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A NEW INSTRUCTOR FOR

Orchard and Field Culture.

THIS BOOK GIVES PRACTICAL DIRECTIONS ON

Natural Forcing of Vegetable and Fruit, also Out-door Culture for
Garden, Orchard, Vineyard, Field and other Culture.

WITH A REMARK FOR

FRUIT-TREE NURSERY.---How to Layout and to Keep.

Insects, and Other Causes of Sickness, Remedies, Etc.

EDITED BY
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KANSAS CITY, MO.,
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G. W. S. Meyer.

PREFACE.

I have concluded to prove, with a description written on Culture for the Garden and Farm, by experience, gathered through a toilsome course of years, to publish, while yet time and in memory able to do so, which will be a great benefit to the public concerned in Garden and Field Culture.

I was poorly educated, and only in the German language, I undertake the writing of this volumn, which, I hope, will be easily understood by any one who takes an interest in this branch of industry, and feel in need of advice or to be instructed. But I beg to be excused, if any one finds some parts should have been more clearly written.

As this branch of business needs to be improved according to the wants of the great increase of the population. So much land is under obligation to great chances, many are compelled to look for a new field to locate on to follow this branch of business, and good advice may not be unwelcome, but will lead to an advantage with little doubt. Concerning fencing, laying-out and division for practical convenience, and stock it so that the nature of the soil and position will suit the nature of all which will be planted and cultivated, no matter whether for market-garden or for private use. Beginners are, in general, of moderate means, and should select that that for the most part be suitable land for the culture intended to be cultivated.

Further advice is needed to guard against the weather according to the climate, regardless of season, while sudden changes in the temperature often results disasterously. If guarded against by foresight, for which to study about the weather and climate, which is necessary to guard against the changes of the different winds and weather by natural forcing (hot-bedding), an early out-door culture; otherwise, if such atmospheric changes are unobserved, damage is sustained, especially in a climate of extreme changes.

Those who only want to follow this branch of culture, don't need, and perhaps don't like to lay out money for books or manuals, with mixed descriptions as to floral culture, about which they take no interest.

Change of position for all vegetable and other is unavoidable, and the change of seed, as well, from time to time.

Only special pieces of land can be afforded to let lay idle, or as a pasture field, until it has regained properties suitable to bring good crops again when re-cultivated.

Farmers have found out long ago that change of position with culture is more profitable and unavoidable. Prefer change of crops rather than let it lay idle three or four years, or grow without any change, worthless crops. Manure is often used to force crops without any success.

The farmer has to follow the same theory in culture as an industrious and experienced market gardener does, who visibly improves or (betters) himself by less good land and weaker means.

When selecting, avoid swampy, undrainable, stony, or high-broken land, but advise do good aluvial soil with different positions, easily accessible to good road not too far from market, with a prospect for sufficient good water.

FIRST PART.

The laying out and dividing of the land need to be done by the desire with what the land shall be cultivated, stocked, according to the difference of positions. It does not matter so much as to soil while possible to improve it.

Different ways to build fences are known and put up according to the means on hand. The cheapest known, is of planks and barbed wire fastened to well seasoned dry solid-put posts, the bottom part brushed over with vitriol, or painted, and planks close to the ground to prevent rabbits from getting in. The parts which need to be protected against high and cold winds should be planted with osage orange, which also makes a strong live fence. Next are the picket and board fences. High, heavy fences do not last so long as light ones of good material.

An easy, accessible, convenient drive to the roadside with a tasteful shape to buildings, is advisable and necessary. Change all good soil on drives, make suitable materials for, like clay, small rock, slate, cinders, etc. Form (lay) the borders between drives and ground with ten-inch wide seedless sod, or part; and especially about the vegetable patch, with dwarfish aromatic herbs.

A row of useful trees should be planted outside this border to protect yard and buildings, which may be sweet chestnut, sugar maple, white birch, etc.

The nearest south slope to building may be stocked with grape-vines, (how to plant it, see vine culture) and a north-westerly slope is best adapted for apple orchard, especially of tough nature for outside rows; next to this may be planted of less high growth, and so to the east, or south-east side where the position is protected for pears, peaches, apricots, cherries, plums and small fruit, such as currant, gooseberries, raspberries, etc., may be planted a single row between apple trees, when planted not nearer than 40 to 45 feet. One row of blackberries will find room between the fence and outside row of trees, which is a suitable position for them and can be better managed

than when in a patch. Strawberries may be planted in different positions; for early, on a sunny, open, low position; middle crop may be planted where a little protected against the noon sun; for late crop, in a more protected place, of latest varieties. Asparagus, rhubarb, seakehl beds may follow on nearly level ground,

A piece of ground should be selected accessible to the main drive in the neighborhood of the barn, where hot-beds shall be located which shall be protected by a substantial, good size shade, to store and shelter all pertaining to the hot-bedding part and garden. Pools, tanks, cisterns, should be at the place near to, and hold as much water, if possible, as needed through the hot weather, if no pool is near with running water to depend on.

How to plant small fruit trees and small fruit. See General planting.

SECOND PART.

Natural Forcing, Hot-Bedding and Pertaining.

Hot-bed frames, sashes, mattings, board cover, heating materials, earth, garden, composed leaves, moulds, sods, earth, sand, are required to be ready under protection, unfrozen, in a moist state, before operation, when the laying can begin. Besides, fresh vegetable seed to be at hand. First, such a quantity fresh, steaming horse manure for the space, to cover with a certain number of sashes, to be ready, as well as a quantity of dry oak leaves and fresh air-slaked lime.

The laying of hot-beds begins already late in the fall, by market and first-class private gardeners.

Construction of Single Frames.

Seasoned, fat yellow pine 1 to 2 inches thick. The size of frames should not be above 16 feet in length, nor more than four sashes 4 feet wide and six feet long. The frames shall be 2 to 2½ inches smaller than the length of the sashes to handle them easy on the frames without any other

means, while frames remain longer sound as when nails or screws are driven into. The frames shall be well joined, solidly put square together by means of hooks, wedges, or spiked together. Three-cornered strips, two inches thick; one shall be fastened in each corner. A strip of $2\frac{1}{2}$ inches wide by $1\frac{1}{2}$ inches thick, with the lower corners rounded to be let into the frame where two sashes join, the ends at the strip shall be cut in shape of a swallow's tail, and of course, be even with the top of the frame which holds the frame in shape and drains the wet of frames under the joint of the sashes, especially when a slight groove is formed in the middle of the strip.

Whenever a frame is set on a place for use it shall be square. Pegs shall be driven, in and outside, near corners, and where sashes join near to the height of the frame to prevent its moving by its filling, and when necessary to raise it.

Double frames should be made of some good material, solidly put to strong (pegs) posts driven into ground, so that a single, or outside frame will fit over, which shall be a few inches higher than the inside one.

This double, or inside frame, prevents damaging (disturbing) plants when necessary to raise the outside one, when plants need more room under the sashes. All frames differ in height to the nature, or height of plants to be grown in them. All frames shall be built to a standing square (slope) about 12 by 20, oiled, painted with good paint, or a solution of vitriol, applied to prevent rot.

Sashes.

They are ordered to be made of best and well seasoned pine of 2 inches in thickness, with or without a finish, where they know how to construct them.

Board cover shall also be made of 1 inch thick, clear, well seasoned lumber, about six inches longer than the sashes, with a 1 inch square strip under each end to hold the board in shape, and prevent sliding on the sashes. On top of each board shall be a 3 inch strip, the length of the board to cover the joint, to keep off all wet. To paint this cover, won't be useless.

Straw-matting (cover) to use on sashes under board cover by cold weather are constructed of rye straw, cut with the sickle and not too hard threshed. It should be cut before ripe and not bleached at all. They shall

have the size of a sash, but 10 inches longer, to prevent the cold to get under sashes.

To form them, screw a form made of inch strips two inches wide to a floor, 4 feet 6 inches by 7 feet 6 inches in size; put a nail in the middle, top and bottom, one at $9\frac{1}{2}$ inches from the middle nail, another in the middle of the two on the small side of the strip; fasten tight, oiled, strong, twine (cord) on each nail, from top to bottom; leave twice this length loose, lay a small bunch of straw on the tightened cord bottom part outside, one on each side left and right ears together at a measure of 4 feet 5 inches. Tack the loose cord and bring it from under the stretched cord, and draw a moderate tight half hitch over the straw, and so fastened to the top or end, loosen the cord from the nails and fix well together, mat at the bottom end and trim it before or after to the size of four feet. It is a cheap, good cover to last several years, by careful handling; 15 pounds of straw will be required for one, and 100 feet of cord; made in one hour.

The Filling of Frames.

The place where frames are placed shall not be a wet one, and protected against cold winds, free, open towards south and east. If a frame is put over a dug-out space, put first a layer of shavings, fine brush straw, spread fresh and steaming horse or mule manure over, mixed with dry oak leaves, according to the heat required to season and nature of the plants; tread it down foot on foot to be all over the same medium solidness till full to about 5 or 6 inches. Cover with sashes and board cover, when cold. Examine in about 36 hours if manure is steaming equally under the sashes; if so, uncover when mild, sow $\frac{1}{2}$ bushel fresh air-slaked lime under four sashes, dust the sides as well, after some oak leaves, mixed with manure, is put when much sunken; then put coarse screened earth, the proper quantity, and mixed to suit the nature of plants. The earth well leveled, sow a few lettuce or radish seed. If those begin to grow, sow the whole bed; label every variety of seed, and when sown, sprinkle with soft water and cover up.

If the heat (steam) under any sashes should be too high, let some escape, which will prevent to blind the glass. All seed sown in hot-beds shall prove genuine, by tasting them, and be sown in lines across the bed, marked with an edged-strip, more or less deep and wide, to give room enough according to the size of seed and nature of plants.

If manure should prove too strawy and dry, use boiling water by the filling of frames. If nearly strawless, mix with oak leaves, which will take up part of poisonous steaming horse and mule manure. A pointed piece of wood as a tester can be stuck under each sash to test the heat with, without to uncover by unfavorable weather. If they are found warm enough when taken out and tried, it is time to sow when not so cold.

The Mixing of the Different Earth and Sand, and the Quantity of Earth Needed to the Different Varieties to Cultivate on.

For lettuce, celery, carrott, radish, cress, peas, use one part leave-mold or hot-bed earth and two parts sandy garden earth; sand should be nearly one-fourth.

The thickness of this bed should be 7 or 8 inches. For lowest kind of plants use lower size of frames, as the highest for cauliflower, for which a double frame is best.

Plants which are forced by about 55 or 60 degrees, more or less, like cauliflowers, cabbage, varieties, which need substantial soil, mixed with only one-fourth of sand, can be forced by the said number of degrees. Cucumber, melon, beans, need a porous, light, rich, sandy-like soil; cucumber, melon, needs a thickness of a bed of about ten inches, to be forced by about 80 degrees of moist, close heat, while beans require a bed of only 7 by 9 inches, grown by less heat, and like much air. Pepper, eggplant, tomatoes and plants of same nature need two parts of hot bed earth, two parts rich, sandy garden earth, and about an eight inch thick bed.

If any hot-bed should prove to be too hot after been layed, sowed, or planted, by danger to burn the root, punch 3 or 4 $1\frac{1}{2}$ inch holes into the bed to the bottom under each sash through which the dangerous heat will escape, but fill these holes as soon as danger is over. Should a bed cool off too fast, prove not hot enough when noticed in time, renew the rim around the frame and put such a quantity of fresh, hot, steaming horse manure around to heat through the frame. If too far cooled off that the plants have a flatry look, by being, or having moist enough, change the plants into another suitable hot-bed. Persons unacquainted with this, seeing the plants in a flatry-like state and without examining it, think to be too dry, do probably water too well, which will prove worse, or fatal.

Rims around every frame of the same heating material to the top of the frame shall be solidly made when laying the hot-bed and renewed whenever necessary, according to weather and season. Such rims and hot-beds prove hottest by wet, cold weather, and do often cool off too fast.

The different degrees of heat are needed to force. Cabbage, turnip, rooted cabbage, cauliflowers, beets, peas, 50 or 60, melons by not less than 85, cucumbers the same, beans, as already stated, by about 65 degrees.

For to force the three last ones, only one-fourth of fresh horse manure should be used; two parts should be fresh boiled hops, and one part of dry oak leaves, mixed with the horse manure, which should be at the bottom. Fresh horse manure, or steam of same, is dangerous while it effects the red spider, and should be strictly avoided by beans, cucumbers, melons, strawberries, and required to be separately forced. Earth and the quantity is specified. Cardoon, endive and leek will grow up well in medium good, sandy garden earth, by about 55 degrees.

What Degrees the Different Heating Materials Produce, and How Long They Will Heat.

Horse manure 180, mule manure 170, will heat about four months; dry oak leaves, when a quantity of 15 inches thick, will last 11 months; fresh boiled hops 145, only last 10 to 14 weeks; refuse of pressed-out grapes will produce, in a 15-inch thick bed, 130, and will last 5½ months. Sheep manure 170, lasts only four months; tanner's bark 120, will last 6 months.

The heat of these materials will rise and fall according to position, atmosphere, season, weather and climate.

Asparagus Forcing.

This can be done in different ways. The most natural is: frame in a bed in size of a hot-bed. From early in the fall cover the bed with leave-mould leaves and horse manure; cover it over with a board cover. By moderate winter weather asparagus will be ready to cut in 4½ months. When harvested, free the bed of all cover and fork in rotten manure. By a second method: Old roots can be planted in early fall, well watered down with warm water; cover with fresh half strawy horse manure, sashes and cover, besides a rim of horse manure all around. By December leave only

part of manure on the roots and treat it without any water like other winter hot-beds. Asparagus may be cut in about 3 months; these roots are of no more use.

By a third method: Plant a bed of asparagus of three rows by a certain length of frames to put over early in the fall when three years old. Treat like last mentioned, they will bring a good crop. This bed will serve for several years when manured and kept well. A ditch be dug around the frame 18 by 18 inches and filled with fresh horse manure to the top of frame. This will bring the earliest crop, especially by moderate weather and sunshine. No airing is needed.

To Force Seakehl.

The plants should be three years old. Clear the earth two to three inches from around the heel, then put a high frame around it, put a small portion of fresh horse manure around, over which place a wooden cap, of funnel shape, $\frac{1}{2}$ to $\frac{3}{4}$ of an inch thick and fourteen inches in diameter on the inside at the bottom, and two and a half at the top; fill this with warm sand. Then fill (around) between with fresh horse manure and leaves which shall be covered with a good board cover. If done in January or February, and well done, sprouts can be cut the latter part of March. When sprouts are visible at the top of the cap, they may be cut; they grow from the old roots. After harvested, all may be cleared off; the ground replaced around the plant and rotten manure forked under.

To Force Peas.

Plant strictly of dwarfish varieties in a hot-bed frame, or on a bed of some size to put a frame over. Plant in rows about fifteen inches apart in substantial, mellow garden soil. Keep frost off by covering it with litter, sashes and board cover, which is only needed when raw, cold weather, but lift the sashes and give plenty of air when sunny and mild. Earliest dwarf varieties will produce a crop in less than two months, when partly sunny weather.

The Forcing of Beans.

Fill in a double frame with only one part of fresh horse manure on the bottom two parts of boiled hops mixed with dry oak leaves, when the heat of this, but untreaded down, is equally heated, sow first the lime, as specified, over which a bed nine inches thick of mellowy sod earth with one fourth of hot-bed earth is mixed, put with a fifth part of sand. Beans of choice, dwarfish kind are planted in rows fifteen inches apart; when up, no airing shall be done, except by sunny, mild weather, and no watering at all. Keep the bed hot by a good rim of fresh horse manure around the frame to the top; avoid the accumulation of steam from the horse manure, as it will have a tendency to spoil the crop.

To Force Melon.

Only early varieties are chosen to be forced, like black mustard, pineapple cantelopes, orange cantelopes, prescot cantelope and thenetz melon. Fill half pots with porous, dry earth out of rotten trees; put two or three seed on it and cover, put them on some pots which are kept filled with hot water near a stove. When the seed have sprung, set, or put them near a window where warm and plenty of light can be had to prevent them from spindling. When about three inches long, plant in a well prepared hotbed; the filling of heating materials is about the same as for beans; one-third of fresh horse manure may be used and two-thirds of hops and dry oak leaves, only tread down the manure. The earth shall be of a light, sandy, rich nature; the thickness of the bed shall not be less than nine inches, which may be a mixture of compost, leave-mould and rich, sandy garden earth.

Plant two plants under one sash nearer to the back or higher side, water them down with warm water, keep them closed and shaded, only ventilate when the heat gets above 95 degrees; plants to be on an oval-like place; keep the frame hot by a rim of fresh horse manure, but avoid steam of the manure to get inside the frame. Sink one five inch pot to the rim, to which necessary watering has to be done; pool-water will not answer. Watering shall be done about one hour after sunrise, only evenly sprinkle the vines and in the pot to effect a moist hot (air) and kept shaded when the sun shines. When the plant seems to grow well, and are about five to six inches long, trim them off above the third eye, which will grow

to be a fruitful vine; not more than four melons are to be left on each plant, and laid on shingles, glass or slate. Small pots with seed can be sunk to the rim to grow young plants. Seeds on ovals in such beds, three or four seed under each sash can be laid to grow plants of.

Cucumbers can be forced in about the same manner. Only early varieties are chosen to be forced, like early fram, early cluster, dark green Russian, bouquet and the white Asiatic.

Strawberry Forcing.

This forcing can be done at little cost, if any one has hotbed frames, sashes and plants. They don't bear bottom heat, and will bear natural forcing better than artificial.

Plant from spring to fall on open ground, and in pots young plants of early, choice varieties on suitable soil, rich and mellow. Keep them till fall free from weeds, put a frame over the planted ones on the bed late in the fall, or plant in a frame about nine inches apart; put a light cover of leaves or straw, and, as well, sashes and board cover. With the beginning of cold weather, by January, clear off the inner cover; keep the cold off by a rim of fresh horse manure and a good cover. Let them have as much light and sun as the weather will allow, and all the air the mild weather will permit.

This plant can be replanted, when put on a shady place to serve for the same purpose again.

To Force Raspberries.

The forcing of raspberries is hardly payable, but plant for fall on a protected, sunny-like place; of dwarf, choice variety, two rows standing heads toward heads, so that each of these rows will be about three inches off the side inside of the hotbed frame, when put over it with the points trimmed off and tight low down to strips which are fastened to pegs driven into the ground. To get a crop of them need to be treated like the strawberries, with a rim around the frame of fresh horse manure sunk eighteen inches into the ground and ridged to the top of the frame. It has to be a high frame, to give them plenty of room under the sashes.

Let strawberries and raspberries have plenty of moisture after fruit has set.

The Forcing of Grapevines to have Early Fruit.

Grapevines of early, suitable varieties, to force, should be planted on protected, sunny positions. An early, dwarfish variety can be planted in a row, to put high hotbed frames over at the time when forcing shall begin. The fruit cans shall be tight down, that the canes with fruit on will have room enough under glass and be forced by means of a good rim of horse manure to heat through the frame and by the sun's heat. Practical attention has to be paid to leave only the canes with fruit on pinched back, and necessary shanks for the next year's fruiting. They do better by moist heat than by dry; so the heat of the sun is to be kept off by half shade. The syringing, or over-watering, is needed every evening after sundown except when in blossom; airing is most necessary whenever suitable. Ripe fruit can be had by the month of June, or earlier. Vines can be planted against or aside of a house wall, over which also a portable frame can be placed, and forced and treated as before stated.

By a third method: vines can be planted near greenhouses to be moved in and out by means of a movable plank; forced and treated like the others or by artificial heat. After the fruit is gathered, the vines should be altogether freed of cover and left to free air; after the leaves drop, lay them down to protect them when cold weather begins; do not allow them to be damaged by the winter's blast.

Dwarfish, early varieties of Southern climate are the most suitable to be forced.

To Force Stone Fruit.

Plant young trees of stone fruit, such as peaches, apricots, plums, cherries, etc., on a protected, sunny place suitable to force; when near a wall, it is more suitable to put a portable frame over them when the time to force it, is at hand. Such a frame has to be built to be high, and large enough for dwarfish sizes of trees, holding two rows of sashes, so that the upper ones can easily be moved over the lower ones to expose such trees to dew and rain, as well as to fall air; it has, and can be fixed, so that by means of a quantity of fresh horse manure and sun, trees can be forced to ripen fruit quite early. Fruit forcing, in a large scale, could hardly be done all by nature. If trees have to be forced by artificial heat, and cannot be

exposed to suit their nature, fruit forcing won't pay. All such trees have to be wrapped up from the heel as far up as it can be done with a porous stuff like moss, which has to be kept moist as soon as forcing has begun, unless the bark gets so dry that it is visited by a black fly, which it will soon be covered with, even the trees are washed every day, and won't live long.

Trees are troubled enough with bugs and other insects when planted on open field, or on any place out of door. As soon as the fruit is gone, free such tree of all its coverings.

THIRD PART.

Seed Tasting.

Nobody should sow any seed before quite sure of its vitability, because very sad consequences are often the cause, when damaged, old, only part viable seed is sown. (Who is to be blamed for poor results?)

Take a piece of woolen cloth on which to put a portion of light, porous earth, or rotten saw dust. Count a certain number of seed, 25 or 50, which shall be sown on this stuff. Cover the seed lightly, if not too fine, mark the seed and number of, by name. Tie the cloth together by the four corners. Set it on a pan where warm, on which pan an inch sand is put; fill it with hot steaming water; don't forget to repeat it. Examine every day, until sure how many of the seed are viable. Seed may be sown on a sponge put on a vessel filled partly with hot water at a warm place; also, on moist sand, in a cellar, which is free of mice and rats. Small pots, boxes may be partly filled with sand, or other earth-like stuff mixed with sand, on which seed is sown and set in a close, hot place, where not less than 70 degrees of moist heat can be raised. The best way is to depend on self-grown seed.

FOURTH PART.

Seed Growing.

To grow seed, select the choicest plants. Vegetable plants, which bring ripe seed the first or same year, are annuals, or only one-year-old plants. Such which bring ripe seed second year, are biennials, two-year-old plants. Hardy plants are perennials, which last several years, bring, also, ripe seed, but only a few of them will bring ripe seed. Annuals: Cress, beans, lettuce, peas, cucumber, melon, squashes, pumpkins, monthly radish, corn, eggplant, spinach, tomatoes, New Zealand spinach, pepper, mangold root, etc. Of herbs: Lavender, majoram, portulac, caraway.

Biennials: Carrott, cabbage, varieties beet, celery, cardoon, parsnip, scurceanary, sasifry, leek, endive, sugar root, turnip, rutabagos, cauliflower, asparagus, kehl, (or brukely kehl) winter or black radish, etc. Hardy plants, as asparagus, chicory root, caraway root, rhubarb, seakehl.

It is difficult to raise seed out of door by a wettish, cold, unfavorable season. Plants which are planted out in the early spring to grow seed of, have to be at such places where they can be protected against wet, and the sun's heat, re-thrown from walls, easy to ripen seed, especially, which ripens slow, like beet, endive, cauliflower, some cabbage varieties, leek, onion. Leek best had better be covered with glass soon after being in blossom.

As said, plant out plants as early as advisable, not be damaged by frost, against which many can be protected, and seed, some of annuals and others, do grow special plants for seed, on sunny, protected, not newly manured, but on substantial, good soil, to suit the nature of such culture.

Only one variety of the same family shall be sown or planted on the same bed to grow seed as pure as possible. Such beds shall be that far apart, if not some kind of a petition is put between beds that amalgamation will be prevented by wind. Bees will do more than liked.

Regulate the planting and sowing so to keep all free of weeds; soil loose and moist to grow good seed. Beans, only one kind on same bed. Pole beans a distance from dwarf or bush beans. Cucumber, lettuce, melon, radish, and so of every family only, and special variety. No matter if sown or planted. Care be taken to gather seed, when enough ripe not to loose

the first, best, before the last on same plant is ripe. Cut off a plant with nearly, and equally ripe seed, and put it, too, after ripened, in a dry place where no mice, rats, etc., get by. When fully dry, clean seed well, preserve in tin or glass vessels, not quite full, to give room to shake it from time to time, with two or more small openings on top to let seed have air. All seeds, when dry and well cleaned, are to be stored in a perfectly dry, airy room, as said, free of mice, rats, etc. Fruit and vegetable seed, like cucumber, tomato, etc., shall be laid aside until fermentation has begun, which is the time the seed are to be washed out and well dried by air (natural heat); all kinds of seed shall be well labeled when packed.

FIFTH PART.

Change of Culture.---Alteration, or Change of Culture to Position.

Not only experienced gardeners, but farmers, also, have found out years ago, that more rank than perfect crops can be raised without any change of position; or let the land lay idle two or more years, which can not be afforded by gardeners. Small growers who need the ground for yearly cultivation, seldom are successful in cultivating same kind of crops on same position a second time or succeeding year as good as the crop of the preceding year was.

When, occasionally, an unfavorable season has set in, then probably they manure heavily to force a good crop, with poor success; a third year, but with no better results. This is easy the case with large, near-surface rooted plants, such as, artichokes, cardoon, cabbage, rhubarb, etc., such plants takes faster the substance out of the ground than any other like slender rooted

The same time they leave a kind of stuff behind of exodation which proves unfavorable to other plants. For example: an old, worn out strawberry bed is cleared, dug, and best kind of manure used, replanted with same kind of plants, proves a failure; the plant will grow and will blossom,

but won't bring any fruit, and die. The nature of the soil must suit the nature of the plant. If not regulated thus, manuring won't help much. The substance which is taken out of the soil by one kind of plant, the next following one will give it back by the change of culture, for which experience is needed to regulate the change of culture, to know what kind by nature to follow first. On such a theory, they will change part in nature, to suit the nature of the succeeding crop, which proved a failure the second year without a change to position. Proof is laid when soil and position are unfavorable for one kind of culture, they will prove contrary for another, as well as the different working of the ground is very important, and especially by vegetable culture.

By the theory of changing the land, it can be made best profitable, and is a great saving in manure; naturally, all wants a change, even fruit trees, where a young fruit tree is planted of some kind, where an old one stood, it will never do well. Where a seed fruit tree stood, plant one which bears stone fruit, or change the earth as far as the most, nearly all, as far as the root of the old one reached. Where spreading large, not deep-rooted plants stand, cultivate some slender, small, light-rooted ones by closely following this theory. The vigorous growth in vegetation when treated thus will prove to be needful for success. The change in cultivation is calculated on a time from two to three years, and calculated thus. By a change of the main culture, the under or between culture concerns the land, can be under a constant and profitable cultivation.

First, an asparagus bed will last fifteen years, and will be changed with seakehl, celery, cucumber, melon or squashes, changes to artichok. Asparagus bed shall receive a coat of leave-mould and rotted cow manure, which shall be forked in early in the spring. It shall not have any under planting, as one row of radishes or lettuce on the edge of the bed; a seakehl bed shall also be treated the same, with manure every fall and spring, unless it will be prepared to be forced after the plants are three years old. In the spring it may receive an under crop of cress, endive, radish, etc, which is mostly sown on the edges of the bed. A seakehl bed will last over twenty years. Rhubarb bed is to be changed after an eight years' duration with celery, cucumber, melons, squashes; in the spring manured and dug through the winter. The following winter lettuce seed may be sown on it. English spinach bed will last four or five years. It shall be dug late in the fall and well manured, to receive the following spring some of the same

crop may be planted on it. Artichok beds shall be changed after four years' time, manured and dug late in the fall and planted the following spring with celery, cucumber, melon, peas and beans. Cardoon beds shall also be manured and dug through winter; in the following spring they may be cultivated with beet, parsnip or spinach. Cardoon are grown from seed every spring if no old roots are set out. Horse radish bed, by real cultivation, lasts two years, and the same bed can be re-cultivated with same of smooth-side root.

Celery beds undergo a yearly change, and generally are changed with cucumber, melon, lettuce, spinach or cauliflower bed, the following spring with celery again. Cucumbers with yearly change when early, may be cleared and sown with winter spinach, or else be planted with early cabbage or cauliflower, beet or turnip, rooted cabbage. Scorceonary beds will last two years and changes after seed and roots are gathered, which will be the second year. It shall be manured and dug; and cultivated with peas, lettuce, celery; if with peas or lettuce, may receive for fall, turnip, spinach or winter lettuce. The following spring it may be cultivated with a like root crop again.

Oyster, salsify and sugar-root bed be changed in the same manner as the above one, when the roots are dug in time and healed into sand. Carrot beds shall be seeded unmanured, and be changed with lettuce, beet, peas, early turnips, radish. The following spring changed and dug through winter. Spinach turnips, for fall crop, are to be sown with carrot seed late the same fall. Parsnip beds change yearly, be cultivated with beans, cucumber, melon, squashes, onions, tomatoes, unless parsnip are left until the following year to raise seed of, but require protection and drainage, unless will rot; if dug the following fall early, turnip seed be sown.

Onion bed shall be changed and spinach or turnips may be sown for fall and winter; the following spring be cultivated with beans, carrots; after the bean crop, endive, escaroll, may be planted, and well manured the following fall, and planted with early cabbage, cauliflower; after pickle cucumber or a late crop of beans. Onion sets or seed beds which are cleared in July may be cultivated with beans, late peas, cucumber, pickle, endive or escaroll. The following spring it may be sown with carrot, or dunged for cabbage, tomato, egg-plant, sweet corn or potatoes. When potato or early onion beds are cleared they may be planted with late cabbage or winter cabbage, like Brussel sprouts and green kehlis, etc.

Cabbage beds be changed through winter for early corn, potatoes, onions, celery, leek, tomatoes, eggplant, peas, akra, radish, lettuce. Brussels sprout and other winter cabbage beds may be cultivated with potatoes corn, sweet potatoes, tomatoes, squashes, pepper. Cauliflower beds may change to cucumber, melon, beans, peas, onion, celery. Tomatoes, eggplant bed be dunged, dug and prepared for long rooted plant, as carrot, parsnip, salsify, scorceanary, beet, and for onion seed, garlic sets, or rutabagas, early in the fall for early spring.

Strawberry beds will last, by good care, four or five years; require rich, medium, light soil at a sunny position, for early. If planted, August or September, covered lightly through winter, will already bear the following year. When planted in the spring will not bear any sooner, and have to be cared for a full year. Strictly avoid fresh horse manure for this culture.

Manuring and Preparing Land.

The best season to manure land is late fall; clay, heavy land be plowed after fall; light, loamy land should be left to the end of winter, unless very early crops like onion, carrot, beet, etc, will be sown. Quite rotten manure may be applied in early spring, when well spread.

Heavy land, when plowed in late fall, will get loose by freezing and thawing, need not be so particular about the nature of manure as to be equally spread. The more or less plowing be done, according to the nature, as for root crops, carrot, mangold root, cabbage and such long rooted crops plow deep, and less deep like for onion and alike short, light rooted crops. Loamy land, when weedy, should be plowed late in the fall so that weed has time to rot.

SIXTH PART.

Vegetable and other Culture.

Rich, aluvial soil is best adapted for vegetable culture; it don't matter so much as to position, and need not to be grown in one patch. Some vegetables and corn can be cultivated between rows of newly planted fruit trees, as well as small fruit, one row between two rows of trees.

Vegetables do best on low, moist land, but some may be grown on rising positions, like corn beans, turnips, New Zealand spinach, tomatoes, corn, salad, pumpkins, cow peas, pepper, eggplant; tomatoes may be planted near pleasure ground, especially the first two ones, as ornamental plants, amongst shrubbery and on hardy flower beds.

A beginner, or insufficiently experienced cultivator, will find here all pertaining to this culture in a practical leading way to know what kind of soil and position is needed to suit for this different culture.

Long and Stump-like Rooted Vegetables.

Carrot, *Daucus Carrota*. It is more a biennial than an annual, while good, ripe seed grows the second year of roots, which are dug in the fall and planted early in the spring to get seed of. The stump-rooted ones are of an early nature and some of them can easily be forced for quite early use, of which some are well known as French horn carrots. They are of a finer quality for table use than the long late ones, except the selfelder, a yellowish carrot, one which is a fine variety, of a good flavor. Other long varieties are best adopted for field culture, while of a courser nature.

The altringham has proven to be the largest grown, is of a half purple color with a dark green head; a belgian, of whiteish, yellow color with a green colored head.

All seed need to be rubbed with sand or dry earth before sown, and need to be sown as early in the spring as possible, if not sown late in the fall. The deeper the land is plowed or dug, the finer prepared of a loamy like nature on a low moist position, the better a crop. Sow the seed thin on light drills eight or nine inches apart; cover very lightly, or not at all when sown shortly before a good rain. When up thin out to four or five inches; keep them free of weed and soil loose; dig them in the fall and keep them frost free in pit or cellar. Seed will last viable three or four years. It likes rich but not fresh manured land. It is a native of south Europe.

Beet, *beta cicla rubra*. Sow seed of no other but of the very dark blood-red ones. This is a good kind for table use as salad, or sweet. Other kinds are used to manufacture sugar of and for stock. Sow early in one and one-half inch deep drills one inch deep. Seed, two inches apart, drills one foot apart, in low, rich alluvial soil; thin out to three or four inches; keep it free of weed and soil loose; hill slightly before hot, dry weather. Sow several times; gather them before cold weather; keep them frost free in pit or cellar. Seed will keep viable for about six years, which gets ripe of choice roots planted out early against a wall on south side. It is a native from the south of Europe.

Horse radish, *cochlearia aromatica*. Horse radish is a perennial or hardy plant, hard to destroy. Is general part cultivated from thin, smooth, six or eight inch long roots early in the spring, on about two feet wide oval shaped bed, heavily manured with rotten manure, deeply dug in and well mixed with the earth on an outside shady, wet position of a garden or field. Plant one foot apart in the middle of the bed with a pointed planter eighteen inches long; leave the top of each root one inch above ground; keep said clean and stirred. By the end of June hold up the leaves, clear the soil from around the root, cut all fibres, put the soil back, level, and water them with strong manure liquid; repeat the same two or three times. First and second year when the roots are large enough grown for use, as a valuable market article, it pays to cultivate it.

Oyster root, *trogopagon porifolius*. Resembles, or is the white scorceanary root. It can be recognized by the purple violet flower which opens about an hour after sunrise, a. m. and closes about 11 a. m. while the flower of the black scorceanary root is yellow and open all day. Both be cultivated alike and like soil and position are useable for same purpose. It is a biennial. Seed is sown as early in the spring as ground is workable

in one and one-half inch deep drills, lightly covered but thinly sown. Keep it free of weed and ground stirred. Usable roots will grow until fall, of which a portion is dug for winter use; the others on beds protected, covered, which will bring ripe seed the second year, when all shall be dug in the fall. This and most of such root crops like all moist, low, sandy-like rich soil, while natives from sea shores. Seed will remain viable, by good care, four years.

Parsly root, *apium petrosilium*. This root requires no difference in culture and treatment to the carrot, but the seed wants more time to germinate.

Black root, *scorcionarie hispanica*. Is by nature and culture as the second last is specified; the only difference found, grows larger but loses by taste.

Parsnip, *pastinaca sativa*. Its cultivation is the same as by the carrot, and treatment also. The only difference is, while the seed is larger it wants to be a little deeper sown or more covered. There are two varieties of; the ordinary, a long one, and a thicker, shorter one, called the sugar parsnip, which is sweeter and of better taste than the other. Dig all, or part, in the fall. Protect either from freezing. It is also a biennial; brings ripe seed the second year, which is gathered of the choicest roots planted in the spring, or of best remaining on the bed, and will remain viable two to three years. It is also a native of seashore of south of Germany.

Chervil root, *chacrophillum scandix bulbosum*. This root is little known yet, and seldom seen at a market. The seed is sown in the fall in shallow (rows) lines one foot apart, little covered, but covered lightly with litter through winter. Keep the plants free of weed, and ground stirred. The top will be dry by July, from which time endive or turnip can be grown between rows when cleared. Dig roots in the fall for winter use, which are of a screw shape, and taste like sweet almond. The undug ones don't suffer any by frost, and increase in size and by taste. Any light garden soil will do for this crop. This, a biennial, ripens seed easy the second year, and remains viable for several years.

Sugar root, *sium, sisarum*. It is a perennial or hardy plant, as it is scarce in the market it is little known. If cultivated, observe the cultivation of the same above. The seed lies from fall until spring before it germinates. Frost will never damage it. Culture and treatment don't differ

much to horse radish. The roots grow in bundles, four to six, and are usable the following fall.

Golddistel root, *scotimus hispanicus*. This is also a biennial. Its culture, habit and treatment are the same of the scorceonary root, and is a native of same country, and serves for same use.

Monthly radishes, *Raphanus sativus radicola*. Is an annual; rippens seed the first year; is cultivated nearly all year round. When the temperature gets too low to grow them outside, some turnip-shaped varieties can easily be forced, of which there are many different kinds and do varigate, from white to nearly black, of which color the Spanish winter radish is. When seed is sown on medium good, mellow garden soil, brings good crops, as long as moist and cool air lasts; heat and dryness produces rank, spongy growth; about 50 degrees suits their growth. The long rooted ones need deeper loosened soil. This is a native of China and Japan, seed will remain viable five or six years.

Raphanns sativus linn is mostly of a black color and turnip-shaped. It is sown late, to grow when the air and ground are cool and moist. They are cultivated in gardens and fields where they grow to good size in substantial soil, needs to be about six inches apart, are treated turnip-like. Gathered before frosty weather begins, and be kept frostfree in pit or cellar. Seed will be viable for seven years.

The springers, a small, quick-moving insect of dark-bluish color, is troublesome to crops of young radish-turnips, rutabagas, cress; cabbage-varieties, when not kept moist and shady.

Rutabagas, *Brassica Napus*, *Rapifera* (Oleracea).

This is also known or called Sweedish turnip. Fewer are cultivated in gardens than on fields. It is a biennial, rippens the second year of roots planted out the following spring. The seed is sown in spring, on a moist, shady bed, and kept moist until plants are grown strong enough to be planted out when land is prepared for.

Land should be of a substantial, mellowy nature, about six inches deep plowed, to be loose easily to plant in rows about thirty inches apart, and kept moist until grown to a size that springers have no effect on them. Seed will be viable in five or six years.

Turnip-rooted cabbage, *brassica oleracea rapa*. Kohlrabi. It is a biennial; ripens seed the second year. The seed of this for early crops to grow has to be sown into a hotbed and plants raised to plant out. It hardly pays to force any of them while they need so much space and don't bring a good market price. There are two or three varieties of them, but the two purple kinds are best. They want to be grown fast, for which moist, cool weather, or moisture and shade is needed, or else they will, by slow growth, be almost too hard to be usable, but cultivated from spring to fall. Seed will remain viable for about five years.

Turnip, *Brassica rapa ratifera*. It is a biennial; also brings ripe seed the second year. Of planted out roots in the spring only early varieties are sown in lines about eight inches apart and very thin, and be thinned out to five or six inches.

Large crops are cultivated on field; for which crop, early and late sowing shall be done, while turnip don't do well when hot dry weather, but cool and moist. The Montmagny yellow, yellow Aberdeen, yellow Scotch, golden stone, golden ball, purple top, strap leaved. Seed will last viable six years.

Vegetables of usable leaves, as cabbage varieties, of loose leaved and of headed varieties, *brassica alerecea acephala* are loosely headed ones, grown for late winter and spring use, and suffer little when grown where the sun don't strike it much, in winter or when frozen, by little protection; called greenkehl. It is a biennial; ripens seed the second year.

Brassica alerecea sabellica, winter brown kehl. Seed is sown of this variety about middle of spring to raise plants on warm out-of-door beds about in middle of the summer, just to grow the plants strong enough to stand the winter. It is a biennial also.

Brussels sprouts *B. Ol: fruticosa*, Brussels kehl or sprouts. The seed is sown the same time of the previous ones, treated, cultivated alike. It is a biennial, also.

Savoyer kehl, *B. Oi: capitata bulata*. Half-headed cabbage, of

which are a few varieties, small round and cone-shaped heads, of a dark green and part yellowish color when ripe. This is also a biennial. Culture and treatment of same time as those of previous ones. If any being dug in the fall and sheltered, the best, healthiest and strongest are planted out with the heads on them to raise seed of them, as well as of the healthies which were kept outside.

Head cabbage, B. Ol: capitata lævis. Cabbage, as a very noted commercial article the whole year round, is extensively grown in garden and field from seed of the earliest to the latest variety, of which a great number is known. Of the early ones, in the fall seed is sown and plants raised; set thinly in a half cold hotbed where it is well protected against cold winds and the sun be kept off by shading it. These plants are to be kept by good care and be hardened to plant them out in the very early spring, of which are different early kinds, known as early dwarf york, early ox-hart, early Mackfield, early Wyman and Athens.

The next early for late spring and summer crop are early winning-state, cone-shaped kind and stands the heat well. Early sugar-loaf (cone shaped), early flat Dutch, early drumhead, of which seed is sown into hotbeds to grow plants to plant when the coldest weather is over. Seed for general and late crop is sown of outdoor on a suitable bed to grow strong plants of, which are planted about three or four weeks different to time the earliest crop is gone. Medium heavy, substantial, loose garden and sod earth is best to raise healthy, strong, straight plants, dug moist with earth to the root when planted, on deep dug, loosely worked, well manured, or rich land, at from thirty inches to three feet apart, in drills two and a half inches deep, before a good shower of rain or then well watered down with soft water. This crop shall be worked, the ground stirred until heads have begun to form, then hilled and kept free of insects.

There are a Number of Well Known Late and Winter Cabbage.

Late Drumbheads, Fothlers, Branswick drumbheads, Centreheads, Mammoth Marbleheads, Premium, Large Flat Dutch, as late varieties, besides the Red, or Purple, cabbage. Cabbage is easily damaged by cold while of a watery nature.

Spinach, *Spinacia*, *Oleracea*. Of which two varieties are known: One, of brickley seed, which only does for winter use, sown in August or September, toward fall, mostly broadcast, and thinned out to three or four inches; it is a hardier one than the one of round seed, which grows a larger, more roundish leaf, which is more tender than the other. If sown towards fall, needs more space and keeps better covered with straw throughout winter than the first. It is an annual, brings seed the same year. Is an Oriental.

New Zealand spinach, *Tetragonia*, *Expansa*. While the seed of this spinach germinates slow, plants to plant on open ground should be raised of, in a hotbed. Plants should be planted about three feet apart; it grows branching, which should be pinched or cut back to keep in shape and grow larger leaves, which are used in place of the other spinach, which is of a cooling nature, and don't suffer any by the hot sun, it is of a fat, succulent nature. The one kind of is of a green, grayish white color, while a second is of a purple one.

The seed will be viable for three or four years, is a native of New Zealand, South Sea Islands and Japan. It likes rich, sandy, loamy soil, moist position.

Tea. or Cristal Plant, Messembryanthum, Cristaliaum.

This plant is of a like nature of the previous one, of same culture, same kind of soil, and serves for same use. Oariniates, from Greek and Cape of Good Hope; both are perennials where they Orient from.

Sugar Melbe, Artiplex Hortensis.

It is a native of America. It grows about three feet high, with roundish, spinach-like leaves, of whiteish green color, and serves for the use of spinash. When cultivated on rich, loamy soil, moist position, six or eight inches apart, brings a good crop, and don't suffer so soon of heat. It is an annual almost everywhere known.

English Spinach, Rumex Potientica.

This is a perennial, or hardy plant, and is a native of South America. Its seed is sown from spring to fall, produces sour, aromatic-like, long leaves, which are usable as greens, like spinach. The same bed will last, by some care, three to four years.

Vegetables with Usable Ribs, Sprouts; Rheum, Undulatum, Rhebarb.

Its ribs are usable as long as they are tender; which are seen often times long before spring and been forced in a pit with sashes on and a heavy rim of fresh horse manure around it, or in a barrel, without heads, set over a plant with the same material forced, when roots are set under banches of a greenhouse, rhubarb can easily be forced, or in a pit.

It is a hardy, or perennial plant, of which are two varieties known grown from seed sown in a hotbed, when stought enough planted three to four feet apart in rich soil. It is generally part cultivated from roots of old plants. Is generally out of vegetation from middle of summer until the following spring, it needs heavy manuring (mulched), protected by covering through winter.

The Victoria, which produces strong, reddish ribs is in preference to the other or Rheum linn. Seed keeps viable four years. The Victoria, or Rhebarb undulatum, is a native of China and Siberia; Rhebarb ribes linn is a native of Syrian and Persian.

Mangold, Beta, ciclee, is a perennial, or hardy plant. In a moderate climate, it will keep out on the bed undamaged, when protected by a cover. The one known as a usable one called Swiss chard, is cultivated mainly for greens, in place of spinach. The richer the soil is the heavier the crop will be.

For early crops, the seed should be sown in a hotbed to grow plants to plant out after frosty weather in drills fifteen inches apart and about nine inches in the row; or seed sown in such drills one inch deep and thinned out to nine inches. The seed should be covered some with fresh horse manure. It don't suffer much by heat when the roots are kept moist with water or liquid; it grows from spring into fall. The outside leaves be broken off, used for vegetable or stock feed; the whole plant can be converted into some use; the remainder late in the fall is dug up and planted

slanting into sandy earth in cellar or pit, which will produce a good vegetable through winter. It is a native of Switzerland and Germany.

A second kind of dwarfish, weaker growth, when sown thick in drills, can be cut off for greens; it is a Romeish variety.

A third kind is the Brazilian, or Parrot kind, one of the most beautiful leaf plant, it is of very rich color: red, yellow, whiteish and green, which shows very fine for an ornamental plant..

Cardoon, Carduns, Cinara, or Cardunculus sinara.

It resembles the artichok; its ribs are useable after having fairly bleached are tender. The head or top, after blossoming, when the seed is still milky, serves for some use as the seed top of the artichok.

The seed are sown in hotbeds, of which plants are raised to plant out on rich garden soil three feet apart, be kept like other crop, at the latter part of the season; the whole plant is loosely tied together.

By the beginning of cold weather, dug (laid) burried in sand, saw-dust or under fresh strawy horse manure to bleach. By using off, clean off the outer skin-like on rhubarb; cut to two-inch pieces and boiled in straight fresh milk.

The root may live until spring when planted out to produce seed. It is a native of North Africa, Spain and Greece.

Cauliflower, Brassica Oleracea, Botritis Cauliflora.

If the top of cauliflower should grow too long and loose, not forming a solid cheese, these ribs can be used before getting hard, be boiled in milk and prepared for the table like cauliflower cheese. Cauliflower seed is sown, plants raised before winter, treated like earliest cabbage plants to plant them early into hotbeds to force it, and outdoors as soon as advisable about cold. In high, double frames about twenty inches apart, for which the earliest and most dwarfish is used. Rich, sod earth, mixed with sandy compost, suits their nature; manure liquid be also used to force them by about 60 degrees. Shade the cheeses before they spoil in growing too loose, and discolor. Guard against the same on out door crop. The largest cheeses grow in the fall by moist, coolish weather, which crop needs nine to twelve weeks time. The same result may be in spring when cool, moist weather.

For early crop sow seed of the early erfurter, early cipryen. For late, late English. It is a biennial; difficult to grow good seed of, except under glass. Good seed will remain viable for about five years.

Italian sprouts kehl is part in like nature of the cauliflower, only grows cheeses in quite moderate climate, where it can remain out door, where it has plenty of time to grow to perfection. Its nature effords the same culture and treatment and serves for same use as the cauliflower, but far more time is needed to grow it.

Asparagus, Asparagus Affisinalis.

This plant is a perannial, grown from seed in a hotbed, and shall, under protection, remain so until two years old, when they shall be planted on a well prepared bed for.

Begin to dig ditches on a sunny, open lot, fifteen inches wide by thirty inches deep; lay the earth on the outside of the bed where beginning. The second line for second ditch shall be two feet of the middle of the first, that each row of asparagus will be thirty inches apart; don't lay the earth in your way by digging the inside ditches. Fill the bottom part of ditch with bones, horns, rotten wood, combine with rotten manure on it until full, half solid to six inches to top; mark the line with sticks eighteen inches apart and fill; level to top with leave mould, and set by each stick a plant with undamaged roots straightened out, and cover it with hotbed earth, or of some alike; divide and lay the dug out earth alongside of the planted row. Cover these roots well with leave mould and manure through winter. The manure with the plants will sink somewhat, but the ditch will be gradually re-filled by hoeing. Cover the plants again like first every year. The third spring dig all manure under, what will nearly level the bed, and so continue. Cut all remaining dry top of six inches of the ground and let it be spread; lay until spring until (forking) digging will be done. Every years growth grows on top of the roots, and gets exposed too soon, if planted another way, and could not bring the expected crop if spring would be dry.

It is so much spread to be a native almost everywhere. There are two varieties; one grows a green, slender, tender sprout, while the other is shorter, thicker, less tender and whiteish.

Seakehl, *Crambe Maritima*.

Which should be more cultivated to be found at the market. English people favor it, while it has proven to be an excellent early vegetable. Seed of this plant should be sown two by two seed together crosswise, two and one-half feet apart in rich, sandy loam on a sunny position. Even it is a hardy plant. It shall be protected with a cover through winter; manured every year. Seed keeps viable three or four years.

Celery, Apium, Cravelens.

This is a biennial, ripens seed the second year on roots, which will be planted out in the spring. While celery seed germinates very slowly, seed needs to be sown into a hotbed to grow plants of, of an early kind for an early crop. For general crop, seed may be sown out of door early, and kept moist and free of weed until plants are strong enough grown to plant out.

There are some varieties known: The Boston market, while dwarfish, is first grown. Sandringham's dwarf is somewhat a purplish colored one. The white solid is for general crop and grows tallest. It might be planted on old lettuce beds, and potatoes. Planted in rows three feet, six inches apart, in double rows on not newly dunged beds, but on rich, loose, sandy-like soil. This space gives plenty room to hill them to the top; left covered out into winter. If room enough in pit and cellar to heal and cover it up with sand, sawdust. Less space is required to grow them on. Plant it in single or double rows, keep the crop steady, clean and moist.

Turnip-rooted celery, *celriæ*. Shall be sown when the general crop at the above is sown, on same soil and position. The plants be planted in drills two feet apart and about two inches in the row. By a second hoeing clear the earth away from the roots and cut all fibres of the main root; replace the earth and apply liquid of manure; hill them some in late summer; tie the top together before digging them up, before cold weather begins. Heal them in and cover them the same as other celery. To bleach the top, to use like the other, and the roots will be ready for market, which is a good commercial article. It is a native of southern Europe. It is a biennial; ripens seed the second year of roots planted out early in the following spring, south against a wall.

Vegetables Usable for Salad.

LETTUCE, LACTUCA SATIVA.

It is an annual. Ripens good seed the same season, except winter lettuce, of which the seed is generally sown the fall before. Lettuce grows well in and out door, by 50 to 60 degrees of heat. Seed of the celerian, a curly variety, is also sown into hotbeds with the beginning of winter to be forced.

Other crops are sown later, to force it to have a good crop of well-grown heads in about two months. The egg- and stoneheads are prevarable kinds to force. The yellow brownish and green brown colored printhead, cabbage head are grown in hot beds to plant out door for early crop; also, Denis tall, Boston market. For the very first crops seed of best winter varieties are sown in early fall in a shady, protected position; in winter on a bed over which a hotbed frame can be put to protect plants by a cover. It succeeds best in rich, light, loose soil. Seed will remain viable four to six years.

Endevien Chicorium Endevia.

It is a half-biennial; when seed is sown early on a sunny position, it will ripen seed the first season, otherwise of plants kept over winter be set out in the following spring to get seed from. Crops grow well on any good garden soil.

There are three well-known kinds which are mostly cultivated for fall and winter use for salad: One, green and yellow curled, is best known and liked; one, yellow leaved, a little larger, which is often sown on edges of beds, which serves and shows a pretty border, when thickly sown serves as greens when cut off. Both varieties grow flat and needs to be tied together by the point when dry, before frosty weather dug and preserved in a half-dry place for use.

A third kind is a broad-leaved one, called escaroll, is cultivated and treated alike for the very same use. This culture needs about ten weeks' time to grow to perfection by suitable weather; most is bleached indoor when tied together, and are of a bitterish-like taste. It is a native of Batavia.

Cichory Root, *Chicorium Lintybus*.

This plant is merely cultivated for the use of its root; to manufacture it for the use to mix it with coffee. The leaves are also usable for greens, or salad, but are of a more bitter taste. Their native place is the Orient. Seed of will remain viable seven to eight years.

Corn Salad, *Plantago Coronapa*.

Is an annual of very dwarf growth. Is sown before fall anywhere on light soil. To be used as salad in early spring.

Watercress, *Nasturdium officinalis*.

It is a perennial. Grows along water of running springs. If cultivated, it must be cultivated from root of same on such places of slow running spring water, where found to suit its nature. It is used as salad in the winter season.

Bivernelle, *Poterium Sanguisorbea*.

It is a perennial. Its leaves are used to decorate dishes with, a mixture of its flowers, malva crispa, and barago officinalis, also mixed with lettuce, cucumber, red cabbage, for a good taste and appearance.

Fruit Vegetable.

BEANS, PHASOLUS VULGARIS.

It is an annual; of two principle kinds, dwarf and pale beans. Seed ripens of the same season. Rich, light loam or substantial loose soil suits their nature, in which they produce good crops. Pole, or running beans,

shall be planted three feet apart in rows in a circle, in which six beans are planted one and one-half inches deep, and a good pole of about eight feet long planted in the middle of; the tops of two to four poles may be tied together to withstand a strong wind better than a single one. Shall be kept free from weed, and somewhat hilled. Avoid to do anything at them while wet. They like a sunny, open position, but not cultivated on newly manured land. Shall only be planted after the frosty season. There are a few kinds of running or pole beans; stringless, yellow podded kinds are in preference, like the yellow podded princess, giant green wax, with red seed, Dutch caseknife, golden butter, southern prolific, horticultural, small and large Lima.

Dwarf, or bush beans, be cultivated on a same nature of soil and position in drills about two feet apart, one and one-half inches deep, the seed about one inch apart; the crop kept clean, soil loose and hilled when nearly full-grown. Early varieties are preferred with stringless, yellow pods, like the German black wax, early ivory pod wax, golden wax, crystal wax, early refugee, is a good podded one.

English Windsor Bean, *Vicia Faba*.

Also annuals, of which are a few kinds. The green Windsor varieties are in preference for table use. The bean is of a brown, grayish color, flat like the large Lima. It brings good crops when planted early, in good, loose, medium heavy land. When cultivated in a hot climate it gets troubled by a black fly or bug, by which the crop is ruined. The seed shall be planted two inches apart in drills of eighteen inches apart, two inches deep. It grows from two to four feet high, stout, straight. The bean is used while green. Besides this for table use, is a scarlet blossoming one of speckled seed, and one of black seed of long roundish shape, called commonly "horse mule" bean, adapted for field culture. The seed will remain viable for six to seven years.

Corn, Sweet Corn.

Is an annual. Gets ripe the same season; it is mostly cultivated to be used while green, in small patches except for market use. Two to three seed planted three feet apart each way. The richer the soil is the better it produces. It likes a moist position, but avoid to plant it on wet land. It shall be kept free from weed, the ground stirred and hilled when about two feet high. No old seed is sown of early sweet.

Peas, *Pisum Sativum*.

Is also an annual. It ripens its seed the same season unless seed is sown late in the fall for earliest crop. Medium light, rich, mellow soil is best to produce a crop of dwarf kinds, of which are several known. Spring planting is done as early as ground is workable. Seed of dwarfish ones be thinly sown in drills two feet apart, and one and one-half inch deep. Kent, little gem, Tom Thumb, blue imperial, are dwarfish ones and early; also, Londrel's extra early and others.

Others which vine and need to keep up by brushes are Carter's first crop, Daniel O'Rourke, blue imperial, royal marrow, champion of England. They shall be planted in drills two and two rows with a space of three feet between to work and pick the crop. This crop shall be sown a little while later than the earliest one, which may be repeated ten days later. The brushes shall be so put that the tops join together. Fresh seed should be sown every year. For seed gather the earliest in largest sized pods.

Asparagus pea, *lotus tetragonlalaus*. Is cultivated to ornament trellises and such other places, besides, is a delicate, sweet one to be used with the pods, and be cultivated same as the previous mentioned, which has to be kept from the ground by brushes.

Cucumbers, *Cucumis Sativus*.

It is an annual. The choicest ripe ones are laid aside for seed, which is washed out as soon as the cucumber has begun to ferment and the seed is loose from the pulp. Cucumbers can be obtained through forcing, when unfavorable weather for outdoor culture, which time is from spring until fall. Have to grow young plants to plant out in the spring. See in the second part to force cucumbers, which is done like the forcing of melons.

While it is difficult to force cucumbers without the sun's heat, it has to be done by great care. Lay the hotbed with a layer of shavings, on which fresh horse manure, one-fourth of the heating material, two and one-half parts of fresh boiled hops mixed with the balance of dry oak leaves; before the earth bed is put sow half a bushel fresh air slaked lime in a frame of four sashes, which will keep worms and insects off. The earth bed shall contain three parts of fresh, rich, sandy-like, loamy garden earth and mixed with compost; the thickness of the bed shall be seven inches of screened, unfrozen, half-dry earth. Plant under each sash on an oval, two plants and near by a few seed after the heat proves to be not less than sixty degrees on the whole bed. If less, heat can be produced of a heavy rim of fresh horse manure laid around the frame. If over seventy-five degrees, let it escape by lifting sashes, otherwise keep the bed close and shaded by sunshine. Keep general heat of seventy-five degrees. Cut some plants off

above the third leaf; over-water the vines every morning shortly or about one hour after sunrise. Water the root by means of a five-inch pot sunk to the rim three inches from the root, or without only around it. Be careful to keep fresh horse manure and steam off from the plants as it is a risk that plants will be damaged by the red spider that hores manure effects. For outdoor crop plant plants and seed in a drill of one and one-half inches deep, over the middle of a slightly oval formed, loosely dug bed of rich, loamy soil. This bed shall not be larger than to ridge from each side to the middle, not to hinder the roots from growing by treading on the bed. Cucumbers, from the earliest to the latest, may be cultivated on such a bed. Don't water when hot sunshine, but keep it under steady moisture. Keep the main root sound by a half cover or hilled.

Melon, Cucumis Melo.

Of which are four standard varieties, net, musk, cantelope and water melon. All of these can be successfully cultivated or grown outdoor if done on the same method as cucumbers. The only difference is that the three first kinds be treated in trimming as specified by forcing. Underlay the melon with slate, toil, shingles. The seed of melon and cucumber will remain vitable until ten years, and are annuals.

Eggplant, Solanum Melangena.

This is also an annual. The seed of this kind of plant must be sown early in a hotbed, which produces a heat of seventy-five to eighty degrees and young plants kept, almost by close heat until somewhat strong, grown

to plant them out of door on rich, medium light, loose, well worked land, on a good, sunny position. Some are left to fruit in hotbeds. The fruit of this plant is like egg, and pear shaped, of violet, white and violet color. It is a native of Asia. The seed keeps viable many years.

Tomatoes, *Lycopersicum Esculentum*.

This is an annual. Ripens seed the same season; is pulpy in the fruit and wants to be treated same as by cucumber.

The seed of this beautiful, healthful fruit need to be sown in a hotbed or else early on a very sunny spot where protected and kept steady medium moist. The soil may be like hotbed earth. The plants be planted out soon after frost-free weather four to six feet apart on heavily manured land, (cow manure is best) if possible by moist or wet weather, unless the plants must be well watered. To effect earlier ripe fruit than general trim plants above fourth eye, either at the plant itself or the vines. Cover the ground with fresh mown grass between the plants after the land is clear of weed and the plants fairly hilled. It is a native of South America. Its seed remains viable several years.

There are several varieties, of which few are found large, solid and of smooth growth. I not dare to name any, while the genuine kinds are best through amalgamation by carelessness and rank growth.

Squashes, Cucurbita Pepo.

It is an annual. It brings good crops on soil of same nature and same worked up as for melon, cucumber and seed planted on hills six feet apart, about same time when melon and cucumber seed is laid. There are several kinds of them, and are called: Vegetable Marrow, Boston Marrow, of greenish color, of ribbed-like unsmooth surface. Butman's, a long-shaped yellow colored one of good flavor. Hubbard squash, of about the same color as the first, still rougher on the surface, somewhat crooked near the stem; marblehead is a crooked-necked one of a long shape, yellow colored. Other varieties are cultivated for winter use, like turban kinds as winter crooked neck, greenish colored, while roundish flat scalloped and Chilian mammoth grows to a weight of 200 pounds, and some others, called pumpkins, of orange and greenish color melon shaped. The last mentioned are the curcubita melopepa linn. A few other kinds are cultivated which are not fit to use.

Pepper, Capsicum Annum.

It is also an annual; brings ripe seed the same season. It is a native of Brazil and Mexico. The seed looks like tomato and eggplant seed. It is often grown up of seed to plant out of on open ground with the eggplants.

It shows well as an ornamental plant with its red colored fruit. It is not particular about soil but likes a sunny position. Five kinds are well known: the early large unegal formed, a long red, long yellow, red cherry like, a tomato shaped or green mountain. All are of a hot, peppery nature.

Artichok, *Carduus Cinara*.

The head or top which brings seed can be taken as a fruit when cut off while the seed is milky, preferred for use like asparagus. It is a hardy plant and cultivated for the above stated use. The plants are grown from seed sown in a hotbed to grow plants to plant out, crosswise, three and a half to four feet apart in rich, substantial soil on a medium dry and sunny position. Kept like other crops and protected through winter, or dug and healed in to sand in a cellar, and planted out in spring. It is a thistle like plant from Spain and north Africa.

Bulbus Vegetables, Onion.

Allium cepa is a biennial of the *allium* family, of which yearly crops are cultivated, not only in gardens, but large crops are cultivated on fields. In climate where the ground can be worked early, crops are grown from seed as well as of sets. It likes rich, light soil smoothly prepared, the seed sown or laid quite thinly in light drills eight inches apart, seed lightly cov-

ered. It don't like previously manured ground. This crop has to be kept clean, ground stirred. When the top begins to get yellow lay it all down with the back of a rack; gather them when the top is fully dry and preserve it frost-free. The young bulbs should be three inches apart, no matter of sets or seed. Seed of the same is sown thickly broadcast for sets, or better, in light drills three inches apart, thinly covered and rolled by same means. It is easier to keep them clean when in rows and taken up whenever the tops are fully dry, and preserved for next planting. Seeds and sets should be rolled with a hand roller. Sets need to be kept on a frost-free, dry place.

Winter onion (potato onion) is a biennial. *Allium fistulosum* multipliers. This kind is planted out in late fall in rows eight inches apart and covered with litter (straw.) This onion is the first crop in the spring. This onion grows of one, which splits apart and be planted five inches apart; it is most of good size; it will grow so that eight or ten parts are made of, and grows to be ripe when the ground begins to be warm, when taken up, divided and re-planted in the fall.

Schalate onion, *allium ascalonicum*. It is more a perennial than a biennial; it shall be transplanted every second or third year. The top gets dry by middle of summer. It shall be dug before fall, divided, one by one, replanted on a new bed three to four inches apart in the row, the rows eight inches apart. The onion is of a mild taste, and a native of Russia and Denmark. Seldom will blossom to ripen seed.

Cut onion, *allium schenoparsum*. The top of this onion is used green in various ways. It is of a dwarfish growth and planted on edges of beds as a border. The top is dry by middle summer and is generally transplanted before fall. It seldom brings any seed, and is a native from Germany, Switzerland.

Garlic, *allium sativum*. Is an annual. It grows and brings its seed or sets in a bunch on top of the stem. It is of a white color.

These four varieties of onions require rich, light soil and do well in half shady positions. It is a native of southern Europe.

Leek, *allium parrum*. Is a biennial. Ripens seed on the root the second year, of which being left out through winter, and of such which has

been dug and healed in cellar or pit, planted out the following spring. Hard to raise seed of if not planted south of a wall or under glass.

To raise plants of seed in hotbed only need medium light soil, but be planted in rich soil in rows fifteen inches apart and six inches in the row, hoed and slightly hilled; manure liquid helps to grow them stout. When somewhat protected (covered) they keep outdoor through winter; if not in a moderate climate it is best to be dug and put into cellar or pit.

Pearl leek is grown is almost an unobserved variety of leek. It is of a whitish green color when freed of the dry top and replanted. It grows silvery-like small onion, which are the most delicate of all used with salt.

Proboscidea martinia. Annual; ripens seed same year; sown in drills on side place. It is used for pickling only while green and tender.

Plants Which are Grown for Manufacturing Purposes to Use Mixed With Coffee or Chicory, Which are

Spanish fragrant, *astragalus lacticus*, *Cicer* pea, *Cicer arietinum* or Earth pea; *Cichory* root, *cichoryom intibus*; Mangold root, *beta vulgaris*; Carrot root, *daucus carata*; Cow pea, *lupinus leutinus*; *Lupinus albus*; *Lupinus angustifolius*; *Lupinus lintefolius*; Parsnip, *pastinaca sativa*.

Aromatic Herbs for Medical and Other Use.

Some are annuals, which are yearly grown of seed. Biennials and perennials, or hardy plants, which are also part cultivated of seed and roots.

ANTHEUM GRAVEOLENCE. Dill, annual, native of the Orient, grows in light soil, cultivates itself, part by dropping seed. It is aromatic.

ANTHEUM FÆNICOLUN. Finkel, It is a perennial, a native of Orient, likes good soil, sunny position, cultivates itself, by dropping seed, needs winter protection; this is an aromatical plant, especially for the use of the seed.

ARTHEMESIA ABSINTUM. Byfess, native of south Europe, is a perennial but better treated in general as a biennial; re-cultivated of seed on sunny position; it is an aromatical plant.

ARTHEMESIA DRACUNCULUS. Esdragon; it is a native of Siberia, a perennial, likes good soil, sunny position, and can be part cultivated every three years from roots.

ARTHEMESIA VULGARIS. Beyweiss, native of south Germany, perennial, will grow in any garden soil, is aromatic.

ANGELICA ARANGELICA. Angelroot, native of Europe, a perennial, is sweetish, usable as a vegetable, and is distilled for liquor; wants cover in winter, be transplanted every two years, and also cultivated of seed as soon as ripe, on substantial soil, sunny position.

ANGELICA HIRSUTA. Angelroot, native of south Florida, America; it contains an acid resinous taste.

APIUM PETROSILICUM. Parsley, native of Asia, Europe, is biennial and aromatic; it is mostly used while green; the most curled is most liked while most showy.

CARUM CARVI. Kimmel, native of Europe; it is a biennial, seed is sown at the place of substantial soil, early in the spring; seed ripens till middle summer; only seed is for use, and strong aromatic.

CARIANCBEUM LATIVUM. Cariander, is a native of Asia, an annual, seed is sown in hotbed to raise plants to set out; the seed is strong aromatic, it likes a sunny position and middle-heavy, rich soil.

CHENOPODIUM ANBROSIOIDES. It is a native of Africa and Central America, of which are several species of a hardy nature. Any kind of good and light soil will suit its nature.

CENTAUREA BENEDICTA. Is a native of Asia, half biennial, of grayish green color and bitter taste. Likes same soil and position of the previous one.

COCHLERIANA OFFICINALIS. Is a native of southern and central Europe; is a half biennial. The seed used is of a bitter taste.

LEPIDIUM SATIVUM AND LATIFOLIUM. Winter cress, native of the south seashore; likes moist position, light soil; is aromatic, used mixed with lettuce. Sativum is sown several times a year. It don't last long by warm weather; is more a spring cress, of same variety, curled, and uncurled.

ORIGANUM MARJORANOIDES. Marjolin, native of north and central Europe; half biennial. It is generally sown every year in a hotbed and plants raised to set out. It is known as a good and aromatic plant. There are several kinds of organums, annuals and perennials.

LAVENDULA SPICA. Lavendula, is a native of southern Europe. Also, a good aromatic one, and half biennial; also, is cultivated for an ornamental plant, and is a native of Italy and Spain. It is of a bitter taste.

MENTHA CRISPA. Minth, is a native of Europe, and strong aromatic. A perennial; can easily be part cultivated of roots. There are a few kinds of which are called curled or crouse minth. It likes light soil.

MENTHA PEPPERITA. Peppermint, it is a native of England, Europe, America. Is a perennial, and is part cultivated from seed, roots and cuttings; is strong aromatic. The peppermint lozenges are made of.

MELISSA OFFICINALIS. Balsam, it is a native of Europe and western Asia; is also a perennial and part cultivated by dividing root and plant early in the spring or early fall. The flowers are used dry for tea as a medical refreshing beverage; one blossoms red and the other yellowish pink. It is well worth to cultivate it, if only as an ornamental plant. It wants rich, light soil.

OCRA COMBO. The seed of is sown in drills fifteen inches apart, and the seed two inches apart in the row, one and one-half inch deep; grows four to seven feet high. The young pod is used with the seed for soup, pickles.

OXALIS ACETOSELLA. Sour clover, native of Europe. *Oxalis esculenta* and *tetraphylla* are natives of Mexico. They are perennials; grow on moist, half shady positions. If the knotty root of the *esculenta* is planted in spring in rich, light soil, it grows until late fall a good usable crop, but won't bear the slightest frost when dug.

SATURIJA HORTENSIS. (saturi beankrout.) A south European. Is an annual; sown early in the spring at the place it shall grow. It is of a slight aromatic taste. Grows in any garden soil.

SCANDIX SEREFOLIA. Kerbel, native of south Europe; annual. Likes a half shady place, light, good soil. It is a strong aromatic herb.

SCANDIX ALBA. White mustard, is a native of south Europe, Spain. Grows well on good, light land.

SCANDIX NIGRA. Black mustard, cultivated for the manufacture of mustard. It is sown early in the spring in light, good soil. It is generally sown broadcast.

RUMEX PATIENTICA. Is a native of south of Europe, England; is a perennial; part cultivated of the roots; is an herb usable early in the spring.

TANACETUM BALSAMINATA. Mint, native of southern Europe, and a perennial plant; has a strong aromatic taste, is used with soup, pickle.

SEVENTH PART.

Field Culture of Vegetables.

Field is used for the culture of such crops of vegetables to grow larger crops to suit the demand for commercial purposes.

If the culture is managed by instructions, good crops will be grown if external causes don't prevent it.

Allium Sativum Ceba Linn, Onion.

It is a biennial. Ripens its seed, with difficulty, the second year. The most are native from the Orient. They like rich, mellow soil, warm, medium position, with no other particular care after being planted than over-watering by dry weather. The field, for not being freshly manured, should be prepared to be ready quite early in the spring. When well smoothed sow seed very thinly in rows of eight inches apart and one inch deep; when up thin out to three or four inches. This method is observed in moderate and hot climate. Otherwise, sets have to be planted by said distance for a crop which has to be kept free from weed after the field has been rolled, by hand. When the top of the crop begins to color lay it down by the back of a rack; after all is dry the gathering can be done. There are three varieties suitable for field culture.

The purple one is best suited for a hot climate. The two others are of a straw yellow color and are in preference. The larger one is a native from the island of Madeira. It generally proves a much wanted article.

Beta Vulgaris, Mangold Root.

It is a native from the south European seashore. It is a biennial. Seed ripens on its roots planted out early in the spring the second year, which will keep viable four to five years.

This crop is cultivated for the manufacture of sugar, and proves to be an excellent stock food, especially for the production for milk.

This crop may be planted after early crop of early turnips, potatoes, peas, corn. The field to be deeply plowed, harrowed; if plants already grown for, shall be planted in rows, drills twenty to thirty inches apart, and plants planted fifteen inches apart in the row, or seed planted one and one-half inch deep at a like distance, two seed together but only one plant left when both have grown; the other planted where one is missing, and watered down.

The crop is to be kept free of weed and the ground stirred. The crop hilled when about over half grown; gathered before frosty weather and kept frost free. The seed should be planted one and one-half inch deep when the crop shall grow. If planted, the points of the roots shall be cut off to grow heavier roots. If the weather is moist it brings heavy crops.

Brassica Oleracea Capitata, Head Cabbage.

It is a biennial; ripens seed the following year on roots set out with the heads on, at a warm position. Cabbage is a well known commercial article. Field is needed to grow it in great quantities, for which rich, loose soil is needed, which should be deeply plowed; heavily manured in the fall; re-plowed when plants are ready to plant out, which may be first or early kind. The second, a middle early one, and for late crop as soon as time for. The plants to be straight and strong grown; early planted for early crop in drill rows three feet apart, and also three feet in the row, by moist, rainy weather, if possible; or else have to be watered down. Varieties known to grow large, be planted further apart.

If land for late crops has not been prepared and reserved for, land on which an early crop of early turnip being raised may be manured with quite rotten manure, if the land should not be good enough without be plowed, well prepared. Keep the crop clear of weed, the soil stirred, and prevent damaging it by insects. Large drumhead, stone and mammoth marblehead, late flat Dutch.

Convululus Batatum, Sweet Potato.

Is a native of China, America and India. There are four kinds known in cultivation; one yellow slender growing one called Jersey sweet; a second, of a larger size, less yellow in color; a third one grows to a far larger size; a fourth one of white color, and one of a purple color. All are of a tender nature and require another treatment to other potatoes.

Rooted sprouts has to be raised to plant out for a crop for which to raise, a hotbed has to be made with a sandbed or of very light earth like peat on it, to lay the roots on it lightly covered with sand or some stuff. The sashes should be put on and be only lifted when the heat proves to be too high or sprinkling is necessary. Sprouts, when three to four inches long, be carefully parted from the root; the too poor rooted ones may be planted in a cold, sandy-like bed to grow them strong enough to plant it outdoor, on particular prepared land. Coarse, loamy, sandy-like land rich enough without manure it. Just before planting, plow three or four furrows up together, to form an oval bed, on level, moist field; when fixed, plant eighteen inches apart over the top of it. Keep the crop clean until the vines prevents the hoeing, which shall be kept for each row by itself. To dig the roots whenever they have grown to satisfactory size; and the general digging be done before cold weather begins; a temperate place is needed to preserve the roots or by 50 degrees in dry sand or leaves.

Phasœlus, China Alba, Navy Bean.

It is a native of China, India. It is an annual. It wants to be cultivated on light, rich soil and different positions; if no flat land can be spared for, it can be sown broadcast on new land, where it will bring a crop as good as on other; has to be gathered before quite ripe.

Vicia Faba, Linn, Broadbean.

Romish bean, it is an annual, native of America, England, Portugal. This variety of bean suits to be cultivated on fields; it is not particular about soil and position, but brings good crops when cultivated on light, rich, part level land in drills two and a half inches deep planted in the drill

two inches apart, and the drills at a distance of fifteen inches. It is a brown grayish bean, of the shape like the large Lima bean, and for the same use; grows straight 3 to $4\frac{1}{2}$ feet high; it is a fast fattening stock feed. The horse or mule bean, which is smaller, very productive, of black color, cultivates on same method, same soil and position.

Pisum Sativum, Linn, Peas.

It is an annual. Peas are a native everywhere now. For dry or winter use, field culture is needed to grow large crops; the gray and blue sugar are suitable for field culture.

Sow broadcast or with a sowing machine on medium good, mellowy land, about middle of spring. When sown broadcast, harrow it well in; this is about what can be done except to harvest it, which has to be done before over-ripe.

Cucumis Citrulus, Water Mellon.

It is an annual, native of Calabrian, Silien. For field culture, light, sandy, rich land, of low moist position, is best adapted for melon culture.

If the land is not to be found loose enough, plow deeply, plow from both sides to the middle to form a slight oval bed of about eight feet wide, over which middle short, rotten manure be mixed with the ground wherein seeds or plants are planted, which of this same should be tightly covered with a glass frame until the plants have begun fairly to vine, to have some as early as possible.

Avoid fresh horse manure near it; water only the vines well over after sundown by dry weather, but water by the roots by means of a six-

inch flowerpot sunk to the rim near the root, to let the root have the required moisture without to water over it, while it is against its nature; the overwatering would effect an unsoundness of the root part just above the ground, by which the whole plant would suffer.

Again, if the whole plant but that part would be so heavily overwatered to be also sufficient for the root, the stronger vines may suffer of such wet, which should and could not sink for some time, and would also damage melons (fruit) before grown to such a size fit to be underlaid with slate, glass, etc.

There are many causes to sickness which plants are soon visited by insects which multiplies so fast to destroy crops by very dry weather which effects that such plants will be troubled of the red spider, chinch bug, and such bulbs of which sometimes all the substance and life is sucked out of such plants.

Carrot, *Daucus Carota*.

It is a native of the South Sea shores. The land for this crop shall be of a rich, low, moist nature, deeply and loosely worked up; it don't want to be manured freshly, as this crop don't like it; it is better when done in in the fall. The surface should be smoothly worked; the fairly rubbed seed with dry earth or sand, thinly sown on rows eight inches apart, which is a great advantage to the spring sowing, while the seed germinates very slow and weeds overpowers the crop before fairly up, otherwise, the seed be sown broadcast into a crop of cereal which will be ripe early to harvest; The crop has to be kept free of weeds early, if a good one is expected; the weeding can faster be done when in rows as otherwise. Carrots are much sought for every spring and find a ready market.

The Long Orange, English Long rooted, Deep Orange, Long Red, Albringham, Yellow Belgium, Half Long red, French, etc. It is always a first-class stock food, which if it cannot be sold at the market for the wanted price.

Beta Cicla, Beet.

It is a native from the South Sea shore, and a biennial. The field is to be prepared as for carrot, on a like soil and position, but only planted seed or plants in one and a half inch deep drills fifteen inches apart and six or eight inches in the row, work the crop like any other, gather and store it in cellar or pit before frosty weather.

The blood-red kinds are preferable for the use of salad; it is also largely cultivated to manufacture sugar of them.

Brassica Napus Ratifira, Rutabaga, Turnip.

It is a biennial, native from the sea coast of Holland. To cultivate this root crop, sow the seed in the early spring, on a moist, shady place; keep them clean and moist until strong enough to be transplanted on the field, which shall be prepared like for head cabbage or mangold root, but not freshly manured, and plant this crop at a same distance as the mangold root. If no rain while planting, water them well down, and keep the springers off by overwatering it frequently, which proves very troublesome by dry weather. Keep the ground clean and stirred, and hill when grown to half size, which will keep them more tender than when exposed. The yellow kind is preferred to the white one, gather before cold weather and keep them frost-free in cellar or pit.

It brings heavy crops; if hot, dry weather is of short duration, and a valuable vegetable for spring use and stock food. Seed will remain viable three to four years.

Bassica Rapa Ratifera, Turnip.

This is a biennial, bring seed the second year of turnips planted out in the spring; of the earliest kind sown early, some may bring seed the first year, but only of the very earliest, or seed will result rank growth.

If the weather is not dry, the land of not too poor and dry in nature, this crop will grow almost on any land by coolish, moist weather. The best and heaviest crops grow by cool, wet weather in the fall. Land not need to be particularly prepared for; seed may be thinly sown on any weedless patch or field broadcast or in rows eight inches apart, on partly loose land after early crop of corn, oats, wheat, rye, peas, beans, etc., are cleared off, if the seed only can slightly be raked, harrowed or brushed in; the crop shall be thinned out to six inches and be kept free of weeds; young crop is generally troubled with springers when dry weather and spoil part of the crop, but can be partly prevented by oversprinkling with water with overtarred brushes, etc., stuck over the crop. The crop shall be gathered when cold weather comes, and kept in cellar, or better, in pits.

When put eighteen inches under ground in layers, with tops down and the ground be kept cool in the spring, will keep good for a good while; of which a few kinds can be recommended: Early kinds should be sown very early, and for late crop, when other early crops made room for; Early White, Top Strap Leaved, Early Snow Ball, White Norfalk, Mammoth Purple Top and the Pamaraien White, also Red Tankard.

The nature of turnip is a coolish, refrechisent, serves also in spring and summer, is a healthy food.

Raphanus sativus, is a biennial, a native of Asia; the Spanish, or black radish is cultivated on very same methods, gathered at the same time, kept frost-free until used; laid in moist sand, will keep until monthly radishes are grown in the spring.

Helianthus Tuberasus.

It is a perennial, bulbous plant, which top grows straight four or five feet high and blossoms yellow, produces well in rich, sandy soil; should be cultivated like potatoes, but earlier. Only as many bulbs are dug as used at the time; when one is in the ground, will never be lost; it is usable in place of potatoes, the taste of is like boiled artichok. It is a native of Brazil. There is a second kind, which blossoms white, bulbs are of a lighter color, and are for the same use.

To Water Plants when Dug Up to be Transplanted.

Plants has to be well watered before they are dug up to transplant, and carefully dug with earth to the root if possible. All stock roots are to be cut back, on plants of spreading roots, carried along moist on a tray by planting, and watered down when planted.

If the stock root is shortened on spreading rooted plants, more finer roots, fibers, will grow like by head cabbage, will effect a less coarse and solider head. If the point of long, heavy rooting plants is shorter, not like on beet, mangold root. rutabagas, etc., the root will grow heavier.

Solanum Tuberosum, Potato.

The name of this culture is known all over the world, and also cultivated.

It can be grown from seed, which has to be sown on a hotbed in sandy-like, rich soil early in the spring to grow strong young plants to plant them first on a cold bed in some kind of soil until all have grown to about the same size, when a piece of ground is ready prepared where to be planted.

A second method is: plant cutting of sprouts sprouted in a cellar, pit, or sprouts of newly planted ones sprouting through the ground, which are to be put in a half hotbed of a sandy nature, and treated like the above mentioned, and hardened by exposing them to free air before they will be planted out of door.

A third method is: cut choice bulbs into parts that each has one eye and to be cut to the center of the bulb. The cuts shall be dried with cinders, soot, and shall be planted when so far dry show to shrink, the part with the eye shall be highest.

A fourth method is: plant whole bulbs, but none smaller than the size of a Guinea's egg. Plant no other but of choice kinds, sure to grow a good crop of. All be planted at a like distance, in rows from twenty-four to thirty inches apart, and in the rows fifteen inches.

The nature of the soil should be a porous, rich, aluvial one, when possible new land of a moist nature, drainable, not wet, neither high rolling.

Land of a porous, brown colored leave mouldy part sandy nature on which sod, wood, etc., being burnt, not too dry, not too wet, is considered best, and good crops has been grown on it.

Preparation of the Land when Plowed.

It shall be free of stone, stumps, roots, etc. Plow well to loosen the soil all through, harrow and straight furrows of three or four inches deep twenty-four to thirty inches apart, and plant with a hoe, fifteen inches in the row, and cover two to three inches. Before the crop grows through the ground, work up lightly, that all will grow up equally, and no clods hinder its growth. Not neglect to work it as soon as a few inches high till hilled. The crop will be nearly full grown a while after the blossom has dropped and the top begins to color, but requires to be left in the ground until the top is fully dry, without being dried from drought or an external cause.

SECOND PART GRAIN CROP.

AVENA SATIVA. Oats. There are different kinds of oats which is mostly cultivated for stock food, for horses and mules, and for manufacture of oat meal.

The variety changes as to climate and soil, and is found difficult to find the kind to suit same soil and climate.

AVENA TURGIDA. White Oats, of coarse long growth, coarse straw, with a long ear, is an English variety.

AVENA GEOGEONA. Oats grown in Georgia, is white of a very strong kind, is of a good growth white good kind.

AVENA SIBERICA. Oats of early growth, earliest ripe, also imported to Georgia, America; is also of white grain.

AVENA JOANETT. Oats of black grain. It being grown about New Orleans, America; said to be a heavy producer; wants to be cut before quite ripe.

AVENA NAIR. Another black grained kind, shorter grained; the ears grape shaped like, and is a good producer.

WHEAT. There are three principal varieties in grain, or called red weather, half-red and half-violet. Of these principal kinds are a great number, and do change as to soil and climate.

BARLEY. Of which are two kinds as principal ones: one, a winter barley, sown in the fall, produces a bearded, roundish ear; the second, called summer barley, sown in the spring, while too delicate to stand the winter; the form of ears is mostly a flat one.

RYE. This the tallest grown of all grains, produces a smaller grain than any other, of a brown, grayish color, of which flour is made for brown bread. All this grain producing culture is only cultivated on fields which are of a substantial nature, neither too light nor too heavy, smoothly harrowed, the grain sown with a sowing machine or broadcast by hand. All this variety of grain should be changed whenever unsatisfactory results are found with on good soil and position and grown by favorable weather. Get samples of grain, and test them by growth, by which method to get the proof which suits soil and climate best.

ZEА MAIS. Corn. It is a well-known annual all over America, where it is a native. The culture is so well known here that it needs no description, only an advise to cultivate it on such position (field) and in such substantial soil as its nature like it, and a change from time to time. Also, to cultivate the different kinds separate the one a distance from the other, of which to grow seed; especially broom corn, separate from any other; also pop corn must be cultivated quite a distance from other which is intended for seed.

Oriza Sativa Mutica, Rice.

It is a native of China. Cultivated in India and America, in a tropical climate. Said variety is sown broadcast, or by sowing machine, in time of the wet season on low, light, sandy-like soil.

The second variety, oriza Montana, is sown about the same season on high land. If the weather should prove insufficiently wet after the seed is sown, it has to be kept watered until fairly up. These are the two principal kinds of many.

THIRD PART OF FIELD CULTURE.

To Grow for Stock Food and Grain.

The grain of the following named kinds are most used for the commerce, to re-cultivation as most of the previous ones are more used for human food.

ALAPECARUS PRATENSIS. Vulpin, or a kind of high, straight growing, somewhat a raw looking grass; it likes a dry position and grows in wet soil.

AGROSTIS STOLONIFERA. Is a kind of English prairie grass. This likes a great deal of moisture; would hardly bring any crop on dry soil. Is suitable for meadows.

ACROSTIS DISPAR. Called herd grass; it is a good kind; brings good crops on good, wet soil, if porous. Sow it thinly in early spring or fall.

BROMUS PRATENSIS. Is a prairie grass. This kind brings good crops if not cultivated on too poor land, and not suffering of dry weather; is suitable for lawns.

FESTUCA ELEVE. Is a perennial prairie grass, a late variety, while of a vigorous growth and very productive, of a very durable kind, besides. Bears to sow it mixed when thinly sown.

FESTUCA RUBRA. Resembles the ovine. It is a good pasture variety, if sown on medium heavy, not too dry, soil, either early in the spring or fall. It has proven to be of a long duration, and the hay of first-class.

FETUCA PURPURATA. Also suitable for a prairie grass, which is of a finer growth. When sown on medium good bottom land brings excellent and heavy crops.

FLEOLE OR PLEMN PRATENSE. English timothy; this kind is durable and produces well by itself and thinly sown on prairie-like land, which is not too wet nor too dry.

FLEOLE ODORANT. It is of a weak growth but of good quality, mixed sown with a variety of a stronger growth to make hay of. It can be found on low and high land, but does best on low land of heavy loam. This is a fine kind and durable; suits well for a lawn variety.

HOLCUS LANTANUS. Brings heavy crops on fresh, moist-like prairie land. Is also of first-class; has generally a green appearance when dry, but proves to be an excellent food.

LOLIUM PERENN. English rye grass, proves to be of good kind for meadow and lawn. It is found along highways and other dry like places thickly grown. Found very durable and thickly grown on lawns; also productive for meadow if cultivated on heavy loam. In light soil bear to be cultivated with clover when thinly sown.

LOLIUM ITALICUM. Italian rye grass, it is a well known variety, suitable for lawn; can be called a perennial for its durability. It grows and stalks thickly for a few years, if well, instead mistreated.

PATURIN MEMORALIS. Byshops grass, *poi angustifolia*, this kind proves as durable as the Australian prairie grass, which often has little or no moisture by rain or dew a whole season. It improves well when only half partly kept by rolling, mowing, watering by very dry weather, and a light mulching through winter. This kind is not particular about soil; does well in sand.

POA PRATENSE OR PATURIN PRATENSE. Sow this kind of prairie grass early in the spring or fall to have time to root fairly before cold weather, and mulch lightly. If in the spring let it have moisture to root well on any patches for lawn of medium good soil and it will do well. Sow thinly when mixed with timothy for meadow on moist position of good loam, but only sow in early spring. The two kinds have been found doing well on poorly soil in the shade under forest trees.

Blue grass has got into favor, while it is cultivated with hardly any care, but proves to be a suitable lawn grass.

The *festuca* varieties are of a hard nature, grows strong even on poor high land, but cultivated as previously stated, brings better feed.

ELEUSINE CORACANA. Is an annual; native of Africa. The seed looks like millet seed; it contains flour of good quality and is used there as food by the natives. It has been exported and is now cultivated with success in other countries. It produces somewhat raw feed, but heavy crops. It is not very unlike, in production, to *ovena elatior*; the only difference that *ovena elatior* suffers by wet while the other likes it.

LOLIUM MULTIFLORUM. Is a British rye grass. It is an annual. Grows an abundance of seed on a tall rough top, which is known of good production, and liked by some stock, green or dry. It wants to be sown in in the fall or very early in spring.

HORDEUM BULBOSUM. This is also one of heavy growth when cultivated in medium good and moist soil, and is mostly used while green. It is a perennial. When sown it shall be sown early in the spring. If cultivated by dividing roots it grows faster than of seed.

SECALE CERIAL VERNUM. This kind of grass is grown for food and grain, of which are several varieties; produces large crops when its culture is fairly known. It is known as quite a nutritious food, when fed green or dry, but it is mostly used in a green state.

There are different kinds which want a different time in culture. The above named shall be sown early in the spring in a cold climate to grow a good crop the same year. It grows to medium height.

SECALE MULTICAULE. This kind should be sown in the fall in a moderate climate, otherwise, in the spring it grows taller than the preceding one, and mostly used green. If sown in the fall it will bring an earlier crop the following year, and better ripened seed. It is called St. John secale.

There is another kind of same name and is nearly alike, which can be sown at different times through the year.

A third kind by the same, name of Russian secale multicaule, which proves of a more vigorous, tender growth, of a larger and more grain than any other. It is earlier and of a better quality. It is generally sown in early spring.

SECALE ROMAIN. Romernish secale, this is of a bland color and produces the largest grain.

There are other kinds of this culture, but only these are specified, which have proven best in culture.

The culture of all varieties of the grass family is as important as the vegetable culture, but those who don't seek such an interest in it as to have it fairly tried, never will know the difference in the results of it; never will know which kind will suit the soil, position and the climate they are in; again, never know the kinds which want to be cultivated alone, or want to be mixed with any others.

A tender variety can be changed in its nature when sown mixed with a very hard one in nature within three or four years, while another wants a higher kind in growth to protect it. Some like to be mixed and grow; do well with Clover, Sucern, Esparcetta, if these three kinds are sown thinly to protect some of the tender grasses. The same tender, low vegetables do well cultivated under high ones to be under protection, unless there would be no success in growing them.

Most grasses want care, protection by mulching through winter, frequent, or at least, spring rolling. Most all need a deal of moisture. The long rooting kinds need a deep, loose soil with part on under moisture.

TRIFOLIUM INCARNATUM. Clover ordinarily is a biennial. It very seldom grows to seed the first year. Wants to be cultivated by itself and re-cultivated every three years. Produces heavy crops. Is best profitable when fed green, but is dangerous to stock when young. Is not of much value. Dry when nearly leafless.

TRIFOLIUM PRATENSE. Clover, of a strong growth, blossoms red. It is known and held for the best variety by clover growers. It likes a substantial, deep, loose like soil, with part under moisture. It will last three to four years.

TRIFOLIUM ALBA. White stone dwarf clover, is of little account for feed; serves on places where little else grows, or mixed sown with some stout growing bunch, like grass. It grows wild nearly all over.

TRIFOLIUM HYBRIDUM. Clover, as a perennial, mixed sown with prairie, rye grass, for meadows or pasture field, especially in not a cold climate, cultivated on medium heavy and partly moist land. Its blossoms are rose-colored, mixed with greenish white; the leaves are glaucish and glabrich.

TRIFOLIUM RUBRA. Red clover, its nature affords to be cultivated in a cool climate, where the soil remains cool around its roots, and be thinly mixed sown with some grass varieties.

TRIFOLIUM MOLINERI. Is adapted for a northern climate. Wants to be mixed sown where soil kept cool. Likes medium heavy, moist soil. It don't grow quite as high as the ordinary red clover.

TRIFOLIUM ELEGANT. Clover of rose and white color. It will last to four years on medium good, moist soil, but don't like a climate either too cold or too hot.

MEDICAGO SATIVA. Lucern, native of Chili. It likes a rich soil of a sandy, gravelly nature, in which it will last several years, and be thinly sown mixed with clover molineri or incarnata. It is a deeper rooting plant than clover and brings three or four crops a season. It shall be sown early in the spring and will produce a crop the same season.

MEDICAGO MEDIA OR LUCERN RUSTIC. It also likes a deep, loose soil, in which it will last for many years as a perennial plant. It needs to be thinly sown. Stalks will grow to over three feet high and produces three heavy crops. It is also a good grower in a northern climate.

MEDICAGO FALCATA. This kind is not so particular about soil and climate; is also a perennial, of a hard nature. Grows on dry soil; grows less high than the previous one, but stalks well. All are dangerous to stock when fed young, but is an excellent dry food, if dried well with its leaves on.

HEDYSARUM ONOBRYCHIS. Esparcetta, native of Spain. It is a perennial. Does very well in same kind of soil, position and climate of the lucern, but is not particular; it grows even on mountainous places, on clay, rocky, slaty places. It is of straight growth, with beautiful rose flower and does as an ornamental perennial plant on garden and lawn. Produces an excellent food, green or dry, for all kinds of stock. It is generally sown mixed with grass seed suitable for high prairie.

ULEX EUROPEUS. Juniperberry, Shrub. Part of this shrub furnishes a moist, valuable food for stock prepared mixed with other short food as a medicine; which is known as a good actor to health, when used in spring, and especially late fall, it will be a good appetiser and a preventative against some sickness. All crackable parts with the berries be gathered and well cracked mixed with short food for about ten days to about eight to ten per cent.

Food for Stock of Plants of a Vegetable Nature.

ERVUM ERVILLIA. Is an annual; is of a heating nature; the seed, which is black round, is pigeon food. The crop, while green, serves plowed under, as green manure for bean, melon, cucumber crop.

FABA VULGARISEQUINA. Fève. It is cultivated annually, and will serve for green food cut green, the seed serves, mixed with oats, secale, etc., as dry food.

LENTILLE, or LATHYRUS SATIVUS. It is an annual. Shall be sown early in the spring, cultivated for all kinds of stock feed used green. When it don't freeze out, like in a moderate climate, it can be sown in the fall for early spring crop.

LATHYRUS HIRSUTUS. Is also an annual, can be sown in the fall; will start its growth and don't freeze, and serves for same use.

LATHYRUS CICERE. Grows on dry, poor soil; It serves for sheep feed and green manure.

PISUM OVENSE. Peas, for sheep, is an annual, is sown in the spring. It is cultivated to gather the seed for cooking use, or for green feed for sheep and for green manure to plow in.

LINUM USITATISSIMUM. Flax, annual; it is sown every spring early to bring ripe seed before fall. Of this seed linseed is made, which is a great commercial article. There are a few kinds, but most vigorous, strongest growing ones are in preference. It blossoms white; it is a native of America. It likes rich, light soil. As soon as the seed is about ripe it is cut or pulled up with the roots dried and the seeds threshed off or separated from the rest. The rest are cleaned in different manners; spun and manufactured into fine linen.

All grain of such cultures are sown by machine or broadcast by hand, harrowed in and rolled at such weather when no earth will stick to roller and feet. Such land should be smooth and free of anything for a clean cut by machine, etc.

EIGHTH PART.

Weeding and thinning out young crops should not be neglected, and should be done at proper time. If plants stand too thick at one place and too thin on another these places should be filled by planting of the above. If dry, water well to lift it undamaged; as for weeds, which can be easier pulled when moist. Between the rows of plants weeding is faster done and weed sooner destroyed by means of hoeing, etc. And all plants amongst weed no use for are no better than weed. When crop is thinned out properly to give plants the required room they sooner will grow to perfection, if too thick, most will be rank growth, nothing better than weed, too many plants hinder others to grow to perfection and take useless substance out of the soil.

Often some plants grown up amongst others of which no seed being sown which can be called weed, if on an improper place can be called weed, as asparagus, horse radish, portulaca and others.

The nourishment of crops (plants) besides manure, are air, (oxygen) dew, water. Rainwater is best for all kinds of plants, but to over-water plants should be avoided by hot sunshine, but as much as needed. Most plants like a strong over-watering after sundown. Quite young, low plants need to be carefully watered, not to be splashed with earth, covered or damaged. To water seed need to be done by same care, and be kept moist until fairly started in growth, unless when part sprung the germ may be burnt by the heat of the hot earth. Liquid water of manure, etc., is a good help to grow crops.

The foliage of plants has to be kept clean or will suffer for air, which is the main part of life. If plants are covered with dust and dirt the perspiration for air is stopped, the moisture in plants draws back, the plant begins to sicken, the ends of the leaves get redish yellow, which indicates

sickness and will the sooner die if already belayed with insects, effected by insufficient moisture and dirt; if not in time well washed off, no matter how strong and deep, plants are rotted, which are of a succulent or vegetable nature. The whole plant will suffer when the part has got inactive, which shall take air and moisture to live.

The better the nature of soil suits the nature of plants, the faster it grows and the more moisture it requires.

A cultivator cultivates crops which he expects to grow as fast as possible to maturity and perfection, therefore, it is very important to know what soil, by nature, suits the nature of one and all plants he will cultivate as well as to position.

Only a few vegetable plants grow well in the shade, which are already specified. All others need to be grown on an open, sunny, low position, in substantial, not too heavy, moist soil; therefore, the most of them are natives from the south European seashores.

A regular vegetable grower, market gardener, finds but little time to meddle with floriculture, and is in general ahead of a florist.

Manuring, Plowing and Nature of Manure.

Heavy land should be heavily manured in the fall with mixed manure and plowed under with the beginning of cold weather. Such manure will partly decay, the ground will get loose of with the frequent freezing and thawing, besides, to be sooner ready to plant or sow on early crop by the least favorable weather; new land should be plowed through winter.

Already cultivated land, which is not free of weed and require manuring for the crop concluded to be cultivated, or may also be manured and plowed; when found necessary to be re-plowed for certain early crop; all land shall be newly plowed, broken, prepared to receive a crop. Avoid manuring late in the spring for any crop, unless with quite rotten manure, considering necessary and suit the nature of the plant, of which are few besides the Brassica, or Cabbage family; because, manure, if not in quite

decayed and well mixed with the earth, does generally more harm than good by dry weather.

All land, when plowed (broken up), shall be even, loose and free from clods that roots find an easy way to grow.

Kind of Manure, and its Nature.

Cattle manure is known as the best for all culture and for all kinds of soil; it is a fat neither of a cool or heating nature.

Horse, mule, sheep, goat is of a heating nature; it is suitable for land of cool, wet, heavy nature; poultry, and manure of all kinds of birds, is of a hot, fast-heating nature to be used carefully as manure liquid for plants of a cool, slow-growing nature; hog manure if of a cool nature, suitable to manure orchard, or for vegetation of a hot nature exposed to the sun planted in light; sandy-like soil.

Street compost fairly decomposed is suitable for any kind of soil and also for any kind of vegetation; other compost, made of leaves, weeds, sweeping, wood, cinder, brush, refuse or garbage of any kind of vegetation, human and animalish manure, equally composed together, will decompose rapidly, by mixing the whole well with fresh air-slacked lime and chemicals which will also suit well, when well decomposed, for any kind of soil and vegetation, when practically well mixed and not in over-quantity applied.

DRY MANURE. (Fertilizer), of which I will note only a few. Bonedust crushed green and dry with marrow in, is a fat substance to be applied thinly, but has no visible effect to crops the first year.

Guano is a very fast-acting stuff, thinly, carefully to be applied by rainy weather, or in water. Both bonedust and guano, or bonedust and air-slacked lime should be thinly sown and harrowed in, are good fertilizers for tobacco, flax, corn crops, etc. Liquid manure of human and animals, manure blood, guano, refuse of slaughter houses, soot, etc., are valuable fertilizers to most of the vegetable culture.

GREEN MANURE. Crops for this purpose can be grown and plowed under, which are dangerous to be fed while green and when dry are of little account for feed, which are annuals of a vegetable nature. Which are brassica oleracea campestris, ervum ervilla ears, faba vulgaris, faba or favi lathyrus hirsutus, cicer, lupinus albus, media sativa, millet or panium italicum, pisum arvense, peas, raphanus sativus, vesco villosa vesk.

Plants Which Grow in the Shade.

Some shady places are to be found in gardens and fields, where it suits plants by nature to grow on shady places, which can be utilized for such culture: Allium chenoparsum, allium escalonium, cress, caraway, beans; endiven, winter green kehl, parsley, oxalis, New Zealand Spinach, winter spinach, the Chih and African strawberry, Alpine raspberry, blackberry, Alpine strawberry, filberts and mispelus.

When Seed Shall be Sown.

Besides the twelve figures in the almanac is the moon, which has great influence on the growth of plants. By a close observation for years it was found that seed should be sown by certain signs, not to blame itself when rank grown crops grow of the very best seed, particularly, sown in good, well prepared soil, kept by good care. Or, for what are all the figures, only to look at in the almanac?

Seed has to be sown and it matters very little by a few days' difference to sow seed.

Sow first seed as directed at different times and by different signs to have your proof. Do it for a trial; it costs you no more than

when sowing it down without knowing when and how. Sow beans by ascension of the moon or first quarter, by the figures of the Twins or Fishes. Also peas and ocras.

Sow carrot, parsnip and all other rooted crops, also, beet, radishes, turnip-rooted celery, mangold root, rutabagas, turnips, by the figure of Fish or Scale, by descending moon. Sow head cabbage, cauliflower by the sign of Scale, a few days before a full moon; also, Brokloi.

Sow turnip-rooted cabbages and the yellow rutabaga by the sign of Fishes and Scale, descending moon.

Sow celery, leek, cardoon, by the sign of Fishes or Twins, in first quarter of moon.

Sow lettuce by sign of Scale, by half full moon.

Sow curled endive, parsley, cress, curled dwarf kehl, Brussels sprouts, Krous winter kehl, feathrekehl, by sign of Maid and Crab, by dark of the moon.

Sow spinash by sign of Waterman, or Maid, dark of the moon.

Cucumber by sign of Waterman, of first quarter.

Sow melons, egg plants, spinach, pumpkins, tomatoes, large pepper, by sign of Scale, full moon.

Onion, by the sign of Steer, full moon.

Potatoes, in Scale, near full moon; also, sweet potatoes.

NINTH PART,

Asparagus Brussannettu, Hops.

It is a perennial, glabrous, vining creeper. Is a native of middle and eastern Europe; can be found wild in sandy, rich, low places along rivers, amongst the wood to creep on the same. It is of about the same nature of

the general asparagus, with a pivoin-like root and produces sprouts on the crown of the roots like asparagus, which are also of the same use.

If the soil is not of a loose, sandy, rich nature, it should be made so by digging trenches or holes and be filled with such soil to suit its nature.

It shall be planted three feet apart in the row, and four feet between rows, planted with sandy leave-mould, light hotbed earth. Every plant needs a strong pole eight to ten feet long, solidly planted. The second year they bring a full crop, which will be ripe about the latter part of September, when picked off and stored six or eight inches thick on a shady floor where fully dry, and stirred with a stick a few times until fully dry, and packed in good drill sacks for the market.

Nicotiana Tobacum, Tobacco Culture.

Tobacco is one of the greatest and most valuable commercial articles, therefore, a very extended culture is needed.

To grow good tobacco and a good crop, seed has to be secured of choice kinds, of which sets have to be raised early in the spring to have enough plants ready grown to plant out on suitable land as early as no more frosts are to be feared.

Choose an open, sunny, dry place; burn a big pile of wood brushes, sod manure on it, which will burn all weed-seed, insects on it. Put a low hotbed frame twelve by twenty, holding four four foot wide sashes; dig up lightly and mix half with leave-mould with half if none is on the burnt spot; level well and sow the seed which should have been well soaked with hot water before and dried with sand or cinders very thinly and sprinkle a little sand over or over-browse with warm water. It is possible to grow 700 plants under one sash, and 10,000 plants can be grown of one ounce of good seed. These plants to raise need fair attention to keep them free of weed and moist by a little above temperature.

The land to grow this crop on shall be of a rich, light, loamy nature and of a level, moist position. It wants to be evenly marked by plowing,

harrowing, rolling, and marked off by a marker (heavy rake) of three feet each way and a plant planted on each cross, and slightly watered down when not rainy. Whenever a plant begins to look flatry-like after it has has taken root there is likely to be a cutworm by, which is to be found and killed and another plant set on the same place of the one being damaged. The crop has to be kept free of weed, hoed, and as soon as it begins to blossom the tops have to be taken off, to leave according to the size of the plant, from four to eight leaves. All shoot between leaves and shoot as well as on the root by daily brake-out.

If some of the lower leaves begins to be covered with brown spots, the crop is ready to be harvested, and brought under roof in the best manner without damaging any.

When dry and fit to handle, bundled and pack it for the store or market.

Grapevine Culture.

VITIS VINIFERA. The grapevine is a native of Asia and America. It is a strong growing creeper, and can often be seen that it has taken hold on the top of a tall forest tree. Its fruit is generally of a small sized berry of dark and bitter taste.

It has so far been improved to produce, in a hot and moderate climate, a great number and choice varieties of excellent fruit through fair cultivation.

The first method to propoget is of seed which will produce in a hot or other climate grown, in suitable soil will produce improved fruit.

By a second method, eyes are cut out with half an inch of wood on each side and laid on a moist sandbed under glass, and kept moist, which will soon start to grow if kept by a moist heat from 75 to 90 degrees. This preparation is done in early spring. This moist heat is slackened when this eye has grown to about six inches long, and may be transplanted

(but by care) either in pots or on a suitable bed outdoor eight to twelve inches apart.

The third method is the well-known common one: cutting made also in the spring, from fresh trimmed off wood, made of the solidest canes, cut close to an eye at the lower end with three or four eyes in length, planted in sandy-like, fresh and loosely dug ground twelve to fifteen inches apart, and kept moist by dry weather; all should be labeled.

Either of the two will begin to bear the third year, if planted the second year, when strong grown.

Layers can be made in the spring of the previous year's growth, grown nearest to the ground, and bent into a four by six inch hole and hooked well down with a wooden hook, and the point cut above the second eye from the ground. When not disturbed, and kept moist, it will root so well to be transplanted in the fall to bear the following year.

Vines can be budded and will readily bear some fruit, when done as early as the bark loosens from the wood. This budding is made the same as on trees.

There are about 200 varieties known, of which the fleshy, thick-skinned ones are most for eating use. Those in which the seed without pulp is seen, are more vinous, and are suitable to make wine from them.

This last named is of a solidier nature in wood, and of closer growth nearer in the limbs.

The former needs to be planted at a distance of from fifteen to twenty feet apart in the row, and fastened to wires or trellises, if not planted on the side of walls or harbors, while the varieties for wine only needs to be six feet apart when trained on poles, otherwise, from eight to fifteen feet apart.

Limbs on old vines, which have been left too long by trimming, may be laid into a twelve by fifteen inch ditch, with three eyes on the previous year's growth, with the points off to two eyes above ground, or, such limbs may be tied bent to weaken the top's growth, to grow canes nearer the old root.

Old vines, with solid canes, grown the previous year, can be transplanted, which will bear some fruit the same year. Of which the old limbs the damaged roots be trimmed back and the old roots as well. Plant them

into a fifteen by eighteen inch ditch with sound, solid canes of last year's growth; cut the points back to two eyes above ground. This young canes well take root next under surface and be a renewed, sound young vine. The old vine or the roots at it will (root) grow again, if sound and not too old and stout.

Pruning.

No newly planted vines, or very few, will be of such a strong growth as to require to be pruned as those of two years' growth, only need be little trimmed back, as those of a fair growth shall be practically pruned. Leave two canes, each of three eyes, one to the left and one to the right, which to be tied to the lower wire or strip. One shank of two eyes, of which fruit canes will grow to bear fruit the following year. The fruit canes which did bear or not shall be trimmed back to make room for the new ones, which may be trimmed to two eyes longer, with two shanks again. The vine might have grown that stong that one or two fruit canes with two or three eyes on each may be left above the lower ones and drained to the second or than to the third wire. If the fruit canes are left too long, with too many eyes on, the vine will become naked (minus) of canes near the root, and some of the lower eyes on the cane will be weakened by the upper ones, which take the strength of the lower ones which prove useless.

If a vine should have many strong, yonng canes on, more than four fruit canes may be left, if room for them to be well divided, or knots of two eyes, which will grow fruit canes, but shall be trimmed kack to keep the vine in shape.

Fall pruning has proven to an advantage against late spring trimming, while at this time the vines lose strength at the bud by bleeding, of which the wet runs over, the eyes will be damaged when frosty weather.

If late pruning is repeated several years, the vines will be weakened to die.

Pole vines, if not very strong, should be strictly trimmed to leave two fruit canes of about five to seven eyes and two shanks. All the fruit canes should be fastened to the proper places before the buds get too big, to avoid damage, but as long as they are loose, don't get so soon damaged by frost, as they are moved by the least air, and keep more dry.

When vines are pruned in the fall, fastened, bent down, covered with earth, straw, manure, protected against wet and sleet, the root gets also covered. The land can be regulated, and the vines left covered till the heaviest frosts are passed, will be found to an advantage.

Care While in Vegetation.

Vines strong enough grown should be regulated before they begin to blossom. Those strong enough with fruit on shall be pinched off above the second leaf above the last fruit, or bunch, and all loosely tied, by danger to be broken off by wind. This is to be repeated after blossoms have dropped. All canes without fruit, if not, shanks must be taken off. The stronger cane on a shank be unpinched, loosely tied. At this time the vine affords the greatest care, and be examined every day about insects.

Acarus Delarius or Red Spider.

It is an invisible insect. It is to say a bad parasite, and nobody as yet is sure where it syring from, except there is a believing that the horse, mule manure, or the steam of same, is the cause of.

While mushroom is cultivated by a preparation of such manure, in an enclosed, nearly tight place, and such a mushroom crop, by a same cause, is swept off in no time, without a visible cause. This insect is shel-

tered under leaves in hot shade; there it sucks all the substance of the leaves, and also of the young grape, into which it grows and lives in it, causes part to rot the grapes. Those berries which have not dropped and can't fully ripen, are the cause of, and which can be seen in the berry. but not with the naked eye.

As soon as any leaves are belayed with, they have a rusty appearance (color) at the under side.

This parasite, if not noticed at first and its spreading prevented, will, within about forty-eight hours, be spread over large patches of vine, cucumber, melon, bean, squashes, strawberries.

Sulphur is a preventive if the lower side of the leaves are overdusted with, also sulphur, blue stone, vitriol, moory-salt, diluted in hot water, when cooled off put a portion of solution of iron by and syringe well the under side of plants with this solution.

As long as moist, rainy weather remains it seems this insect has no effect on plants, as it is the case when dry and hot.

This insect has very rarely been found on plants in the cool country, and only at some parts.

But another air parasite called odium tuckeri, on grapes only, in a form of a grayish white mould, by part misty, cool, moist weather, which rather causes the berries to break open and to rot not ripen. Where the cause springs from is unknown. The fruit and juice as wine used of plant which has been belayed with such a parasite may prove fatal to human nature, without knowing what the cause would be and may prove incurable.

Agaricus Edulis, Mushroom.

The varieties of mushroom are numerous and great care is to be taken not to mistake poisonous ones for usable kinds, while poisonous ones effect, generally, fatal causes. Therefore they are, and be cultivated, which is done on different methods.

When successfully cultivated in or about large cities may pay as well as a poor crop of strawberries, and can be cultivated through the whole year.

Since mushroom, spawn or white, is known, it can be used whenever prepared for.

Prepare a bed of strawless horse or mule manure of three and one-half feet in thickness on a dry place, close, almost air-tight, and dark and warm. Lay the bed in a long or nearly square-shaped, solid, rammed lightly with a piece of plank. As soon as it steams well all over, if not packed between walls change the outside inside. It shall be in size and shape of a stout hotbed walled in, and has lost the smell of manure; press the manure down with your hand to be equally solid over the top.

After this, begin to plant mushroom spawn or white two-inch pieces two inches deep all over where no room is needed to tend to; cover all over with a light cover, until lifted by mushrooms. This crop will last from two to four weeks. Spring and summer are the best seasons. Not too old cucumber and melon beds are suitable to grow mushroom of spawn white, but has to be kept well closed and shaded.

Mushroom spawn or white can be obtained on a high, dry pasture of horses and sheep. They appear early in the fall and can be found where spider-like threads are seen. Where this spider-like thread begins is the seed, and place to cut square-like pieces of about four inches deep out the ground, which shall be dried and preserved until use.

TENTH PART.

Fruit Tree and Other Fruit Culture.

PYRUS MALUS. Apple; a seed fruit. To grow stock root to grow sound, healthful, well-bearing trees, sow the seed of choice fruit of

healty, good-bearing trees, for high orchard trees to grow of. Also, seed of *Pyrus malus pumila*; *Pyrus malus praecox*; *Pyrus malus fruticosa*, which are the three principal kinds to grow stock root for half dwarf apple trees, and lower, when treated for by trimming.

PRUNUS COMMUNIS. Pears; also a seed fruit. Stock root for pear is grown of the *cydonia communis*, or quince, by seed, or of cutting in the month of July, on a sandy-like bed in the shade; also, of wild pear seed, and of *crataegus alba*, white thorn. Dwarf kinds of pears do well on quince stock; pears of a strong growth, on the other stock.

CYDONIA COMMUNIS. Quince is a seed fruit; grows to a pear like shape, with a yellowish, green, raw-like skin. When ripe, a while after being gathered, is of a lemon-like color; used for preserves.

AMYGDALUS PRUNELLA. Peach; it is a stone fruit. There are two principal kinds, as cling and free stone, which are most of a velvet color when ripe; those of the largest blossoms brings the largest fruit. To grow stock roots for peach trees, plant seed of the choicest fruit. Stock root of apricot and almond is well adapted for.

ARMANIACA VULGARIS. Apricot; stone fruit. Seed of the very choicest fruit is to be sown to grow stock root of. Root stock of almonds, plums, are suitable to graft apricots on it; also cherries *dulcis*, or black cherry root stock.

AMYGDALUS COMMUNIS. Almond, is a nut or shell fruit apricot and almond roots are of pivoin-like nature. Both are of a gummy nature, like peach and cherry. Its nature affords a mild climate.

To grow seedlings of, plant seed three inches apart. The one grows up first and strongest generally brings good fruit, the weak ones be taken off. There are three or four kinds of hard and soft shell of a sweet and some of a bitter taste.

The peach almond brings both sweet and bitter; those grown in the sun are sweet, the other bitter. They furnish graft-root of seed for its own stalk; stock-root of plums, peaches, can be used for.

Prunus Domestica and Prunus Insitita.

It is a hard stone fruit. It grows numerously wild in different countries, of which stock-root from seed or suckers be raised to furnish its own root-stock to graft its many varieties on it.

PIOSPYRUS VIRGINEANA, or **PERSIMMON**. (Dates), resembles prunes; are known as a commercial article, in a dry state.

CORASUS. Cherries, of which I say are two principal kinds, *cerasus dulsis*, one of a healthy, vigorous looking growth, of brownish colored bark, bears black fruit, while the other, *cerasus dulsis sativa*, is of a poorer looking growth, with grayish bark, suitable for dwarfish, sour fruit, while the former is suitable for all the other and finer varieties.

OLEA FURROPEA. Olive tree, oil tree, not fruit; grows in a mild climate. Trees grow of its own seed, in light, rich soil, and begins to bear with the sixth year, but not a crop to manufacture oil of until in the tenth or twelfth year, but serves for eating use.

There are several kinds of olives more or less productive. Of the most productive ones, the others are grafted. There are two principal kinds: one black, the other white, and are eatable unprepared, like some other nuts. Olive oil is a large commercial article.

CORNUS MAS. Dates; a stone fruit, being grown from seed, layers, or from cutting, in light, sandy soil on a shady spot.

There are two kinds of fruit: one red, of long round-like fruit, the other, yellow, but smaller; it is a much-liked green pickle, and in a dry state.

MISPELUS GERMANICA. Mespel, is a hard seed-fruit. It is a small tree, of dwarfish growth. Those brings the largest fruit are preferred. *Mispelus apyrena* brings stoneless fruit; some is grafted fruit. It can be grafted on its own root. Also pear stock and white thorn *cratagus alba*, but only for trial.

PUNICUM GRANATUM. Granite tree with seed stone fruit. This

kind of trees must be on a hot place to grow large fruit and to ripen it. While a native of Africa, it is a beautiful ornamental and flowering plant of double and single scarlet flower, and also yellow; only the single ones are fruitful.

The fruit is a showy, pear-shaped like, of a purple color when it is ripe, of a sweetish acidus taste. Its cultivation is an easy one of seed and suckers on a warm position in light, sandy soil.

Orange.

CITRUS CHINOA, INDIA. Is a seed fruit. This kind of fruit succeeds best in a hot climate. To raise trees of seed has to be sown in boxes, low pots, etc., and sunk to the rim into a fresh laid hotbed, which has to be kept moist hot; the sashes tight and covered when no sun, until the seed has grown up to a few inches before air and little light shall be given. Possible that some can be grafted by doubling the following fall early. The graft is surer to grow before transplanted and thus be kept until spring, but the temperature shall not be lower until spring than 55 degrees, which can be kept up by renewing the rim around the frame with horse manure, and a good cover on sashes.

In the spring all these seedlings shall be potted or set, or with pots in a fresh laid hotbed, but with little air. Those ungrafted ones can be grafted by coupling through summer, but only give some air the growing ones; the others shall be kept separate, and to say, kept without air until the graft is somewhat grown, and to leave them in the same hotbed until the following spring, but do not let them stand, and cover all up well through winter, in the spring they are uncovered, raised, and all re-potted which need it.

All the different kinds of oranges, lemons, can be grafted after the second year, and oranges grafted on wildlings grow surer than on lemon stalk.

This stalk grows from cuttings, and be also grafted on other methods.

When oranges, lemons are planted out door the climate must be temperate, if it is not, all have to be planted in tubs, etc., and kept frost-free under roof.

The soil for, shall not be too heavy nor light, but of a rich nature Rain water, manure liquid, is essential through the vegetating season. Don't water when not very dry, but water heavy that it runs through the bottom of the tub.

Those in cases, tubs, pots, want to be changed to larger ones, the old soil around the ball to be reduced and replaced to larger ones, and re-filled with rich, fresh soil, which will be necessary every two years.

Oranges, lemons, are wanted all the year round, and besides, are a valuable, fine fruit.

FICUS CARICA. Figs, is a fruit, full of fine seed. Its nature effects the same mild climate of the citrus, but light soil and a great deal of moisture when in vegetation. If planted out door in a climate where the mercury sinks under four degrees of the freezing point. Figs must be planted on the south side of a house, solid wall, or steep, rising hill, and well protected through winter. If planted in cases, tubs, pots, serves as an ornamental plant for the beauty of its leaves.

It throws a great number of suckers about its heal, which are taken off when rooted, of which the figs are part cultivated. It is a valuable and noted article.

Old plants of large size bear three or four crops the same year, on a side of a stone wall, with its roots in a creek of running cold water.

When cultivated in a climate suit its nature, they produce good and heavy crops, and are used like other green fruit, but are more nourishable, dry.

Morus Nigra, Mulberry.

Is a fruit of small seed, in shape of a big blackberry, of a blueish black color. Its leaves are large, showy, likes a sunny position, protected against cold winds; is not particular about the soil.

MORUS RUBRA. A kind of a reddish color and of good taste, with large, showy, glauish leaves. Morus alba brings a whitish yellow fruit, but small. All three kinds are easily cultivated from seed and cuttings.

The last furnishes the food for silkworm, while leaves are tender, which are produced by plenty of moisture and trimming.

Castanea Vesca, Sweet Chestnuts.

Shell fruit. This is a native from the middle of Europe; also, there is a kind of small one grows in America. To grow sound fruit, deep, porous, sweet, light soil and a mild climate are necessary.

Plant choice seed in the fall in a low box with sand and put it in a moist place, like in a cellar, where it won't be disturbed by mice, rats, or out door, where it won't be disturbed by anything; frost won't hurt it. If the climate is mild it will begin to take root till spring. The fruit shall be planted two and one-half inches deep in deep dug ground in rows eighteen to twenty-four inches apart, and to eight to ten inches in the row. As soon as the winter is over mulch lightly to keep the moisture in the ground, fresh mown grass is the best to mulch with. The bitter wild ones may be planted but have to be grafted of the sweet ones, when strong enough, the second year. As soon as limbs are grown about eighteen inches cut them back to ten or twelve inches to prevent being broken by wind; the limbs will be more numerous and the trees stouter, and grow to a large tree.

The uncultivated ones bring smaller fruit; only choice kinds are grafted of.

The largest in fruit is the most preferable for its size, taste, and to preserve it, it is called limonsin. Many other varieties of early to late ones are known.

JUGLANS REGIA. In general, called English nut, but some parts of the Swiss Alps are covered with, of which brings choice fruit. This nut will succeed in a moderate climate when planted before cured and dry.

They like a light, sandy, gravelly, peat-like soil. It will pay to cultivate it if only for its well known wood. It grows best on a northerly position.

CORYLUS TUBOLOSA. Hazelnut, grows wild in Europe, America, etc. Of the choicest ones are cultivated, which improve through cultivation. Two kinds are cultivated for showy foliage, besides for its fruit, one with a varigated, the other with a purple foliage. It likes the same kind and position as the previous, and cultivated of seed, sprouts and layers. The nut is mostly round, hard.

PISTACIA VERA. Native of Syria. Grows high, but as yet don't grow in a cold climate. It is a very showy, high-priced fruit, in size of a big walnut, of a yellow and violet color, very juicy and of a good flavor. Cultivated of seed sown in a hotbed of sandy-like soil, also of layers, and which don't bear are most males, and be grafted on females, which is done by the method of grafting in the split.

PISTASIA LENTISCUS. Native of the Meditteranean, is also a dwarfish like tree; blossoms greenish stained like none; its leaves are pine like, long and small, with darkish droopings. Its resinos sap is gathered and called mastic.

Fragaria, Strawberry.

This is a well-known and largely cultivated fruit. The alpine is the original one of which many kinds have to the present been cultivated of

through seed; the seedling from being improved by practical cultivation, soil and climate.

The fruit improves of seed sown of choice fruit. And even of the rooted runners, when transplanted into soil, position and a climate which suits its nature, and treatment, by which method large, choice fruit, being obtained, and has also improved in flavor.

This culture likes a rich, middle-heavy soil, on a sunny, moist, low position, and planted two feet a part in rows and eight to ten inches apart in the row, on well-worked-up land. When planted early in the fall, it will, of good grown plants, bring as much as half a crop the following year. If planted in the spring, it will bring a better crop, but requires good care a full year, by keeping it clean of weed, and protected with a light straw cover, which shall be every winter, and cleared off in the spring, after which the ground is cleared and loosened, and the plants gently treaded down if (loosened) raised by frost. As soon as grass can be mown, cover the ground with, especially around the plants; this cover will keep the moisture in the soil, while the berries need moisture before ripe; second, it keeps the weed from growing, the runners from taking root, which partly weakens the plant, and third, it keeps the fruit from being splashed.

When found necessary, a coat of rotten cow manure should be applied before to put the straw cover. This manure shall be worked in when the straw cover is cleared off.

Ripe berries should be protected against the noon sun, unless it will be damaged by heat. The matting around and between the main, plants by runners shall never be allowed, unless, crops will be greatly reduced; no fresh horse manure will do. The cultivation of this culture is an easy one, and is said to be done by seed, runners, and by the dividing of old plants.

RIBES, CURRENT. *Ribes rubrum*, red current. The largest of all varieties is in preference; the cherry current.

The versailly is the next largest in size to red current; it originates from France.

A third one, also red colored, from Holland; also the grape current, white, which is an excellent variety. They are easy to be partly cultivated from seed, cuttings and by dividing of the old plant, by planted about

three feet apart in rich, medium light soil; the top covered with rotten cow manure, and the reducing of the old wood helps to improve the crop.

RIBES NIGRA. Black current, is not one for general culture, even its berries are of the largest size. It has a peculiar, aromatic taste but is of a healthy nature and used as an medicament. All this current shall be covered through winter.

Ribes aurea blossoms yellow, but don't pay to be cultivated for its berries, is used as an ornamental shrub; it brings small yellow berries.

Ribes sauguinea is a beautiful flowering shrub, and a very ornamental one, with its red, grape-shaped flowers. They do all well by same cultivation; does better in light soil than in clay, on sunny, moist position.

RIBES UVA CRIPA. Gooseberry. This culture has been well improved from its seed sown and cultivated in suitable climate and soil, where it has improved and grows berries of good size and taste, and is in color from greenish white to an olive color, and is in size of a medium cherry, of which I remember the names of Downing's seedling, a green white berry; Smith's seedling, nearly of same color and size; white amber, a large white berry.

Smith's English choice is of largest size, greenish color; their cultivation is an easy one of seed, layers and by dividing of the plants, planted three feet apart in rows; they shall also be mulched and their roots protected; tops and roots should be protected by a cover through winter.

RUBUS IDACUS. Raspberry, of which are a good many kinds of the Alpine, which is the original one; has been improved of by change of climate and soil, through seed and sprouts. They are found from a yellow color to black.

The red and yellowish colored ones grow straight. The dark colored are more of a dwarfish, straggly growth, more covered with prickles than the others, with green bark, while the other of a brown color. The latter takes root at its points when hanging to the ground, which are used for the general planting. The Philadelphia is of vigorous, straight growth, of a yellowish color; fruit, large, tender.

BRANDYWINE CUTHBERT PARNEL. Turner, are upright growing ones, with red fruit. All of a more or less vigorous growth.

Dolittle, Gregg, New Rochelle, Mammoth Cluster, are more prickly and with green colored bark.

RUBUS NIGRUM. Blackberry. Of which are as good kinds found in a wild and uncultivated state and hardier than some of the cultivated ones. Some cultivated from seed have proven well improved and are also part cultivated of sprouts. All these rubus varieties grow sprouts on the crown of the roots, like asparagus and hop. The bearing canes die off the same season, which need to be cleared off and the limbs of the succeeding ones shortened back. Some have to be kept straight by fastening them. They all require rich, light soil, low, moist position, half shady, and be planted in rows three to four and a half feet apart and two feet in the row. The tenderer kinds need protection by cover through winter.

BERBERIS VULGARIS. Vinnett. Grows best wild in moist, sandy soil, along rivers. It is a shapely shrub with a sour foliage and bears an oblong, red fruit, of which vinnett wine is made as a refreshing drink. The roots are of yellow color and manufactured for.

Oxicoccus Maccrocarpus, Cranberry.

Whoever bears in mind to meddle with cranberry culture, and with an intention to follow this business should be fully armed with pertaining to this business and culture.

Besides, should have an income from another branch of business, or capital, until he will be able to realize means of the cranberry crop.

If a cranberry meadow is well situated, well cultivated and well managed, is a profitable one.

The question where and how to look for a place on which the result will be a sure one to good success. Not to put up with in vain, and even work with as little capital and labor as possible.

By experience look for marshy land which lies on a gradual incline, of a porous, rotten-like, sandy nature, with an undermoisture to about

seven inches under the surface, but with no standing or stagnant water on it easy to be drained off; also, with no weed of any raw nature likely to be found along large rivers, marshes and seashores, and with a chance for plenty of soft water to be used when needed or wanted. If such land has to be chosen near a salt water seashore, it must be protected against salt water and high, cold winds.

Could such land not be chosen without any holes and sods at all, the sods have to vanish to about eighteen inches under ground and the land be laid level like to an incline.

A large quantity of running water to overflow such a piece of land to over one foot when necessary, either by a canal or branch of a never-failing stream, or from a dam of such a capacity, considered to hold more than needed when necessary, which dam has to be situated near the highest part of land, while at the lower part the water should drain off as fast as wanted.

The land should be prepared and ready until late in the fall to have time to settle and be all on a level-like incline; all over equally even.

The water is needful to overflow the plants. Set them under water to protect it against damage by frost by the frosty season, while a healthy undermoisture is the very life for this culture.

To secure the right kind and healthy plants or vines early in the spring to plant can be done through winter, and by the size of the prepared land, the amount of plants.

If plants have to be sent quite a distance they should be got and healed into moist sand on a frost-free place. If attainable in the neighborhood should only be dug at about the time of planting it.

Great care must be taken by dividing plants that no two vines are left together, and not even a piece of grass root is planted with. There shall be two to three spears or runners on each root. Spread the runners well and bury them well in the ground, but be careful to have the ends, or tips, out of ground.

The reason of this particular planting is, that the runners will grow new roots by the joints, above which will grow young, healthy vines, fit to mat after some time. A patch so planted will seldom fail, besides, when planted in the spring. The rows shall be thirty inches apart, the plants in

the row one foot apart. This is about the distance to give space to work the crop and for picking.

Planting is done on a second method: The plants are cut to about six inches each with a root, and four on a hill; two standing, nearly laying right and left, and two in the middle of.

The Difference in the Nature of the Cranberry Plants.

The nature of the cranberry vine is a flexible looking one, but hard and short in the wood.

A new cultivator, unacquainted with the difference of vines in nature, may get deceived by planting unfruitful ones, which are the healthier looking ones, with greener leaves and of a better appearance. The fruitful ones are of a barren, wiry, unhealthy appearance and are found on different positions, and some parts of the year not easy to recognize the difference of.

The plants with blossoms and berries on are very sensitive about frost, and are easily injured, early and late.

The vine is of a dark green color in the spring when healthy. June, July is the time when blossoms appear, which are of a delicate pink color, slightly tinted with purple, and appears from the creepers to the spears. From this time protection is needed in regions where frost appears about this season. A frosty night may destroy the crop, which will be protected when set under water, and shall be cautioned until all fear of frost has disappeared. What also retards the blossoming?

Vines get delicate by standing under water, therefore regions where few and no late frosts appear are more favorable for this culture.

Flooding is, again, a great prevention against the cranberry worm. It appears to be the red spider, a parasite. Soon after it is noticed it spreads fast and devastates whole crops by dry weather.

The other enemy is a worm which pries into the berry, which rots.

The picking time is about in October, done by hand, which saves the time to clean it to be fit for the market instead to rack it off and clean it without any blemish when barreled.

There are three varieties of cranberries grown in America. The first is a bell shaped one called Bell cranberry, the second, Cherry, cherry shaped; one a larger one than this, second Cherry; fourth, Bell Bugle; fifth, of same but smaller.

Oxycoccus palustris is, or was, cultivated in England and Ireland, but is very inferior to the American. *Oxycoccus viridia* is a Russian variety.

Nursery or Place Where All Kinds of Fruit is Raised of Seed, Sprouts, Roots, etc.

This place shall be situated where well protected against the cold, and damaging winds, on a position not too high and no fear to be flooded. With soil, most of a medium, light, substantial nature. All seed of fruit should be sown fresh in the fall and covered through winter with sawdust, or kept in moist sand until early spring, sown as early as surface gets a little dry.

No other seed be sown but of ripe fruit, and be sown soon after, while it can be depended on its vitality; especially stone fruit, seed shall be sown soon after being ripe, while the stone is green, while it springs easier than any time after, while the stone gets hard.

Apple, pear and quince seed be sown in rows two feet apart, two inches deep and from one and one-half to two inches apart in the row.

Stone fruit seed in rows of same distance, but three inches deep, and the largest stone well three and a half inches deep, as the seed or stone of peaches, apricots, etc. Seed of cherries, plums, dates, mispels, of three inches deep.

Shell fruit seed, like of almonds, are of easy growth, especially those of soft shells, and need to be sown at a same distance and depth of plum seed; also chestnuts at a same distance, but one-half inch deeper.

Nuts, no matter if English or American, should not be delayed to be planted at three and one-half inches deep at a same distance of others; also, hazelnuts or filberts, but only one and one-half to two inches deep.

Seed of fruit most grown in-door or in a mild climate are partly specified and need to be sown in a hotbed like granate, apples, oranges, lemons, figs. Mulberry seed may be sown in or out door, but seed of a special kind of strawberries should be sown under glass, also other special small fruit seed.

All seed sown in the fall shall be protected through winter with a cover of sawdust, as it is the best cover; manure or leaves shelter mice and insects.

All this seed shall only be of the healthiest trees, which grow the soundest and choicest fruit.

Transplanting of Seedlings.

All seedlings of fruit trees may be that far and strong enough grown to be planted on another part of the nursery at twelve to fifteen inches apart in the row, but the rows at three feet distance, with the stock-root cut off, after which the quantity of fibers will increase. All the sickly, crippled-like ones shall be left out as the handling of them would be useless.

All fruit seedlings, when strong enough grown, shall be planted at the place where they shall bear.

Seedlings of imported seed will be weaker in growth, and sown months later, even of fresh seed of the same season, while seed has to be naturally dried before packed.

Grafting, Preparing.

This can be done on different methods. The best time for, is when the sap is beginning to circulate, or is in full circulation.

If early fruit is to be grafted on late root stock, in which the circulation of sap is later, the scions have to be cut far earlier and stuck in moist sand on a cool place until the sap in the root to be grafted is in fair circulation.

These scions are used by side or grafting in the split. Side and split grafting be applied to trees, stock-root, on which grafts have failed, by budding, doubling, coupling, and has grown too stout to reapply the same methods again.

There are different methods of grafting, of which to graft in the split is the commonest, and can be applied to apple, cherry, pear, plum trees. Young trees have to be cut off to one foot above ground and lower, which stump shall be split at the thicker side of the middle as far as the scion, When cut on both sides wedge-like, can be fitted into the split even with bark to bark, the split held open with a wooden wedge, which is carefully withdrawn when the scions are rightly placed, with two buds on them. The split be covered immediately with cold or hot grafting wax to keep air and the wet off. The outer bark on scions to fit by grafting. Stone fruit has to be nearly even with the inner bark on the stump. The same operation can be applied at the crown of strong grown trees which have just begun to bear, but unsuitable fruit. When grafting is done at the crown, a tree bears sooner.

SIDE GRAFTING. The young tree, or limbs on the crown, be cut off like the first. The scion is trimmed to the thickness of the bark on the limb, with a saddle to rest on the cut; a piece of bark is cut, which space the cut at the scion shall exactly fit and fill, which shall be gently and fairly tied with a strip of muslin, etc.

A scion can be cut to slip between bark and wood, that bark will fit on bark filled out with cold wax, and tied with a strip of muslin; thirdly: a scion to be cut to a sharp edge from both sides to a point, and be let fitted

into the wood part under or inside the bark, well filled with cold wax and bandaged with a strip of muslin.

GRAFTING BY DOUBLING, can be done to stock-root, yet too small to be budded by a diagonal, clean through cut on the stock-root and at the scion of exactly the same size, that both fits, bark on bark, gently, exactly and solidly tied with muslin.

GRAFTING BY COUPLING. The root part be cut off a few inches above ground and sharply cut to wedge from both sided to the middle, at length on both sides on equally cut to a sharp edge; the scion to be of exactly the same size, and cut so as to fit over the wedge, bark on bark, and also tied like the one before. Mucilage should be used by every graft.

GRAFTING BY BUDDING. Budding is a general method of grafting, which can be done as soon as the sap is in a fair circulation, which is the time in the spring when buds fairly swell; what is called grafting on the vitable, or growing eye; also on the unvitible, or sleeping eye, and be operated in July, August, September, when favorable, moist weather that the sap is in fair circulation, and can be done from the top of the root to the crown, which is a great advantage to low budding, while a tree of such a size for sooner will bear.

When ready to operate, make sure that the sap is up in the graft roots; the bark loosens easily from the wood than begin with the earliest fruit; apricots, peaches, plums, or all which the buds swells first are best.

If the scions are a distance from the place of the graft roots, and several has to be cut at one time, they have to be put in water, moist sand, be stuck into fruit or potatoes on quite a shady place; but avoid to do it when rainy or wet, and when very hot and dry. It won't hurt to water the stock-root well a day or two before, when the ground, being, and is, dry, by which they get cleaned and refreshed; graft them on the smoothest spot, mostly on the east side; the leaf of the bud to be half reduced only. The buds on the scions must be well chosen, only the middle ones on the twig be used, which proves the best for fruit, and most vitable ones and well developed.

Well developed scions can safely be sent from or to a distance by sticking them into cucumbers, potatoes, fruit.

Budding has to be done with a small budding-knife, which are made for this purpose, and be as sharp as the sharpest razor. With which to cut

one of the good buds first from the upper side about half an inch above the bud, down to a point in length of about one inch, or in size and shape of a steel pen, and not thicker or more than the bark, on which the bud shall be a little above the middle, with the full, or perfect, bud even with the bark on the inside, but no more. If any wood should adhere, stick to the bark, cleaned it peeled off carefully on your thumb, then cut the point above the eye half an inch square off on your thumb. If this is ready, as specified, the bark is not damaged, the bud is perfect, with a grain in it, which is the only life, hold it by the point between the lips until the incision in the form of T is made just through the bark, which, when loosened to the left and right with the back point of your budding-knife, hold it open with it and shape the bud under to fit the cut well, the bud in the middle of the cut. Press the bark lightly over, then begin to tie with woolen yarn, thin inner rind of linn tree bark, or with narrow strip of light muslin, etc; lay the tie on the back of the bud and bring it around to the front under it, tie gently the bark over above the bud solid, the second, and if necessary, above it and then down until all is covered to keep the air off.

As soon as that bud is adhered, has begun to grow, the tie shall be a little loosened and taken up when it is grown well to the root part and about an inch long. If grown to two inches or a little longer, the wild part or the part above it, which is to be stuck by the root to protect the young shank or graft. This cut has to be as clean and closely done as possible to over-grow easily in a short time. The incision should be made as near the root as can be; the eye must be seen free of the bandage; quite soft grafting wax could be used instead of bandage, which would tighten and hold as long as need it. This is the only and best method to graft almond, apricots, peaches, while most all other fruit, which needs to be budded, is done on this method.

Another method of grafting I mention, which can be called coupling. It resembles side or grafting in the bark. This is done without cutting or parting the scion from the limb or tree. Plant graft-roots near a tree of which to graft; the next scion to a graft, or stock-root, is cut one-half to three-quarters of an inch, smooth diagonal to a point, the point to be cut one-quarter of an inch from the other side; a cut into the root stock is made so that the point of the scion fits even and a cut be made that the upper part of the scion fits also even with the bark on the stock-root; all be well tied with rubber or other ties. When adhered and growing, the scion

is severed from the limb at a suitable place. As well as the part above the graft is like by the budding method.

The time to graft fruit trees by this method is when the scions have grown to perfection, which is late in the spring. Cherries are generally grafted on the sleeping eye, or by the second rise of the sap.

The preparation by cutting of fruit trees to raise standard trees of has as yet been less a success than from seed of choice fruit, but can be laid to a success when done on a different method.

Trees can be raised from cuttings on apple, pear, quince, cherry, etc., on the trees.

Limbs on many trees hanging to the ground of which cuttings can be made by laying fine wire solid around at the beginning of the last year's growth, early in the spring. If the wire has nearly disappeared by the swelling of the bark, will easily take root when put on a close, propagating bed.

Layers can be easier produced by making layers, that is, hook this wire twig about one inch under very light soil, which, when kept moist, will root in a short time, of which any number of trees can be raised and be called standard ones.

Propogating, grafting, can be done on many other different methods which I find now useless to mention. I only have specified some of the commonest and general ones.

Numbers of experiments being made in grafting by crossing nature to raise fruit on judicious trees and shrubs, like apple on sycamores, or acer platanus, or ashes or sarbus anebaria, alpina.

Velved colored fruit, like apple, has grown on those trees, but very few and tasteless.

Pears on whitethorn and ashes, which has not done better on white-thorn than on ashes, or the apple on ashes.

Grapes, being tried on nut trees, regia juglans, to raise grapes containing oil, but has failed altogether.

Apples on pears, and pears on apples, all with unsatisfactory results.

Grafts of dwarf fruit grafted on vigorous-growing, judicial vines and shrubs, had not proven any better.

Grafts of dwarfish fruit trees put on strong-growing ones proved of too slow growth.

Therefore, graftroots shall be grown from sound, choice fruit, from strong, heathy trees to graft fruit on of same in variety.

The time of grafting depends greatly on the climate for sooner or later, and for success, also on favorable atmospheric changes. Shady, moist, warm weather is best for grafting; rain or wet is to be avoided.

Pruning Trees in the Nursery, and on the Place of Bearing.

Seedlings which have been transplanted where they shall be grafted should be examined before fit to be grafted.

The lowest eyes should be rubed out, and in case some sprouts be already grown, about one foot above ground, they shall be cut off, to give enough room to bud them, or be smooth and clean enough for doubling, as coupling, as a smooth surface is needed of not less than about two feet from the ground.

If any of the seedlings grow with larger, heavier leaves there would be an indication for good fruit without to graft them, and should be left ungrafted. These be trimmed up according to nature as dwarfs, half-dwarfs, or high growing ones to a height where a crown is to be formed, for which the center, or head, has to be cut off. If such are strong enough with a crown on to be grafted, and grow when grafted, is a double advantage about its bearing to low grafted ones. If any of the ungrafted ones bear good fruit it will be a good, hard, standard tree and a general bearer. The blossoms on seedlings are less delicate than on others and bring sounder fruit.

The low, budded ones, when the wild top is cut smoothly off above the graft-bud, shall be treated alike in trimming, to form a crown on them, but if a tree should be very tender and weak, trim the shoots below the crown only half back, by which will stouten them in growth.

If apples are grafted on roots grown from strong grown trees, they want to be trimmed to form a high crown, for which the young graft is drained to a certain height before it is cut off to form the crown.

The second highest are half dwarf like, grown of pepins, are treated alike for a second height, and the crown on dwarf ones be formed right above where budded. The crown be formed of four or five limbs, and when on the place to bear it should be treated in rubbing out buds and by trimming, that the crown on the south side be far heavier than on the north, and be clear on the inside of limbs, near one foot long. The small ones on large ones are required as leaders of the sap to keep the tree sound. No tree shall be allowed to be much open on the top, or around it, and be deprived of low, small limbs, except towards noon to protect trunk and big limbs against the hot sun.

A yearly trimming to keep trees free of suckers at the heel of water sprouts, and the crossing of limbs; also, to reduce such limbs which would take advantage of the others, to keep trees in an equal shape.

TRIM APPLE TREES FOR GENERAL CROP TO SUCCESS.

Trim half the one year's growth back to three or four eyes; this will somewhat retard the blossoming against the untrimmed ones, which may be damaged by frost, cold rain; the others will bring some fruit.

Seed fruit, as apples, pears, quinces, bear fruit on old wood, while stone fruit grows on the previous year's growth.

Never let the top of a tree grow to be over-proportioned to the root, unless there is, only every few years, a heavy crop, for which trees need to rest.

The nature of pear trees is different to apple. Sow seed from a good kind of wild pears; may be sown in the fall in sandy-like soil, protected with sawdust through winter, but better preserve it in moist sand until spring. When early sown need hardly be two inches deep.

When up, no side growth be allowed to grow up smoothly, be also grafted low by budding. If late fruit be grafted on stock-root grown of seed from fruit of a strong, vigorous nature, let the graft grow to a certain height before cut off to form a crown. Those grafted on seedlings or cuttings of quinces are of dwarfish nature, and will suit well for dwarf-like fruit, and shall be treated in trimming according to nature. Pear tree roots are

of a pivoin nature, and the whole tree, more or less. Therefore, it requires to be planted in mild, sweet, sandy-like soil, drainable by nature.

Its future treatment as to bearing, depends greatly on the part of trimming, and does only any good on special parts, when pear trees are planted in partly rich, not wettish soil.

The trimming of pear trees is a more particular one than by apples. Dwarf trees need a thorough short trimming early every spring, which is in general neglected, but shall regularly be done for production and the shape of the tree. The cleaning and mulching of through the hot season with young grass.

The high growing ones need only the attention to keep them in shape, mulching and cleaning; not allow any water sprouts nor suckers at the heal.

APRICOTS. The root of apricot tree is of pivoin-like nature. The seed, as already said, should be sown soon after the fruit is ripe, of choice fruit, in same kind of soil as for pears, in a sunny position. Some seed may be sown single where a tree shall grow up to bear, others in rows, treated like pears; some may be left ungrafted, which probably will bear good fruit, if not, can be grafted after by budding them at the crown, others budded with choice fruit; stock-root of almonds, prunes, may be used for. The latter is preferred to bud peach apricot on them.

Keep them by trimming at a dwarfish, stout growth, to prevent its over-bearing and mostly small fruit, which is generally of poor taste while partly unripe. There are many kinds of apricots, but the larger one is in preference. The trimming to be done quite early in the spring, while they blossom very early and easy be damaged by frost, which should be prevented by smoking.

ALMOND. When the seed of almond has grown up for fruit, which only can be expected in a mild climate, it shall be treated in trimming as a tree of a half dwarfish or medium height.

They bear different kinds of fruit, sweet and bitter on the same tree, as, sweet in the sun and bitter in the shade. Those with small foliage bring most small fruit with a hard shell, while those with the large foliage generally produce good, large fruit with soft shell. The stock-root be also used to bud peaches on them. The root is of a very pivoin nature.

Deep, loose, rich, sandy-like soil for its nature, and to produce large, sweet fruit, which grows on the young wood. One, called peach almond, bears the most difference in fruit, from small to large, from bitter to sweet, from soft to hard shelled nuts. The one year's growth shall be trimmed half the length back early every spring.

PEACHES. The soil for peaches shall be a deep, light, substantial one. If seed of the very choicest is sown, after some of them bring also choice fruit, the indications for are a vigorous growth, big buds, heavy foliage.

These trees should be trimmed clean up to two to four feet where it shall be topped to form a crown of a few branches, others may be budded low. When the graft-bud has begun to grow loosen the bandage, of which the tree be freed as soon as a fair growth is noticed, and the wild part be cut off above the graft shoot.

It is hardly necessary to grow graft-root to graft peaches on it than of its own, unless almonds, apricots, or if to graft on still harder stock-root seedlings of a good kind of plums be used for.

There are four principal kinds of peaches, a free-stone, one with a raw, velvety skin, the other of the free-stone is of yellowish color with a smooth skin.

The third is the cling-stone, with a purplish, raw, velvety skin; the fourth, also a cling-stone, with a smooth, greenish, yellow skin, which adheres, or sticks, to one side of the stone.

The pruning of peach trees is as necessary as the trimming of grape vines, and especially when not planted in soil which does not altogether suit its nature.

If not kept in an upright, part close shape, by trimming, it will grow out of shape; while its growth is a vigorous one, and if not trimmed, it cannot (weep) push off the surplus of the gummy sap, of which can't descend as it should; the tree is apt to get sick, if this surplus sap don't descend, which is gummy, (will) has to decay on some part under the bark, which has to decay also, if it can't find its way through the bark. Such a tree will only last a few years, while the worms of the sap are part cause. When trimmed, will keep healthier for years; it will not over-bear, but bear larger fruit and more regular, if protected. It brings the fruit on the one

year, or young shoots which have to be trimmed good half of the length back early every spring.

PRUNES. A prune tree is not particular about soil if only light and good warm, and drainable. The roots grow deep to nourish the tree.

The stock-root on which plums be grafted shall be prepared a few days before, and should be well watered a few days before budded, also, by transplanting. It grows its fruit of the young wood, which shall also be trimmed back to four or five eyes every spring early, while it proves more gummy than peach trees. It grows untrimmed very soon out of shape, when planted in heavy, wet soil, in which they often will not last long. Showy, large fruit is obtained through improving it.

CHERRIES. Of which there are two to three principal kinds. The one which brings the largest, and a sweet fruit, grows on a tree whose bark is of a brown, good looking color, of a vigorous growth, and found in the forests of Europe, of a great height with black fruit called the guigiser.

The stock-roots are well suited to graft the best fruit on them. The trees grow strong to a pyramidal shape. Those of a grayish colored bark are stouter in growth and bear red and small brown fruit of a sour and bitter taste, which are less gummus and do to graft sour cherry on it.

A third kind, of white reddish colored fruit, is in preference for the quality of fruit, and such like variety are often grafted in the seedling of, which need to be prepared before grafting, like other seedlings.

The grafting of plums and cherries is generally done on the sleeping eye in late summer.

Cherry trees do not need but very little trimming, which is against their nature, especially when in sap or vegetation.

Figs need but to be trimmed to improve the fruit, also, to shorten and to thin out the many limbs, unless they are grafted, which be by a general root, trimmed back to the fourth or fifth eye.

Mulberry trees are trimmed to improve the fruit, by half-trimming back the vigorous shoots, and form the shape of the tree.

Sweet chestnut has to be trimmed back two or three times, to prevent them from breaking by high wind, and also, to give them good shape.

The Planting.

To plant trees in the fall is an advantage when the ground is dry, but when wet, not before spring.

To plant an orchard of apple trees, the toughest in nature of late fruit should be planted on the outside, the most valuable, earliest kinds, on the inside, and should be planted on a northern-like slope, not nearer than forty feet apart each way, and strictly in line (rows) east, west, north and south, and on cross lines. Good sized holes dug about two weeks before planting is done, for which under and around it nothing but mellow soil is used; between the roots well filled with about the same height as they stood, and the top gently worked medium, solid with an oval filling around it.

When on an exposed place, the trees should be planted standing towards the south, and south-west winds, one foot of the perpendicular line being with the grafted side pointing north-east.

Pears, peaches, apricots, cherries, plums shall be planted by a same rule, but only about thirty feet distance, into such soil as specified, to suit their nature, on north-east, south-east and south side, according to more or less early varieties and nature.

Trees planted late in the spring, in dry-like soil, shall be well watered down, without to tread on it; and protected against swaying by wind; also, well mulched with grass through summer, with well loosened soil under.

LABELS. A seed, plants, trees to be labeled with a number or full name on the label with unfairable ink; when by a number, it shall be specified in a book for that purpose.

Also all the seedlings when transplanted for graft-roots, by grafting all kinds of fruit grafted without fail.

The label, or stick, shall be white pine wood, split into pieces fifteen to eighteen inches long, half inch thick, and two to two and a half wide, smooth cut and white painted.

ELEVENTH PART.

Wounded, Sick Trees.

Fractures and other causes to sickness on trees, vines, etc.

A cultivator can not be too careful to prevent causes which may cause sickness, and too feeble to battle against all, besides to ward off the fiends of plants and trees.

Fractures happen to trees by wind, part when insufficiently trimmed, when overloaded with fruit, by too close plowing and harrowing, by which damage is done under and above ground, by stock, by a very cold snap to forked trees, by a sudden thawing of the sun's heat when hard frozen; also by rabbits while the tree is still that small that rabbits can peel it, which fracture is as bad as any other and worse when carved into the wood. When peeled all around the tree has to die right after the first circulation of the sap, while it can not descend, on account of the fracture by which it is stopped. The sap rises through the inside of the tree and has to descend through the bark. Minor fractures cared for right after, trimmed and covered with salve, may be cured, not leaving a fracture behind. Other fractures mentioned may be treated alike unless by broken limbs, which have to be cut off as far as damaged, the other limbs have also to be cut near alike if the tree shall become equally shaped again.

If that rabbit-fracture is left uncured it will be as long as the tree stands, which will be only a few years when far enough rotted through this cause. The same will happen to trees frozen, the bark torn from the wood through fast thawing of the morning sun's heat if not mended early the same spring.

This torn bark will rot, under which worms grow up and bore into the tree of which the tree will rot fast until blown down.

Are these worms apple, or tree borers?

ORGANIC SICKNESS. Sleet is one of the organic causes to sickness of trees, vines, etc., which is never formed unless an object is that hard frozen that any kind of moisture will freeze on it and will not damage any trees, vines, etc., without a sudden thawing by the sun's heat, which shines through the ice like through an avorn glass by which the inner bark gets torn from the wood. This bark has become inactive and prevents the descending sap from its natural course, thickens there, of which the outer bark gets black and decays. This so damaged part of the tree or the whole is lost.

PLETORA. is caused on some parts of trees by too much sap, accumulated through rich soil and of the other part cut off, such an over-circulation will partly stop and thicken, and will be the same result as from sleet, frost, etc., if such trees are not bled about the crown by cutting through the bark.

Such a tree should be equally trimmed off, and the rich soil changed if or poor until mended.

GANGRAENA. Is also an over-circulation in sap, caused of wet, too rich soil, manure around or near roots. If a tree cannot absorb it, part will stop and thicken on some parts of the tree if not bled, unless, the bark will burst at some places. No bad result will happen to seed-fruit trees by bleeding.

FLUXUS GUMMOSUS. This is effected by a quantity of some sour stuff, which happens become mixed in a shape like gum, with the natural sap of the tree, which happens to stone fruit trees, which will die after this gum-like sap has bursted through the bark.

The cause of it is wet, rich soil, manure or of too poor, gravelly, dry soil; also, from loosening the foliage through insects or other causes; if the flaw of a gummus sap be caused of a fracture, it can be stopped by trimming the fractured part, and by covering it with salve.

GARCIOMA. Is thickening and rotting of sap, caused of fracture and rot on the roots, frost, manure. of a hot nature, of iron, and other unsuitable soil. This happens by apple and nut trees. Trees are generally lost by this cause.

TABES. Weakness. This is caused by an unsuitable climate, soil, position, drought, frost, twisting, swaying, breaking by wind, and parasite causes.

CRISPATIO FOLIORUM. Is the curling of foliage, caused generally in the spring, when hot days after cold nights, or a great change in temperature, which stops perspiration, and causes lameness; when noticed or seen in time, a strong over watering, washing, loosening up the soil, also by trimming of the points will help and effect a new circulation in the sap.

LETHARGIA is a weak and retarded growth, as the cause may be by improperly planted trees in dry, lumpy soil, not filled around and between the roots, also when planted in too wet soil or too much wetted and too solidly worked down.

PARALYSIS is nearly of same nature; if any trees, plants, etc., are planted with and in stuff which is against the nature, without any substance like out of cellars, old wall, metallic or poisoned earth; such trees and plants can't grow, but die.

ALBIGO. Looks like a fine, white mould on the foliage, covered with or mucar erysiphe, which is most an atmospheric cause, or a great change in temperature.

If trees, plants are only partly befallen of this unnatural sweat which shows sickness, may be cured by an over-sprinkling, morning and evening.

RUBIGO. Is caused by a part stoppage of perspiration through some atmospheric changes; it is of a black color, while the previous, or white, it is an unnatural black sweat shows a sickness in the trees, plants, it begins at the tenderest part of the foliage; all such trees, plants befallen with, are of a very unhealthy nature, and may die off; it is a kind of rust, exciting perspiration, which is like a parasite.

HAMORHAGIA. Trees, plants die of bleeding; they begin to grow in spring, but bleed to death by the blossoms and leaves, which drop at that time; the sap is driven first through bark, which proves the last stage of life.

DEFORMATION at trees, plants is everywhere to be seen, happens through any cause or neglect. *Tetraneura pruni*, also called pocket louse, which pierces into the fruit bud, while the blossom on plum tree and lays the eggs in it, which wound soon closes by the fast growth of the fruit, which insect, when hatched out, sucks all the sugary substance of the fruit, by which the fruit gets deformed, which grows with the growing family in it, until fullgrown, by which the plum crop is entirely destroyed; if this

insect which is also found in the blistered leaves is picked off and destroyed, and all the dropped fruit, there would be less the cause.

But this is seldom done. Few cultivators may know it, but do not take time to do it to save such an excellent crop. It only would show important, when a good crop could be harvested.

Such blisters or pockets are found on a number of different kinds of trees, plants in which packets millions of insects grow only on a small tree or shrub, without any notice is taken of.

Wounds on trees prove often as useful as deadly, when neglected to mend them by trimming and said wounds fairly covered with a salve. There are trees which grow to a big size, but bear not before accidentally wounded or on purpose by ringing which is done with a sharp hook knife, with which one half inch wide (rind) bark is cut out to the wood, but not into, just above the crown all around the limbs at the very time, trees are in blossom, if not before a few days.

This has an effect of a slower descending of the sap, through which fruitbuds will be formed and effect the tree to bear.

Otherwise parts of trees and whole trees can be made to bear by tying cords, etc., near to the ends of the limbs and bend them without breaking to pegs or weights on the ground, to hinder the sap from fast circulation.

SUFFOCATION can be named organic sickness. A small tree, shrub, etc., planted under higher trees or on places, where they are devoid of natural need to a fair growth, like of dew, rain, free circulation of air, gets sick if not transplanted on a free, open place and well cleaned and if necessary, trimmed back.

Suffocation happens to seed sown too deep; to young crop covered with earth or otherwise washed under, also trees, vines, plants, etc., suffer when covered with soot, cinderdust and other like causes may suffocate, if not released for a course of time, especially when dry hot weather.

ANASARCA. Rot, through wet by too much watering or rain. Wherever solid ground causes the water to stand, soft vegetation, like vegetable, grain, etc., can not bear it, and rot. Harder vegetation, when standing too long in such water which gets stagnant the root begins and will rot.

The same causes the foliage to turn yellow or spotted colored which drops to decay, what happens through many other causes, which can be called organic ones, and never will be known if unobserved and left unexamined, but can be avoided in a great many cases, if cultivation is executed by directions.

MILLIGO is an exodation of sweat which belays the upper part of the foliage which is part sweet sticky of a clear, yellow color much liked by ants and plantlice. If not soon often washed off by a heavy rain, it will ferment on the leaves and form a kind of mould and seems to be alive and stops perspiration. The cause of this can be recognized by a sudden temperature a hot day follows a cool night the sap can be seen running from the wounds into the pores.

TYPANITIS is the cause of too fat, wet soil which effects a sickly deformation on dicotyledones or lapping leaf-plants like by onions. This too wet, rich soil effects a too fast growth in some plants by which some parts grow together or flat or unshaped. By fruit trees such a fast growth which shoots are covered with imperfect, unripe buds which could not come to a perfection by too a fast growth through the strong force of sap and so been growing in one instead to more shoots.

Many trees, vines, shrubs, plants are visited by insects while sick, which helps to a faster destruction, while they will not trouble any healthy ones.

APHIS. Plantlice. Belays shoots, leaves, and each plant seems to be troubled with a different species of the lice family. The worst damaging and commonest are *Aphis pruni*, is greenish gay, white powdered trouble plum trees.

APHIS CERASI, is of dark brown color, on top redish at the under side.

APHIS RIBES, at currants, gooseberry is of gray green color.

APHIS MALI, is grayish green, with blue wings.

APHIS BRASSIÆA, is of green color with a half yellow breast white powdered, be found on the under side of cabbage leaves.

APHIS PERSIÆ, *Aphis apricoty*, are of a black color. These plant lice are on other trees, vines, shrub-plants found when in vegetation, are somewhat different in size and of all colors. They mutiply very fast, and are more destructive, as small as they are, than any one knows or may believe, because one family breeds 16 to 20 generations in one season.

It is difficult to keep it off or destroy it. The remedy used for is dust of tobacco, sulphur, but which proves to be too costly for the purpose. Water of boiled potato peelings, tobacco stems, fox glove leaves, boiled and blue stone (vitriol) soluted in the strained of the above with which the plants shall be well sprinkled. The same species of the Aphis family troubles greenhouse plants which are made to drop off from the plants by a strong tobacco smoke at night, swept off and burned.

THE ANTS, formica, greenfly, Hemirabia perla a cochenilla, some eat wasps and kill many of them.

THE APHIS COCCUS are as damaging to trees and shrubs as the previous. They stick to the bark of which they suck the substance; the same species of nearly the same color of the bark are unnoticed. They are unmovable by eating, breeding, hatching. The young ones occupy the covers of the old, dead ones until they are spread over plants. It sticks to apricots, peaches, grapevines, etc. Orange trees. Coccus Hesperidum, Coccus vitis, is of a brown marble color; when old, dark brown and lays eggs in white wool and vines and apricot trees. The one on peaches is like the one on oranges; also troubles a great many other in and out door plants.

THE COCCUS CACTI is cultivated on Cacti Opuntica in South America which is a much wanted commercial article.

A hot or a cold climate seems to make no difference with them. The remedy to destroy them is a solution of tobacco, with black-oil soap and strong vinegar, well wetted and scraped off with a strong brush, after which the scraped parts are to be washed off with clean water. Where no scraping can be done to rub well with a fatty skin of bacon.

Another remedy has been tried to success, which is of black soap, saluted in strained water of boiled wild camamils, and strong vinegar, with which all vegetation befallen with plant lice and many other insects, be watered.

FORMICA. Ants, damage some vegetation by dry weather by loosening the ground, undermining sod, roots of trees, plants, etc., but do the most damage in hotbeds by the undermining of young plants, and also damage ripe and even half ripe fruit. By any means, they can't be stopped from getting into houses, where they spread where any eatables are placed. If they are prevented to pass on one place they soon find another. They

dislike dead and stinking fish, aromatic stinking herbs, camphor, turpentine, etc. When they pass into houses wash floors, mats, etc., with strong salt-water; put near their place of entering a pot with honey water poisoned with white arsenic, which they like and be poisoned; sweetened tar, thick molasses, to which they will stick; also, old ham bones, which they like, accumulate on it and be killed with boiling water or fire.

To kill them out of door tie sweetened tar band around trees to which they will stick. Where they are in pits, in or on the ground, not near roots of trees, burn them with fire, fresh lime slaked on them, with a strong solution of salt and sulphur. When under or near tree roots banish them with stinking stuff, dead fish, clams, with camphor, turpentine, stone oil on rags.

There are many kinds of ants, from the very small red one in houses to big black horse ant, also some with wings, which fly by hot weather and are dangerous.

ONISCUS ASELLUS. It is a kind of a worm with seven pair of feet, of dark gray color, with a stinking odor; often found numerous in hotbeds. They like to live on warm, moist places and do damage to soft skinned, juicy fruit and tender, young plants.

ONISCUS AMADILLO. Is of a dark blue color; are poisonous, while they live partly off poisonous juice, sap, and coil when alarmed.

Damage some fruit, vegetables, and can be caught in a ball of moist moss, hollow bones, hollow pig feet toes, cucumber, into which they shelter and be killed.

JULIUS THERESTINS. Gallfly, is of worm shape, with ten pairs of feet, of a yellow steel-like color, which is found anywhere coiled, laying quite useless; aroused, is partly of a poisonous nature, but is never found in numbers. Damages plants, roots and leaves, also some fruit. When noticed where plants be damaged of, water the spot with a bucket or can full of water, mixed with two big spoonsful of vitriol, which brings them on the surface.

SCOLOPANDRA. Is of a long, yellow, brown body. The *scolopandra electrica* with about sixty pair of feet, moves quick when aroused. It is found anywhere, under bark, stone, manure, moist earth, rotten wood,

also in damaged fruit, flowers, by which fatal accidents happened to persons, smells on flowers, being bitten on the nose, which is a poisonous bite, also crept through noses into the brain. They are also killed with vitrioled water.

FORFICULA ONLICULARIA. Earling, is half bug, half worm. It does great damage to ripe fruit, especially to plums, peaches, apricots and some pears, also destroys a great deal of seed by eating all the inside of flowers. Shelters in dark, moist places. They can be caught in hollow bones, wood, or in anything that is loose and hollow into which they creep, especially, when flavored with aromatic oils.

LUMBRICUS TERRESTRIS. Worms which are found in manure, moist earth, under stone, wood, etc. Destroys mostly young plants, which they undermine and pull into the holes, exode soil where fat, shady, moist. They ruin and dislocate roots and cover with their half poisonous exodation, of which plants sicken and die. The best and cheapest remedy is to mix the ground by digging with air slaked lime, or use limewater, soot, cinders, water of boiied nuts, leaves and shells.

LIMAX AGRESTIS. Snail, is about one inch long, of a reddish gray, white gray, and of a yellowish gray color, some are striped of such colors. They damage plants and fruit spring and fall, by moist weather, especially on shady, moist places. Are found under stones, wood, etc.; they are, in general, found near wells, cellars, and in hotbeds on the lower side inside where they often do much damage.

The best known remedies are: Sow before sunrise and after sunset fine, unslaked lime, cinders, salt, soot, the refuse of cleaned flax, etc.; in a climate where numberless are found coeder them with fine chopped vegetable and fruit, where they are easily killed with vitriol water, fresh lime.

May Beetle.

MELALANTHA MAJALIS. There are three kinds of this known colored bug, which some years in some places are very troublesome and

destroy the foliage on fruit and forest trees, also on plants, shrubs, vines. It is a well known bug, appears in the spring as soon as the trees are green. The best remedy is to shake it off the trees, etc., early in the morning before any fly off, pick them up and kill with boiling water.

The larves of are also very damaging almost to any kind of crop by eating of roots, on grain fields, meadows, vegetables, often does much damage to potatoes. They are about one and one-half inch long, of a white yellowish color, with partly a black head, and is found everywhere in manure.

MELOLANTHA SOLSTITIALIS, smaller in size, the larve also smaller, and damage more other roots of plants or vegetation, roots on poplar trees and willow than does damage.

MELOLANTA HARTICOTA. This bug is only about one-half inch long, of a red-dish brown color, which is some years swarming and does a great deal of damage to fruit and other trees and to vegetables also. The larve lives on roots of perennial plants, also on clover, lucern and other grass root. The bug appears later than the other, is also shaken off the trees, plants, picked up and burned. The worms will remain under the ground four to five years before their transformation to a bug.

HALTICA OLERACEA. Springer, which is of a bright green bluish color, small build, with a kind of spring feet with which it gets very lively, when annoyed, especially when sunny. dry. They can be prevented with moisture and shade, if very troublesome lay or stick tarred boards, rags on sticks and brushes between the rows of plants to which they will stick, also sow over fresh sown seed pulverized chicken, pigeon manure, lime or tobacco dust.

Mole, Cricket.

GRILLIATALPA VULGARIS. This is a big-winged worm, in shape of a bug of dark brown color, over one inch long, which keeps mostly under ground, undermine it and eats the roots of plants through they happen to meet by traveling; wherever seen, the ground be undermined by flatering plants, work the ground solid, to find out where they are, when and where indications of newly damaged plants are seen flatering.

Then apply this remedy: two parts coal tar, one of terpentine, with which a bottle is filled, corked, with a small opening in the cork; dig open all the tunnels with your fingers until you find a perpendicular one is found, in or below which they are located, then pour about two quarts of water in, and of the bottled stuff two spoonful on it, and again a little water, of which this varmin soon will be up dying.

They dig the gang-ways only about one inch under ground, meet and breed in or near fresh horse manure, of which a quantity of two wheelbarrow's full are buried in a hole to cover the manure with six or eight inches of earth; about three or four weeks after, by frosty weather, the manure, with all in it, may be dug out and moved away on a solid place, where all the worms are killed.

Lepidopteras are Well Known.

CATERPILLERS. This insect does the most damage to fruit trees, vegetable and plants in a short time after they being out of the larves.

Also the best remedy found against it, is to shake them off the trees, pick and kill it. This shall be done with papilion, and the eggs of them, which are in general found on the under side of leaves, which shall be destroyed. The leaves are, in general, only accidentally found, and are mostly found on places where not sought for; again, are of about the same color as bark, and other places, and material they stick to.

PAPILION CRATEGI. With black veined, shinning, white wings; the caterpillar of makes their appearance by mid-summer, are black when young, after which, they change color, reddish yellow on both sides below, and also white haired on the belly, with three black marks between same collar over the back; they grow to about two inches long.

The larves are white and of high yellow collar, with black lines and spots; stick to trees and fences. They feed on stone and seed fruit trees.

As soon as the young worms are hatched out, they begin to work up a silken web around them, for a protection, after which, they set at buds and begin to feed, which is generally in late summer; through winter their web is closed, but, as soon as nature begins, begins to move they are out to feed, and in their home at night. They are also inside by raw, rainy weather. As there are from twenty to sixty of one larve, and the same of many different kinds, a tree will be without any foliage in a short time.

All such breeds seen in a web attached at the points of trees, should not be neglected to be cut off and burned, or otherwise destroyed. It should be done early in the morning, when all are inside the web.

The papilion, when watched, can sometimes be killed by thousands, the day after a rainy day, when they assemble on leaves of low limbs and near water, with a broom or a bunch of brush.

PAPILIO BRAEERAE. Butterfly or bird, with white wings with black (ends) points, the side ends are also black on the female; the male is marked with a black spot on each wing and with a yellow under end.

The color of the caterpillar is grayish blue, with three yellow lines over its back. The larve is green colored and black spotted, hangs on fences and walls. Cabbage is much damaged of this caterpillar through summer and fall.

The best remedy is to destroy the eggs in time, which sticks at the under part of the leaves, strong bluestone solution, applied at outside of leaves, will do good service.

PAPILIO RAPAE. Is a little smaller than the previous one, with black wing-points; the male is also marked with a black spot on each forewing, flies until fall.

The caterpillar makes its appearance in summer and fall, and is about one and a half inch long; feeds on cabbage and turnip. The larve is of same color as the preceding one, and found on like places.

PAPILIO NAPI. Colored with black ends on white wings. The male is marked with a black spot on wings, while the female with two or three, with slight green and yellow on ends of under wings; flies from spring until mid-summer.

The caterpillar is slight brownish green, with reddish yellow pores, feeds also on cabbage and turnip; the larve is yellowish green.

Dyurna, Large Butterfly.

PAPILIO POLICHLORAS. This is a large one, of about two inches broad, of clear, red and yellow color; the caterpillar is dark blue with a rusty color over the back and sides, feeds on all kinds of fruit trees, but mostly on cherries, which they fully strip.

The larve is dark, and marked with gold or silver spots. As long as they are young, keep together, and are easily shaken off, picked up and killed.

BOMBYX DISPAR. The female is larger than the male, of grayish brown forewings, dark shaded and marked with black zigzag square lines with a black middle spot of a hook-shape. The wings of the male are of a dirty white color, but clearer marked.

The caterpillar, of about two and one half inches long, very numerous, marked with three yellow lines over the gray or brown colored body, with a big yellow, grayish color and two brown spots.

The larve is of a quick moving nature, of dark brown color, marked with yellow bunches of hair, sticks in a loose, thin web under roofs, joints, splits, under leaves, on trees, etc., where the eggs are laid by the papilion, which are covered with a woolly or finer sponge-like cover; therefore, this kind is called the stem or sponge mott.

This caterpillar is a numberless one, strips, sometimes, trees, shrubs, roses, etc., quite bare. The young caterpillars can easily be destroyed, while found in lumps, but difficult after they have spread.

BOMBYX CHRYSORRHEA. Papilion is colored dark, brown on the wings, the back part of the male is of a dirty, yellow color, by the female woolly-like, covered with a bisam-like smell.

The caterpillar is dark, gray colored, with two red-brown lines over the back, covered with clear, brown hair and with short white lines on the sides, and is about one and one half inch long.

The larve is dark brown, with a pointed back end.

The eggs are found on trees' leaves, the end of the larve is woolly like, does often great damage to fruit trees by destroying the leaves, blossoms and fruit.

This kind can be found and destroyed like the previous one. They are found in lumps in a grayish colored web.

BOMBYX AURIFLUA. Is one of the most damaging to trees, shrubs and other vegetation. It is nearly of the same color and action as the last mentioned, except marked with two black spots on the forewings.

BOMBYX NEUSTRIA. Is also of the same habit and action, but larger, colored from a dirty yellow to a high red on the wings, marked with two reddish, yellow lines of a different form, called ring-bird.

The caterpillar is two and one half inches long, very damaging to the most vegetation. The difference of their habit is that they can be found easier on the underside of big limbs, and hanging also in great lumps on knots, twigs, on the front of trees, where they accumulate through by wet, raw weather, and be easily destroyed the morning after. Their color is bluish, red, covered with fine hair, with white lines over the body, with a bluish, gray head, marked with two black spots. The web of the larves is of a purple color and the larve of a high yellow one, easily to see.

The eggs stick very hard around twigs, limbs and bark, and has its name of ringworm (Raupe). Most of the caterpillars have from one to two thousand eggs, by which they obtain such a vision to see about them and notice all approaches.

GEOMETRA BRUMATA. Pear mott. It is a common one. The female is, instead of wings, covered with a kind of lap, with an irregular, dark line over the centre, and can not fly, they change to different color to age and time. The male is colored of a yellow, brown earth color which is easier to see just before its transformation to a larve, which the breed leaves early in spring, which also color with the time, but in general gray or half green and yellow, with white lines over its body, besides a yellow, greenish one on each side. It is armed on the end with two outside bent points. The papilion flies in fall, even in winter, at which time they pair and lay eggs around buds and twigs. By tying a tared band around trees, males and females, which travel up and down during the night, will stick to this band and can be caught by great numbers.

GEOMETRA GROSULARIATA. (Harlekin.) The papilion is black and of a yellow, spotted body, with white wings, lined half yellow in small spots with two yellow lines in front.

The caterpillar appears early in the fall and changes the skin twice through winter, by which time it grows to about two and one half lines under dropped leaves of the gooseberry and currants. In a course of eight to ten weeks it will be one and one half inch in size, which is the time they strip currants, gooseberry and other plants clean of foliage.

To get rid of them the dropped leaves, under which they are hidden, must be well cleared off early in spring.

The plants be dusted with tobacco dust, white heleboro, black paper while dewy and well syringed off with a solution of bluestone water and vinegar.

If any caterpillars should be damaging to fruit and forest trees like bombyx processionea, effect a strong smoke through the trees, by burning moist manure, of which they will drop together and destroy it.

Black ants gathered into bags in forests and hung at the trees with the open sack will do good service.

DIURNAS. Butterflies. These are of a different size, most of a beautiful color, one of over two inches long, cylindric, of a green color, yellow reddish points, feeds on tomatoes, potatoes, as caterpillar called solanum, it is easily detected by seeing tender leaves on tomatoes, eaten off near the points, where they are generally found and cut through with a pair of scissors.

BOMBYX PROCESSIONEA. Of which the caterpillars sometimes are seen in big swarms, destroy most vegetation, besides strips forests where it happens they travel through. The foliage is special food for them of fruit trees. They travel in a triangular shape .:; one, two, three at the point.

TORTRIX POMONANA. This kind does great damage to ripe fruit by hollowing it out to get the juice and seed of, about which the gatherer or eater gets deceived on the fine looking fruit.

It has been reported that new kinds has been seen, but have not been specified, which might be a cross in transformation of any kind if not the same as bombyx processionea, as many other new kinds may be but unknown; yet, while nobody will look for, and will only be accidentally discovered. In estimating their power of locomotion by comparing the length of their body, some surpasses the flight of birds.

Besides the specified ones, is yet a great number known which could be specified, if space and time would permit.

I find it necessary to name and specify another number and kinds of insects, fiends to vegetation, which I term: *A Third Part*, which cause sickness:

THIRD PART. Insects that cause sickness: Acridim migratorium, grasshoppers, locusts, Corculia bug, Lema asparagi, Tetraneura, pruni, Tefels pup, Cimex tree bug, Hymetopteras, Bees, Wasps, Ants, Nepidia Pinera, Stink bug, Mantida pasma bug, Tiptera bot fly, Anhanipera, Plumbia Pudra part parasite, Tlipula oleracea, Fly tenthreda pini, bug, Dimerus plant lice, Coccus bug, Alphis lice parasites, more caterpillars, wasps, Amphibia.

ACRIDID MYGRATORIUM. Grasshoppers. Which are well known, and are in color from green to nearly black, are different in size, also too well known as a very damaging one when in swarms, which sometimes travel fast, and no remedy found as yet to prevent it, except by hot smoke in a close location.

HYMEDOPTERA. CURCULIO. Is in shape of a bug, does great damage to roots, leaves, young shoots, blossoms and fruit.

The larve is found in filberts; *Curculio nucum*, the same in almonds; C: *pisi*, in peas; C: *rubri*, in raspberry; C: *pomerum*, in apple and pear; C: *pruni*, in prunes. It is reddish white, which pierces blossoms and fruit. Trees should be strongly syringed with bluestone water when in blossom. The yellowish white larve is red-haired, sticks to such trees and plants mentioned, with which it is often unnoticed it carried indoor in the fall, especially C: *othischindus* and the C: *violaceus*, which is three times as long of a violet color, which works itself into porous parts of plants, bark, etc. The bug of this larve appears most times in a bright, copper color, armed with a pinch-shaped, pointed tongue, with which the wounds are made to deposite the egg.

LEMA ASPARAGI is about three lines long with a reddish breast, yellowish wings; it feeds on asparagus.

TETRANEURA PRUNI. Tefels pup. Its habit is to pierce buds when they swell to blossom, and into leaves, which causes a kind of blister called pocket, into which they lay their eggs, which are generally hatched out about fall, but the young ones generally remain in it until spring.

Cimex is about of same size and color, resembles a small bedbug; adheres well to the bark of peach, apricot, plum trees, a grayish colored one to apples and pears, etc., which suck the substance of trees until dead, if not scrubbed off in time by means of a solution of whale-oil soap, bluestone, tobacco water and a brush. Gooseberry, currant, raspberry are troubled of the same.

HYMENAPTERAS. Bees, wasps, flying ants. They generally damage ripe fruit, or nearly so, but partly can be avoided by hanging vessels with honey, sugar water, at trees which they like, and get drowned in it while unable to get out.

NIPIDIA CINERA. Chinch bug, (stink bug) of which are many kinds, from the ash gray to black colored. The gray one is nearly round, in size of a cent, stinks, damages melons, cucumbers, squashes, etc.; winged, but no wings can be seen before it flies. All of them of any shape and size damage vegetable, grain, grass crops, fruit, etc.

The night or light bug, which damages fruit trees by piercing blossoms and fruit, can partly be kept off of orchards while trees are in blossom by keeping a fire on one or two sides of it.

They are also of a stinking nature; damage grain crops and are found next under surface, where they damage crops at the roots, and sometimes seen in swarms on the tops of crops. There are other kinds, of brown, gray, reddish color, but smaller in size and shape.

They only weaken like some other insects, by moist, cool weather.

MANTIDA PASMA. They look like sticks by the time their wings begin to develop, and are very damaging to vegetables.

TIPTERA. Bot fly. It is of a dark bluish color, and very destructive to most all kind of vegetable.

ANHANIPERA PLUMBEA PUDRA. Is of a dark blue color. If annoyed without seeing any they rise and disperse like a cloud of smoke hidden under bark, leaves, stones, loose growing weeds, plants, etc. They mostly live off exodation of plants on moist positions.

They are shaken and partly reduced by heavy rain.

THIPULA OLERACEA. This insect is a damaging one to cabbage plants, especially to cauliflower. It lays its eggs on cabbage leaves, trunks, roots. As soon as the breed is out of the eggs, it eats itself into the middle of the plants, through which the sap is partly stopped, by which knotty like roots grow, in which worms are found, which in general results to a part stoppage or sickly growth and destruction of such plants. The larve of this cabbage fly, Ocyptera Brassicaria and Anthomyia Brassica generally cause a destruction of whole crops. All plants befallen of it look quite flatry after sunrise and are of leaden like color.

This kind of cabbage fly resembles mosquito. The best remedy is: to plant cabbage down nearly to the heart, and keep plants moist. Meadows and fields get sometimes over swarmed and partly stop their growth by feeding on their roots. Some call it the army worm, or fly.

TENTHREDO PINI or NOCTURA PINIPERLA, also, BOSTRICHUS TYPOGRAPHUS. The first of worm shape. They, as a bug, are often seen swarming in pine forests. They pierce the bark in lines like printed letters.

BOMBYX PINI is also to pine trees a very plague in years of dry summers; so is Grometra Piniaria. Both of these sometimes destroy other vegetation.

DIMERUS HOMPTHERA. Plant lice. This kind is very injurious to most vegetation, especially to vegetables. It even damages roots, from which they suck the sap and effect it to flow until vegetation is stopped.

COCCUS ASPEDIoidES. Is a bug of brownish gray, rusty color. Sucks the substance of a good many hardwooded plants, which has to be destroyed by a specified remedy.

If some limbs or oranges, lemons, etc., suffer, and shall be trimmed back, it shall be done a short time before the circulation of the sap, and by a calculation that the spot be well filled and formed with a healthy growth.

The useful kinds of the coccus family are those known as cochmill, cultivated for the use of color; another is the coccus of the silk worm, feeds on white mulberry leaves, which are for the cultivation of silk.

HEMIPTERAS, APHIS LINN. Are lice; are the cause of some atmospheric changes and seem to be part organic. They belay young shoots and leaves of trees, plants, of which they suck the substance, by which the leaves curl up with a change of color and die.

The most common and damaging are: Aphis pruni, of a white greenish color, white powdered on plum trees. A: ribes, is also white, green, on currants, gooseberries; A: ceraci, on cherry trees, is dark brown on top and reddish under its body. A: mali, on apple trees, is of a poor green color and of a bluish when it flies. A: bracea, the color of green leaves under, with half yellow breast and white powdered.

Multiplies very fast by moist, warm weather. While it is a winged insect it is very hard to destroy. A heavy, cold rain washes it off and are part killed. They can be kept off plants as far as possible to overwater them with tobacco and bluestone water.

Parasites are such which are in general unnoticed. First, there are more than three different kinds, look like dust on powder from bluish white, which is a stange color; found on roots and on the crown of the root, which is by some people called blight, and is found on sickly trees under surface.

A rusty, brown, dust-like stuff is found on some places on the bark also some of a dark brown color. There is moss of a grayish white color which adheres very solidly to smooth bark, which seems to tighten the bark, and also some of other color, which is easy to see, and a tree or plant can be relieved of by scrubbing it off with a solution of whale-oil soap and bluestone water, or mixed with lime water.

There are other parasites like the one, caused through some organic cause, like mushroom, which is found on trees. It is of a brown and grayish color.

A parasite, which is caused by a red spider and extremely atmospheric changes which is not noticed before damage is done by, and is a plague to beans, melons, cucumbers, vines, etc. Spreads very rapidly by hot, dry weather. There are more of same nature besides creepers growing on trees.

There are a few kinds of caterpillars, Winders, Wicklers true and Foal's moth, which swing and let themselves on a silken thread from trees to the ground to feed as long as they please unless they get aroused, when they swiftly draw back upon the tree to the place of safety to which the great number of them are armed with, which are *Noctua*, *Pyralis tortris tinea*, *Geometra brumata*, *Bombyx neustria*, etc.

All caterpillars papilion, and larves of, are called lepidopteras, are produced of eggs of various forms and colors, generally cylindric in form, with thick, stout, fleshy limbs, pointed feet, armed with a number of minute hooks and powerful muscles. Most of them are leapers, hold themselves with the hind feet while they eat the tender foliage, which are the best fit for perspiration, give life to the whole plant. Propagate in myriads. They are mostly of a soft and are divided into the three specified parts. Butterflies are distinguished to the others by their brilliancy of color.

The caterpillar has sixteen feet; by the beginning of their transformation they close themselves up into silky webs, some in the earth, and others anywhere above it.

Silk worms are sent great distances in cocoons.

Vespa Scabra, Wasps.

VESPA VULGARIS. Large yellow wasp, is a dangerous one, as well a smaller yellow one, *vespa murrarfa*. The second one is very damaging to fruit and is not easy to destroy, unless in their nest by burning, etc.

There are some dark colored kinds, but less damaging and less dangerous.

If no nests can be found to destroy them in it, vessels of honey water can be fastened to trees, into which they may drop and be drowned.

AMPHIBIEN, BUFO VULGARIS. Which is by many, held for a damaging one; are eating worms, papilions, caterpillars, the egg of the first, bugs, their larves, caterpillars and their eggs. The damage they do out of door is unnoticeable; if in hotbeds, some few plants may suffer when undermined. They are mostly hated about the ugly look of it.

The frogs are as less damaging; they live off insects and do no harm to plants. The green frog is a useful one. Lizards, snakes, also do no harm to plants, but moles, mice, rats are troublesome and damaging, and are of another nature.

Remedy against mice, rats, are to kill them by poisoning them, and otherwise.

Thin, fresh lime mixed with as much sugar, moistened, made into balls like marble and rolled into holes is found a good remedy; lime and water, which they must have, will destroy them. Birds may be scared off by shooting, or otherwise, if they get at some fruit, like cherries.

A cultivator has to risk a deal of means, labor and time by an expectation to raise a valuable crop, but is often sorely disappointed if he forgets to guard against such an army of enemies, especially by dry weather by which they hurt vegetation most and when moister is absent for a course of time; improper care, neglected, crops are as much as lost.

Protection and Foresight.

Land should be free of weed, pits, of rubbish, rotten bark and wood, hopelessly lost plants covered with insects, as cabbage plants, radish, turnip, rutabaga, etc., which are generally damaged of plantlice, bugs; should be burned. Water, should not miss to keep vegetable crop moist with.

Fresh air-slacked lime, tobacco dust, soot, wood, cinders, etc., also liquid of part poisonous plants, (weed) which are not troubled by insects, and green nut shell of hickory, walnut, wild camamile, wild cucumber, stramium, green tomato vines, purplish foxglove leaves, belladonna, tobacco water and dry, should be ready.

Remedy to protect trees, vines from being damaged of cold and heat: A half circle or two boards nailed thusly together with point to it: hold it on the ground and with a piece of board on top, tied or tacked to the tree, will keep the hot sun off, but coated with a coat of soluted glue, finely worked clay, cow drop, or blood mixed well to thick salve, trees, vines well coated with from the root up to above the crown. It is one of the best protectors against rabbit, wet, sleet and sun through winter. while the other is merely to keep the hot sun off. One of common glue at twenty cents, soluted with three quarts of hot water, mixed with two-third quarts of unclotted blood, the rest of the clay and cow drop, will take three gallon salve to coat trees with by means of a strong brush.

A number of remedies against, and for sickly trees, vines, plants could be specified, and more insects also, and how they could partly be destroyed.

Many kinds of grasses and plants for field culture for different use I could specify, besides the culture on cotton, castorial plant for oil, ginger, peanut, pecon, etc., about which I beg to be excused.

THIRTEENTH PART.

Lawn and Pleasure Grounds.

No matter of what size, shall be laid tastefully and practically. I any basin, fountain, water for any use, be laid at a place, as well as pipes, be laid to drain the surplus or waste water off.

The top of such a basin should be on a same level with the top of the main entrance step, unless a fountain be put of one solid piece of stone or cast iron, which top of the circle may and shall not be higher above ground than three to four feet.

Basins and lakes can be made to any size and shape, of the very toughest clay, about ten to twelve inches thick bed, well worked in. The same can be paved with small, smooth, flat-like stones or metal of different color, or painted, to show like a good, tasteful ornament.

The cellar window cells are about within the same level with the lowest doorstep from which middle of thickness a line should be stretched to an incline to about two and a half inches per ten feet, which shall be the grade of the ground to be laid all around the buildings, if the place don't lay on low and high grade where walls and steps are needed.

Drives and walks shall be pegged out in a tasteful shape and convenience, out of which the earth could be used if needed, if not, the grade may be made first, so far such earth can't be used, after which, they are cut out and formed by paving or concrete it, solidly laid to a slightly oval shape, corresponding with the grade, to get easily drained, and without weed will grow on them. The ground should be of a substantial nature, neither light nor too heavy, of clay, evenly put, and strictly free of any particle of wood, to avoid damage by ants, which happens by very dry weather, when wood has begun to rot, and the place is not to be kept under steady moisture.

Flower beds can be formed twelve to fifteen inches from the walks and drives, on places of size and shape to a tasteful appearance from every side. The place should be tastefully planted with flowering plants, evergreens, special flowering shrubs and dwarf trees; high shade trees, of strong growth, exodes the ground, thrives and shelters insects.

The edges along walks and drives may be laid of ten or twelve inches wide, best blue or lawn grass sod, or the whole may be seeded with such grass seed of a known kind of grass for a durable lawn, to suit the position and soil.

Lalium multiflarum submenticum, is the hardiest, aside from the blue grass, and the Australian prairie grass, and the Swiss paturin.

The English rye grass *lolium pereune* and the Italian rye grass *lolium Italicum*, and Byshops grass, which are of a tenderer nature, and of a greener lively green.

There are a few more kinds suitable for lawns, but none will prove satisfactory, if it shall take care to itself by dry weather and perhaps unprotected, laid on an unsuitable soil and position, or misused.

The nature of all kinds of grasses wants steady moisture, mowed, and frequently rolled, also protected through winter, with a light cover of manure.

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