Compound*, used in botany to express the union of several things in one; thus, a compound umbel is formed by several simple umbels, a compound flower by several simple flowers, &c.
- Compressed*, pressed together.
- Concave*, hollow.
- Concentric*, points or lines at equal distances from a common centre.
- Concrete*, hardened or formed into one mass.
- Cone*, a particular kind of compound fruit.
- Conferruminata*, united together, so as to be undistinguishable.

- Confervoid*, like confervæ.
- Confluent*, running into one another.
- Conglobated*, collected into a spherical form.
- Conical*, resembling a cone.
- Conico-hemispherical*, between conical and round.
- Conico-ovate*, between conical and ovate.
- Conjugate*, joined in pairs: a term chiefly applied to leaves.
- Conate*, joined together at the base.
- Connivent*, converging.
- Conoid*, cone-like.
- Constricted*, tightened or contracted in some particular place.
- Converging*, approaching together.
- Concave*, rising in a circular form.
- Convexo-plane*, plane on one side, convex on the other.
- Convolute*, rolled together.
- Coralloid*, like coral.
- Cordate*, heart-shaped.
- Coriaceous*, leathery.
- Corneous*, horny, of the consistence of horn.
- Corniculate*, having processes like small horns.
- Cornate*, horned.
- Corona*, literally a crown: applied in botany to the crown-like cup which is found at the orifice of the tube of the corolla in Narcissus, Paneratium, and others.
- Corpuscle*, a small body; a particle of any thing.
- Corroborant*, strengthening, having the power to give strength.
- Corrosive*, having the power of wearing away.
- Corrugated*, wrinkled or shrivelled.
- Cortical*, of or belonging to the bark.
- Corymb*, a raceme or panicle in which the stalks of the lower flowers are longer than those of the upper, so that the flowers themselves are all on the same level.
- Corymbose*, formed or arranged after the manner of a corymb.
- Corymbulose*, formed or arranged in many small corymbs.
- Cosmetic*, beautifying.
- Costæ*, literally ribs: applied by botanists sometimes to the midrib of a leaf, and sometimes to any projecting round elevations having the same direction as the axis of the fruit.
- Costate*, ribbed.
- Cotyledons*, seed lobes or leaves.
- Cowled-leaved*, a thing is said to be cowled, or cucullate, when its end is curved inwards in such a manner as to represent the cowl or hood of a monk.
- Crenæ*, notches.
- Crenate*, notched.
- Crenature*, the notching.
- Crenulate*, full of notches.

- Crest*, applied to some elevated appendage terminating a particular organ: a stamen is crested when the filament projects beyond the anther, and becomes dilated.
- Cribiform*, riddled with holes like a sieve.
- Cribose*, perforated like a sieve.
- Crisp*, when leaves are very much undulated at the margin, they are called crisp or curled.
- Cruciate*, shaped like a Maltese cross: a flower is said to be cruciate when four equal petals are placed opposite each other at right angles.
- Cruciferous*, the name of a particular family of plants bearing cruciate flowers.
- Crustaceous*, having a hard brittle shell.
- Crystalline*, consisting of, or resembling, crystals.
- Cucullate*, hooded, cowlled; see *Cowlled*.
- Culm*, the stem of grasses, scitamineous plants, and the like.
- Culmiferous*, producing culms.
- Cultrate*, shaped like a pruning-knife.
- Cuneate*, wedge-shaped.
- Cup*, the same as *corona*; see that word.
- Cupule*, the cup of an acorn, and of all amentaceous plants.
- Cupuliform* or *Cupulate*, shaped like a reversed bell.
- Cuspidate*, like the point of a spear, a leaf is cuspidate when it is suddenly tapered to a point.
- Cutaneous*, relating to the skin.
- Cuticle*, the scarf skin or epidermis.
- Cut-toothed*, cut and toothed at the same time.
- Cyathiform*, cup-shaped, concave.
- Cylindrical*, having the form of a cylinder.
- Cylindrical*, cylinder-shaped.
- Cylindrico-campanulate*, cylindrically bell-shaped.
- Cymbiform*, hant-shaped.
- Cyme*, a mode of inflorescence, resembling a flattened panicle.
- Cymose*, flowering in cymes.

## D

- Decandrous*, having ten stamens.
- Deciduous*, falling off. Leaves which are shed annually are said to be deciduous; as are also trees that annually lose their leaves.
- Declinate*, curved downwards.
- Decoction*, a preparation or digest by boiling water.
- Decomposed*, a leaf is said to be decomposed when it is twice pinnated; a panicle when its branches are also pinnated.
- Decorticated*, disbarbed.
- Decumbent*, lying down.
- Decurrent*, running down.

- Decursive*, having a tendency to run down.
- Decussated*, when two right lines cross each other at right angles they are said to decussate: leaves are often placed in this position.
- Deflexed*, turned downwards.
- Dehiscent*, gaping; an expression applied to the mode in which the anthers or the fruit burst open and discharge their contents.
- Deliquescent*, melting away upon exposure to air.
- Demulcent*, having the property of softening any thing.
- Dentate*, having the margins divided into incisions resembling teeth.
- Dentato-ciliate*, having the margin dentate and tipped with cilia.
- Dentato-sinuate*, scalloped and toothed.
- Denticulate*, being finely dentate.
- Denticulations*, small toothings.
- Dentiform*, tooth-shaped.
- Deobstruent*, having the power of removing obstructions, a term of medicine.
- Dependent*, hanging down.
- Depressed*, pressed downward.
- Depurated*, purified, cleansed.
- Despumate*, to throw off in froth or scum.
- Detergent*, *Detersive*, having the power of cleansing.
- Diandrous*, having two stamens.
- Diaphanous*, transparent.
- Diaphoretic*, promoting perspiration.
- Dichotomous*, a stem that ramifies in pairs.
- Diocous*, having two cocci.
- Didymous*, two united.
- Didynamous*, having two long stamens and two short ones in the same flower, each pair being collateral.
- Difform*, two forms; used to express irregularity.
- Diffuse*, scattered, widely spread.
- Diffusible*, such as may be spread.
- Digitated*, fingered, shaped like the hand spread open.
- Digitiform*, formed like fingers.
- Digynous*, two styles or female organs.
- Dimidiate*, halved, divided into two parts.
- Dioecious*, when a plant bears female flowers on one individual, and males on another, it is called dioecious.
- Discoid*. When in *Compositæ* the florets are all tubular, the head of flowers is said to be discoid. In other cases, when the florets of the centre of a head of flowers are more perfect than the rest, they are called discoid. Finally, when any thing is dilated into something which may be compared to a disk, the term discoid is also made use of.
- Discus* or *Disk*, the fleshy annular process that surrounds the

ovarium of many flowers; also the surface of a leaf; also the centre of a head of flowers of *Compositæ*.

*Discutient*, having the power to scatter the matter of tumours.

*Dissepiment*, the partitions by which a seed vessel is divided internally.

*Distichous*, two-rowed: producing leaves or flowers in two opposite rows.

*Ditrichotomous*, divided in two's or three's; a stem continually dividing into double or treble ramifications.

*Diuretic*, having the power of promoting the flow of urine.

*Divaricate*, growing in a straggling manner.

*Dodecandrous*, having twelve stamens.

*Dolabriform*, axe-shaped.

*Dorsal*, growing on the back.

*Drastic*, applied to medicines which act violently.

*Drupe*, a kind of fruit consisting of a fleshy succulent rind, and containing a hard stone in the middle.

## E

*Echinated*, covered with prickles like an echinus or hedgehog.

*Edible*, eatable.

*Effuse*, literally poured forth; applied to inflorescence, it means a kind of panicle with a very loose one sided arrangement.

*Electuaries*, a medicine of conserves and powders in the consistence of honey.

*Ellipsoid*, like an ellipsis.

*Elliptic-lanceolate*, a form between elliptical and lanceolate.

*Elongated*, lengthened.

*Emarginate*, having a small notch in the end.

*Embossed*, projecting in the centre like the boss or umbo of a round shield or target.

*Embracing*, a leaf is said to embrace a stem when it clasps it round with its base.

*Emollient*, softening.

*Emulsions*, medicines made of bruised oily seeds and water.

*Ensate* or *Ensiform*, shaped like a sword with a straight blade.

*Epidermis*, the outer skin of the bark.

*Epiphyllous*, growing upon a leaf.

*Epiphytes*, plants which grow upon other plants, without deriving any nutriment from them.

*Equidistant*, equally distant.

*Equilateral*, having equal sides.

*Equitant*, a mode of veneration, or of arrangement of leaves with respect to each other, in which the sides or edges alternately overlap each other.

*Erecto-patent*, between erect and spreading.

*Eroded*, gnawed, bitten; a term used to express a particular kind of irregular denticulation.

- Eroso dentate*, the tnttbing being ernded.  
*Errhine*, promotiog a discharge of mucus from the onstrils.  
*Escharotic*, haviog the power tn sear nr burn the skin.  
*Esculent*, good for food.  
*Etiolated*, whitened by being kept frnm air aod light.  
*Evanescent*, quickly vaoisbiog.  
*Evolved*, uofolded.  
*Excavated*, hollowed out.  
*Excentrical*, flying off from the centre.  
*Excoriate*, stripped nf the bark or skin.  
*Excurent*, projecting nr runoing beyood the edge or pint nf any tbing.  
*Exotic*, foreigo.  
*Expectorant*, aoy thioo that prmmtes the discharge nf mucus frnm the chest.  
*Exserted*, prnjecting beynod smnething else.  
*Exsiccated*, dried up.  
*Extra-axillary*, above or on the outside of the axils.  
*Extra-foliaceous*, away from tbe leaves, nr inserted in a different place from them.  
*Exuvia*, whatever is cast off by plants nr animals.

## F

- Facula*, the nutritious pnwder nf wheat nr of other tbing.  
*Falcata* or *Falciform*, bent like a sickle.  
*Farinaceous*, full of flour.  
*Fascicles*, parcels or bundles.  
*Fasciculate*, arranged io buodles or parcels.  
*Fastigiate*, taperiog to a narrow pint like a pyramid.  
*Fauces*, the jaws; the gapiog part nr orifice of a mnonpetalms flower.  
*Favose*, pitted nr excavated like the cells nf a hooeycnmh.  
*Feathery*, resemhliog a feather.  
*Febrifuge*, efficaceous in moderating fever.  
*Feculent*, muddy, thioo with sediment.  
*Fecundation*, the act of makiog fruitful.  
*Feroces*, thickly set with spices.  
*Ferruginous*, iroo-coloured, rusty.  
*Fibrillose*, cnvered with little strings nr fibres.  
*Fibrous*, being cnmposed of fibres.  
*Fiddle-lipped*, haviog a lip resemhling the figure nf a fiddle.  
*Filiform*, shaped like a thread.  
*Fimbriate*, frioed.  
*Finger-parted*, divided iotn lmbes haviog a fanciful resemhliance tn the five flogers of a humao haod.  
*Fistular*, or *Fistulous*, bnllow like a pipe.  
*Flaccid*, feeble, weak.

- Flexile*, capable of being bent in different directions, pliable.  
*Flexuose*, having a bent or undulating direction.  
*Flexuose-recurved*, bent backwards in a flexuose or undulated direction.  
*Flocci*, little tufts like wool.  
*Flora horologica*, flowers which expand at particular hours, whence they are a sort of timekeepers.  
*Floral envelopes*, the calyx, bractæ, and corolla, which envelope the inner part of the flower are so called.  
*Florets*, little flowers; chiefly applied to those which constitute what were formerly called compound flowers.  
*Floriferous*, that which bears flowers.  
*Flosculous*, compound flowers, consisting of many tubulose monopetalous florets.  
*Foliaceous*, having the form of leaves.  
*Pollicle*, a particular kind of seed-vessel.  
*Footstalks*, the stalks of either flowers or leaves.  
*Fornicate*, arched.  
*Fragmentary*, composed of fragments.  
*Fringed*, having a border like a fringe.  
*Fronde*, the leaves of palms.  
*Frontal*, that which is in front.  
*Frosted*, covered with glittering particles, as if fine dew had been congealed upon it.  
*Fructification*, all those parts composing the flower and fruit of plants.  
*Frutescent* or *Fruticose*, shrubby.  
*Fugacious*, that which lasts but for a short time.  
*Fulvous*, tawny yellow or fox-coloured.  
*Fungous*, having the substance of fungi or mushrooms.  
*Funicle*, the little stalk by which the seed is attached to the placenta.  
*Furcate*, forked.  
*Furfuraceous*, scaly, mealy, scurfy.  
*Fuscous*, blackish-brown.  
*Fusiform*, spindle-shaped.

## G

- Galeate*, helmeted; the upper lip of a ringent corolla is the galea of that corolla.  
*Gelatine*, jelly; a term of chemistry.  
*Gelatinous*, consisting of jelly.  
*Geminate*, doubled.  
*Gemmae*, leafy buds as distinguished from alabastra or flower buds.  
*Geoponio*, relating to agriculture.  
*Germ* or *Germen*, the old name of ovarium.  
*Germen inferior*, fruit below the flower.

- Germination*, the first act of vegetation in a seed.
- Gibbous*, protuberant.
- Glabrous*, smooth.
- Gladiate*, shaped like a short straight sword.
- Glandular*, having glands.
- Glaucous* or *Glawine*, having something of a bluish hoary appearance.
- Glaucous*, having a decided hoary gray surface.
- Globose* or *Globular*, round or spherical.
- Glomerate*, gathered into a round heap or head.
- Glumaceous*, plants are said to be glumaceous when their flowers are like those of grasses.
- Glume*, a part of the floral envelopes of a grass.
- Gluten*, a chemical principle.
- Glutinous*, adhesive.
- Grained*, the segments of the flowers of *Rumex* have tubercles which are called grains.
- Graniform*, formed like the grains of corn.
- Granular*, covered as if with grains.
- Gregarious*, herding together.
- Grooved*, furrowed, channelled, marked with grooves.
- Grumous*, clubbed, knotted, contracted at intervals into knots.
- Gynandrous*, having the stamens and style combined in one body.
- Gyrose*, turned round like a crook.

## H

- Habit*, features or general appearance of a plant.
- Hastate*, formed like the head of a halbert.
- Hastato-lanceolate*, between halbert-shaped and lanceolate.
- Hastato-sagittate*, between halbert-shaped and arrow-shaped.
- Haulm*, dead stems of herbs.
- Helmet*, the same as *Galea*; see *Galeate*.
- Herbaceous*, a plant the stem of which perishes annually.
- Hermaphrodite*, consisting of two sexes.
- Hexagonal*, six-sided.
- Hexandrous*, having six stamens.
- Hexangular*, six-angled.
- Hexapetalous*, having six petals.
- Hilum*, the scar or mark on a seed which indicates the place by which it adhered to the placenta.
- Hirsute*, rough with soft hairs.
- Hispid*, rough, with stiff hair.
- Hoary*, covered with white down.
- Homogeneous*, having a uniform nature, or principle, or composition.
- Honey-pore*, the pore in flowers which secretes honey.
- Honey-scales*, the scales in flowers which secrete honey.

- Honey-spots*, the spots in flowers which secrete honey.  
*Hooded*, being curved or hollowed at the end into the form of a hood.  
*Horn*, any long subulate process in a flower is called a horn.  
*Husks*, the dry envelopes of either flowers or fruits.  
*Hyaline*, crystalline, transparent.  
*Hybrid*, mule; partaking of the nature of two species.  
*Hygrometrical*, indicating the approach of moisture.  
*Hypocrateriform*, salver-shaped.  
*Hypogynous*, situated below the ovarium.  
*Hypophyllous*, under the leaf.

## I

- Iced*, covered with particles, like icicles.  
*Ice-drops*, transparent processes resembling icicles.  
*Imbricate*, laid one over another like tiles.  
*Incised*, cut, separated by incisions.  
*Incrassated*, becoming thicker by degrees.  
*Incurved*, bending inward.  
*Incurve-recurved*, bending inwards and then backwards.  
*Indehiscent*, not dehiscent.  
*Indigenous*, native of a country.  
*Indurated*, hardened.  
*Indusium*, the membrane that encloses the theca of ferns.  
*Inflated*, blown up.  
*Inflexed*, bending inward.  
*Inflorescence*, disposition of flowers.  
*Infundibuliform*, funnel-shaped.  
*Innocuous*, harmless.  
*Inspissated*, thickened; spoken of sap or other liquor.  
*Intenerating*, having the power of making tender or softening.  
*Internodes*, the space between the joints of plants.  
*Interpetiolar*, between the petioles or leafstalks.  
*Interstices*, spaces between one thing and another.  
*Intramarginal*, within the margin.  
*Inverse*, inverted.  
*Involucels*, the partial involucre of umbelliferous plants.  
*Involucral*, having an involucre.  
*Involucrated*, covered with an involucre.  
*Involucre*, or *Involucrum*, the bractæ which surround the flowers of Umbelliferae in a whorl.  
*Involute*, rolled inwards.

## J

- Joints*, the places at which the pieces of the stem are articulated with each other.  
*Juliform*, formed like an amentum or catkin.

## K

- Kaliform*, formed like the *Sálsala kál*, a sea-coast plant.  
*Keel*, when the midrib of a leaf or petal is sharp and elevated externally, it is called a keel.  
*Kneed* or *Knee-jointed*, bent like the knee-joint.

## L

- Labellum*, the front segment of an orchideous, or other flower.  
*Lacinia*, segments of any thing.  
*Laciniate*, cut or divided into segments.  
*Lactescant*, yielding milky juice.  
*Lacunæ*, little pits or depressions.  
*Lacunose*, covered with little pits or depressions.  
*Lævigatè*, smoothed.  
*Lamellated*, divided by plates internally.  
*Lamina*, literally a plate; it is mostly applied to the leaf of a plant considered without its petiole.  
*Lanceolate*, lance or spear shaped.  
*Lanceolate-subulate*, between lanceolate and subulate.  
*La'eral*, on one side.  
*Lax*, loose, not compact.  
*Leaflets*, small parts of compound leaves.  
*Legume*, or *Legumen*, a pod; the fruit of leguminous plants.  
*Leguminous*, plants which bear legumes, such as the pea, the bean, the kidneybean.  
*Lenticular*, shaped like a lens.  
*Lentiform*, in form like a lens.  
*Leptous*, covered with spots or scales.  
*Lid*, the calyx which falls off from the flower in a single piece.  
*Lingula*, the membrane at the top of the petiole of grasses and other plants.  
*Lingulate*, strap-shaped.  
*Limbate*, having a coloured or dilated surface.  
*Linear*, when the two sides are parallel.  
*Linear-ensate*, long sword-shaped.  
*Linguiform* or *Lingulate*, tongue-shaped.  
*Lipped*, having a distinct lip or labellum.  
*Lobelets*, small lobes.  
*Locomotion*, motion from place to place.  
*Loculaments*, partitions or cells of a seed vessel.  
*Locular*, a fruit is called unilocular if it contains but one cell, bilocular if two cells, trilocular if three, and so on.  
*Loment*, a kind of legume falling in pieces when ripe.  
*Lomentaceous*, bearing pericarpia, called lomenta.  
*Lorate*, shaped like a thong or strap.  
*Lubricate*, to make slippery.  
*Lucid*, bright, shining.

- Lunate* or *Lunulate*, shaped like a half-moon.  
*Lurid*, a colour between purple, yellow, and gray.  
*Lymphatic*, of or belonging to lymph or sap.  
*Lyrate*, lyre-shaped.

## M

- Macerate*, to decompose by steeping in water or other liquid.  
*Marginal*, relating to the margin.  
*Masticatory*, grinding or chewing with the teeth.  
*Math*, an old term for crop.  
*Matrix*, a place where anything is generated or formed.  
*Medulla*, the pith of a plant.  
*Medullary*, relating to the pith of plants.  
*Melastomaceous*, partaking of the nature or appearance of *Melastoma*.  
*Melliferous*, honey-bearing.  
*Membranaceous*, or *Membranous* having the texture of a membrane.  
*Menstruum*, a liquor used as a dissolvent.  
*Meshes*, the openings in any tissue.  
*Micacious*, glittering, shining.  
*Midrib*, the large vein which passes from the petiole to the apex of a leaf.  
*Miliary*, granulate resembling many seeds.  
*Mitriiform*, formed like a mitre.  
*Mobility*, the power of motion.  
*Monodelphous*, having the filaments cohering in a tube.  
*Monandrous*, having one stamen.  
*Moniliform*, formed like an necklace, that is to say, with alternate swellings resembling beads and contractions.  
*Monocotyledons*, having one seed lobe or leaf.  
*Monocious*, having the one sex in one flower, and the other in another.  
*Monopetalous*, having one petal.  
*Monosepalous*, having one sepal or division of the calyx.  
*Mordant*, that which enables vegetable matter or tissue to receive dyes or colouring matter, and to retain them.  
*Mottled*, marked with blotches of colour of unequal intensity passing insensibly into each other.  
*Mucilage*, a turbid slimy fluid.  
*Mucronate*, pointed sharp.  
*Mucronulate*, having a little hard point.  
*Mulch*, a gardener's term for the placing manure about the roots of trees on the surface of the ground.  
*Multifarious*, very numerous; or arranged in many rows.  
*Multipartite*, much divided.  
*Multiplex*, much multiplied.

*Muricated*, covered with short sharp points.

*Muricato-hispid*, covered with short sharp points and rigid hairs or hristles.

## N

*Naiades*, nymphs of the springs and fountains ; a particular order of Monocotyledonous plants.

*Narcotic*, producing sleep or torpor.

*Navicular*, boat-shaped.

*Neck*, the upper tapering end of hulbs is called the neck.

*Nectariferous*, bearing honey.

*Neotary* or *Neotarium*, that part of a flower which produces honey.

*Nerves*, the strong veins upon leaves or flowers.

*Nervimotion*, the power of motion in leaves.

*Nervose* or *Nervine*, composed of nerves.

*Neuter*, neither male or female.

*Nidulant*, nestling ; lying among any thing, as a hird in its nest.

*Nidus*, the nest of anything.

*Nodding*, having a drooping position.

*Nodi*, the articulations of plants: the place where one joint is articulated with another.

*Nodose*, having many nodi or knots.

*Nodules*, small hard knots.

*Notch flowered*, having the flower notched at the margin.

*Nucamentaceous*, producing nuts.

*Nucleus*, the kernel.

## O

*Ob*, is used in the composition of Latin technical terms, to indicate that a thing is inverted ; for instance, ohovate is inversely ovate, obcordate inversely cordate, and so on.

*Occidental*, coming from the west.

*Ochraceous*, having the colour of clay or yellow ochre.

*Octandrous*, having eight stamens.

*Octogynous*, having eight styles.

*Official* any thing that is, or has been, used in the shops.

*Oleaginous*, having the qualities of oil.

*Oleraceous*, esculent, eatable.

*Olivaceous*, having the qualities of olives.

*Opercular*, covered with a lid.

*Operculiform*, having the figure and position of a round lid of something.

*Operculum*, a lid.

*Opiate*, having the power of opium.

*Orbicular* or *Orbiculate*, a plane surface, circumscribed by a circle.

*Orchideous*, of or belonging to the natural order of Orchidææ.

*Orifice*, an opening.

*Ossified*, become like bone.

- Ova*, the eggs of any thing.  
*Oval*, having the figure of an ellipso.  
*Ovarium* or *Ovary*, the part of the flower in which the young seeds are contained.  
*Ovate*, egg-shaped.  
*Ovato-acuminate*, egg shaped, and tapering to a point.  
*Ovato-cylindrical*, egg-shaped, with a convolute cylindrical figure.  
*Ovato-deltoid*, triangularly egg-shaped.  
*Ovato-rotundate*, roundly egg-shaped.  
*Overlapping*, when the margin of one thing lies upon that of another, it is said to overlap.  
*Ovoid*, egg-like.  
*Ovules*, the young seeds of plants contained in the ovarium:

## P

- Palate*, the mouth of a ringent flower.  
*Paleaceous*, abounding with chaffy scales.  
*Palmated* or *Palmatifid*, divided so as to resemble a hand.  
*Panduriform*, having the figure of a fiddle.  
*Panicled*, loose-spiked.  
*Pannary*, useful for making bread.  
*Papilionaceous*, butterfly-shaped flowers.  
*Papillose*, producing small glandular excrescences like nipples.  
*Pappus* the crown of the fruit of *Compositæ*, and similar plants.  
*Papulose*, producing small glands like pimples.  
*Parabolically*, to form like a parabola.  
*Parenchyma*, all the parts of plants which consist of cellular tissue only.  
*Parietal*, being attached to the side of an ovarium instead of its axis.  
*Patent*, spread out or expanded.  
*Patulous*, slightly spreading.  
*Pectinate*, resembling the teeth of a comb.  
*Pectoral*, relating to the breast.  
*Pedatifid*, cut into lobes, the lateral ones of which do not radiate from the petiole like the rest.  
*Pedicillate*, slightly stalked.  
*Pedicels*, small foot stalks of flowers.  
*Peduncle*, the common footstalks of flowers.  
*Pellicle*, a thin skin.  
*Pellucid*, bright, transparent.  
*Peltate*, when the petiole is fixed to the disk instead of the margin.  
*Pencilled*, marked in lines as if with a pencil.  
*Pendulous*, drooping, hanging down.  
*Pentagonal*, having five angles.  
*Pentagynous*, having five styles.

- Pentandrous*, having five stamens.
- Pentapetalous*, having five petals.
- Perennial*, lasting many years without perishing.
- Perfoliate*, when the stem passes through the base of the leaf.
- Perianthium*, the envelope that surrounds the flower; this term is applied when the calyx cannot be distinguished from the corolla.
- Pericarp*, the seed vessel.
- Perichætal*, leaves which in mosses surround the base of the stalk of the theca.
- Perigynous*, inserted into the calyx.
- Peristome*, the rim which surrounds the orifice of the theca of a moss.
- Perithecium*, *Peridium*, or *Perisporium*, different kinds of envelopes of the reproductive organs of Fungi.
- Persistent*, remaining, not falling off.
- Pervious*, having a passage through which anything can be transmitted.
- Petaloid*, like a petal.
- Petals*, divisions of the corolla.
- Petiolate*, having footstalks.
- Petioles*, footstalks of leaves.
- Petiolules*, little petioles.
- Pezizoid*, like a Peziza; a kind of fungus resembling a cup in figure.
- Phanogamous*, such plants as are visibly furnished with sexual organs.
- Pharmaceutical*, relating to the art of pharmacy.
- Pileate*, having a cap or lid like the cap of a mushroom.
- Pileus*, the cap of a mushroom.
- Piliferous*, bearing hairs.
- Piliform*, formed like down or hairs.
- Pilose*, slightly hairy.
- Pimpled*, covered with minute pustules resembling pimples.
- Pinnæ* or *Pinnulæ*, the segments of a pinnated leaf.
- Pinnate*, a leaf is so called when it is divided into numerous smaller leaves or leaflets.
- Pinnatifid*, a leaf is so called when it is divided into lobes from the margin nearly to the midrib.
- Piquancy*, sharpness, pungency.
- Pisiform*, formed like peas.
- Pistillum* or *Pistil*, the columnar body situated in the centre of a flower, consisting commonly of three parts, viz. the ovarium, style, and stigma.
- Pitchers*, hollow leaves so called.
- Pith*, medulla occupying the centre of a stem or shoot.
- Pituitous*, discharging mucus.
- Plane*, flat.

- Plano-compressed*, compressed down to a flattish surface.  
*Plethoric*, having a full habit.  
*Plicate*, plaited.  
*Plumose*, feathery, resembling feathers,  
*Plumula*, the young leaves in the embryo.  
*Pitriocular*, having many cells.  
*Pod*, a kind of seed vessel such as that of the pea tribe.  
*Polyandrous*, having more stamens than twenty.  
*Polygamous*, a plant is said to be polygamous when some flowers are male, others female, and others hermaphrodite.  
*Polygynous*, having numerous styles.  
*Polypetalous*, having many separate petals.  
*Polyspermous*, having many seeds.  
*Pome*, an apple.  
*Pores*, apertures in the cuticle through which transpiration takes place.  
*Porrect*, extended forward.  
*Pouch*, a little sack or bag at the base of some petals and sepals.  
*Prænomèn*, the first name of several; in plants it is the same as the generic name.  
*Precocity*, ripe before the usual time.  
*Prismatic*, formed as a prism.  
*Processes*, protrusions either natural or monstrous.  
*Proliferous*, a plant is said to be proliferous when it forms young plants in abundance about its roots.  
*Prominences*, protuberant risings from the surface.  
*Propendent*, hanging forward and downward.  
*Prurient*, stinging.  
*Pubescence*, down closely pressed to the surface.  
*Pullulating*, budding.  
*Pulverised*, reduced to powder.  
*Pulvinate*, become cushion-shaped.  
*Pulvinuli*, little cushions.  
*Punctiform*, formed like points.  
*Pungent*, stinging or pricking.  
*Pustular* or *Pustulate*, covered with glandular excrescences like pustules.  
*Pustules*, pimples or little blisters.  
*Pyriform*, shaped like the fruit of a pear.

## Q

- Quadrangular*, four-angled.  
*Quadrifarious*, arranged in four rows or ranks.  
*Quadrifid*, divided four times.  
*Quadriglandular*, having four glands.  
*Quaternary*, succeeding by fours.  
*Quaternate-pinnate*, pinnate; the pinnae being arranged in fours.

*Quinate*, in fives.

*Quinquefid*, divided into five.

*Quintuple*, five times multiplied.

## R

*Racemes*, a particular arrangement of flowers, when they are arranged around a filiform simple axis, each particular flower being stalked.

*Racemose*, flowering in racemes.

*Rachis*, that part of a culm which runs up through the ear of corn, and consequently the parts that bears the flowers in other plants.

*Radiant* or *Radiate*, a flower is said to be radiant, when in a cluster or head of florets, those of the circumference or ray are long and spreading, and unlike those of the disk.

*Radical*, proceeding from the root.

*Radicant*, producing roots from the stem.

*Radicule*, that end of the embryo which is opposite to the cotyledons.

*Radius*, the ray of compound flowers.

*Ramenta*, little brown withered scales with which the stems of some plants, especially ferns, are covered:

*Ramentaceous*, covered with ramenta.

*Ramifications*, subdivisions of roots or branches.

*Ramose*, branchy.

*Ramuli*, twigs or small branches.

*Raphe*, in seeds this is the channel of vessels which connects the chalaza with the hilum; in umbelliferous plants it is the line of junction of the two halves of which their fruit is composed.

*Receptacle*, that part of the fructification which supports the other parts.

*Recesses*, the bays or sinuses of lobed leaves.

*Recurved*, bent backward.

*Recurvo-patent*, bent back and spreading.

*Reflexed*, bent backward.

*Reflexed recesses*, sinuses of leaves which are bent backward from the ordinary direction of the surface of a leaf.

*Reniform*, kidney-shaped.

*Repand*, a leaf having a margin undulated and unequally dilated is said to be repand.

*Repando-dentate*, repand and toothed.

*Replicate*, folded back.

*Resolutive* or *Resolutive*, having the power to dissolve,

*Resolvent*, having the power of dissolving.

*Restricting*, astringent.

*Respinate*, inverted in position, so that that which was in front becomes at back.

- Reticulated*, resembling a net.  
*Retuse*, abruptly blunt.  
*Revolute*, rolled back.  
*Rhomboidal*, like a rhombus.  
*Rhomboid-ovate*, rhomboidally egg-shaped.  
*Rib*, the projecting vein of any thing.  
*Rigid*, stiff.  
*Ringent*, gaping.  
*Ringing*, making an incision resembling a ring all around a branch.  
*Rotate*, a monopetalous corolla, the limb of which is flat and the tube very short, is called rotate.  
*Rotundo-ovate*, roundly egg-shaped.  
*Rubefacient*, any thing which reddens the skin, or raises slight cutaneous inflammation.  
*Rudiment*, when an organ is imperfectly developed; botanists call such development a rudiment.  
*Rufous*, reddish, orange-coloured, or rusty.  
*Rugose*, rough or coarsely wrinkled.  
*Rugulose*, finely wrinkled.  
*Runcinate*, hooked back, applied to the lobes of leaves.  
*Runcinato-dentate*, hooked back and toothed.  
*Runners*, procumbent shoots which root at their extremity.  
*Rusty*, rust-coloured.

## S

- Saccate*, hagged; having a hag or pouch; as many petals.  
*Sagittate*, shaped like an arrow-head.  
*Samara*, a kind of winged seed vessel; the same as what the English call key.  
*Sapid*, agreeable to the palate.  
*Saponaceous*, soapy.  
*Sarmentose*, producing sarmenta or runners.  
*Sawed*, resembling the teeth of a saw.  
*Scabrous*, rough with little asperities.  
*Scales*, any small processes resembling minute leaves; also the leaves of the involucrem of *Compositæ*.  
*Scandent*, climbing.  
*Scape*, a stem rising from the root, and bearing nothing but flowers  
*Scarious*, or *Scarios*, membranous and dry.  
*Schistous*, rocky, formed of the rock called schist.  
*Scion*, a shoot intended for a graft.  
*Scoria*, cinders.  
*Scorbiculate*, excavated into little pits or hollows.  
*Scrotiform*, formed like a double hag.  
*Scurfy*, covered with scales resembling scurf.  
*Scutate*, formed like an ancient round huckler.  
*Secund*, arranged on one side only: the same as unilateral, which is better.

- Sedges*, a tribe of marsh plants so called.
- Segments*, parts of any thing.
- Semi-*, half.
- Seminal*, belonging to the seed.
- Semination*, seeding.
- Sepals*, the segments of the calyx.
- Septa*, the partitions that divide the interior of the fruit.
- Septiferous*, bearing septa.
- Serrated*, like the teeth of a saw.
- Serrulations*, notchings like those of a saw.
- Sessile*, without footstalks.
- Setaceo-rostrate*, having a beak with the figure of a bristle.
- Setaceous*, resembling a bristle in shape.
- Setæ*, bristles.
- Setiform*, formed like a bristle.
- Setigerous* or *Setose*, covered with bristles.
- Sheath*, the lower part of the leaf that surrounds the stem.
- Sherds*, the fragments of potting employed by gardeners to drain their flower-pots.
- Shield*, a broad table-like process in the flower of *Stapelia* and its allies.
- Sialagogue*, having the power of exciting saliva.
- Silicated*, coated or mixed with flint.
- Siliceous*, flinty.
- Silicle*, the small round pod of Cruciferae.
- Siliqua* the long taper pod of Cruciferae.
- Simple*, the reverse of compound.
- Sinuate* or *Sinuose*, hending in and out.
- Sinuato-dentate*, sinuate and toothed.
- Sinus*, the bays or recesses formed by the lobes of leaves or other bodies.
- Soboliferous*, producing young plants from the root.
- Soddened*, soaked.
- Somniferous*, causing sleep.
- Soporific*, causing sleep.
- Sori*, the patches of fructification on the back of the fronds or ferns.
- Spadix*, a spike protracted from a spatha.
- Spatha*, a broad sheathing leaf enclosing flowers arranged upon a spadix.
- Spathaceous*, furnished with a spatha.
- Spathulate*, shaped like a spatula, a knife so called.
- Sphaelate*, withered or dead.
- Spherical*, round like a sphere.
- Spheroidal*, almost like a sphere.
- Spherules*, minute spheres.
- Spike*, flowers sessile upon a long rachis.

*Spines*, indurated branches or processes formed of woody fibre, and not falling off from the part that bears them.

*Spiniform*, formed like a spine.

*Spinous*, full of spines.

*Spinulose*, having a tendency to produce small spines.

*Spinulose*, covered with small spines.

*Spiral*, circularly involved.

*Sporules*, that part in Cryptogamous plants which answers to the seeds of other plants.

*Sporuliferous*, bearing sporules.

*Spurious*, counterfeit.

*Spurs*, long processes resembling horns produced by various parts of the flower.

*Squamiform*, like scales.

*Squarrose*, spreading rigidly at right angles, or in a greater degree.

*Stamen*, the male organ of a flower.

*Staminiferous*, producing stamens.

*Standard*, the upper segment of the flower of Leguminosæ.

*Stellate*, in the manner of a star.

*Stellulate*, resembling little stars.

*Sterile*, barren.

*Sternutatory*, qualities which provoke sneezing.

*Stigma*, the female organ of a flower.

*Stimulating*, exciting.

*Stimuli*, stinging hairs.

*Stipes*, the stalk of Fungi.

*Stipitate*, having a short stalk.

*Stipulaceous* having appendages called stipulæ.

*Stipulary*, occupying the place of stipulæ.

*Stipules*, small scales at the base of the petiole of certain leaves.

*Stoloniferous*, having creeping roots.

*Stolons*, root shoots.

*Stomachic*, relating or agreeable to the stomach.

*Stranguary*, a disease, and produced on plants by tight ligatures.

*Strata*, layers, beds.

*Striæ*, small streaks, channels, or furrows.

*Striated*, having striæ.

*Strigæ*, little, rigid, unequal, irregular hairs.

*Strigose*, having strigæ.

*Strophiolate*, surrounded by protuberances.

*Struma*, a wen or protuberance.

*Strumose* or *Strumous*, covered with strumæ.

*Style*, the stalk which intervenes between the ovarium and stigma, bearing the latter.

*Styptic*, having the power to staunch blood.

*Sub*, in composition, signifies subordinate, or somewhat.

- Succulent*, fleshy and filled with juice.  
*Sudorific*, having the power of producing perspiration.  
*Suffruticose*, shrubby in a slight degree.  
*Sulcate*, furrowed.  
*Supernatant*, floating on the surface of any thing.  
*Suppurate*, to generate matter.  
*Supra-decompound*, doubly compounded.  
*Surculi*, young shoots.  
*Suture*, the line formed by the cohesion of two parts.  
*Syngenesious*, belonging to the nineteenth class of the sexual system.  
*Synthetical*, combining; opposed to analytical.

## T

- Tails*, the long feathery or hairy terminations of certain fruits.  
*Tap-root*, a root which penetrates deep and perpendicularly into the ground without dividing.  
*Teated*, resembling the figure of the teat of animals.  
*Tendrils*, the curling twining organs by which some plants lay hold of others.  
*Terebinthinate*, consisting of turpentine.  
*Terete*, taper round and long.  
*Terminal*, ending, or at the top.  
*Ternary*, consisting of threes.  
*Ternate*, growing together in threes.  
*Tessellated*, variegated by squares.  
*Testa*, the skin or integument of the seed.  
*Testaceous*, having a pale brown colour.  
*Tetrachotomous*, a stem that ramifies in fours.  
*Tetrandrous*, having four stamens.  
*Tetrapetalous*, having four petals.  
*Tetrasepalous*, having four sepals.  
*Thalamus*, that part of a flower which rises from below the ovarium, and sometimes supports the outer envelopes.  
*Thallus*, that part which bears the fructification of Lichens.  
*Theca*, the cases that contain the sporules of Cryptogamic plants.  
*Threads*, long delicate hairs.  
*Throat*, the orifice of a flower.  
*Thyrse*, a kind of dense panicle like that of the lilac.  
*Thyrsoid*, resembling a particular kind of panicle called a thyrus.  
*Tomentose*, densely and closely hairy.  
*Tomentum*, dense close hair.  
*Tonic*, bracing, strengthening.  
*Toothed*, divided so as to resemble teeth.  
*Toothletted*, furnished with little teeth.  
*Topical*, local, confined to some particular place.  
*Torose*, uneven; alternately elevated and depressed.

- Tortuose*, twisted.  
*Torulose*, slightly torose.  
*Torus*, the same as thalamus, which see.  
*Trapeziform*, in the shape of a trapezium.  
*Trapezoid*, like a trapezium.  
*Triandrous*, having three stamens.  
*Trichotomous*, branches divided in threes.  
*Tricuspidate*, having three points.  
*Trifarious*, arranged in triple rank.  
*Trifid*, divided in three.  
*Trilocular*, having three cells.  
*Tripetaloid*, appearing as if furnished with three petals.  
*Tripetalous*, having three petals.  
*Triquetrous*, having three sides or angles.  
*Triturated*, reduced to powder by pounding.  
*Tropical*, belonging to the torrid zone.  
*Truncate*, blunt, as if cut off.  
*Tuberculate*, covered with knobs or tubercles.  
*Tuberous*, bearing solid fleshy roundish roots, like the potato.  
*Tubers*, roots so called.  
*Tumid*, swelling.  
*Tunic*, a coat.  
*Tunicated*, having a coat.  
*Turbinate*, having the figure of a top.  
*Turgid*, swollen, puffed up.

## U

- Umbellules*, divisions of an umbel.  
*Umbels*, the round tuft of flowers produced by the carrot, &c.  
*Umbilicus*, the cord which attaches the seed to the receptacle.  
*Umbonate*, having a top in the centre like that of the ancient shield.  
*Unarmed*, destitute of prickles or spines, which are the arms of plants.  
*Uncinate*, hooked.  
*Unctuous*, fat, oily.  
*Undulate*, waved.  
*Undulato-rugose*, rugose or rugged and waved.  
*Unguiculated*, furnished with a short unguis.  
*Unguis*, the taper base of a petal.  
*Unilateral*, one-sided.  
*Unilocular*, one-celled.  
*Unisexual*, being of one sex.  
*Urceolate*, pitcher-shaped.  
*Uterine*, belonging to the womb.  
*Uterus*, the womb.  
*Utricle* or *Utriculus*, a little bottle or bladder.

## V

- Valvular* or *Valved*, consisting of valves or seed cells.  
*Varicose*, swolloe here and there.  
*Vascular*, consisting of tissue in a very succulent eolarged state.  
*Vaulted*, formed or placed like the roof of a vault.  
*Veneering*, the art of covering one kind of wood with thin plates of another kind.  
*Ventricose*, inflated.  
*Veratrine*, the active priinciple of *Verátrum*.  
*Vermifuge*, that which expels worms.  
*Vernacular*, native.  
*Vernal*, helongiog to the spring.  
*Versatile*. swiogiog lightly on a stalk so as to be contioually changiog direction.  
*Vertex*, the uppermost point.  
*Vertical*, perpendicular.  
*Vertically compressed*, that is depressed.  
*Vertilinear*, the same as rectilinear; io a straight line.  
*Vesicatorics*, blistering plasters.  
*Vesicles*, hollow excrescences resembliog bladders.  
*Vexillum*, a standard; the upper petal of a papilioaceous flower.  
*Villous*, shaggy, with loog loose hair.  
*Virescent*, green, flourishing.  
*Virgate*, twiggy.  
*Viscid* or *Viscous*, adhesive, clammy.  
*Vivacious*, lively.  
*Viviparous*, bearing young plants io the place of flowers and seed.  
*Vulnerary*, useful in the cure of wounds.  
*Vulviform*, like a cleft with projectiog edges.

## W

- Wattled*, having the processes like the wattles of a cock.  
*Wetted*, flaccid, drooping.  
*Whorls*, leaves inserted round a stem.  
*Wing*, in hotany, signifies a memhranous border, wherewith many seeds are supported in the air when floatiog from place to place.

## Z

- Zones*, stripes or belts.

## ERRATA.

- Page 45, for Basic, read Basil; Aogelsea, Angelica; Barmsot, Burnet.  
 ... 46, Savoury, read Savory.  
 ... 50, one half ioch, read one and a half inch.  
 ... 171, dind, read kind.  
 ... 208, hybrid, read hybrid.  
 ... 224, reumstances, read circumstances.  
 ... 229, Blood-flowered, read blood-flowered.  
 ... 246, mose, read more.  
 ... 284, manuae, read manure; and for prepaoced, read prepared.  
 ... 304, punicle, read pucicle.  
 ... 346, scrophulanese, read Scrophularineae.