THE

RURAL ANNUAL

AND

HORTICULTURAL DIRECTORY,

FOR THE YEAR 1860;

CONTAINING TREATISES ON

PLANTING AND MANAGEMENT OF FRUIT TREES; DWARF PEARS, APPLES, PLUMS, AND CHERRIES; ORNAMENTAL DECIDUOUS TREES; PLANTING EVERGREENS; CULTIVATION OF THE AMERICAN BLACK RASPBERRY; INSECTS INJURIOUS AND BENEFICIAL TO THE FARMER AND FRUIT-GROWER; MANAGEMENT AND VARIETIES OF PIGEONS, ETC.,

OF PRACTICAL VALUE TO

THE FARMER, THE FRUIT-GROWER, AND THE GARDENER.

ILLUSTRATED WITH NUMEROUS ENGRAVINGS.

ROCHESTER, N. Y.:
JOSEPH HARRIS,
(Office of the Genesee Farmer.)
1860.

PREFACE.

In presenting the fifth number of the Rural Annual and Horticultural Directory to its numerous readers, no formal introduction is needed. Our attempt to furnish a cheap manual, containing practical and useful hints for the farmer and fruit-grower, has been well received. The greatly increased circulation of the volume for 1859, together with the constant demand for all the previous numbers, prove that such a work was much needed.

Encouraged by this liberal patronage, the publisher has spared no expense in the preparation of the number for 1860. The work is beautifully illustrated with appropriate engravings. In this respect it will bear comparison with any work of the kind ever issued from the American press. Published in one of the best horticultural sections of the United States, we have unusual opportunities for procuring drawings of the finest specimens of fruit and ornamental trees. Those here given were made, by one of the best artists in the country, from actual specimens growing in this vicinity. Those well capable of judging pronounce them superior to the best English engravings. The portraits of the different varieties of pigeons were also drawn and engraved expressly for the *Rural Annual.*

Of the contents of the work, little need be said. The article on the "Planting and Management of Fruit Trees," contains much that is valuable, though perhaps little that is new. On this subject we need "line upon line," and it has been our object to give such hints as are most generally needed by the majority of planters.

The alarming increase of Insects injurious to the Farmer and Fruit-Grower will render the article on this subject, by Mr. Mackeloan, one of much interest. For some of the illustrations in this article we are indebted to the politeness of Prof. Asa Fitch, the able entomologist of the State of New York.

Mr. C. N. Bement's article on Pigeons will well repay an attentive perusal. There is no abler or more pleasing writer on such subjects than Mr. Bement.

The article on the American Black Raspberry by H. E. Hooker, like everything from his pen, will attract attention.

James Lennox, Stereotyper,
Rochester, N. Y.
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THE

RURAL ANNUAL

AND

HORTICULTURAL DIRECTORY.

PLANTING AND MANAGEMENT OF FRUIT TREES.

BEST SOIL FOR AN ORCHARD.

SOILS are divided into six classes—argillaceous or clayey, containing above 50 per cent. of clay; loamy, containing from 20 to 50 per cent. of clay, with a sensible admixture of decomposed vegetable matter; calcareous or limy, containing more than 20 per cent. of carbonate of lime; gravelly, composed of small stones, sand, and a small portion of loam or clay; siliceous or sandy, containing not more than 10 per cent. of clay; peaty or mucky, chiefly formed of vegetable matter, in which a large proportion is in an inert state — most so when it exists in deep masses, surcharged with water, and least so when in a thin surface stratum, resting on a dry base.

When first cleared of the original forest, sandy soils are usually, for a few years, more productive than those of a clayey and more compact nature. They are light and porous, and the food of plants which they contain is in a more available condition—more decomposed and soluble. But such soils seldom, if ever, contain as much plant-food as those of a more clayey character, and they are, therefore, sooner impoverished. They may be compared to a stick of pitch-pine, which is easily ignited and gives out considerable heat for a short time, but is soon burnt up; while the clay soils may be represented by a stick of maple, which is less combustible, burns slower, but lasts longer, and, on the whole, gives out much more heat.

Sandy soils are easily cultivated, and produce good crops for a short time, with little labor. On this account, in a new country, especially, they are generally more highly esteemed than clayey soils. They are, too, warmer and earlier, and trees come sooner into bearing. For peaches, which in ordinary field culture grow rapidly and soon exhaust themselves, sandy soils, if not too light, are usually preferred. Sandy soils can be made very productive by the judicious application of manure; while the clays require less manure, but are harder to cultivate.

The late A. J. DOWNING considered a light soil, "on the whole, *the worst soil for fruit trees*." "Under the bright skies of July and August," he says, "a fruit tree requires a soil which will retain and afford a moderate and continued supply of moisture, and here the sandy soil fails. In consequence of this the vigor of the tree is checked, and it becomes feeble in its growth, and is comparatively short-lived, or unproductive. As a tree in a feeble state is always most liable to the attacks of insects, those on a sandy soil are the first to fall a prey to numerous maladies.* The open loose texture of a sandy soil, joined to its warmth, affords an easy passage, and an excellent habitation for all insects that pass part of their lives in the ground, preparatory to rising out of it to attack the fruit, foliage, or branches of the tree.

"Such are some of the disadvantages of a light sandy soil; and, in thoroughly examining many of the fruit gardens of the Middle States, the last few seasons, we could not fail to be struck with the fact that in nine cases out of ten, where a variety of fruit was unusually liable to disease, to blight, or to the attacks of certain fruit-destroying insects, as the curculio, the trees themselves were on sandy soils; while on the other hand, and frequently in the same neighborhood, the same sorts were growing luxuriantly and bearing abundant crops, where the soil was a rather strong loam.† For a few years, the growth and productiveness of the trees upon sandy soil, is all that can be desired; but the trees are shorter lived and sooner fall into decay than where the soil is stronger. If there is any exception to this rule, it is only in the case of the peach, and judging from the superior flavor of this fruit on stronger soils, we are inclined to doubt the value of the exception even here.

"*Gravelly loams* are frequently much better adapted for orchards than sandy, especially where the loam is of a strong quality, and the gravel is not in excess; and the hardier fruits usually do well on this kind of soil.

"*Strong loams*, by which we mean a loam with only just a sufficient portion of sand to make it easily worked, are on the whole by far the best for fruit gardens in this country. A strong loam is usually a deep

* This remark applies to the middle and southern portions of this country. North of the 43° a light sandy soil is perhaps preferable as warmer and earlier.

† As an instance in point, the owner of one of the most highly cultivated gardens in the vicinity of Boston was showing us, in despair, some trees of the *Seckel* pear upon which he could no longer get good crops, or fair fruit, and lamenting the *degeneracy* of the sort. The next day we saw in a neighboring garden beautiful crops of this pear growing with the least possible care. The garden in the first case was a light sandy loam; in the second, a strong loam.

soil, and affords during the whole heat of the summer, a proper supply of moisture and nourishment to the roots of trees. Fruit trees do not come into a bearing state so soon in a strong as in a sandy loam, because the growth of the wood is more vigorous, and fruit buds are not so soon formed; but they bear larger crops, are much less liable to many diseases, and their longevity is much greater. The largest and most productive orchards of the apple and pear in this country are upon soils of this kind.

"*Clayey loams* are, when well drained, and when the clay is not in excess, good fruit soils—they are usually strong and deep soils, though rather heavy and difficult to work. Trees that will flourish on these soils, such as the apple, pear, cherry, plum, and apricot, usually are very free from disease, or insects, and bear large crops. In a moist climate, like that of England, fruit trees on a clayey loam would die of canker, brought on by the excessive quantity of water contained in the soil; but such is not the case under the high and warm temperature of our summers. The finest, largest, and most productive plums and pears within our knowledge, grow in sites on the North River, where the soil is a stiff clayey loam, almost approaching a clay. Those fruits that on light sandy soils are almost worthless from their liability to disease, and the attacks of insects, are here surprisingly luxuriant and fruitful."

For a general orchard, a soil of medium character should be selected, when attainable. The specimen orchard of Ellwanger & Barry, the justly celebrated nurserymen of this city, is remarkable for its health and productiveness. The soil is a rather compact sandy loam, with a sandy clay subsoil, and so dry that it can be worked immediately after a rain of twenty-four hours. "On this," says Mr. Barry, "we have apples, pears, plums, cherries, peaches, apricots, and, indeed, all the fruits planted promiscuously, side by side, not by choice but necessity, and all these yield bountiful crops of the finest fruit every season, and that, so far, without any special attention in the way of manures or composts. Our country abounds in such soils, and others somewhat different in character, but equally eligible for all fruit trees when well managed. On the other hand, there are soils wholly unfit for fruit trees of any kind—such are peaty or mucky, and damp, cold, and spongy soils. For an orchard of apples or pears, a dry, deep, substantial soil, between sandy and a clayey loam, and possessing among its inorganic parts a considerable portion of lime, is, according to all experience, the best. On such soils we find the greatest and most enduring vigor and fertility, the healthiest and hardiest trees, and fairest and best flavored fruits. Trees both of apples and pears, planted on such soils in Western New York, upwards of fifty years ago, are, at this day, in the very height of their vigor and productiveness, without having received more than the most ordinary culture. In some of these soils, where the pear and apple flourish so well, and endure so long, the peach does not succeed at all. The reason is, it is too stiff and compact.

"The *plum* succeeds best, as a general thing, on a clayey loam, rather stiff. The Canada or native plum, however, succeeds well on very light soils. The *cherry*, the *peach*, *apricot*, *nectarine*, and *almond*, require a light, dry, and warm soil, and will not succeed on any other. The best and most enduring peach orchards are on dry, sandy loams; but good orchards are raised with proper management on loose, light sands, though on such the trees are shorter lived, and require constant care in the way of dressings of manure and compost."

ASPECT AND LOCATION.

It is impossible to give any precise rules on this subject. There are flourishing orchards in all aspects. Perhaps, on the whole, a gentle slope to the south-west is the best aspect; because, in such places the trees, when in blossom, are partially protected from the morning sun after spring frosts. Planting on the north side of hills is for this reason a still more effectual remedy against early frost, when the season is warm enough to ripen fruits in such an exposure. A southern and eastern exposure should be avoided, as it is desirable to keep the buds from starting till all danger from spring frosts is past. Low land is the worst of all situations, from the fact that it is subject to greater variations of temperature than the hill-side—being warmer in the day time and colder in the night; and the wood gets but imperfectly matured before its growth is checked by early frosts in the fall. It is well known that a slight frost in the fall frequently cuts down Indian corn growing in the valley, while that higher up the hill escapes. This may be owing to two causes: the increased succulence of vegetation, and the decreased temperature in the valley. That the air is colder in the valley during a still frosty night, than higher up the hill, is well known. THOMAS, in his *American Fruit Culturist*, says: "In the winter of 1845–6, when the cold, on a clear night, sunk the thermometer several degrees below zero, after the peach buds had been swelled by a few warm days, trees which stood on a hill thirty feet higher than the neighboring creek valley, lost nine-tenths of their blossoms, while on another hill sixty feet high, nine-tenths escaped. The lake of cold air which covered the top of the smaller hill, did not reach the summit of the larger." The same author mentions several cases going to prove the importance of elevated sites.

In the beginning of March, 1857, some experiments were made in the garden of the Horticultural Society (Turnham Green, London), for the purpose of determining the *lowest* temperature experienced during the night, at various elevations, between the surface and 36 feet above it. Upon a perpendicular pole, five accurate self-registering thermometers were fixed at six feet distances, and a sixth was placed on the ground. Every morning, the state of these thermometers was carefully noted. We extract the result from the London *Gardener's Chronicle* for a few days in April and May, when vegetation was becoming active, and when all tender crops were most sensible of low temperature.

It will be seen that in the spring of the year, when frosts are so injurious, the temperature at the surface of the ground, during the night, is on the average 3¼° colder than 12 feet above the ground, and nearly 5° colder than at 24 feet. Above 24 feet there is little increase in temperature. On the 6th of May, the temperature at 12 feet from the ground, was just at the freezing point, while at the surface it was 5° below. "An immense difference," says Professor LINDLEY, "when we consider how sensitive plants are to even small variations of temperature, especially when they are growing fast as in the spring."

Thermometers at	0 feet	12 feet	24 feet	30 feet	above the surface.
April 12	30°	33½°	35°	35°	
" 15	24	27	28	28	
" 16	25	27½	29	30	
" 17	27	30	32	32	
" 21	31	35	38	37	
" 24	24	26	28	28	
" 29	23	26	27	27	
May 3	26	31	32	32	
" 4	31	33	34	....	
" 5	23	27	28	....	
" 6	27	32	33	....	
" 7	25	29	30	30	
" 8	28	29½	31	31	
" 18	37	40	41½	42	

Practical fruit growers have long observed that cold air settles down in deep valleys in a calm frosty night. DOWNING says: "We know a rich and fertile valley in Connecticut where the cherry will scarcely grow, and a crop of the apple, or the pear, is not obtained once in ten years; while the adjacent hill tops and high country, a couple or three miles distant, yield abundant crops annually. On the other hand the borders of large rivers, as the Hudson, or of some of our large inland lakes, are the most favorable situations for fruit trees, as the climate is rendered milder by large bodies of water. In the garden where we write, a fourth of a mile from the Hudson, we have frequently seen ice formed during the night, of the thickness of a dollar, when the blossoms of the apricot were fully expanded, without doing the least harm to that tender fruit. This is owing to the slight fog arising from the river in the morning, which softening the rays of the sun, and dissolving gradually the frost, prevents the injurious effects of sudden thawing. At the same time, a couple of miles from the shores, this fruit will often be quite destroyed. In short, the season on the lower half of the Hudson, may, from the ameliorating influence of the river, be said to be a month longer—a fortnight earlier in spring, and later in autumn, than in the same latitude a few miles distant; and crops of the more tender fruits are, therefore, much more certain on the banks of large rivers or lakes, than in inland districts of the same climate."

Many of the failures of peach orchards in inland situations are probably owing to the practice of planting in the vallies; and the results might have been very different had more judgment been exercised in the selection of the situation.

In a comparatively level country, such as a portion of Western New York, the principal object is to guard against the injurious influence of the severe winds from the west and north-west. A situation where a belt of woods, or a hill, which breaks the force of these winds, is desirable; and when such a situation can not be obtained, artificial shelter may frequently be provided with great benefit, by planting a hedge of American Arbor Vitæ, or a belt of rapid growing deciduous and evergreen trees, such as the European Larch, Lombardy and Balsam Poplar, Soft Maple, Abele, and Norway Spruce.

Whatever location is selected, it is absolutely essential to success to have a *dry, permeable subsoil.* "After much examination and observation," says an experienced fruit grower, in the *Genesee Farmer*, "we have thought that among all the drawbacks upon successful fruit culture, at least in Western New York, no cause is so destructive of every good quality in fruit trees, as the want of proper underdrainage.

"Want of good underdrainage often exists where it is not suspected by a superficial observer. It is often the case that extensive slopes, having various inclinations, all of them sufficient, if good channels existed, to carry off water rapidly, are nevertheless ruined for fruit growing, and indeed for almost all farming purposes, by the fact, that while the surface, for a foot or more in depth, is mellow and porous, the soil beneath is hard-pan of the most impervious sort. The surface becomes saturated and remains full of cold water, until, by gradual evaporation, or by slowly soaking along from the high to the lower land, it becomes firm enough to plow—too late, however, to be available for fruit trees. Unless some remedy is found, such land will always remain unfit for orchards.

"Thus it frequently happens that the man who believes he has a fine hill for an orchard, has by no means as good a site as he imagines; hills having as often as bad subsoils as flat lands or valleys; and if the subsoil be bad, the fact that it is a hill, will keep the lower portions of the slope wet the longer. Hill sides are therefore often the worst of locations.

"The planter of trees should make it his first study to ascertain the nature of his subsoil; look for springy places, and go over the land frequently during the spring and autumn rains and snows, and ascertain carefully where the land is firm and dry soon after heavy rains, where it will do to plow and plant early in the season, and select such, and such land only, as the place for orcharding.

"It will surprise many men to find that surface soil is so often deceptive in regard to the character of the subsoil. A man looking over his farm after a flood, with this in view, will frequently find himself up to his ancles in water, upon what he supposed was a gravelly, dry place; gravelly it certainly is upon the top, but not so below; while the patch of clay which he feared would swamp him is quite firm; he did not know that gravel lay below here, and the water had fallen through very readily. Sandy surfaces are also often found saturated with water, held there by the clay subsoil beneath.

"The *depth* to which the natural drainage of water exists is, in our view, a most important consideration. The roots of large trees extend to considerable depth, and will, of course, be affected by the water in the soil, if they reach it, and if water exists in superabundance at some considerable distance from the surface, it will affect the surface so as to sensibly *diminish* the temperature early in the season. A soil dry to a great depth, then, we think desirable.

"We have spoken only in favor of soils *naturally* underdrained to considerable depth; we know it will be said that we have the means of making any soil dry enough for fruit where there is sufficient fall for the use of draining tiles. Without asserting that this may not be done, we must beg planters of trees for orchards not to be too sanguine before trial of the benefits of draining tile, and if they do drain, to drain deeply, and at no great distance apart.

"Apple trees in orchards are expected to grow large and their roots to extend a corresponding depth into the earth, and to cover a large surface. To drain for such roots is quite a different affair from draining for grass and grain, or even for dwarf fruit trees, and small fruits.

"From some experiments in the use of drain tile, to carry off the water from an unprofitable apple orchard, we are satisfied that if accomplished at all, the work of draining a springy piece of land, so thoroughly as to make it valuable for orcharding, is a serious undertaking, and that, although it is not very difficult to make the soil useful for grass or ordinary crops, it is much more difficult to get good, mellow, fine flavored and fair apples to grow upon such a hard-pan bottom, than it is to select a proper soil before planting the trees."

PREPARATION OF THE SOIL.

Of the advantage of selecting a soil naturally underdrained, there can be no doubt. Yet if such can not be had, we see no reason why the judicious use of artificial underdrains will not make any soil sufficiently dry for all kinds of fruit trees. It may well be, that if an orchard is planted on a wet side-hill, the trees will become diseased, and no after-drainage will make them healthy and productive. But that the soil can not be made dry and entirely suitable for fruit trees *previous to planting*, we can see no reason to doubt. The great error with most fruit growers is that they neglect the preparation of the soil before setting out the trees. Soils which need underdraining are usually richer in the elements of plants than those naturally drained. So that, when thoroughly drained, wet soils are generally more productive than those which have been always dry. After the lengthy article on this subject in the *Rural Annual* for 1859, we need say nothing further on the marked benefits of underdraining. But we can not help remarking that it lies at the very foundation of all improvement in horticulture. No matter how well the ground is trenched, manured and cultivated; no matter how carefully the trees are selected and planted, and pruned and mulched; no matter how diligently insects are watched and destroyed; all will fail to give profitable results if the soil needs underdraining. Let it never be forgotten, then, that if we neglect underdraining when needed (and it is needed far more generally than is usually supposed), *all other attempts at improving the soil will prove of no avail.*

In preparing the ground for an orchard, then, the first thing to be attended to is to see if the soil needs underdraining. Dig a few holes, here and there, three or four feet deep, and if water flows in and remains there, underdraining is absolutely essential to the success of an orchard on such soil. The drain should be at least three feet deep, and, if there is fall enough, four or five feet would be all the better. The deeper the drains, the fewer will be needed; and, in this country, where tiles and other draining materials are so expensive, it is the greatest folly to make shallow drains, even were they as good as the deeper ones, which is very far from being the case, especially for fruit trees. Trenching or subsoiling is the next process to be attended to. The former is the most beneficial, but is too expensive to be resorted to on a large scale. Subsoiling can be performed at little cost compared with its advantages. Underdraining and subsoiling are the grand means of increasing the temperature of the soil, as well as equalizing it in this respect. They also supply moisture and air—the latter so important to the healthy action of the roots and plants. The air admitted by the drains and porous earth, carries with it, during summer, heat from the sun, which is daily accumulating and retained for a length of time, the soil being a bad conductor of caloric.

It is not desirable to bring too much of the raw subsoil to the surface. On this account, subsoiling—which merely breaks up the subsoil without bringing it to the surface—is better than deep plowing. In trenching, too, it is better not to bring the lower spit to the surface, but simply to break it up; and if some fresh manure could be worked in with it, so much the better. For this purpose, broad-pronged forks are preferable to spades, and are generally used in England.

"An English gardener," says Downing, "when he is about to plant fruit trees, talks about *preparing his borders*, an American says he will *dig his holes;* and we can not give a more forcible illustration of the ideas of two persons as to the wants of a fruit tree, or a better notion of the comparative provision made to supply these wants, than by contrasting the two phrases themselves. The one looks upon a tree as a living being, whose life is to be rendered long, vigorous, and fruitful by a good supply of food, and a soil mellow and easily penetrated by the smallest fibre; the other considers it very much in the light of a truncheon or a post, which he thrusts into the smallest possible hole, and supplies with the least portion of manure, trusting to what he seems to believe the inextinguishable powers of nature to make roots and branches under any circumstances.

"Whether a transplanted tree shall struggle several years to recover, or grow moderately after a short time, or at once start into a very luxuriant and vigorous growth, depends entirely upon the amount of labor the planter is willing to bestow on the soil for his trees. We have seen several instances where, side by side, one man planted his trees in large spaces of deeply moved and rich soil, and another in small holes in the common mode, which uniformly showed the trees of the first, larger after five years, than those of the last after twelve."

SETTING THE TREES.

If the ground has been well prepared the labor of planting is very slight. The holes need be no larger than to hold the roots without cramping. If the ground has not been all plowed, subsoiled or trenched, the holes must be made at least three feet square—the larger the better. But under such circumstances it is a mistake to make the holes too deep. They should not be deeper than the surrounding soil has been previously worked.

The trees should not be set in the holes any deeper than they grew in the nursery. Deep planting is a great and common error. The earth thrown around, under, and above the roots, should be *fine*, rich, surface soil, and the practice of treading it in tightly round the roots should be avoided. Place all the soil which comes out of the hole in a little mound round the tree, so that when it settles it will be level with the surface. Staking is the next thing to be done. The accompanying figure (fig. 1,) will illustrate the method of staking, the trees being tied to one or two stakes with a band of hay or straw. If the trees are planted in the autumn, the object may be attained by placing a mound of earth round the tree, a foot high (fig. 2). Beside keeping the tree firm, the mound protects it from mice. The earth should be removed in the spring. Trees set out in the spring, unless very large, and in exposed situations, seldom require staking.

FIG. 1.

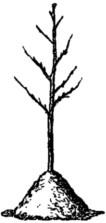


FIG. 2.

The practice of putting raw manure into the hole at the time of planting, is not to be commended. Better put it on the surface, covering a space of two feet, or so, on all sides of the tree. If in the autumn, the fertilizing matter of the manure will be washed into the ground during the winter, and the strawy part of the manure will afford some protection against the severity of the weather. If applied in the spring, it will act as a mulch during the summer, keeping the ground moist, by checking evaporation from the surface.

If manure is put in the holes at the time of transplanting, it should be well rotted, and thoroughly incorporated with the soil. One of the best manures for this purpose is a compost made of one-third barnyard manure and two-thirds leaf-mould, dried muck or old sods. It should be made from four to six months before it is needed, and turned over once or twice to accelerate decomposition. A bushel each of quick lime and unleached ashes might, perhaps, be added to each load of compost, at the first turning, with advantage; as also a few pounds of salt and gypsum. In this section, and throughout the Western States and Canada, trees do not require manure at the time of transplanting. If the soil is well cultivated—if it has been summer-fallowed as well as a good farmer prepares his land for wheat—it will furnish the trees with all the food they need, at least for the first year.

The distance of planting depends somewhat on the vigor of the varieties, manner of pruning, &c. *Apples*, from 25 to 40 ft.; the usual rule being two rods or 33 ft. *Peaches* and Apricots, from one rod to 20 ft. *Cherries*, 20 ft. Plums, 15 ft. Quinces, 6 ft. to 10 ft. Dwarf Pears and Apples and Cherries, from 6 ft. to 10 ft.

PRUNING.

After what has appeared in the previous numbers of the *Rural Annual*, little need be said on this subject. A few extracts from *Barry's Fruit Garden* must suffice.

"A standard apple or pear tree for the orchard, when taken from the nursery to be finally planted out, we will suppose to have a straight, stout trunk, four to six feet in height, as the case may be, and a head composed of a certain number of shoots or branches, but generally shoots of one year's growth. At the time of planting, three or four of these shoots should be selected to form the main branches, or framework, on which to build the whole head, and the remainder cut clean out; those reserved should be cut back full one-half, and from the shoots produced on these at and below the cut, two of the strongest are selected each on opposite sides, and the others are rubbed off while they are soft. In selecting these shoots, care must be taken to have them equally distant from one another, and pointing in such directions as not to cross or interfere.

"During the first season these young shoots must be watched and kept in a regular state of vigor. If any threaten to become too vigorous, they must be pinched and checked at once, so that perfect uniformity be preserved. This is the time to secure a well formed and nicely balanced head. A very slight circumstance sometimes throws the growth into one side or one branch of a young tree, and produces a deformity from which it never recovers. The trunk must be kept clear of all shoots, by rubbing off such as appear at the earliest possible moment, when it can be done without the use of a knife. Supposing we commenced the head with three branches at the time of planting, there will be at the end of the first season, six.

"The attention required after this will be to maintain an uniform growth among these six branches, and their members and divisions, and to prevent the growth of shoots in the centre. The leading defect in all our orchard trees is *too much wood*, the heads are kept so dense with small shoots that the sun and air are in a great measure excluded, and the fruit on the outside of the tree only is marketable or fit for use. The head should be kept open, rather in the form of a vase, so that the wood, leaves, blossoms and fruit may all, on every part, enjoy the full benefit of the sun and air, without which they can not perform their functions, or maintain maturity and perfection."

AFTER CULTURE.

We have said that subsequent cultivation can never fully compensate for the want of previous preparation. On the other hand, it is equally true that, although the soil has been perfectly prepared and the trees rightly planted, the highest success can not be attained if the after culture is neglected. It should be laid down as a rule that none but *hoed crops* should be sown or planted in an orchard. Perhaps, of all crops, beans are the best; potatoes next, and corn last. To sow oats, wheat or barley in a young orchard is the height of folly. Among dwarf pears nothing should be planted or sown. Keep the land as clean and mellow as a summer-fallow. The same remarks are applicable, though not in the same degree, to peaches. Among the latter it is sometimes advisable to plow in a crop of clover or peas. A better crop than either would be spurry. This might be sowed in July and plowed in next spring. It would enrich the land, and, unlike clover, its growth would not rob the soil of moisture during the early summer, when it is needed by the trees.

COMPOSITION OF THE ASHES OF TREES, FRUITS, &c.

NAME OF PLANTS, OR OF THEIR PARTS.	Ash in 100 parts.	Water.	Potash.	Soda.	Magnesia.	Lime.	Phosphoric Acid.	Sulphuric Acid.	Silica.	Peroxide of Iron.	Chloride of Sodium.	Chloride of Potassium.
Grape vine, ...	2.62	—	27.88	8.96	6.61	36.26	18.18	2.70	0.88	2.12	1.39	—
Apple tree, wood,....	—	—	19.24	0.45	7.46	63.60	4.90	0.93	1.31	1.66	0.45	—
Cherry tree, wood,...	0.28	—	20.78	8.40	9.19	28.69	7.73	3.29	2.06	0.07	—	—
Cucumber, ...	0.63	97.78	47.42	—	4.26	6.31	14.97	4.60	7.12	2.06	9.06	4.19
Strawberries, fruit,...	0.41	90.22	21.07	27.01	trace	14.21	8.59	3.15	12.05	11.12	2.78	—
Plum, Greengage, fruit	0.40	83.77	59.21	0.54	5.46	10.04	12.26	3.83	2.86	6.04	trace	—
Cherry, fruit, ...	0.43	82.48	51.85	1.12	5.46	7 47	14.21	5.09	9.04	3.74	2.02	—
Pear, fruit, ...	0.41	83.55	54.69	8.52	5.22	7 98	14.28	5.69	1.49	1.96	trace	—
Apple, fruit,..........	0.27	84.01	35.68	26.09	8.75	4.08	12.34	6.09	4.32	2.65	—	—
Lettuce,.............	0.87	93.96	46.01	5.29	2.17	6.05	8.52	3.89	20.23	trace	7.82	—
Gooseberry, ...	0.39	93.26	38.65	9.27	5.85	12.20	15.58	5.89	2.58	8.65	1.23	—
Carrot, ...	0.79	81.25	32.17	5.00	5.73	12.34	10.39	3.26	4.78	3.02	9.62	—
Beech, wood,........	—	—	11.80	2.04	8.42	47.25	3.29	1.01	1.09	0.60	0.16	—
Oak, wood,..........	—	—	5.65	3.77	3.01	50.58	2.32	0.78	0.52	0.88	0.02	—
Elm, wood,..........	—	—	21.92	13.72	7.71	47.80	3.38	1.28	8.07	1.17	—	—
Basswood,...........	—	—	35.80	5.23	4.15	29.93	4.85	5.30	5.26	7.97	1.49	—
Pine, wood, ...	0.14	—	2.79	15.99	19.76	31.74	1.93	3.04	3.04	3.51	1.48	1.48
Larch, wood,........	—	—	15.24	7.27	24.50	26.97	1.79	3.60	3.60	4.25	0.92	0.92

DWARF TREES FOR GARDENS.

MANY persons with whom we have conversed seem to have very indefinite ideas in regard to the nature and habit of dwarf trees, and especially of the object and effect of dwarfing. There are those who, from seeing so much in the papers about "Dwarf Pears," think that the *fruit* is dwarfed, and conclude that *their* pears are already small enough.

A dwarf tree is one which has been subjected to a process which checks the growth of wood, without impairing the health of the tree. Instead of letting the tree grow and produce wood for many years without any fruit, it is subjected to treatment which renders the wood of the young tree as perfectly matured as the fruit bearing branches of large old trees. This is generally accomplished by budding or grafting the tree to be dwarfed on one of a less rapid growth. Thus the pear is budded on the quince, which is a slower growing tree or shrub. The same result is obtained by root pruning; that is to say, if we cut off some of the roots of a pear tree growing on the pear stock we lessen the amount of sap furnished by the roots and the tree becomes dwarfed and prematurely fruitful. But this process requires much skill, and it is better to dwarf the trees by budding on the quince.

A pear tree growing on the quince, then, is a tree with roots which furnish less sap than the natural roots. The leaves of the pear, having a less quantity of sap to elaborate are the better able to render it more suitable for the formation of fruit. Hence a pear on the quince root will produce fruit in three years from the bud; and, indeed, such is its tendency to form fruit that it is absolutely necessary to pinch off one-half or more of the pears, while young.

Of course, pears worked on the quince stock are in a more artificial condition than those grown on the pear stock—and indeed the same is true of any good variety of the pear, even on its own roots, as compared with the wild, thorny original. It follows, too, that being in a more artificial condition it requires more artificial treatment. The farmer that will not give his trees as good cultivation as he does his corn, had better not plant dwarf pears.

With judicious care and cultivation, and with proper varieties, dwarf pears are generally successful. There is no reason why they should not succeed. It is true they are liable to disease, but not more so than standard pears. Whether they can be profitably grown for market is still an open question. We see no reason to doubt it. T. G. YEOMANS, of Walworth, N. Y., has 120 dwarf pear trees, on one-third of an acre, of the *Duchesse d' Angoulême* variety, from which he sold in 1857, the trees being four years from planting, 18 barrels of fine fruit, which sold for $14 per barrel. This is $252 from one-third of an acre, or $756 per acre. The next year (1858) they produced seven barrels which sold for $127, or $381 per acre. This year (1859) we visited the orchard,

Dwarf Pear—Seckel.

and the trees were in a very healthy condition, and loaded with magnificent fruit. ELLWANGER & BARRY, of this city, have half an acre of *Virgalieus*, on the quince, which yield even larger returns.

Dwarf Pear—Duchesse d' Angouleme.

But whether dwarf pears can or can not be profitably cultivated for market purposes, there can be no doubt of their adaptability to garden culture. In fact, dwarfs are the only fruit trees admissible in a garden.

They are beautiful and productive, occupy but little space, and soon become one of the chief attractions of the garden. A little successful attention to the cultivation of dwarf trees will soon make any intelligent man an enthusiastic horticulturist.

We annex two beautiful engravings of dwarf trees—a *Seckel* and a *Duchesse d' Angoulême*. They are not fancy sketches, but were drawn from actual specimens, growing in the grounds of S. MATHEWS, Esq., near this city. We may add that Mr. M. has several hundred dwarf pear trees, all healthy, handsome and highly productive. A sight of this orchard would do more to encourage the planting of dwarf pears than all that could be written on the subject.

We are aware that many persons decry dwarf pears. There is some reason for this. Many of the fruit trees sent out were worked on the common quince, and this, it is well known, is not proper for the purpose, (the wood being too compact to unite with the pear,) and is now never used. Then again, the trees have been planted in grass or grain, and left to take care of themselves. Others have been allowed to bear too much fruit the first or second year after planting. Others have not been properly pruned, and others again were varieties which it is now known do not succeed on the quince. But these facts prove nothing, except that dwarf pears require care and skill in their management. Some time since a Canadian farmer contended that the native cattle were more profitable than the improved breeds, because, he said, "they would stand starvation better." The same remark applies with equal force to standard trees—they will stand neglect better than dwarf trees, and those who will not obtain the requisite knowledge, or bestow the necessary care and attention, should have nothing to do either with improved stock or dwarf trees. A *choke pear*, or a scraggy native, is good enough for them.

DWARF APPLES.

The apple is dwarfed by being worked on the Paradise stock. MILLER, in his *Gardeners' Dictionary*, published in 1759, describes it as "rather a shrub than a tree, commonly called the Paradise apple. It never rises to any height; the branches are weak, scarce able to support themselves, and this difference is permanent when raised from the seed." When the apple is worked on this slow growing kind, it is dwarfed in size, for the same reason as the pear is dwarfed when worked on the quince. Like the pear, too, the fruit is increased in size, and of finer flavor. The dwarf apple trees begin to bear in three years from the bud, and few things are more beautiful than one of these miniature trees covered with blossoms or loaded with large fruit. We annex a cut of a *Wagener* apple tree taken from a specimen on the grounds of H. E. HOOKER & Co.

The finest collection of dwarf apples trees we have ever seen is in the specimen grounds of ELLWANGER & BARRY, and we have the pleasure of presenting an accurate representation of one of them—a *Baldwin*. Mr. BARRY, in his *Fruit Garden*, says: "We know of nothing more interesting in the fruit garden than a row, or a little square, of these miniature apple trees, either in blossom or in fruit. Those who have not seen them may imagine an apple tree four feet high, and the same in width, of branches covered with blossoms in the spring, or loaded with magnificent golden and crimson fruit in the autumn. They begin to bear the third year from the bud, and the same variety is always larger and finer on them than on standards. We had *Red Astracans*

Dwarf Apple—Wagener.

on Paradise the past season, that measured eleven inches in circumference. The French plant a square or compartment of these in the kitchen or fruit garden, as they do gooseberries and currants, six feet apart, and call it the '*Normandie*'; they also alternate them with pyramidal pear trees in rows; and in some of the best mixed kitchen and fruit gardens, two dwarf apples are planted between two pyramidal pears, thus giving double the number of them as of the pears in a border or row. In small gardens the apple should not be admitted under any other form, and even to a limited extent in that, for it is the great fruit of the *orchard*, and in nearly all parts of this country they are extensively grown, and can be purchased at very moderate rates."

Dwarf apples are not to be recommended for general cultivation.

Dwarf Apple—Baldwin.

They are interesting trees in a small garden; and in a new country where apples are very scarce, fruit may be obtained from them before the standards come into bearing.

THE DWARF CHERRY.

The cherry is dwarfed by working on the Mahaleb stock. The Dukes and Morellos are the best for dwarfing, as they are less vigorous and more easily managed; but even the free-growing sorts, Hearts and Bigarreaus, are dwarfed with good success. We annex a cut of a Dwarf Cherry tree growing in the specimen grounds of ELLWANGER & BARRY. Mr. BARRY, in the *Fruit Garden*, says: "We have a collection of upwards of thirty varieties, of four to five years old, that are now

Dwarf Cherry—Elliott's Favorite.

fine pyramids, from five to eight feet high, and they have all borne since the third year, and we find them quite as easily managed as the pear. The Dukes and Morellos should be chosen, where very small trees are desirable, as they can be grown in bushes like the apple on the Paradise stock, at five feet apart."

DWARF PLUMS.

The plum is dwarfed by being worked on the common native or Canada stock; and still more so on the cherry plum, which is believed

Dwarf Plum—Diaper Rouge.

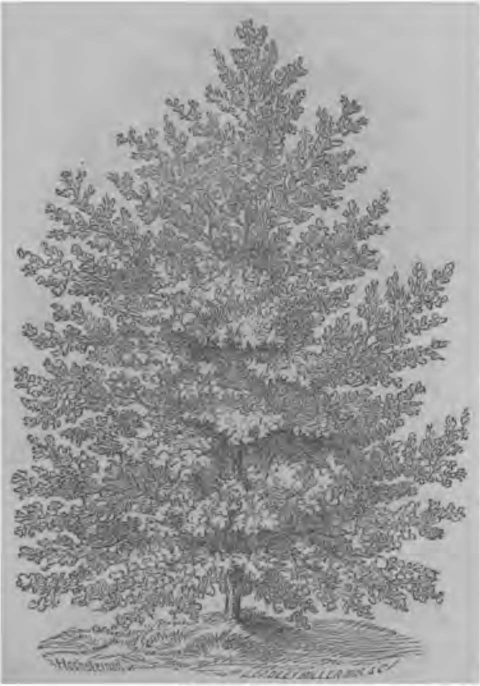
to be identical with the "Cericette or Myrobalam" of the French. We annex a drawing of a dwarf *Diaper Rouge* plum tree, growing in the grounds of ELLWANGER & BARRY. Summer pruning and pinching, as well as occasional root pruning, are all necessary to check the vigor of most varieties.

The Golden-twigged Linden.

ORNAMENTAL DECIDUOUS TREES.

THE European Linden (*Tilia Europea*,) is closely allied to our common Basswood. It is, however, much more fragrant, but of less robust growth. It is admirably adapted for planting along the streets in cities, the heat radiated from the building and pavements increasing the delicious fragrance of the flowers. It also makes a beautiful tree for the lawn. We annex a drawing of one growing in the grounds of S. MATHEWS, Esq., which has been so trained that the lower branches trail on the ground. It is justly admired. The European Linden is a rapid-growing, vigorous, pliant, well-balanced tree, with a great number of lateral branches of an easy and graceful habit. It likes a rich soil and a sheltered situation. It is better adapted for avenues than almost any other tree.

The Golden-twigged Linden (*T. aurea*) differs from the former in the yellowness of its twigs, and in its less vigorous growth. It is a beau-



European Linden.

tiful tree anywhere, but more especially on a lawn, where the colors of its branches form a pleasing contrast. The specimen from which the cut at the head of this article is taken is ten feet high. This variety is not common, and should be more generally introduced.

Sugar Maple.

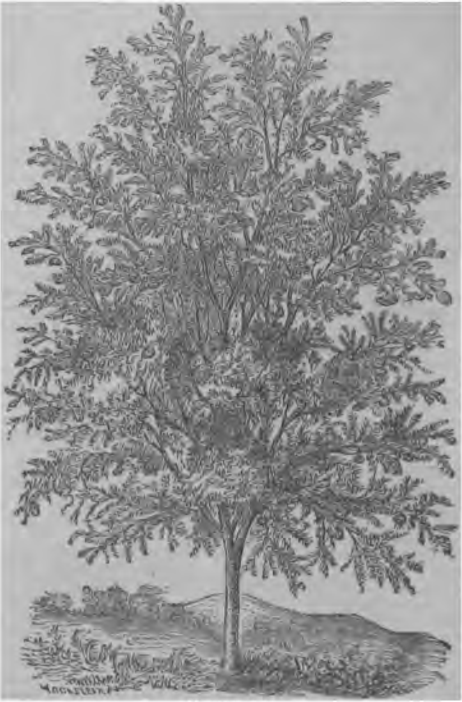
Taking it all in all, there is no more desirable shade and ornamental tree than the Sugar Maple (*Acer saccharinum*). Its healthy and vigorous growth, the beauty of its form, the rich verdure of its foliage during the spring and summer, and its bright and varied tints in autumn, fully account for its popularity. DOWNING says: "The contrast of color exhibited on many of our fine river shores in a warm dry autumn, is perhaps superior to anything of the kind in the world: and the leading and most brilliant colors, viz. orange and scarlet, are produced by Maples. Even in Europe, they are highly valued for their autumnal appearance, so different from that of most of the trees of the old world. Very beautiful effects can be produced by planting the Scarlet and Sugar Maples in the neighborhood of the Ash, which, as we have already noticed, assumes a fine brownish purple; of the Sycamore, which is yellow, and some of the Oaks, which remain green for a long time; if to these we add a few evergreens, as the White Pine and Hemlock, to produce depth, we shall have a kind of kaleidoscope ground, harmonious and beautiful as the rainbow.

"When the Maple is planted to grow singly on the lawn, or in small groups, it should never be trimmed up ten or twenty feet high, a very common practice in some places, as this destroys half its beauty; but if it be suffered to branch out quite low down, it will form a very elegant head. The Maple is well suited to scenes expressive of graceful beauty, as they unite a considerable variation of surface, a pleasing softness and roundness of outline. In bold or picturesque scenes, they can be employed to advantage by intermingling them with the more striking and majestic forms of the Oak, etc., where variety and contrast is desired.

"It is unnecessary for us to recommend this tree for avenues, or for bordering the streets of cities, as its general prevalence in such places sufficiently indicates its acknowledged claims for beauty, shade, and shelter. It bears pruning remarkably well, and is easily transplanted, even when of large size, from its native woods or swamps. The finest trees, however, are produced from seed."

We annex an engraving of a fine specimen growing in this vicinity.

The Mountain Ash (*Pyrus aucuparia*) is an elegant tree, deserving a place in the smallest collections. When young, especially, it is very graceful and beautiful. It grows rapidly for the first three or four years, attaining, in five years, the height of nine or ten feet, after which it begins to form a head, and, in ten years, will attain the height of from twenty to twenty-five feet. After this the head will continue increasing slowly, but the tree seldom grows much higher. We annex an engraving of a full grown specimen growing in the grounds of AARON ERICKSON, Esq., of this city. When the drawing was made the tree was loaded with heavy clusters of red berries, which bent the slender branches almost to the ground. Nothing could be more beautiful. One great advantage of the Mountain Ash is that it never requires pruning, and never grows out of shape. It is well adapted for the lawn, as grass grows well under its shade. We need hardly say that the tree is not an Ash, but belongs to the Pear family. It is called Mountain Ash from its growing on mountains, and from the pinnæ of its leaves bearing some resemblance to those of the common ash. The Mountain Ash is as common in the church-yards of Wales



Mountain Ash.

as the Yew is in those of England. EVELYN says "it is reputed to be a preservative against facinations and evil spirits; whence perhaps, we call it *witchen*."

Cut-Leaved Birch.

The Cut-Leaved Weeping Birch (*Betula lasciniata*). "With us," says the lamented DOWNING, "the birch is a great favorite; and we regard it as a very elegant and graceful tree, not less on account of the silvery white bark of several species, than from the extreme delicacy of the spray, and the pleasing lightness and airiness of the foliage. In all the species, the branches have a tendency to form those graceful curves which contribute so much to the beauty of trees.

"Nothing can well be prettier, seen from the windows of the drawing-room, than a large group of trees, whose depth and distance is made up by the heavy and deep masses of the Ash, Oak, and Maple; and the portions nearest the eye or the lawn terminated by a few Birches, with their sparkling white stems, and delicate, airy, drooping foliage."

The Cut-Leaved Weeping Birch is the handsomest of the family. We annex an engraving of a fine specimen growing in the grounds of Ellwanger & Barry.

No country is so rich in varieties of the Oak as America; and yet, while all admit its great beauty, it is rarely met with, even in our best ornamental grounds, or in the catalogues of our largest nurserymen. Its comparatively slow growth induces ordinary planters to neglect it. Those who build on a bare and treeless spot, very naturally plant trees which will rapidly grow up and convert its bleak, harsh aspect, into cozy mellowness and beauty. But while this is desirable and proper,—while it is good to plant for immediate effect,—the future should also be borne in mind.

The entire tree or shrub of every species of Oak is highly ornamental—the least so, perhaps, are the willow-leaved Oaks, and mostly so, the lobed and deeply sinuated-leaved kinds. The foliage, even of the same species, and more especially of the deciduous kinds, varies exceedingly: not only on different individuals, but on the same individual at different seasons of the year. In spring, the leaves of many of the deciduous kinds are small, delicate, and beautifully tinged with yellow and red; in summer, they are broad and green; and in autumn, coriaceous, and of a russet brown, scarlet, or blood-red color. In form and outline, the Oak has greatly the advantage over other trees in point of character and variety.

On the following page we give an engraving of the Over-cup White Oak, or as it is sometimes called Burr Oak (*Quercus macrocarpa*), growing in the grounds of S. Mathews, Esq. It has made a fine growth, and is a very handsome tree. Michaux says the leaves are larger than any other Oak in the United States, being frequently fifteen inches long and eight broad. The acorns are also larger than any other American species. It abounds on the dry slate or limestone hills of Kentucky, West Tennessee, and in Upper Louisiana near the Missouri. Downing alludes to it as "a noble tree with fine deep green foliage."

European Larch (*Larix Europea*) is one of the handsomest of Coniferous trees. It grows with great rapidity, and thrives well on the poorest sandy soils and in the most exposed situations. It has been more extensively planted in Scotland and England, during the present century, than any other timber tree. As an ornamental tree, Baudrillart says, "it is admired for its pyramidal head and spiral form; for the tender green and peculiar disposition of its foliage; and for its female catkins, which spread over the tree, and, seen at a little dis-

Over-cup White Oak.

tance, resemble wood strawberries in their form, color, and size; contrasting strongly with the pale green of the beautiful tufts of leaves with which the branches are uniformly furnished. Placed singly on a

European Larch.

lawn, or rising from a group of other trees, this species is rarely surpassed in beauty." We annex an engraving of a fine specimen growing in the grounds of H. E. HOOKER & Co., near this city.

PLANT EVERGREENS.

In a climate where deciduous trees are destitute of foliage for nearly three-fourths of the year, it is surprising to witness the tardiness with which farmers plant out evergreens. Take a sleigh ride in almost any direction, and you will find set out along each side of the road, at regular distances, tall, straight, branchless sticks—a cross between a hop-pole and a telegraph post—which you will be surprised to hear are intended for shade trees; but where will you meet with a grove of evergreens surrounding a farmer's quiet homestead? The glaring white houses look cold and cheerless, as the fierce north-wind whistles around their unprotected gables. The atmosphere becomes colder as you gaze, and you drive on, thinking it less strange that so many farmers' sons and daughters are willing to leave such bare and desolate scenes for even the dingy walls of a crowded city, than that intelligent, industrious, prosperous farmers should so far lose sight of their own interest as to neglect to ornament their rural homes, by planting out a few of the hemlocks, firs, pines, or cedars, which are to be found in great numbers in their own woods, and which could be transplanted with a ball of earth around their roots, at little expense, during the leisure season of the year.

The point of most importance in transplanting evergreens is to avoid exposing the roots to the air. If the roots are exposed to the sun and wind 'till they are dried, the tree *may* live, but the chances are very much lessened.

Nearly all evergreens prefer a rather soft, moist soil, but not wet with stagnant water. With judicious management, however, they will do well on nearly all soils. Dig the holes of good size and depth, and if you have any muck or peat that has been thrown up a year or two and is thoroughly decomposed—if it has been decomposed with ashes or lime so much the better—put a small barrowful under each tree and mix it up with the soil, and then plant the tree on the top, spreading the roots out carefully and covering them with light, moist soil. Mulch the ground round the tree, and you will be abundantly rewarded for your labor.

One of the handsomest and hardiest of evergreens is the Norway Spruce (*Abies excelsa*). We annex an engraving of a beautiful specimen, growing in the grounds of Aaron Erickson, Esq., of this city. The Norway Spruce is the lof iest tree indigenous to Europe, attaining, in some instances, the height of 180 ft. It derives its nourishment principally from the surface, and luxuriates in a cool and moist soil. It is, however, well adapted to all soils, and should have a place in the smallest collections.

The Douglass Spruce (*Abies Douglasii*) is far less common than the Norway, and equally beautiful.

Norway Spruce.

The common White Pine of this country (*Pinus strobus*) also makes a most beautiful tree for a lawn. There is a handsome specimen on the grounds of B. R. McAlpine, Esq., of this city, which we have

White Pine.

admired so much that we have procured a drawing of it for the *Rural Annual*. It is the common white pine of Commerce. Lord WEYMOUTH imported large numbers of this tree into England, and it has become generally known as the Weymouth pine. DOWNING thinks it "undoubtedly the most beautiful North American tree of the genus."

The Scotch Pine (*Pinus sylvestris*) is also a hardy, vigorous, and rapid-growing tree, deservedly much admired,—its dark foliage and general habit forming an agreeable contrast with other evergreens.

The Austrian Pine (*Pinns Austriaca*) is rapidly gaining favor in this country. No collection is complete without it. It is, perhaps, the hardiest of all pines, thrives on a great variety of soils (though prefering a dry, calcareous one), and is of rapid growth while young. It thrives best in situations having a southern aspect.

We have given engravings of the American and Siberian Arbor Vitæs in the *Rural Annual* for 1857. They should have a place on every lawn. The Siberian is of slow growth when young, but nothing can exceed the beauty of a well-grown specimen.

AMERICAN BLACK RASPBERRY.

WRITTEN FOR THE RURAL ANNUAL BY H. E. HOOKER.

IT is surprising, that with all the attention which has been bestowed upon small fruits of late years, so little has been said and done for this most valuable berry. It has long stood first in the estimation of housekeepers as a capital article for puddings, pies, tarts, and jams, and the fact that it is found disseminated over a wide area of cold and temperate climates, has enabled almost every farmer's wife to come to a knowledge of its healthful and useful properties. It is, nevertheless, true that improved seedling varieties have not generally found their way into the nurseries or fruit plantations.

It is with great pleasure that we have now the means of introducing to our readers a variety of this fruit which combines the valuable qualities of good size, beauty, and first rate quality as a *table and dessert* fruit—we know many of our readers will doubt this last assertion until they try it—with so great vigor, hardiness and productiveness, that it is, beyond all doubt, a most valuable market variety; making a combination of good qualities which compel us to give it the first place in our list of valuable small fruits. The strawberry alone is its equal, if even that can be said to equal it in real value as a household institution.

The variety of which we have in advance said so much is called

THE IMPROVED BLACK RASPBERRY.

It was introduced by Mr. H. H. DOOLITTLE, of Oaks Corners, Ontario county, N. Y. The cultivation of this fruit is so simple and easy that no person need fail of a crop. It is not difficult to suit with regard to soil. Any strong moderately rich soil, with good underdrainage, not too sandy and light, will do. The common, and to many the easiest way, is to plant in rows six feet apart, plants three feet apart in the row, driving a stake five feet high to each hill to which the young canes are tied in early spring with tar twine or other cord.

Where large plantations are to be made for market purposes, the following is the best method of procedure: Having the soil well prepared by deep plowing, manuring, and harrowing, mark off the rows eight feet apart, then cross-mark three or four feet apart, as the case may be. The young plants should, in all cases, be the plants produced by the tips of the shoots of last year's growth, rooting in September, and taken from the parent plant in March or April, just as they are required for planting; these are planted one in each hill, covering lightly with the hoe. The first season the ground is kept clean with the horse and cultivator, working both ways. By autumn the plants will have grown several shoots four to six feet long, and many of these will root at the tips forming new and good plants. The canes thus formed will produce a crop the next season, but not a full crop, and may be tied up to wires, as described hereafter, or allowed to lie upon the ground and waste their fruit, in part, if they are too weak to pay for the trouble of tying up. The ground, all this season, to be kept loose with small plow or cultivator, neither of which should be worked very deep near the hills, as the fine roots are near the surface.

The young canes of the second year will be very vigorous, strong, and, if headed as they should be about the first of July, finely branched.

The following spring, which will be the second after planting, the old wood is to be cut out, and the young canes shortened back and tied with tar twine to the wires of a trellis formed as follows, and which the reader will readily understand from the accompanying illustration:

Two sound oak or cedar posts, four feet high, well braced and planted firmly, are set one at each end of the rows of plants; from one to the other of these posts, a strong annealed wire is strained, and supported at intervals of about forty or fifty feet by stakes of oak or chestnut driven into the soil, to which the wire is pinned with small staples.

These posts should not be set exactly in the line of the plants but eighteen inches or two feet on one side that the canes may be bent over to the wire, thus allowing the young canes of this season to come up separate from the bearing canes, which facilitates the picking. The expense of this trellis is little if any more than staking, and far neater as well as more durable, lasting as long as the plants, which may be expected to yield good crops for six or eight years. There will be annually a loss of a few plants, which assume a spindling, upright growth, and soon die out—or rather should be immdiately dug out, as they will produce no more berries. But the annual growth of canes will be strong, and should be treated each year in the manner described above.

The crop of fruit is increased in size and improved in quality by pruning the young canes quite freely in the spring, when they are tied up; and is highly remunerative for marketing, as it bears carriage admirably, and brings a better price than strawberries. We hope soon to see this estimable fruit in every garden, and plenty in every market.

HEAT IN GREEN-HOUSES SHOULD CORRESPOND TO THE LIGHT.—An error in hot-house culture consists in not adjusting the heat of art to the light of the sun. In one of KNIGHT's forcing-houses, in which grapes were grown, he always wished to see its temperature, in the middle of every bright day in summer, as high as 90°; "and after the leaves of the plants have become dry," he says, "I do not object to 10° or 15° higher. In the following night, the temperature sometimes falls as low as 50°; and I am well satisfied that it is generally beneficial." "I suspect," he continues, "that a large portion of the blossoms of the cherry and other fruit trees in the forcing-houses often proves abortive, because they are forced, by too high and uniform temperature, to expand before the sap of the tree is properly prepared to nourish them. I have, therefore, been led to try the effects of keeping up a much higher temperature in the day than in the night. As early in the spring as I wished the blossoms of my peach trees to unfold, my house was made warm during the middle of the day; but towards night it was suffered to cool, and the trees were then sprinkled, by means of a large syringe, with clear water, as nearly at the temperature at which that usually rises from the ground, as I could obtain it; and little or no artificial heat was given during the night, unless there appeared a prospect of frost. Under this mode of treatment, the blossoms advanced with very great vigor, and as rapidly as I wished them."

DISEASES OF ANIMALS--REMEDIES, ETC.

HORSES.

INFLUENZA.—If marked by inflammatory action, blood must be abstracted, and that quickly by making the orifice large. Close it as soon as the pulse begins to falter. If no febrile action is apparent, small doses of aloes may be given, combined with the usual fever medicine. It is not prudent to continue the aloes beyond a third drachm. Great attention must be paid to diet. No grain is to be allowed, but give mashes of thin gruel. Water should be entirely refused, and a bucket of gruel kept suspended in the box. Green food may be offered, such as grass, clover, and above all, carrots. If matters look serious, it will be best to call in a surgeon.

INFLAMMATION OF THE BOWELS—ENTERITIS.—The first necessity in this case is bleeding. From six to eight quarts of blood should be abstracted as soon as possible. A strong solution of aloes, guarded by opium, should follow the bleeding. This should be quickly followed by backraking, and the injection of warm water in which Epsom salts have been dissolved. The horse should be encouraged to drink plentifully of thin gruel, and a draught of two drachms of aloes and a little opium be given every six hours.

DIARRHEA.—The treatment should consist in an alteration of the food, giving such as is of a more wholesome and binding nature, and if medicine is then required, give the following in thick gruel: Ginger, powdered, one drachm; gentian, do., two drachms; opium, half a drachm; prepared chalk, one ounce. To be carefully combined together and repeated twice or thrice a day.

DYSENTERY.—The treatment should consist of moderate bleeding, and the administration of mild diluents, such as linseed gruel or tea. Two drachms of nitrate of potash and four drachms of super-tartrate of potash may be given with the gruel four times a day, and warm mashes and carrots offered as food.

FEVER.—Bleeding is in most cases necessary, after which gentle opening medicines may be used, followed by the proper fever medicines. Digitalis, tartar emetic, and nitre may also be given. The horse is to be kept warmly clothed, but in a cool, and well ventilated stable.

STOMACH STAGGERS.—Give oily purgatives, assisted by draughts of warm water and purgative injections. Afterwards give carbonate of ammonia, two drachms; gentian, one drachm; spirits of nitrous ether, one ounce; twice a day.

WORMS.—Take an ounce of dried tobacco powdered fine, a teaspoonful of salt, and a handful of unleached wood ashes; mix them well and give the horse a large table-spoonful of the mixture, in his oats or cut food, two or three times a week.

Colic.—Turpentine is one of the most powerful remedies, especially if combined with a small quantity of opium and in good warm ale. A solution of aloes may be advantageously added. The horse should be walked about, and the belly rubbed with a brush or cloth. If relief is not obtained in half an hour it will be prudent to bleed. Clysters of warm water, or containing a solution of aloes, may be injected. Give the animal bran mashes and lukewarm water for two or three days afterward, and keep him well stabled.

Mange.—A liniment made of four ounces of sulphur vivum, two drachms of white hellebore, four ounces of oil of tar, one pound of linseed oil, well mixed together, and rubbed in with plenty of friction every day for several days, with an occasional washing with soap and water, will in most cases be effective.

Catarrh.—In nineteen cases out of twenty recovery will take place without any medicine, if the horse is kept free from the *cordials* grooms are so fond of administering, and allowed warm stabling and mashes, and no heating food. A fever ball may be given mixed with a little aloes and antimony.

Bone Spavin.—Take six ounces oil of origanum, two ounces camphor, two ounces mercurial ointment; mix them well together and rub the spavin two or three times a day, keeping the legs dry and free from dirt.

CATTLE.

Milk Fever.—From half a pound to a pound of Epsom salts, dissolved in a quart of boiling water, and add one-quarter of an ounce each of powdered red pepper, caraway seed, ginger, and a gill of molasses, and give the whole lukewarm at once. If this does not act on the bowels, another dose is to be given, with the quantity of pepper, caraway, and ginger doubled. After the operation of this medicine, sedatives may be given if necessary. Bleeding is sometimes, but rarely, necessary in the first stages of this disease.

Red Water.—Take a pound of Epsom salts, half an ounce of ginger, and half an ounce of carbonate of ammonia. Pour a quart of boiling water on the salts and ginger, stir thoroughly, and when cold add the ammonia. If this fails to act on the bowels, repeat a quarter part of it every six or eight hours till it succeeds. Give a nutritious diet afterward.

Simple Fever.—In slight attacks a cathartic of salts, sulphur, and ginger is sufficient; but if neglected it will turn into pleurisy, and then a veterinary surgeon should be called in to give the best chance of saving the animal.

Hoven.—In the early stages, the gas in the animal's stomach may be neutralized by giving two ounces of ammonia in a quart of warm water every quarter of an hour, or by the use of chloride of lime, in the same way.

Scours or Diarrhea.—Mild purgatives, followed by astringents, are advisable in this disease.

DYSENTERY, SCOURING ROT.—This is a dangerous and troublesome malady, and difficult to cure. Dry, warm stabling, with careful nursing, will do much. Dry, sweet food, should be given. Give a purgative, and afterward make a mixture of two ounces prepared chalk, one ounce powdered oak bark, two drachms pulverized catechu, one drachm pulverized opium, and four drachms powdered ginger, to which add a little starch, and give it in a quart of warm gruel.

TYPHOID FEVER.—Copious drinks of oat meal gruel, with tincture of red pepper, a diet of bran, warmth to the body, and pure air, are great essentials in the treatment of this disease; followed by light purgative medicines, and afterward by light stimulants, to move the digestive organs into healthful action.

HOOSE.—Half a pint of lime-water every morning, and a table-spoonful of salt each evening, for four or five days, will alleviate this disease, which most generally affects calves and young cattle. An ounce of oil of turpentine in four ounces of linseed oil, repeated once a week, is often effective.

INFLAMMATION OF THE LUNGS.—Warm water and mashes or gruel may be given, and the animal kept in a dry warm place. If the body is cold, give two ounces sweet spirits of nitre, four ounces liquor acetate ammonia, in a pint of water, two or three times a day.

COLIC.—A carminative mixture, composed of half a tea-spoonful each of powdered anise seed and cinnamon, given in a quart of spearmint tea, and repeated if necessary, is the best method of treating this disease. A couple of quarts of thin gruel made from slippery elm bark, is also good. Brisk friction of the belly, and warm housing, should also be used.

MANGE.—Rub the affected spots once a day with an ointment made of sulphur, one pound; mercurial ointment, two ounces; turpentine, half a pound; lard, one and one-fourth pounds. Melt the turpentine and lard together, and stir in the sulphur as the mixture cools; then rub down the mercurial ointment on some hard surface with the other ingredients.

CAKED BAG AND SORE TEATS may be removed by washing the bag and teats several times a day in clean soft water, afterward rubbing them with goose oil, or an ointment made by simmering the root of bittersweet in lard.

SHEEP.

DIARRHEA.—The following will be found suitable: Pulverized catechu, four drachms; prepared chalk, one ounce; pulverized ginger, two drachms; pulverized opium, half a drachm. To be mixed in half a pint of peppermint water. Two or three table-spoonfuls given twice a day.

DYSENTERY.—Give linseed gruel several times a day; also administer a dose of two ounces of linseed oil, two grains of opium, repeating the opium the following day, with the addition of a scruple of ginger, and two scruples of powdered gentian.

Foot Rot.—The foot must be carefully examined and every loose portion of horn cut away with a sharp knife. Then wash it with a solution of chloride of lime, and apply butter of antimony, by means of a stick with a piece of tow tied to one end, to every denuded part of the hoof. It is then expedient to wrap the foot in a piece of clean rag or tow, tied fast, and turn the animal into a dry yard or pasturage, taking care to dress the foot again every day. A solution of blue vitriol applied in the same way, is also very much used; so also is hot tar.

Catarrh.—Somestimes this assumes an epizootic form, in which case it is difficult to arrest its progress. Bi-chloride of mercury, at the rate of one-eighth of a grain a day, dissolved in water, with the use of fifteen grains of a decoction of rhubarb, and the ordinary carminative and stomachic adjuvants of ginger and gentian, have proved the most useful of any treatment yet tried.

Inflammation of the Brain.—Abstract from half to one pound of blood from the neck veins, and give a purgative, such as two ounces of magnesia, afterward.

Giddiness—Caused by hyatids on the brain. If a soft spot can be found on the skull the hyatid can be destroyed by penetrating it with an awl; but in most cases it is better to make mutton of the animal at once.

Hoven.—A tea-spoonful of salt may be dissolved and poured down the throat; or what is better still, give a drachm of chloride of lime, dissolved in water. Sulphuric ether is also good.

SWINE.

Mange.—Wash the hog with warm water and soap. Withhold every kind of heating food. Give two ounces of Epsom salts in a warm bran mash. Give in every meal afterward for a few days a table-spoonful of flour of sulphur and as much nitre as will cover a six-pence.

Colic.—A dose of from one to eight drachms of opium and double that quantity of spirit of nitrous ether, (according to the size of the animal,) in a few ounces of warm water, is the best remedy for this disease. In extreme cases bleeding may be resorted to.

Measles.—This will yield to cooling treatment, such as Epsom salts and nitre, with attention to feeding, giving warm drinks, with say thirty grains of sulphur and ten of nitre, three times a day.

Quinsy.—Prompt bleeding and purging should be adopted, followed by cooling medicines, and the swellings in the throat may be punctured with advantage, and setons inserted.

Skin Diseases.—A cooling lotion made of four drachms muriate of ammonia, one ounce of acetic acid, and one pint of water, is an excellent topical application.

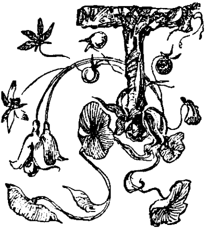
Leprosy and Murrain.—The best treatment is cleanliness, coolness, bleeding, purging, and limitation of food. A few cloves of garlic may be given with good effect.

Lethargy.—Bleed from behind the ears, and administer an emetic, and afterward give a few doses of sulphur and nitre.

INJURIOUS INSECTS.

ON SOME INSECTS INJURIOUS TO GRAIN, FRUIT, AND VEGETABLES.

WRITTEN FOR THE RURAL ANNUAL BY JOHN MACKELCAN, JR.



THE name INSECT is given to all such small animals, whose bodies are not supported upon a bony frame, but are composed of several rings, or *intersections*, jointed together, so as to form one harmonious whole. Every insect, when in perfect condition, has at least six legs. Like vertebral animals, they possess a circulatory system, and warm blood, which renders them peculiarly susceptible to changes of temperature. They have a respiratory system, the organs of which are generally situated on the hinder part of their bodies. The process of nutrition is effected through a stomach and intestines. They are allowed to have the nervous powers of sensation, and perception, to an extent exceeding even that of the larger animals.

> ——"The poor beetle that we tread upon,
> In corporal sufferance finds a pang as great
> As when a giant dies."

They have the faculty of instinct to a remarkable degree. Witness the combination of labor in an ant hill.

There is scarcely a plant, or an animal, that is not, in a more or less degree, the dwelling place of some insect which derives nourishment from it; and the bodies of many insects, again, form the dwelling places for still smaller animals, belonging to a still lower order of creation. The food of insects is as varied as that of the larger quadrupeds, and in proportion to their size they consume a very much larger quantity of it. Some of them are carnivorous, preying upon other insects, sucking the blood of the larger animals and man, or feeding upon dead bodies, decayed wood, or decomposing vegetable tissue. Others, again, feed upon the juices, or sap, of the various plants and trees comprised in the vegetable world. These last are those most inimical to man, and against them his energies are directed in order to discover their habits and, this acquired, the means of lessening their numbers or preventing their ravages.

Insects have been divided by naturalists into seven orders, or classes, distinguished from each other by the character of their wings. Spiders, although often called insects, are not included in entomology, but occupy an intermediate space by themselves, between Insects and Crustacea. According to LINNÆUS, the great naturalist, Insects are divided into the following orders:

I. COLEOPTERA—*Beetles.*—All insects with horny bodies, six legs, and four wings, of which the upper ones are horny, and, when closed, fold down over the lower parchment-like wings, and form a protective covering to the under portion of their bodies, enabling them to resist moisture, and live in the ground, for which their legs and feet are adapted to burrowing in, and where they remain concealed during the day, issuing forth only at night in search of food. These may be again divided into two classes—"Carnivorous," or those that prey upon plant-lice or aphides, caterpillars, etc., as the Carabi, Calosoma, Coccinella; "Herbivorous," or those that feed on vegetable substances, as the Elaters or Spring-Beetles, and the Weevils.

II. HEMIPTERA—*Bugs.*—Insects with four parchment-like wings, six legs, and which obtain their nourishment by sucking the juices of plants and animals, for which purpose they are provided with a movable proboscis, as the Cicada, Plant-lice, Bed-bugs, etc. The wings, however, are not always present.

III. ORTHOPTERA—*Straight-winged Insects.*—Having four parchment-like wings, of which the upper ones are thick and opake and overlap on the back, and the two under ones are thin and folded together like a fan. They have strong jaws, with which they destroy vegetables, and many of them have long hinder legs, formed for leaping, as the Grasshopper, Crickets, Earwigs, etc.

IV. LEPIDOPTERA—*Butterflies and Moths.*—Having four expanded wings, covered with farinaceous, dust-like scales. They are not of themselves very injurious, but their larvæ are among the most destructive insect pests the cultivator has to contend with.

V. NEUROPTERA—*Net-winged Insects.*—Those which have four net-woven, lattice-like wings, as the Dragon-flies. They are mostly aquatic, and may be often seen skimming over the surface of water, on bright summer days, and many of them are very beautiful.

VI. HYMENOPTERA—*Vein-winged Insects.*—With four transparent wings, and generally provided with a venomous sting, as Bees, Wasps, Ants, etc. Some of the species in this order are without wings. This class are generally the most useful to man of all the insect tribe. To it, however, belong the Saw-flies, and Gall insects.

VII. DIPTERA—*Two-winged Insects.*—Having only two wings. In all the states in which they exist, these insects are among the most troublesome both to man and the inferior animals. To this class belong the Wheat-midge, Hessian-fly, Bot-fly, Mosquito, House-fly, Flea, etc.

The greater portion of the insect tribe undergo four transformations in the course of their lives, and then perish, viz: First, eggs, which hatch into larvæ; these change into pupæ, or chrysaloids; and from these, after a period of dormancy of more or less duration, the perfect insects emerge. Some insects, however, as the Hemiptera, and some species of the Diptera, bring forth young alive, as well as deposit eggs. In others, again, as the Orthoptera, the perfect insect is hatched directly from the egg. The time occupied in passing through these various transformations, varies greatly in different tribes of insects, and even with separate species in the same tribe, and is also, in some measure, controlled by the state of the weather, cold usually keeping dormant the vital power of the eggs, or the pupæ, while heat stimulates them into greater activity.

The great injury that the cultivator of the soil suffers from the depredations of the insect tribe upon his crops and fruits, and which seem to increase year by year, reveals the necessity of a more intimate acquaintance with their species and habits, in order to successfully contend against them. In the limited space allowed for this article, it is impossible to do full justice to the subject. I can do little more than give a brief description of a few of the insects most injurious to the farmer and gardener, together with the best known means of destroying them, or at least of mitigating their ravages. And here I would acknowledge my obligation to Dr. Asa Fitch, the able entomologist of the New York State Agricultural Society, not only for much reliable information, but also for the permission to use some of his excellent engravings in illustrating this article.

THE WHEAT-MIDGE. (*Cecidomyia Tritici.*)

This apparently insignificant looking little fly, erroneously called the weevil, has shown the full application of the adage, "union is strength." Simply, by itself, it would indeed effect nothing; but its appearance in such vast numbers, simultaneously, throughout some portions of the country, has at times done incalculable damage to the cereal crops, especially the wheat, for which it seems to have a peculiar liking. Our cut shows the female wheat-midge and larva, (1, perfect insect, magnified—2, natural size; 3, larva, magnified—4, natural size). The perfect insect is a small orange-colored fly, about one-tenth of an inch long, with delicate, transparent wings, and long, slender legs. A variety has been observed with dark spots on the wings. The male is rarely seen, and differs from the female in having a more slender body and longer antennæ. The midge belongs to the same order and family as the Hessian-fly, which it resembles in appearance; but although eqnally, if not more destructive than the latter, it has very different habits.

The female midge may be seen on a calm, mild evening, in early June, while the wheat is just in flower, hovering over the field of wheat, and occasionally alighting on an ear and depositing her egg in the glumes of the flower, or on the germ of the still undeveloped grain, through the chaff, which she penetrates with her telescope-like ovipositor. When the chaff is far advanced, or very silicious in its nature, it becomes too hard for the insect to puncture, and this is one reason why early blossoming wheat is much more likely to escape the attacks of the midge. The number of eggs deposited by the female on an ear of grain rarely exceeds ten, but it occasionally happens that several of these insects lay their eggs in the same floret; hence from ten to one hundred, or even more, larvæ are sometimes found in one ear of wheat. After laying her complement of eggs, the female dies, and may then frequently be found suspended from the grain by her ovipositor. In about a week, the young maggots, which are of an orange-yellow color, hatch out. These maggots feed upon the juices contained in the young and soft grain, and in about three weeks they attain maturity. They then leave the grain, of which nothing but the empty hull now remains, generally in damp weather, or when the stalk is wet with dew, and wriggle down it to the ground, where they penetrate an inch or two below the surface. There they remain until the following spring, still in their maggot state. In May they transform into pupæ, and remain in that state for two or three weeks, when they work their way to the surface, break their pupa skin, and assume the form of perfect insects, ready to go through the same course of devastation again.

Wheat-midge.

Many remedies have been tried to destroy this insect, but none with certain success. The main point is to sow only early blossoming varieties, and in good season, so as to have the grains hardened before it is time for the midge to undergo its last transformation. It is thought that by plowing the stubble deep in the fall, and thus burying the maggot, it would be unable to force its way to the surface in the spring. I heard of one farmer in Canada, who, plowing a stubble field this spring, was struck by the reddish color of the soil. On close inspection, it was found that the ground was literally covered with the pupæ of the midge; so thick were they in the ground that they almost touched one another on the surface of the newly turned soil. Wheat on well-drained land has been found to be less liable to the attacks of the midge than that on damp soils. Professor HENSLOW, of Cambridge, England, many years ago, found millions of the pupæ of the wheat-midge in the dust and chaff collected on barn floors, where the wheat had been threshed and cleaned, and he recommended the use of a wire gauze sieve, placed in a sloping position before the fanning-mill, so as to allow the chaff to fall on it and then roll down. The pupæ fall through, and can be caught in a box or tray, and afterward committed to the flames. More time and research are yet required to be devoted to the study of the habits of this insect, in order to enable us to successfully compete with it, and ward off its attacks, or compass its destruction. It would be well to know if it can live on anything else than unripe grain, what amount of cold the pupa can bear, and whether the parent fly is capable of extended flights. As one of the agricultural papers lately said, "It is a battle between man and the midge, for bread; and hitherto 'midge' has beaten us."

THE HESSIAN-FLY. (*Cecidomyia destructor.*)

This is a very small, black, two-winged fly, belonging to the same order as the common house-fly, and closely resembling the wheat midge in appearance. The female deposits her eggs upon the stalk and young leaves of wheat, barley, rye, and timothy grass, as soon as the plants are up in the autumn, (September,) and in the spring, (May.) The eggs hatch in about a week, and the little white maggot enters the stalk at the first joint, where it remains feeding upon the sap, and weakening the stem so that it breaks near the surface of the ground. In five or six weeks the maggots attain their full size, and then change into light-brown pupæ, resembling the seed of flax, from which the perfect insects soon afterward emerge. This takes place twice, and sometimes thrice in a year; first, upon the grain grown in spring, and again, on wheat grown in autumn.

Professor Hind, of Trinity College, Toronto, C. W., in a very able essay on this insect, says: "The maggots appear to live wholly by suction; they do not penetrate the stem, or make any apparent incision; they produce, however, a depression, caused by the obstruction they offer to the growth of that part of the plant where they lodge. These depressions, though not always apparent from the outside, greatly weaken the stem, and render it liable in early summer to be blown down or broken by a slight breeze of wind." Again he says: "The manner in which the maggot of the spring brood affects the stem in the early summer months, seems to arise from its presence preventing the deposition of the necessary amount of silica, or flint, in the straw of the wheat immediately under its body. Those varieties of wheat which produce strong, flinty stalks, are less liable to suffer injury from the presence of the maggot."

It is generally allowed by all who have written on the subject, that the Hessian-fly deposits its eggs on the young leaves of the wheat plant above the first and second joints. From this circumstance, it may be found that turning sheep on the growing wheat in the fall, and pasturing it down close to the ground, will effectually get rid of the autumn brood; and that being got rid of, where are the flies to come from to create a spring brood? It is said that if an acre or two, in the middle of a large field, be plowed and sown with wheat in the middle of August, all the flies in the vicinity will be attracted to it and leave their eggs on it; and the other prepared fields being sown with wheat, this patch is to be turned under, and the maggots and unhatched eggs buried in the soil.

There are four small parasites that prey upon the Hessian-fly when in its pupa or flaxseed state. They are very small, four-winged flies, resembling bees, which sting the pupa and deposits an egg in it, from which a small maggot hatches that devours the body contained within, and afterward escapes from the shell.

THE CHINCH BUG. (*Micropus leucopterus.*)

This insect is allied to the bed-bug, which it resembles in many respects, particularly in emitting the same disagreeable odor. It is occasionally very destructive to wheat, oats, and corn, in the Southern and Western States. In its perfect state it is about 3-20 of an inch long, of a coal black color, with snow white wing-covers lying very flat upon its back, and showing a black margin and two black spots. Fig. 2, natural size; 2*a*, magnified. It never appears in the form of larva but lays its eggs in the ground in the autumn, where they remain through the winter until the warm weather of the June following, when they hatch out in the form of a small bright red bug, without wings, which gradually becomes transformed into the perfect insect, which may be called a fly, although it belongs to the order Hemiptera.

The Chinch Bug.

It commences its ravages as soon as it leaves the egg, puncturing the plants with its sharp, needle-like beak, and sucking out the juices. These insects prefer wheat to any other herbage, and remain upon it until harvest, when they leave it and migrate to fields of oats or corn. As soon as the cold weather appears they suddenly disappear. They seem, like their congener, the bed-bug, to have a particular dislike to moisture, as they never appear in wet seasons, and a sudden shower, or long continued rain, will often be effectual in stopping their ravages for the season. So sudden, however, is their appearance, and so rapid the destructive progress of these insects, that no effectual remedy appears to have been yet discovered for getting rid of them.

THE WHEAT-FLY. (*Chlorops vulgaris.*)

There are several species of this fly known in Europe, where it is accounted the worst among the depredators on the grain crops. FITCH has described several species of this genus, and also *Oscinis*, as being native to America, where, however, they have not yet made themselves remarkable among the enemies to the ceralia. The fly, of which we give a cut, occurs upon the heads of wheat in June, and is often mistakenly regarded as the fly from which the larvæ of the wheat-midge proceed. It is of a pale tawny-yellow color, with some black spots, and rows of black bristles on the thorax. Little is yet known of their habits, but it is believed that they feed upon the juices of the ceralia, and that their larvæ penetrate the wheat plant and live upon the pith of the straw while it is green.


The Wheat-fly.

THE WIRE-WORM. (*Agriotes.*)

This name is given by farmers to the larvæ of numerous species of Click-beetles, belonging to the genus *Elateridæ*. According to HARRIS,


Click-beetles—Wire-worms.

upwards of sixty varieties of these beetles are known in the New England States. Our engraving represents three species: 2, Agriotes lineatus, flying; 1, natural size; 8, larva; 9, do. magnified. 3, A. obscurus; 4, natural length. 5, 6, A. sputator; 7, larva; 10, pupa; 11, do. natural length. The perfect insects are popularly known under the name of "snapping bugs," from their possessing the faculty of throwing themselves up with a jerk when laid on their backs. They vary from one-third of an inch to one inch and a half in length, but are almost uniformly of a blackish or brown color, with yellowish legs. The larvæ or wire-worms have a long, slender, tough, cylindrical body; six feet; and a prop at the hinder end. Their length is about one inch, often more; color yellow, with a brown head. These larvæ feed upon the roots and underground stems of wheat, corn, the different pasture and hay grasses, and many vegetables. Some of them are wood-eaters, and live in the roots or trunks of old trees. It is believed that they remain in the larva state for several years before becoming pupæ. The pupæ are whitish, with two black spots over the eyes, and about one-fourth of an inch long. The worm is found in great numbers infesting old pastures and meadows.

Hind says: "Sometimes the wire-worm is found in such destructive abundance that it cuts off most crops as fast as they appear two or three inches above the surface of the ground. Under such circumstances, starving them out is perhaps the only remedy; a field kept perfectly free from vegetation can afford them no nourishment, and they must either perish or remove to another locality." In England it is a common practice to bury slices of potatoes or turnips in the field, and employ women and children to take them up in the morning and kill the wire-worms, which will be found attached to the slices in great numbers. The insectivorous birds are among the greatest destroyers both of the wire-worms and the beetles. The Hon. A. B. Dickinson says he has "tried all sorts of remedies and only proved one remedy for these rascals to be good, and that is to break up the land and sow it with buckwheat."

THE WHEAT-MOW-FLY. (*Agromyza Tritici.*)

This insect appears much like the common house-fly, greatly reduced in size. It is black, with a broad reddish-yellow band on the front above the base of the antennæ, and the mouth margined with dull yellow. It is the parent of a small yellow maggot, that is sometimes found crawling among the wheat sheaves while in the mow. These worms eat up and destroy the ripened grain, leaving the kernels shrunk up, in the same manner as when they have been infested with the wheat-midge. The worms all crawl out of the wheat in the early part of the fall, and find their way to the earth, where they bury themselves and transform into pupæ; the next season the perfect insect emerges from the ground and lays its eggs upon the young wheat. The worms are extensively preyed upon by the wheat-mow-fly parasite, (*Diapria agromyza*,) a small black fly that feeds upon the worm and

The Wheat-mow-fly.

destroys it, and thus acts as an effectual check upon its too rapid increase; otherwise this pest would become still more destructive to our wheat crop than any yet known.

THE WHEAT-THRIPS. (*Thrips cerealium.*)

A tribe of small active insects, belonging to the order Hemiptera, which reside in the ears of wheat and rye. In June they may be found in the furrows of the seed, which they puncture while green, and suck out the juices, causing the grain to shrivel up. They may be also found on the stems of late sown wheat, which they puncture above the joints, causing abortion of the ear. They are also found upon the potato, and the peach tree sometimes suffers severely from their attacks. Our engraving shows, fig. 1, male, magnified; 2, natural size. 3, female, natural size; 4, magnified. The larva, 5; 6, magnified, of an ocherous-yellow color, and scarcely visible to the naked eye. 7, potato thrip, *T. minutissima*; 8, magnified. After the grain is ripe they are said to disperse upon other plants, in the blossoms of which they may be found after harvest. Nothing is yet known of any means of destruction, but it is said that a mite greatly smaller than themselves preys upon them, and keeps down their numbers.

The Wheat-thrips.

THE WHEAT-WEEVIL. (*Calandra granaria.*)

This insect belongs to the tribe known as snout-beetles. It is about the size of a flea, and of a chestnut color. It does immense injury in granaries, by boring into the grains of wheat, barley, or rye, with its snout, and depositing therein an egg, from whence there hatches a small maggot, which devours all the farinaceous substance of the grain, so that nothing remains but the hull. JAEGER says "these maggots live in this condition about thirty days, when they metamorphose into white cocoons, from which, after about ten days, the perfect insects proceed, the females of which immediately deposit their eggs on the grain still

The Wheat-weevil.

remaining whole, each laying about one hundred and fifty." The general method recommended for destroying these pests, is, to have the wheat kiln-dried, and the heat will effectually kill them, whether eggs, bugs, or larvæ. It is said that placing a barrel of tar in the granary for a short time will drive every weevil out. A correspondent of the *Genesee Farmer* recommends mixing four quarts of unslaked lime with each hundred bushels of grain. This he says will check the ravages of the weevil, and will not injure the grain. By passing the grain through a fanning mill the lime can be blown out, if desired.

THE PEA-BEETLE. (*Bruchus Pisi.*)

This insect is common both to Europe and America, but it is probable that it was unknown in the latter until it was imported along with the seeds brought over by the early settlers. It is about the size of a bed-bug, round and flat, and of a dark color, with white spots on the

The Pea-beetle.

thorax and wing-covers, the rump and under sides whitish, with black spots. The females deposit their eggs on the young pea pods soon after they are out of the blossom; the eggs hatch, and a young maggot crawls into each young pea while it is quite small and tender. There it remains, feeding upon the farina of the pea, till it hardens, when the maggot undergoes its transformations within the shell of the pea—first into a pupa, and soon afterward into the perfect insect. The peas containing them at this time can scarcely be distinguished from sound ones, except by a dark looking speck on them, the weight of the larva or pupa being quite equal to the farina consumed. But the perfect insect, as soon as hatched, breaks out of its confinement, and then the peas are light enough—scarcely anything but the hulls being left.

So great has been the injury done by this insect, of late years, that the cultivation of the pea, as a field crop, has been almost entirely suspended in some sections of the country. Some people believe that the beetle, or bug, as it is generally but incorrectly called—for it belongs to the *Coleoptera*—does not destroy the germ of the future plant contained within the pea, on which it feeds, and that buggy peas will do for seed as well as any others; but this, to say the least, is improbable. No rational or reliable method has yet been discovered for destroying these beetles, without destroying the vitality of the pea at the same time. The insect is limited to a certain time for depositing its eggs. Late sown peas are therefore much more likely to escape its attacks. A gentleman who sowed his peas, for several successive years, after the 10th of June, has never found bugs in them.

THE CORN CUT-WORM. (*Agrotis segetum.*)

Although cut-worms are common in all parts of the Union, yet our knowledge of their derivation, habits, and economy, is still very imperfect. They are mostly all the larvæ of a tribe of night-moths, known in Europe as dart-moths, and in some localities as owlet-moths, a cut of which, together with the worm, is given on this page. The American species differ from the European only in being smaller, and of a paler tint. FITCH says: "The parent insect drops her eggs upon the ground the latter part of summer. These soon hatch, and the young worms crawl into the ground and feed upon the roots and tender shoots of herbaceous plants. When cold weather arrives they descend a few inches below the surface, and there lie torpid during winter, renewing their activity on the return of spring. It is not till they have nearly completed their growth, in the month of June, that they show that habit which render them so injurious, and gives them the name of "cut-worm." They then crawl from the earth at night, and, with their sharp teeth, cut off the young succulent plants of maize, cabbage, beans, &c." When daylight returns each worm crawls into the ground again, close to the plant it has cut off, and leaves the dirt rough and disturbed where it has entered, so that it is easily found and destroyed.

The Corn Cut-worm.

It would be impossible to describe the appearance of these worms, as every one who is familiar with them, and there are few farmers that are not, has probably noticed that there are many varieties, differing in their color and markings. The insect given in the cut is known as *Agrotis segetum;* and the moth is of a brownish-grey color, beautifully marked, and freckled with lighter and darker shades. The most common species here is the *Agrotis gothica*, which is often seen coming in at open windows in warm weather, attracted by the light of the candle. It is then easily destroyed. The best mode of destroying the cut-worm itself, and the only one, in fact, which has been found efficacious, is to dig them out in the morning from their retreats beside the young corn, and kill them. But this is found a tedious operation, and as the worm only cuts off one or two plants in a hill, it is found less troublesome to plant plenty of seed; hence the old rule in corn-planting:

"One for the black-bird and one for the crow,
Two for the cut-worm, and three to grow."

THE TURNIP-BEETLE. (*Altica nemorum.*)

One of the greatest drawbacks to the successful cultivation of turnips is the presence of the insect known as the turnip-fly, which is, in reality, a small beetle of the same tribe to which the striped, or cucumber beetle belongs. This little beetle devours the first leaves of the plants, as soon as they appear above the ground. This insect is so well known that a minute description is not needed; but we give a cut and description of it, in its various stages of development, from the *Genesee Farmer* of June, 1859. Fig. 1 is the fly greatly magnified—the

The Turnip-beetle.

cross lines at fig. 2 indicating the natural dimensions, as well as fig. 3, where one is represented feeding on the leaf. It is shiny black, minutely punctured, with two yellow stripes down the wing cases, the hinder legs formed for leaping. The female deposits her eggs on the under side of the rough leaf, (fig. 4—5 magnified.) The laying continues as long as the rough leaf appears, and the eggs hatch out in a week or ten days, when the young grub pierces the skin under the leaf, and begins eating the pulp, and the spot becomes visible by a brownish appearance, (fig. 6.) It continues moving in a tortuous direction till it reaches the mid-rib, (fig. 7,) by which time it is full grown, (fig. 8—9 magnified.) It then eats through and falls to the ground, to become pupa, just under the surface, (fig. 10—11 magnified.)

In regard to the means of preventing the ravages of this pest, the same paper says: It is difficult to suggest any remedy against the attacks of the turnip-fly. The great point is to give the plants a rapid growth, by having the soil rich and fine. Superphosphate of lime, sown *with the seed* in the drills, has a magical effect on the young turnip plants, pushing them forward so rapidly that the fly has no time to do them much injury. Another remedy is, to sow plenty of seed—from one to three pounds per acre—and thin out after the turnips get into the rough leaf. We have known as much as five pounds per acre sown in England, in order, if possible, to have enough plants to satisfy these voracious destroyers. Another remedy, which has been resorted to with considerable success, is founded on the fact that the fly prefers the leaves of radishes to those of turnips. If a little radish seed is sown with the turnip seed, the fly will eat the radishes and let the turnips alone. Dusting the plants with ashes, lime, or soot, while the dew is on, is sometimes useful in checking the ravages of the fly.

THE JOINT-WORM. (*Eurytoma Hordei.*)

This insect is a small four-winged fly, of a jet black color, frequently mistaken for the Hessian-fly, on which it is said to prey; but that is doubtful. During the past summer some specimens of curiously plaited straw were sent me by a gentleman who found them in the packing of some pails from Massachusetts; near the joints were a number of minute holes from which emerged several of these flies. It is most commonly found in barley straw, whence its specific name; and it is frequently met with in Virginia, where the larvæ are said to commit great ravages upon the wheat.

The larvæ of these flies, which constitute the true joint-worm, are small maggots of a pale yellowish color, varying from one-tenth to six-tenths of an inch in length, found near the base of the straw at the second or third joint, the substance of which seems to be solidified and changed to a wood-like texture, and the hollow of the stem entirely obliterated for some distance above the joint. The external surface appears spotted and slightly elevated like a blister, on the paler portions. The plaited appearance of the interior of the straw is the most curious part of it, and has not been accounted for.

Little is yet known about this singular insect, although the matter has been discussed by several of our entomologists. HARRIS says: "We are to consider, in destroying the *Eurytoma*, whether we are destroying an enemy or a friend. If it be a parasite, as the almost universal opinion of entomologists would lead us to believe, it would not be advisable to interfere with its operations." Yet his own opinion is that it is a plant eating insect, and that it should be destroyed by burning the straw or stubble where it is found.

THE APPLE TREE BORER. (*Saperda bivittata.*)

This insect is one of the worst enemies with which our apple trees have to contend. It is a yellowish, footless, cylindrical grub, the larva of a winged-beetle of the *Cerambycidæ* family, which makes its appearance in June, and deposits its eggs, one at a time, upon the bark near the surface of the earth. The maggot, when hatched, eats its way directly down into the bark, producing a discoloration where it is situated. Scraping off the outside bark, the last of August or early in September, so as to expose the white under bark, which can be done without injury to the tree, will enable the young worm to be detected and destroyed. FITCH says of it: "The worm gradually works its way onward through the bark, increasing in size as it advances, till it reaches the sap-wood. Here it takes up its abode, feeding upon and consuming the soft wood, and forming a smooth, round, flat cavity the size of a dollar, or larger, immediately under the bark. It keeps its burrow clean by pushing its excrement out of a small crevice, or opening, through the bark. This excrement resembles new fine saw-dust, and enables us to readily detect the presence of the worm by the little heap of this substance which is accumulated on the ground, or covers the orifice of the hole out of which it is extruded." The worm when it is about half grown changes its habits, and the cavity, which it was so careful to keep clean and open, it now fills and obliterates, that it may not be discovered. It now confines itself to the heart-wood, gnawing a cylindrical retreat for itself, upward in the heart of the tree, as shown in the cut of a split section of the tree at this time. Here it lies dormant during the winter season, and in spring changes into a pupa, while still in its hole. From this the perfect insect soon after hatches, and, tearing away the saw-dust like powder which fills up the hole through which the worm originally cleared its burrow, it comes out of the tree. According to HARRIS, the larva state of this insect continues for two years. The tree becomes so weakened by the borer working through the wood, that it is easily blown down by the wind, or knocked down by stock rubbing against it.

The Apple Tree Borer.

The greatest preventive of the undue increase of this insect, is provided in the numerous woodpeckers which inhabit the country, especially the Downy woodpecker. These birds proclaim war to the knife against the borer, and are assiduous in seeking out and destroying it. In regard to the remedies used by man, in this instance "an ounce of prevention is worth a pound of cure," and for this purpose alkaline preparations of suitable strength, such as soft soap, applied to the outer bark with a brush, are better than anything else. To kill the worm, FITCH recommends finding out, with an awl, the top of the burrow, which will probably be not very far from the ground, cutting away the bark there with a pen-knife, then scraping out the loose saw-dust and pouring in hot water from a tea-pot until you are certain, from its oozing out at the lower orifice, that the worm is dead. This operation will not hurt the tree in the least.

THE APPLE BUPRESTIS. (*Chrysobothris femorata.*)

This is another insect, the larva of which has lately been discovered as a borer in our apple trees. The perfect insect is a shiny, blackish-green beetle, belonging to the order of Elaters, or Click-beetles. It may be observed in June and July, running up and down the trunk and limbs of the tree. FITCH says: "It deposits its eggs on the bark, from which a worm hatches; this worm passes through the bark, and during the first periods of its life consumes the sap-wood, immediately under the bark."—When the worm has become strong, it excavates a burrow in the heart-wood, and makes a great wide hole in the interior of the tree, in which it remains torpid during the winter. In its habits, and mode of procedure, it closely resembles the apple tree borer, already described, and the same remedies that are used against the above borer will probably be found equally effectual with this one. It will be seen by the cut, that this worm differs considerably in appearance from that of the apple tree borer. It is soft and flesh-like, and of a yellowish color, with a black head, and powerful jaws.

The Apple Buprestis.

THE APPLE BARK LOUSE. (*Aspidiotus conchiformis.*)

This insect is the most pernicious and destructive to the apple tree of any known in this country. It originated in Europe, from whence it has been imported to America, and infests our orchards to a great extent, from the New England States to as far west as the western line of Lake Michigan, beyond which it has not yet been observed. FITCH says of it: "It appears in the form of minute scales, resembling the shell of an oyster in shape, adhering to the surface of the apple tree. It is no rare occurrence to meet with young trees, the bark of which is literally covered with these insects from the root to the end of the twigs." The cuts show (fig. 1,) the appearance of the bark of the tree when covered with these insects, and also the same (fig. 2,) magnified. The insect is about one-eighth of an inch long, of an oval form, bent in the centre, the head being rounded and the tail pointed; it is of a brown color, yellow at the

Fig. 1.

Fig. 2.

smaller end, and is often designated the oyster-shaped bark-louse. It lays its eggs upon the tree and then dies, covering the eggs with its body which dries up and appears like a scale covering them. These eggs hatch out into small maggots, which crawl out from inside the scale and spread over the bark, appearing like minute white spots. It is the perfect insect, however, which does the most damage, sucking out the juices of the tree till it withers and dies. It is also found upon the wild currant, the butternut, and the rose.

Many remedies have been given for the destruction of this insect. Tar and linseed oil, beat together, and applied with a paint brush to the tree before the buds expand in the spring, has been found effectual. The best remedy that has been recommended, however, is to boil leaf tobacco in stong lye till it is reduced to an impalpable pulp; then mix it with soft soap, to make the mass about the consistence of thin paint, which prevents its being readily washed off by rains. The trees are then trimmed well, and this preparation applied with a paint brush to the trunk, limbs, and every twig of the tree infested by these insects, in the early spring before the buds swell.

THE APPLE ROOT-BLIGHT. (*Pemphigus Pyri.*)

Sometimes the apple tree is affected with a disease of the roots resembling galls. Fig. 1 shows a root so affected. It consists of wart-like excrescences growing upon the roots, sometimes to an enormous size, and is mostly met with upon the roots of young trees in the nurseries, at the time of transplanting. FITCH thinks this disease is caused by a small insect (fig. 2,) belonging to the tribe of plant lice, and somewhat similar to the woolly aphis.—The larva of this insect is supposed to cause this disease by puncturing the roots and causing the sap to flow out, and form small knobs under the bark. I have examined several trees thus affected and think FITCH mistaken on this point. The disease is said not to injure the tree after transplanting. Little is yet, however, known of this insect. FITCH says: "If the roots be dipped in soap-suds at the time of transplanting, unless these lice are a much hardier race than their kindred which are found upon the leaves and twigs, they will at once be destroyed, and such trees may then be set out with perfect safety." DOWNING recommends mixing a shovelful of ashes with the soil around the roots, as a remedy.

Fig. 1.

Fig. 2.

SEVENTEEN-YEAR LOCUST, OR RED-EYED CICADA. (*Cicada septendecim.*)

This insect is most remarkable in its habits, and for its periodical appearance. FITCH says of it: "The unusual length of time which it requires for completing its growth, and the perfect regularity with which every generation, numbering many millions of individuals, attains maturity, so as to come forth at the end of seventeen years, the

The Seventeen-year Locust. (Fig. 1)

entire brood hatching in a few day's time, has caused this, more than any other American insect, to be noted throughout the world. From this circumstance it was that the early settlers gave it the name of locust, although it is wholly unlike the celebrated migratory locust of the East. The broods of these insects appear in different sections of the country in different years, but always at intervals of seventeen years." Its last appearance in New York was in 1843, consequently it will appear again in 1860.

It is a very large black fly, (fig. 1,) belonging to the order *Hemiptera*, with four glossy wings, orange-colored ribs, and red eyes. These insects generally confine their depredations to the forest, never inhabiting lands that have been cleared seventeen years, nor the prairie lands of the west. On the prairies, however, they attack fruit trees that have been planted over seventeen years. Their habits yet require further investigation, but it is supposed they deposit their eggs upon the trees, and the young larvæ derive their nourishment from puncturing the bark of the roots and living upon the juices of the tree till it dies. It is said they also subsist upon the roots of grasses and herbs. These larvæ (fig. 2,) are in fact the insects in their pupæ state, and in a measure resemble the perfect insects, but without wings, as shown in the cut. The perfect insect lives upon the juices of the tree, which it extracts from the ends of the twigs, wounding them so that the twigs ultimately die, the female first depositing her eggs in the wounds she makes. The tops of the forest trees thus injured appear as if scorched by fire. No means have yet been discovered for their destruction or of mitigating their ravages.

Fig. 2.

APPLE TREE CATERPILLAR, OR LACKEY MOTH. (*Clisiocampa Americana.*)

This insect is in its larva state one of the most universally known throughout America. It is the common caterpillar, whose cobweb nests are everywhere seen hanging upon the apple and cherry trees, during the months of May and June. Few people, however, are acquainted with the moth, or miller, into which these caterpillars change, a cut of the male of which we give (fig. 1). The moth is of a dull reddish color, varying in the depth of the tint upon different individuals—the females being generally paler, approaching to greyish. There are two straight white stripes extending obliquely across the fore-wings, dividing each wing into three nearly equal portions. FITCH says of this insect:

Fig. 1.

"The moths are the most numerous about the end of the first week in July. They pair, and the females deposit their eggs in a day or two after they come out of the cocoons." The eggs are laid in clusters upon the twig, somewhat symmetrically disposed in rows and finely glued together in a solid mass, having a gradual tapering off at each end, and covered over with a thin glutinous coating which hides them from view and protects them from the weather, as shown in fig. 2. They remain upon the tree through the autumn and winter, until the warm weather of April or May hatches them out. For a few days after hatching the young worms feed upon the matter which envelops the eggs, until they are strong enough to crawl about. FITCH says: "They move down the limb one after another, each spinning from his mouth a fine silken thread which he attaches to the bark, whereby his foothold and that of those who follow him is rendered more secure. On coming to a fork of the limb, they halt, and there erect a kind of tent for their subsequent residence, by traveling around the spot, spinning their threads in every direction, forming a web resembling that of a spider. This at first is quite slight, and wholly inadequate to shelter them. But thousands of additional threads being added to it every fair day, it rapidly becomes substantial and better adapted to protect them." These caterpillars grow in size, and leave their habitation regularly at stated hours during the day to feed upon the leaves. At first the worms are but one-tenth of an inch long, but they keep growing till they reach one-quarter of an inch in length. During this period they moult or change their skins five or six times, causing them to present a very diversified appearance of colors. By the month of

Fig. 2.

June they have become full grown, and then disperse in search of secure retreats in which to spin their cocoons and undergo their transformation into pupæ. The cocoons are oval, pale yellow, about an inch long, and may be found in crevices in the bark of trees, under the rails and boards of fences, beneath the corners and clapboards of buildings, or almost any place where they are sheltered from rain.

Many modes of destroying these caterpillars have been adopted, but the two most effectual are, first, to destroy the eggs by cutting off every twig having a cluster of eggs on it, and scraping them off the larger limbs carefully into a basket, and burning them. This may be done in the winter season. The other method is to destroy the caterpillars by tearing off the nest while they are all in it, and crushing them to death with the hand or foot.

THE HANDMAID MOTH, OR YELLOW-NECKED APPLE TREE WORM.
(*Eumetopona ministra.*)

Although there is perhaps no insect frequenting our apple trees which excites more notice, and causes so much alarm at the time of its appearance, as this; yet its economy and habits were scarcely known until FITCH described it in 1853. The perfect insect is a moth measuring from two to two and a half inches across the spread wings. The fore-wings are of a dusky buff-color, crossed by four or five bands of a darker tint; the hind-wings are of a light color, approaching to white; the body is nearly of the color of the wings, and the head and thorax bright orange. There are, however, several varieties of this moth, differing more or less in the markings of their wings. They appear upon the wing in June and July, and the female deposits her eggs in a cluster on the under side of a leaf at the end of the branch of an apple tree. They hatch about the 20th of July, some a month later. The young worms, when just hatched, are of a tawny yellow color, nearly red, and thinly covered with white hairs. When mature they are coal black. They are from six to eight weeks in reaching their full size, and it is thought they then drop off the tree, penetrate the ground, and become transformed into pupæ there; but this point has not yet been decided.

The Handmaid Moth.

The worms commence devouring the leaves at the ends of the limbs, and as they grow they strip the leaves from the tree, and from the twigs toward the trunk, giving the tree a bare and wintry appearance. Some years they are much more abundant than in others. When engaged in feeding they are huddled together on the under side of the leaves, a row of shiny black heads, like a string of large beads, appearing along the sides of the leaf, each busily engaged in gnawing the margin, which rapidly melts away as they progress in their work of destruction. When at rest they may be found clinging to the twigs they have just stripped.

More than half of these caterpillars are usually destroyed by birds, and what remains are easily destroyed by cutting off the twigs on which they are found and throwing them into the fire.

THE ROSE-BUG. (*Macrodactylus subspinosa.*)

About the middle of June this insect makes its appearance on the rose bushes in great numbers, consuming the foliage, both on this and all plants belonging to that order, including the apple, the plum, and cherry. Grape vines also suffer severely, wherever these insects are numerous. They may be met with on Indian corn, as well as many garden vegetables, and grasses. They devour the fruit as well as the leaves. The perfect insect is exactly the size of the one represented in the cut. It is a small beetle, of a blackish color above, but covered with minute scales which give it a buff or ochre-yellow tint, the under side of the body being white; the legs are bright tawny-yellow, and covered with fine hairs. There are several varieties, slightly differing from each other in color and general appearance. These insects show themselves in great numbers quite suddenly; and after continuing about a month, and committing great depredations upon almost every green thing within their reach, they vanish as suddenly as they came. FITCH says: "Towards the close of their lives the females crawl an inch or more into the ground, where they deposit their eggs, which are about thirty in number to each insect. These hatch in twenty days afterwards, and the little whitish grubs which come from them, feed upon whatever tender, juicy roots they find. They grow to their full size before winter, and are then three-quarters of an inch long. To pass the winter, these grubs descend into the ground below the reach of frost, and become torpid. When warm weather returns, they revive and crawl back to the surface, and each worm forms for itself a pod-like cell of an oval form. This is made by the worm turning round and round in one spot, whereby the earth surrounding it becomes firmly compacted together." In this cell it changes to a pupa, from whence the perfect insect emerges in June, and is first seen upon the oak, and elm, before it invades the garden. These beetles find more natural enemies opposed to them than usually falls to the lot of insect existence. The large Dragon-fly devours them in great numbers; all the insectivorous tribe of birds make war upon them; fowls, ducks, and poultry generally, feast and fatten upon them. But where they appear in excessive numbers, great difficulty is experienced in getting rid of them. The only reliable measure yet known, according to FITCH, is to gather them day after day by hand, or by brushing them into tin vessels of water, or

The Rose-bug.

by shaking or beating them from the trees into sheets spread underneath, and then crushing, burning, or scalding them.

THE PALMER-MOTH. (*Chætochilus pometellus.*)

This moth (fig. 1,) is small, being sixty-five-one-hundredths of an inch across the expanded wings. It is of an ash-grey color, the fore-wings sprinkled with black atoms, and having a fringe on the outside border. The hind-wings are dusky with a glossy azure-blue reflection, also with fringes. The larvæ (fig. 2,) are pale yellow, with a darker stripe along the back, and a darker head. They grow to half an inch in length, and when full grown appear more of a green color. Along each side runs a blackish stripe, several small black dots are scattered over the body, from each of which springs a hair. FITCH says of it: "Though not abundant, this worm is common upon the leaves of orchards and forests, making its appearance about the middle of June. But it sometimes becomes multiplied in a most astonishing manner, appearing suddenly in great numbers, over a vast extent of country, in a single day changing the green foliage every where to a withered brown hue, as though scorched by fire. And after continuing a week or two it disappears as suddenly as it came, so that on a tree which to-day contains hundreds of these worms, to-morrow not one can be found." The foliage is sometimes so entirely destroyed by this worm that whole orchards and forests perish. It remains upon the tree concealed in a sort of fold formed in the leaf, by spinning a slight silken web with which it joins together three leaves, (fig. 3,) in the hollow of which it lies concealed. They change into pupæ in these about the end of June, and about the middle of July the moths emerge from them, lay their eggs, and then perish. There are several varieties of *Chætochilus*, the larvæ of which are injurious to fruit trees. A small footless grub, or maggot, destroys great numbers of this worm. FITCH says: "The fact of the sudden disappearance of these worms with showers of rain was noticed in several places in 1853, and suggests the showering of trees infested by them with a garden engine, as a measure whereby to dislodge and destroy this enemy. Drenching with whale-oil soap, diluted with water, has proved effectual."

Fig. 1.

Fig. 2.

Fig. 3.

THE CODLING MOTH. (*Carpocapsa Pomonella.*)

This has become a great pest in our orchards, where it attacks the fruit of both apples and pears, though it seems greatly to prefer the former. The moth is small, and belongs to the genus *Tortrix*, and it is one of the most beautiful of that tribe. It appears in June, and may be sometimes seen in houses in the evening, having been brought in with the fruit while in the larva state. Our cut gives an idea of the markings of the wings, which are of various shades of brown and gray, resembling watered satin; and also represents the grubs in the apple. These moths lay their eggs on the young fruit in July, dropping them in the hollow at the blossom, or the stalk ends; they prefer the early to the late fruit, and select the finer sorts. The grubs hatch in a few days, and immediately burrow into the apples, where they remain near the core feeding upon the substance of the fruit. These grubs are whitish at first, and become pink as they reach maturity, which is in about three weeks. To get rid of the refuse fragments of its food, it gnaws a hole through the side of the apple, and thrusts them out of it. The fruit usually falls before it is ripe, and the worm escapes into the ground, or, if not, it crawls out upon the tree, and in either case spins a cocoon and transforms into a pupa, in which state it remains through the winter.

The Coddling Moth.

The best way to check their increase is to gather up all premature fallen apples and make immediate use of them, destroying the insects within when they are cut open. Pieces of cloth wound round the limbs of the tree will attract those worms that have escaped from the fruit while on the tree, and when unrolled will often contain thousands of chrysalides which may be thrown into the fire. Where orchards are much infested by moths, &c., lighting small fires of straw or shavings, here and there under the trees, will be an effectual means of destroying great numbers by attracting them into the fire.

THE MAY-BEETLE. (*Phyllophaga quercina.*)

This insect belongs to the *Cockchafer* tribe, and is very destructive to vegetation. The cut shows: 1, Field-chafer, magnified; 2, line showing natural size; 3, Garden May-beetle; 4, do., magnified; 5, larva. The common garden-beetle is about an inch long, of a chestnut-brown color, smooth but with the surface finely punctured. In its perfect state it feeds upon the leaves of trees, especially those of the cherry.

The beetle flies with a humming noise at night, during May and June, and is frequently attracted into houses by a light. The larvæ are the common white grubs with brown heads, so often seen in turning up the soil in the garden. These grubs are a great pest, devouring the

The May-beetle.

roots of vegetation. These beetles are extensively eaten by the skunk, whose foot-prints are often seen in the garden, and he is then accused of being in search of eggs, or chickens, &c. Birds of every kind are fond of the grubs and devour them. The beetles may be effectually destroyed by shaking them from the fruit trees late in the evening or early in the morning; they are then easily collected and thrown into boiling water, and afterwards given to the poultry or swine. Two or three pailfuls of them have been collected from a single tree.

THE PEACH TREE BORER. (*Ægeria exitiosa.*)

Many persons suppose this insect and the apple tree borer are one and the same thing; but although the larva of both closely resemble each other, they belong to two entirely different orders. The perfect insect (fig. 1) is a butterfly with wings of a dark steel-blue color, variously marked with sulphur-yellow, and having a glossy lustre, like satin, and measuring about an inch across them when extended. The female differs considerably from the male, being larger, and heavier in the body, and having a purple reflection on her wings, and a broad stripe across them of a bright orange color. These perfect insects make their appearance in July, but the females do not generally deposit their eggs on the tree till August. The eggs are deposited upon the bark of the peach tree, near the surface of the ground. From each of these

Fig. 1

eggs hatch out, in a few days, a naked, soft, white grub. The worms (fig. 2) commence working downward to the root of the tree, forming a slender flexous channel, which becomes filled with gum. An inch or two below the surface the whole of the bark on the roots of badly infested trees becomes consumed, and the soft sap-wood is extensively cut and gnawed, as shewn in fig. 3. FITCH says "The larger worms in the winter season repose with their heads upward, in contact with the exterior surface of the root, commonly in smooth longitudinal grooves which they have excavated, (fig. 4) their backs being covered over with the castings mingled with gum and cobweb-like threads, thus forming a kind of cell, the cavity of which is larger than the body of the worm inhabiting it. The smaller worms have no such cells, but lie promiscuously in the gum, or between it and the root. When ready to enter its pupa state, the worm crawls upward to the surface of the ground, and there forms for itself a follicle or pod-like case of a leathery texture, made from its castings, held together by dry gum and cobweb-like threads. This follicle is placed against the side of the root, with its upper end slightly protruding above the surface of the ground." Dr. HARRIS thought that the peach might be secured from the depredations of this worm by means of grafting it on plum stocks, but it is found that this insect has an equal partiality for the plum as for the peach. This insect is a pure native American, being totally unknown in any other country. Various remedies have been tried to save the peach tree from the ravages of this insect, some of which are of very doubtful efficacy. FITCH says setting out plants of tanzy around the peach trees is a good preventive against the attacks of the worm. Clearing away the earth from the roots of the trees, and then applying a coat of diluted gas-tar with a paint brush, after taking out or killing all the worms by inserting a long wire into their hole, has been found effectual by a Maryland correspondent of the *Genesee Farmer*. The cavities left after the worm is destroyed do not become obliterated, but are generally taken possession of by various species of wood-lice, or "sow-bugs."

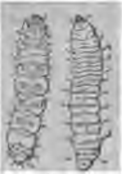


Fig. 2.


Fig. 3.


Fig. 4.

THE CABBAGE MOTH. (*Mamestra Brassica.*)

The caterpillar of this moth is very destructive to different varieties of culinary vegetables. The species found in this country is much smaller than its European congener of the same name. The moth (fig. 1) is fifty-eight-one-hundredths of an inch across the expanded wings, and its general appearance can easily be known by the figure. This moth appears at intervals during the season from May to October, which leads to the belief that two broods of them occur in each year. The worm infests the outer leaves of cabbages, lettuce, and other plants, which may frequently be observed riddled with holes, the work of this worm. It seldom, however, attacks the heart of the plant, like the European species. This worm (fig. 2) is a most choleric, mercurial

The Cabbage Moth.

little creature, and when disturbed it bends nearly double, and wriggles away backwards, or by a fine thread lets itself down from the leaf, rendering it difficult to catch and destroy it, which is the only way to effectually get rid of this species. Ducks and poultry are useful for this purpose. Watering the plants is said to be effectual in driving these caterpillars off the plants, but they would probably return to them again after the moisture has become dried up. Its greatest enemy is a small parasite or Ichneumon-fly, which deposits its eggs in the body of the worm, and the little maggots which hatch from them feed upon the vitals of the caterpillar till it is full grown, when it dies, and the maggot of the parasite transforms into a pupa within the dead body. Such worms as escape this and other enemies, spin a pretty gauze-like cocoon, and change into pupæ (fig. 3) within it. These cocoons may be found attached to the under side of the eaten leaves, two or more together, and are easily gathered and destroyed in the fire.

THE ONION FLY. (*Anthomyia ceparum.*)

This insect, which is a native of Europe where it does considerable injury to plants of the onion tribe, has within the past few years made its appearance in America, and has in some places almost entirely destroyed the onion crop. It is a small fly, about half the size of the common house-fly, and belongs to the same order. The perfect insect is of an ash-grey color, the male having black stripes on the back, the

The Onion-fly.

The first figure on the right shows the onion cut open and grubs at work, natural size; second figure, the grub, magnified; third, the fly, greatly magnified—the cross lines under, showing natural size; and the fourth figure, the pupa, magnified.

wings clear as glass, with broad iridescent reflections, and yellowish-brown veins. The fly lays her eggs on the outer leaves of the onion, close to the earth; the eggs hatch in a week or two, and the young maggot then descends between the leaves of the onion to its base, where it remains feeding upon the bulb, which soon becomes rotten. It then leaves the onion and enters the earth, where it changes into a reddish-brown pupa, out of which the perfect fly emerges in about twenty days. The fly lays again, and then dies; these eggs hatch out, and the brood pass through the winter in the pupa state.

It is very difficult to destroy these insects. The flies are so small they are seldom observed, and the maggots have done their work before their presence in the onion-bulb is indicated. Their power of production is so great, that unless they are destroyed the moment they are discovered to have attacked the crop, which can only be effectually done by carefully pulling up every diseased plant and burning it, their total eradication becomes a difficult matter. Strewing the beds with pounded charcoal, leaving a patch here and there for the fly, which will feed on them in preference to the others, is very general in Europe. Laying soot or salt over the beds, watering with lime-water, gas-tar, soap-suds, stale urine, and tobacco-water, or a mixture of all these, have also been employed. Spirits of tar is said to destroy the pupæ if applied to the ground in sufficient quantity after the onions are removed. But insects peculiar to any plant seldom attack the crop the first year after being planted in land not before occupied by the same crop, so that it is likely that the ravages of this fly may be prevented by planting the onions on a different and distant spot each year.

PLANT-LICE. (*Aphides.*)

This is a very numerous class of insects, belonging to the order *Hemiptera*. The different varieties so much resemble each other, that the figures we give of the cabbage plant-louse, *Aphis Brassica*, (fig. 1,

male, magnified; 2, natural size; 3, female; 4, do., magnified,) will convey a general idea of the appearance of the entire tribe. They have small, oval, soft bodies, of various colors, mostly greenish, with a whitish dust scattered over them. The greater portion of them are wingless, but some winged individuals appear among them at particular seasons, and these are the males, and full grown females. They are both oviparous and viviparous, consequently their power of multiplication is immense. These Aphides are

Lady-bird.

Aphis-lion. Eggs, larva, and perfect insect.

extensively preyed upon by numerous insects, especially the carnivorous beetles, among which their greatest enemy is the well-known Lady-bird. The Aphis-lion also lives upon them, and they are devoured by several species of wasps and the flies of the genus Syrphus. The plant-lice feed upon the juices of plants, which they pump out with their long needle-like beaks, and when they are numerous, cause great injury. All the species are provided with two horny tubes, or warts, on the hinder part of their bodies, from which exudes a sweet, glutinous substance of a brownish color, often observed on the branches and leaves of trees and plants infested by them. This substance, known as honey-dew, is eagerly sought after and devoured by ants, which also suck their honey tubes for this substance, from which circumstance these lice have in some localities obtained the name of "ant's milch cows." Wherever we see ants running up and down trees and shrubs, we may consider it a certain indication of the presence of plant-lice upon them. There is scarcely a tree, shrub, or plant, that grows in our fields and gardens, that is not, to a greater or less degree, the abode of some of the species of plant-lice.

The same remedies will be found equally applicable to all, viz: Thoroughly drenching the plants with strong soap-suds, or a weak solution of potash. Brushing them off will sometimes answer. When trees are infested by them, scraping off the rough bark and applying a paint made of equal parts of melted resin and fish-oil, has been found effectual. Placing a small quantity of soap in the fork of a limb, close to the trunk of the fruit trees, so that the rain may dissolve and wash it down the stem, is a very effectual way of preventing the female aphides from endeavoring to effect a lodgment.

THE CATERPILLAR-HUNTER. (*Calosoma scrutator.*)

This insect is very common in our gardens, and belongs to the *Carabi* tribe of beetles, the members of which live upon and destroy the various caterpillars infesting fruit trees and garden vegetables.

The Caterpillar-hunter.

An opinion is gaining ground that our winters are becoming colder and our summers more variable, and that in consequence fruit raising is becoming altogether too precarious to be profitable. But people are always more ready to find fault, grumble, and throw blame on something else than their own want of energy, and will, to overcome obstacles. A large amount of this lessening of the prospects of our fruit crop must be charged to the ignorance and carelessness of cultivators, in relation to insects. The number of fruit trees planted of late years has increased rapidly, and with it the number of insects which derive their nourishment from fruit, and fruit trees, have increased fourfold, while their natural enemies, the insectivorous birds, have been ruthlessly condemned to destruction. Here and there a cultivator may be found who has sense enough to spare the birds, while at the same time he is diligent in destroying the insects. But in most cases the insects are allowed to have unmolested sway. Let such be the case no longer.

DOMESTIC PIGEONS.

A SHORT TREATISE ON THE REARING AND MANAGEMENT OF DOMESTIC PIGEONS.

WRITTEN FOR THE RURAL ANNUAL BY C. N. BEMENT.

ANTIQUITY OF PIGEON KEEPING.

THE first mention of Pigeons to be met with is found in the Holy Scriptures. "And it came to pass at the end of forty days, that NOAH opened the window of the ark which he had made. And he sent forth a raven, which went to and fro, until the waters were dried up from off the earth. Also he sent forth a dove from him, to see if the waters were abated from off the face of the ground. But the dove found no rest for the sole of her foot, and she returned unto him into the ark: for the waters were upon the face of the whole earth. Then he put forth his hand, and took her, and pulled her in unto him into the ark. And he stayed yet other seven days, and again he sent forth the dove out of the ark. And the dove came into him in the evening, and lo, in her mouth was an olive-leaf plucked off. So NOAH knew that the waters were abated from off the earth. And he stayed yet other seven days, and sent forth the dove; which returned not again unto him any more."

For the last two or three thousand years, at least, certain pigeons have been kept by man as domestic creatures, with the object of making them fulfil a rather varied round of characters. Their office has been to afford a ready supply of wholesome food, convenient to have at hand in hot countries, where animal food must be eaten almost as soon as it is killed; to furnish manure, indispensable in the east, for the cultivation of the fruits and vegetables most in request there — the melon, the squash, and other vines; to render efficient and ready services as messengers under circumstances of extremest difficulty; and to be pampered at home as domestic pets, whose value lies in their docility, their beauty, or even in their strange and anomalous peculiarities.

The Roman authors on agriculture, give copious directions for the management of dovecots, and the modes of fattening pigeons for the table, and pigeon-houses were an important feature in the rural economy of the ancients. The Romans kept domestic pigeons very much in the same way as we do now; and in addition to this were in the habit of catching the wild species, such as the Ring Dove and the common Turtle, and putting them in confinement as we do our Wild Pigeons. Fancy Pigeons, too, as distinguished from the dove-house kinds, which were reared solely to be killed and eaten, seem to have been known from a very early period. According to PLINY, the Campanian Pigeons were of the largest size; while we infer from COLUMELLA, that the taste of the Alexandrian fanciers were more in favor of the smaller kinds. The latter writer is sadly scandalized at the invetaracy and extravagance of the pigeon fancy among his contemporaries; while the former records the prevalence of a pigeon mania among the Romans. "And many," he says, "are mad with the love of these birds; they build towers for them on the tops of their roof, and will relate the high breeding and ancestry of each after the ancient fashion."

But it is as letter-carriers that pigeons have obtained the greatest celebrity among the ancients; and of their services in this capacity we find frequent and interesting mention. The practice seems to have been adopted in remote times, in modes and upon occasions the exact counterpart of those which call forth the powers of the birds at the present day. During the last few years, however, the invention of the Electric Telegraph has done more to bring Carrier Pigeons into partial disuse, than has been effected in all the three thousand years previous. Whether the bird so employed in early ages was identical with our Carrier does not appear; but, until something to the contrary is proved, we may be permitted to assume that it was the same in every respect.

The Dove is also famed in classic lore. ARISTO tells us that the death of ORILLO was made known to all Egypt by the Carrier Pigeon in a few hours. When BRUTUS was beset in Modena, he, by these birds, kept up an uninterrupted correspondence with HORTIUS without, ANTHONY failing in every stratagem to stop these winged couriers; luckily for these poor birds, powder and shot were not then in use. The people of Ascalon had such a high veneration for pigeons, that they durst not kill and eat them, lest they should feed on their Gods themselves; and they were particularly careful of all those that were produced in that city. ANACREON tells us he held a correspondence with his lovely BARTYLLUS by a dove. These and many other ancient historical anecdotes, while they cease to be credited, yet serve *us* to show of what importance and interest these birds have always been considered.

But we need not go thus far back for instances of utility and services of the pigeon. In England they have been much used by sporting characters, as the most expiditious means of conveying information of the termination of prize fights, horse racing, shooting matches, &c., to the members of the various clubs, who are anxiously waiting to learn if they will be the losers or gainers by their bets. There are clubs in Holland, Germany, and England, expressly for breeding and perfecting that particular species, the Messenger or Carrier Pigeon. These birds are bred and trained to such perfection, that they will readily return from the principal cities in each country, and the wonder is no longer at the bird's return; but at the surprising swiftness and exactness with which instinct has endowed them to direct their route, so that the reduction of time is as much an object of ambition to these fanciers as an extension of distance.

France, Germany, England, and some other countries, abound in many varieties of domestic pigeons; they are carefully reared for profit and amusement. Extensive accommodations are prepared for them; and as they will nine months in the year seek their own food, they become considerable sources of gain to their keepers; for the most fastidious taste pronounce them excellent food. There are some of the pigeon family extremely curious and beautiful, and they are kept for ornament. These varieties have been the favorites of man from time immemorial; and various treaties and works have been issued on the subject. In our own plentiful and peaceful country they are little known, and scarce any work has treated on the subject. To supply, in a measure, this deficiency, is the object of the writer, who, having been familiar with their wants, habits, and peculiarities, ventures to lay the following pages before the reader.

DOMESTIC PIGEONS.

Of all the feathered race, Domestic Pigeons have always been the greatest favorites with man: in every age, and in every country, even back to the earliest records. NOAH, we have no doubt, rejoiced more in this bird, when it returned with the olive-branch, than in all his *arked miscellany* beside.

At the present day, a love for pigeons is considered by many as rather low, a taste scarcely the thing to be indulged in, a study of a department of nature from which little can be learned, and, as a hobby, decidedly out of fashion. But any pursuit may be vulgarized and made the means of evil, by being taken up from base motives and in an unworthy manner; and on the other hand, even an indulgence in the pigeon fancy may be so regulated and conducted as to afford interest and instruction to the young, and a healthy relaxation and matter for speculative inquiry to their seniors.

What boy, whose parents permitted him to keep ever so few pairs of pigeons, forgets in after days the pleasing anxieties of which they were the source—the occupation of spare half-hours which they never failed to afford? Well do we remember our first two pigeon-houses, of widely-diverse construction; the earliest effort of contrivance being an old candle-box placed against the side of the stable, with the complicated machinery of a falling platform, or "trap," in front, to be drawn up by a small cord, so as to secure the inmates, or their visitors, for a learned inspection; the second, a more ambitious piece of architecture, namely, a barrel mounted on the top of a post, divided internally into apartments, each of some cubic inches capacity, and each with a little landing place projecting for the birds to alight upon, after their meal on the ground, or their circling exercise above the house-tops. And the wonderment to behold the process of fixing this lofty structure firm and upright in its site in the back-yard! How the man dug an awful hole in the ground, from which he could with difficulty shovel out the earth for the crowding, and the pushing, and the peeping in of us children—how the tall structure was, by the combined efforts of all present, slowly set upright—how three or four vast stones (rocks they seemed to us to be) were jammed in at the foot with a beetle—how, when earth and pebbles had been duly added to make all smooth and tight, we retired a few yards and looked up with admiration—and when at last the ladder was brought wherewith to ascend, which we did without delay, and inspect the internal arrangement with a high degree of pride.

And then, the strange events necessarily occurring to us. The severe countenance with which our neighbor and landlord, hitherto beaming with benignant smiles, now greeted us as we were walking over the roofs of the out-houses in pursuit of an old "Duffer" with a clipped wing; the astonishment of a respectable tailor on the other side of the street, to see a boy's face peering over the ridge of the opposite roof, with the air of CORTES surveying the Pacific Ocean from the summit of the Andes, rather than with the consciousness of being the mischievous urchin that he was; the arrival of a strange pigeon with a sore and naked breast; the bold resolve to use decisive surgery, and to decapitate it, lest the evil should prove contagious;—these, and a whole chronicle full of such-like accidents, soon showed us that life, to the young, is an onward journey through an unexplored country, every step of which leads to some discovery, and opens to us a pleasant or a repulsive prospect.

NATURAL HABITS OF PIGEONS.

The natural habits and cultivation of Pigeons are, in several respects, so peculiar, that we deem it right to give a brief account of them, as the most useful rudimental information we can offer to a novice in pigeon-keeping; for it is impossible to manage birds and animals successfully without a knowledge of what their instincts are.

The main difference between pigeons and all other birds that are bred for domestic uses, is, that the young of the latter have to be supplied with suitable food as well as the parents; and on that supply depends the chance of successfully rearing them. No nest or *permanent* habitation is required for them after they are once brought into the world; merely a temporary shelter by day, and a secure and convenient lodging by night, which, however, may be shifted continually from place to place, with advantage rather than injury to the restless little occupants. This is the case of all the water-fowl which we keep domesticated, as well as the gallinaceous birds. The Duck and the Goose, as well as the Hen and the Turkey, lead out their young by day to their proper food, any deficiency of which, arising from their not being in a state of nature, is supplied by man; and when rest and warmth are required by the tender brood, the mother herself furnishes all that is needed under the shelter of her wings. Her own personal attentions supply from time to time whatever nest and covering is required; *our* care is to exercise a general superintendence, and provide them liberally with the necessary articles of diet.

But the reverse of all this is the case with pigeons. The rearing of the young gives *us no* trouble, if the parents can but find enough to eat and drink. Consequently, of all domestic creatures, Dove-house Pigeons are the easiest to keep. If you cater for them plentifully, well and good; they will partake of the fare, and give themselves no more anxiety. If you stint them, never mind; they will go further a-field, and forage for themselves, not being over scrupulous as to the proprietorship of the grain they may eat, or delicate about committing a trespass. But if your allowance is too pinching, and the neighbors wage a war against all pilferers, then the pigeons will pluck up their resolution and migrate to some new home, where better treatment awaits them; for a home they must and will have.

The domestic pigeon is so very prevalent in England that it has attracted the notice and complaints of the farmers, and in a country so highly cultivated, the larger flocks of these almost wild pigeons may certainly be destructive, particularly as they never think of feeding them, and thus compel them to trespass for their daily food. The remedy is obvious; and if the fancy variety were substituted for the common Dove-house, or Blue Rock pigeon, of which these larger flocks are composed, even hunger would not compel them from home.

Cobbett, in his *Cottage Economy*, says of Pigeons: "A few of them may be kept about any cottage, for they are kept even in towns by laborers and artizans. They cause but little trouble; they take care of their own young ones, and they do not scratch nor do any other mischief in gardens. They want feeding with tares, peas, or small beans; and buckwheat is very good for them. To *begin* keeping them they must not have *flown* at *large* before you get them. You must keep them shut into the place which is to be their home, for two or three days, and then they may be let out, and will never leave you as long as they can get proper food, and are undisturbed by vermin or annoyed exceedingly by lice.

"The common Blue Pigeons are the best to keep; they breed oftener and feed their young ones best. They begin to breed at about nine months old, and if well kept they will give eight or nine pairs in the year. In any little place—a shelf in the cow-shed, a board or two under the projecting eaves of a building, or in short any place under cover, even on the ground-floor—they will sit and hatch and breed up their young ones. It is supposed that there could not be much *profit* attached to them; but they are of this use: they are very pretty creatures, very interesting in their manners; they are objects to delight children, and to give them the early habit of fondness for animals and setting a value on them, which, as we have often had to observe, is a great thing. A considerable part of all the property of a nation consists of animals. Of course a proportionate part of the cares and labors of a people appertain to the breeding and bringing to perfection those animals; and if you consult your experience, you will find that a laborer is, generally speaking, of value in proportion as he is worthy of being intrusted with the care of animals. The most careless fellow can not hurt a hedge or a ditch, but to trust him with the team or the flock is another matter. And mind for the *man*, to be trustworthy in this respect, the *boy* must have been in the *habit* of being kind and considerate toward animals; and nothing is so likely to give him that excellent habit, as his seeing from his very birth, animals taken care of, and treated with great kindness by his parents, and now-and-then having a little thing to *call his own*."

HOW TO STOCK A PIGEON LOFT.

It is no easy matter to *stock* a pigeon loft for the first time. Over and over again birds may be placed there; they may settle and be apparently content for a time, and then the unexpected discovery will be made that not a single bird is left; consequently, several modes of colonizing an empty pigeon loft have been recommended. The following, perhaps, is one of the best: As soon as the pigeon-house is fitted up completely, both inside and out, if it be summer-time, or, what is better, very early spring, select a sufficient number of pigeons of the former year, and early-hatched birds, and those that have not *flown* at *large* before you get them, as far as possible. The more numerous the colony which you try to fix in their new home, the greater will be the chance of their settling there. They ought not to be procured from a shorter distance than six or eight miles, for fear that the sight of their old haunts and companions should tempt them back again, even after the lapse of several months. If they can be obtained from a greater distance, it will greatly increase the chance of success. After every window and outlet of the pigeon-house has been closed by wire grating or lattice-work, the new arrivals will be turned loose inside, and well provided with fresh water, corn, peas, or wheat screenings, and a dish of salt, or what is better, a dry salt codfish, nailed to the wall. The floor of the pigeon-house will have been strewn with gravel or sand, and calcarious earth of some kind. They must be fed punctually every day at the same hour, and by the same attendant. After three or four days they will expect his arrival, and get used to his presence without manifesting alarm. Of course this office should be deputed to the person who is intended hereafter to take charge of them. Birds of that age, shut up in confinement, and liberally supplied with food and drink, with no long journeys to exhaust them, will soon begin to think of making their nest. For this purpose, a few sticks and straw should be scattered on the floor; the pigeons will select and arrange them themselves. It may help to hasten the period of their laying if they are fed with a *little* hempseed, mixed with cummin, anise, and caraway.

As soon as it observed that the greater number of the birds have laid, and that a few of them have young ones hatched, the latter may be removed, and the parent birds will follow their accustomed habit of going out to seek for food for their progeny. Their attachment to their eggs and young will prevent them from deserting the compulsory resting-place. Meanwhile, food will be provided for them within the loft for a short time longer; but little by little the quantity may be diminished, and after the hatching of the second laying, it will not be requisite to continue the supply. By this method of management, both the parents and their offspring will be settled in the dovecot. After the second laying, the old ones will give up all thoughts of deserting; and the young ones, knowing no other home, will be free from any temptation of the kind. All this, however, supposes that their natural tastes and habits are consulted, and that they are not annoyed by rats, weazles, cats, guns, or strange pigeons, nor troublesome human visitors, every one of which is a source of considerable annoyance to them. If the birds are uncomfortable, they will quit their habitation, one and all.

"No man ever need have an ill-provisioned house," says a French writer, "if there be but attached to it a dovecot, a warren, and a fish-pond, wherein meat may be fonnd as readily at hand as if it were stored in a larder. Wherefore the father of a family, having set in order his arable lands, his vineyards, and his pastures, and arranged his hen-roosts, will hasten to set himself up with pigeons, rabbits and fish, in order that, being provided with these viands, he may nourish his family in noble style, and give good cheer to his friends, without putting his hand into his pocket." If the pigeon-house is properly managed, there will always remain somewhat *to sell*, over and above what is consumed at home.

HOUSES.

Of pigeon-houses, or dovecots as some call them, a great variety exists, in different styles of architecture, sometimes standing isolated in the midst of a lawn, sometimes placed in the gable-end of a stable or shed. We are acquainted with one instance in which the pigeon's house is an arch which spans the road, and the upper portions of the gables being tenanted by a family of pigeons. The picturesque effect is really very good, and the birds thrive well and evidently enjoy the vicinity of a lake or pond, which serves them as a convenient watering and bathing place.

In regard to the size of the pigeon-house, we would give it eight or ten feet in diameter, whether round, octagon, or square. Its height should be one-fourth more than its width. Its roof should project sufficient to throw off the water; and beneath these projecting eaves, should be shelves or galleries, for the birds to repose and sun themselves, according to the weather or the direction of the wind.

Pigeons are what are called platform builders; that is, they make a nest flat, with a few sticks, straw, and bits of dry grass, laid together with as little art or trouble as is possible to conceive in thinking of a bird's nest. Some nests are so flat or slight, that is it a marvel the eggs do not fall off or through them. All pigeons lay two eggs, with one exception—the Wild or Passenger Pigeon, which appears to lay but one, whenever laid in an aviary.

The "mating" of pigeons is another important point in their natural history. When young pigeons are about six months old, or before, they begin to go in pairs, except when associated with the entire flock at feeding times; and when they are resting on the roofs, or basking in the sun, they retire apart to short distances, for the purpose of courtship, and pay each other little kind attentions, such as nestling close and mutually tickling the heads one of another. At last comes what is called "billing," which is in fact, the kiss of the bird. As soon as this takes place the union is complete. The pair are now united companions, and remain so as long as they continue satisfied with each other. The male is the first to become serious. He takes possession of some box or shelf that seems an eligible tenement. If it is quite empty and bare, he carries to it a few straws and sticks; but if the apartment has already been furnished for him, he does not at present take much further trouble in that line. Here he settles himself, and begins complaining with a sort of moaning noise. His appeal is sometimes answered by the lady affording him her presence, sometimes not; in which latter case he does not pine in solitude very long, but goes and searches out his careless helpmate, and with close pursuit, and a few hard pecks if necessary, insists upon her attending to her business at home. The hen obeys, occasionally, however, making or pretending to make some resistance; but at last she feels that she ought to discontinue general visiting and long excursions: she enters the modest establishment that has been prepared for the performance of her maternal duties. A day or two after she has signified her acceptance of the new home, an egg may be expected to be found there. Over this she mostly stands sentinel, till, after an intervening day, a second egg is laid, and incubation really commences; not hotly and energetically at first, as with hens, turkeys, and many other birds, but gently and with increasing assiduity.

And now the merits of her mate grow apparent. He does not leave his lady to bear a solitary burden of matrimonial care, while he has indulged in the pleasures only of their union. He takes a share, though a minor one, of the task of incubating; and he more than performs his half-share of the labor of rearing the young. He feeds her while she is sitting and gives her drink from his crop, which he has flown to fetch from the pond or brook; even at other times he will often give her a morsel which he raises that she may take it from his bill. At about noon, oftentimes earlier, the hens leave their nests for air and exercise as well as for food, and the cocks take their place upon the eggs. If you enter a pigeon loft at about two o'clock in the afternoon, you will find all the cock birds sitting—a family arrangement that affords an easy method of discovering which birds are paired with which.

At the end of eighteen days from the laying of the second egg, a young one will appear. Subsequently, at a short but uncertain interval, sometimes comes another chick, sometimes remains an addled egg. Of young things, babies included, a new-hatched pigeon ranks among the most helpless. Most little birds, if blind, if weak, can at least open their mouths to be fed; but these actually have their nourishment pumped into them. They have just instinctive sense enough to feel for the bills of their parents; they will make the same half-conscious movement to find the tip of your finger, if you take them in hand. And this act of pumping from the stomachs of the parents is so efficiently performed as to be incredible to those who have not watched the result. A little pigeon grows enormously the first twelve hours; after the third day, still more rapidly; and for a time longer, at a proportionate rate. If it do not, something is wrong, and it is not likely to be reared at all. The squab that remains stationary is sure to die.

The young are at first sparsely covered with long filaments of down; the root of each filament indicates the point from which each stub or future feather-case is to start. The down, for a while, still hangs on the tips of some of the feathers, and is a sure sign that the birds are young, when purchasing any for table.

CHOICE OF SORT.

The reader may be disposed to ask, "which is the most desirable sort of pigeon to keep?" to which we reply, that tastes differ. Please *yourself*, without consulting others. Nuns and Archangels are to be recommended for their beauty, Tumblers and Pouters for their oddity. But according to our experience and judgment, the common Blue Pigeon, being the most prolific and hardy, is the most appropriate tenant, and most worthy the attention of country people, as it is generally remarked, though we think erroneously, that the smallest pigeons rear the greatest number of young ones. According to the judgment of some, the dark grey colored pigeon, inclining to ash color, especially if she has a redness in her eye, and a ring of gold color around her neck, are never failing signs of fertility. On farms convenient to cities and large towns, it will turn to good account to keep a number of the fancy sorts, for as they hatch early in the season, they fetch a good price at market; on farms more remote from villages and cities, the common Blues are preferable, as they will find their own food and increase fast.

We will now proceed to give a description of each variety at full length, according to the standard of European fancy, and commence with the Carrier.

THE CARRIER.

The European fancy have unanimously designated the Carrier or Messenger, as the king of pigeons; but we, less aristocratic here, must, we suppose, call him the president. It is not so much the beauty of his plumage, as his uncommon sagacity, that has elevated him to this title.

The Carrier is of Persian origin, and is rather larger than most of the common sized pigeons; their feathers lay close and sleek, and are usually very glossy; there are good birds of all colors, but the black are usually preferred, and they will occasionally breed duns and blues. Those that are pied, or irregularly marked with two colors, are very objectionable to the fancy; and we should suspect them of a cross, though we have seen a bird slightly pied with three or four white quill feathers in one wing; this will sometimes arise from weakness. Their necks are long and straight, and when erect they display an elegant shape. Their symmetry is perfect. They should measure fifteen inches from the tip of the beak to the end of the tail, and weigh about twenty ounces. From the lower part of the head to the middle of the upper chap, there grows out a white naked fungus flesh, which is called the wattle; a smaller proportion also grows from the under mandible. This flesh is valued most when of a dark color, but it is generally of a nearly white; and when the bird is very old and sick, it will turn yellow. The more wattle there is on the head of the Carrier, the greater is the value of the bird, provided it is not the effect of old age. The eye is commonly of a brick-dust color, but most admired when of a fiery red; and it is also encompassed with the same fungus matter as the beak, which at its full growth should spread round the eye to the breadth of an inch, and the broader and thicker this grows, the greater evidence it is of its being a good breeder. The wattle does not attain its full growth till the fourth or fifth year.


The Carrier.

The plumage of this bird is generally either dun or black, though there are also splashed, whites, blues, and pied of each color; but the dun and black agree best with the before described properties; yet the blues, and blue pieds, being very scarce, are great varieties, consequently of great value, though they are inferior in the properties relating to the above mentioned feathers.

The Carrier in his domestic habits is retired and timid, but is a formidable enemy when he does encounter the other varieties; they are good breeders and good nurses, but care must be taken that they are not disturbed while sitting.

Carriers are a remarkable race of pigeons, which, from a remote antiquity, have been employed in the office of bringing rather than of carrying letters. They fetch intelligence home from whatever place, within their power of return, they may have been purposely sent to. They do not carry letters out whenever they are bid, as some people have supposed. To avail oneself of the Carrier Pigeons, birds must first have been sent *to* the place from which intelligence is desired; so that in cases where difficulty of access is likely to occur, considerable foresight has to be exercised. The birds have to be kept confined in the places whence they may be required to start on an emergency.

Repeated experiments have been tried with the view of ascertaining whether Carrier pigeons can instinctively return to their homes from a distance, or whether, to make them useful as messengers, it be necessary to teach them the road. The result clearly proves that the Carrier is guided in his journey solely by memory, and a knowledge of the country he has to traverse. These birds, when employed to carry intelligence from one part of the country to another, are trained by being taken, first, say, five miles from home, then ten, and so on, till the whole journey is completed by short stages; and even if the bird should know the road, it can not travel in foggy weather.

The question has often been discussed as to *how* the pigeon finds its way through such long distances as we know to be occasionally traversed by it. It is supposed by some that they are guided on their return home from long distances by instinct. Instinct is said to be unerring; not so the pigeon's flight. If instinct be the guide, why not fly through foggy weather with equal facility as in clear sunshine? This, is notorious, they can not accomplish. When the ground is covered with snow, pigeons seem to miss their points of guidance and are lost. This would seem to favor the opinion that they travel by sight, and are less indebted to instinct than is generally imagined. They do not fly at night; they settle down if they can not reach their home by the dusk of evening, and renew their flight at day-light next morning.

The Carrier pigeon is the bird that was so largely employed to take messages, before the invention of the Electric Telegraph rendered even the speed of the wind too slow for the present day. The most valuable carriers were trained to carry to and from their residence. A letter was written on a small piece of paper and fastened under the wing of the bird, or to its feet. When the pigeon was set free, it rose high in the air, made one or two circular flights, and then darted off like an arrow in the proper direction. One of these birds has been known to fly nearly one hundred miles in one hour.

THE TUMBLER.

The general characteristics of Tumblers are, to be below the average size of pigeons, to have a short body, a slender neck, a plump, full breast, a short, round head, with a forehead rising perpendicularly from the beak, a small, spindle bill, often compared to that of a gold-finch, and a pearl eye. Tumblers with feathered feet and legs are not at all uncommon. Those Tumblers which are self-colored, or whole colored, that is, all black, or all cinnamon-color, in various shades, or all cream, are called Kites. There are, beside, various splashes; as myrtle-splash, cinnamon-splash, and others.—Choice specimens of the Tumbler are especial favorites with the pigeon fanciers, and often fetch high prices; though even the common Kite, such as could be bought for fifty or seventy-five cents the pair, may boast of its own intrinsic merits. Do you want a bird to eat? It is as good as any; a merit, though a humble one. It breeds as freely, and with as little trouble; and there is nothing so neat and trim as it is among domestic birds, not even the most perfect of the Sebright Bantams.

The Tumbler.

If we look at its performances in the air, we must allow it to be decidedly the most accomplished member of the aerial ballet. The very peculiar method of tumbling, and from which they derive their name, is performed in the air, by throwing itself over backward several times, as if it were shot; this action they usually perform while rising or descending, and not when at their greatest hight or elevation. Pirouettes, capers, and tricks of agility, all come equally easy to it in turn. Other pigeons, certainly, can take any course in the air, from a straight line, to circles and elipses; but the Tumbler, while it is rapidly wheeling past some sharp corner, seems occasionally to tie a knot in the air through mere fun; and in its descents from aloft to weave some intricate braid or whiplash. Tumbling in the air, on the part of good Tumblers, is to themselves an act of pleasure. They never do it unless they are in good health and spirits. Their best performances are after being let out from a short confinement.

The flying of Tumblers is no trifling thing to the fancier, but a thing of great interest, and by some considered of more importance than any other property the Tumbler possesses; certainly a good flight of them, well trained, is a very interesting object, for beside their peculiar method of tumbling, their long continued flight, and often at a great hight, is exceedingly amusing; and we do not know why it should not be as much so as a balloon—that will drag forth many a weary, straining to "*see it out of sight.*"

THE POUTER.

Pouters are the rivals of the Tumblers in the eyes of some fanciers; or rather, there are two classes of fanciers, one of which is devoted to Pouters, and the other to Tumblers, while both look down upon a third set of fanciers, whose taste specially leads them to the keeping of Toys. The peculiar characteristic of Pouters is the size of their crop, which they are fond of distending into a ball by inflating it with air. Hence, in many parts of England they are called Croppers, which is not a vulgarism, but an old form of speech. "Croppers," says WILLOUGHBY, "are so called because they can, and usually do, by attracting the air, blow up their crops to that strange bigness, that they exceed the bulk of their whole body beside, and which, as they fly, and while they make that murmuring noise, swell their throats to a great bigness, and the bigger the better and more generous they are esteemed." The hen Pouter has also an inflated crop like the male, the same in kind, though less in degree.

As Tumblers are noted for one peculiar mode of flight, so Pouters have theirs; and they are not considered good birds unless they execute it properly. After "playing" a little while in front of their trap, they ought to launch into the air, performing a number of stately and dignified circles, clapping their wings loudly immediately after their first starting. The inflated crop ought not to be collapsed by the exertion of flying, but should be seen moving through the air like a permanent soap-bubble, with a body and wings attached to it. Other pigeons will indulge in the same noisy action to a less degree, but Pouters are especially expected to be clappers.

The Pouter.

Pouters are of various colors; the most usual are blue, buff, and white; and there are black, red, dun, cream, and iron pieds, and a great variety of other hues, all accurately pied. Also, there are dark tail whites and splashes, each having their admirers.

The carriage of the Pouter is a great point to be attended to. He ought to walk upright, almost like a man. In the language of the fancy, the Pouter should play erect, with fine, well-spread tail, which must neither touch the ground nor sink between his legs; neither must it rest upon his rump, which is a great fault, and is called rumping.

He should draw the shoulders of his wings close to his body, displaying his limbs without straddling, and walking almost upon his toes, without jumping or kicking, but moving with an easy majestic air.

THE JACOBIN.

This pigeon is usually called *Ruffle-neck*, and sometimes for shortness, Ruffs, or "*the Jack.*" It is a very pretty bird, but good birds of this species are very scarce. "Jacobins," says WILLOUGHBY, "are called by the Low Dutch, *Cappers*, because in the hinder part of the head, or nape of the neck, certain feathers reflected upwards encompass the head behind, almost after the fashion of a Monk's hood, when he puts it back to uncover his head."

The Jacobin.

The Jack is one of the smallest varieties of pigeons, the less its size the more it is valued. It has a range of inverted feathers on the back part of its head and neck, which runs down until it meets on the breast, thus forming a hood over its head, like the cap or cowl of a Monk from which it derives its name; this is called the hood and chain. It should be formed of very close and long feathers, so that by laying hold of the bill and giving the neck a gentle stretch the two sides should lap over each other. The real Jacobin is possessed of a very small head, with a short, spindle beak, and a clear, pearl eye. The plumage is either cinnamon-red, yellow, black or blue, and we have some that are mottled; but they must all have a white tail and flight, and clean, white head. Some of them have feathers on their legs and feet, others have none; and both are equally esteemed, according to the taste of the fancier.

The Jacobins are about the most unproductive of our pigeons. They lay small eggs, which they incubate unsteadily, and if they hatch them, nurse carelessly. It is best to transfer their eggs to some more trustworthy foster-parents. On account of this difficulty in rearing them, good Jacobins are both scarce and dear. They are included among the pigeons technically called "Toys;" Tumblers, Pouters, and Carriers being alone considered worthy of the serious attention of fanciers.

The Ruff.—There is so great a similarity, both in shape and make, between the Jacobin and this bird, that the latter has been frequently sold for the former. But the Ruff has a longer beak and a larger head; it is also a larger bird. The irides of its eyes are in some of a gravel, in others of a pearl color. The chain does not flow so near to the shoulders of its wings, though both the hood and chain are longer, but are nothing near so close and compact as the others, and are easily disturbed with every puff of wind; they likewise fall more backward off the head in a rumpled, discomposed form, and from this the pigeon receives its name.

THE TURBIT.

This is another of the small Toy Pigeons. Its great peculiarity is, that the feathers on the breast open and turn back both ways, standing out almost like a fringe, or like the frill of a shirt. The feathers arranged in this unusual way are called the purl; and the handsomer and more conspicuous the purl, the higher the value set upon the bird. Their tail and the back of their wings ought to be of one entire color, as blue, black, or dun; but in yellows and reds, the tails should be white; and those that are blue, should have black bars across the wings; the flight-feathers, and all the rest of the body, should be white. As Nuns are described according to the colors of their heads, so Turbits are spoken of with reference to the colors of their shoulders; thus there are black-shouldered, yellow-shouldered, and blue-shouldered Turbits. There are, however, whole-colored Turbits, such as entirely white, black, or blue. These are often known as Owls; and whatever nice distinctions between Turbits and Owls dealers may make, our eyes can perceive no other difference than that just mentioned. All Turbits ought to have a short, round, button head, and a short beak like a partridge—the shorter the better; on which account this pigeon is called, by the Dutch, Cort-beke, or Short-bill. The iris in the brown-shouldered Turbit is dark hazel, surrounding a large black pupil; and the attention of naturalists may be directed to the similarity in the shape and air of the head in the Fantail, the Jacobin, and the Turbit, all races with striking peculiarities of plumage.

The Turbit.

Several French writers have asserted the Turbit to be the most distinct breed of all the races of domestic pigeons, and to have greater claims than any of them to be regarded as a separate species. Our own experience and observations do not confirm this remark. It is just as distinct, and no more so, as the other domestic breeds. Whatever right they may be adjudged to have to specific honors, the Turbit also has, but no greater. TEMMINCK complains of the difficulties which amateurs experience in making them propagate with the other breeds of pigeons, which are supposed to be derived from the Blue Rock Dove; but cases are known in which the Turbit has paired and bred with Rock Dove itself. Instances sometimes occur of sterile males among Turbits—a fact which may have led TEMMINCK to suppose that these birds entertain some general aversion to the females of other breeds; but like cases of infecundity occur with Chinese ganders, and even Turkey cocks.

THE TRUMPETER.

The Trumpeter is nearly as large as a middle-sized Runt, and very like it in shape and make, and nearly allied to that race of birds. It is considerably larger than the Dove-house pigeon, and approaches to the Runt in size. The more salacious it is the more it will trumpet. It derives its name from its imitating the sound of a trumpet after 'playing,' which it always does in the spring of the year continually; and by being kept unmatched and high fed he will trumpet all the year. A flock of these birds make, of course, a very singular noise. By many they are much admired, and good birds will bring five dollars the pair. Trumpeters are very prolific, good nurses, and fatten well for the table; they are, therefore, a desirable breed to keep, if merely for that purpose, without any reference to their curious appearance. They have one great advantage over Runts, in being better flyers, and more able to save themselves out of harm's way, as from the clutches of a cat, a rat, or a dog.


The Trumpeter.

The most usual color of Trumpeters is pure white, though they are often found mottled with black and white in so regular and even a manner, almost every feather contrasting in color, as to give their plumage the general effect of a chess-board, or a black and white marble pavement. Their most distinguishing characteristic is the tuft of feathers which sprouts from the root of the beak; and the larger this tuft grows, the greater is the value set upon the bird. A well-grown moustache is the point which the amateur is advised most strongly to insist upon. It has a helmet-like turn of feathers at the back of the head, and should be very feather-footed and legged, or booted as we might call it. The soldier-like appearance and fierce military air, while cooing before its mate, probably suggested the appellation of

Trumpeter—unless that name is another corruption of the Italian *Tronfo*. The trumpetings, however, are much exaggerated in the printed descriptions. They differ very little from the cooing of the Runts; perhaps the inspiration of the end of the coo may be a little more sonorous. Good Trumpeters are not common in England or this country; they are much more frequent on the continent; but there, little pains is taken to pair them properly, and numerous half-breds are the result. The Trumpeter is one of the "pearl-eyed" pigeons; that is, its iris is delicately shaded with pink. It is also one of the breeds which are denominated "Toys" by old-fashioned fanciers.

THE ARCHANGEL.

The Archangel Pigeon is both rich and unique in its coloring. The head, neck, and forepart of the back and body are chestnut, or copper-color, with changeable hues, of different lights. The tail, wings, and hinder parts of the body, are a sort of blue-black; but many of the feathers on the back and shoulders are metalic and iridescent—a peculiarity not usual in other domestic pigeons. The chestnut and blue-black portions of the bird do not terminate abruptly; but are gently shaded into each other. There is a darker bar at the end of the tail. The iris is very bright orange-red; the feet clean and unfeathered, and bright red. Archangel pigeons have a turn of feathers at the back of the head very similar to that of the Trumpeter. It is the coloring rather than the form which so specially distinguishes them. Their size is very much that of the Rock Dove. Neither the older ornithologists nor the pigeon-books, with one exception, furnish any hint of Archangel pigeons, that we have been able to find. They are sufficiently prolific to be kept as stock birds, and a flight of them is a particularly beautiful object; but they are too valuable, either as presents or for exchange and sale, to be consigned to the hands of the cook. Still it is with the higher rather than the lower class of pigeon-fanciers in England that they are in much request, in spite of the bright and glowing hues with which their plumage is adorned. Their name is probably derived from their having been originally brought from the Russian port, or *via* Archangel from some other quarter, as Tartary, India, or the Chinese Empire. They are at present very scarce, and have not yet been introduced into this country.

The Archangel.

THE LAUGHER.

This pigeon is a native of Palestine, in Asia, and at present unknown in America. "In shape and make it very much resembles a middle sized Runt. Its plumage is generally red mottled, but sometimes it is blue; and it has a very bright, clear, pearl eye, inclining to white. When the cock seeks for and begins to lack the hen he has a kind of rough *coo*, like the bubbling of water poured from a jug, and makes a rattling noise very much like a convulsive laugh—and from this the bird derives its name."

THE RUNT.

These are by far the largest and heaviest of the whole race of pigeons, and are less known and cultivated in this country than they deserve to be, merely because their powers of flight are not such as to afford much amusement to the amateur. A pair of good Runts will weigh two pounds and a half, or more. There are Leghorn Runts, Roman Runts, Spanish Runts, and Friezeland Runts; but the truth is, that Runts of various breeds are to be found all along the shores of the Mediterranean. The most remarkable point respecting them is their extreme antiquity. PLINY and other Roman writers make frequent mention of them, as Campanian Pigeons. The English name of Runt is probably a corruption of the Italian *Tronfo*. WILLOUGHBY calls it "the greater tame pigeon."

The Runt.

If placed in favorable circumstances, Runts are very prolific birds. Twelve young ones in the course of the season is not an uncommon produce for a single pair. Their heaviness unfits them for being the occupants of ordinary Dove-cots; they have a difficulty in flying up to any height, and are therefore best accommodated in a low house, only a few feet from the ground. The Runts prefer walking on the ground, to perching on buildings, or strutting on roofs. The eggs of Runts are much larger than those of other breeds. BUFFON calls them *mondains*, and truly says they are nearly as big as little hens. We have been told of one bird fatted up to the weight of two pounds eight ounces.

Runts vary in color; but their prevailing ones are shades of brown, light slate-color, and white; cinnamon-color and a very dark slate are favorite tints with amateurs, and the variations are not hard for the inexperienced eye to detect, though not easy to describe. A marked characteristic is the way in which they carry their tail, holding it up ordinarily above the tips of the wings, which some have compared to the gait of a duck. In Runts, their principal standard of merit is weight. They are short necked and very broad chested. They prove themselves excellent nurses, if accommodated with a nesting-place suited to their habits; and we believe the want of being provided with that, is the sole cause why they have failed with some breeders, and that it has been recommended to take their eggs or young from them to be brought up by other pigeons. The cooing of Runts is less distinct than in other breeds, having a sort of muffled sound. They tremble when excited, though not so much as the Fantails. They breed freely with other domestic pigeons, and the half-breeds are so excellent for the table, that in many situations it is well worth while rearing them with that object in view.

FANTAILS.

Of all the family of domestic Pigeons, the Fantails stand eminently the first in the eyes of the amateur. They are so named in consequence of having their tail furnished with so great a number of additional feathers as to give it the appearance of an outspread fan, nearly bent double into a hollow form. The more feathers a bird has in its tail, the greater it is valued. The number varies from twenty to as many as six-and-thirty.

This pigeon, especially when lustful, has a frequent tremulous motion, or shaking of the neck, which, joined to the breadth of the tail, gives it the name of Shaker, or Fantail. This beautiful bird is possessed of a long, taper, handsome neck, which it erects in a serpentine form, rather leaning toward its back, somewhat like a swan; it has a very short beak, and is exceedingly full breasted, with a tail that should be composed of thirty-six feathers, not less than twenty-four, though few are possessed of the former number. The tail should be well spread, and it then produces a very pleasing and striking effect, after the manner of the turkey-cock, and it raises it up to such a degree, if a good bird, that its tail appears to be joined to its head, like that of a squirrel; and from hence some fanciers give them the name of "Fan-tails." Observe, if the bird droops its tail so that it does not meet its head, it is considered so great an imperfection in the opinion

Fantails.

of the fancy, as never to be overlooked, be all the other properties of the bird ever so perfect; though a very large tailed bird of this species, which carries its tail according to the rules of the fancy, is a great rarity, and of great value. The general color is white, which, with their peculiar carriage, gives them some resemblance to minature swans. Rarely, Fantails are quite black, or blue-black; and there are red, yellow, blue, and black pied; the colored birds are best marked on the shoulders, like the Turbits.

Fantails are by no means the miserable and degraded monsters some writers would induce us to believe them to be. They may be, and often are, closely kept in cages, or dealer's pens till they are cramped and out of health. The most robust wild pigeon would become so under the same circumstances. But if fairly used, they are respectably vigorous. It is a mistake to suppose that they are deficient in power of flight, unless their muscles have been enfeebled by long incarceration. Their tail is not so much in their way as the train of the peacock. Like other pigeons, Fantails, if taken from home, will attempt to fly back to it again; and their qualifications as parents and nurses are far from being despicable.

THE NUN.

The Nun is perhaps one of the very prettiest and most striking of the fancy pigeons. It is smaller in size, but resembles the Trumpeter in having a tuft of feathers rising from the back of the head, and bending forward, like a hood thrown a little back. The small bill and pearl eye of this bird also add to the neatness of its appearance. Their coloring is various, but in all the varieties is strongly contrasted. In almost all cases the body is white, while the head, tail, and the six flight-feathers of the wings are either black, red, or yellow; and they are consequently styled black-headed, red-headed, or yellow-headed Nuns. The color of the tail and the flight feathers must correspond with the color of the head in the same individual. Whenever the color of the feathers differs from these rules, or there is a white feather in the wings, tail, or head, or a dark feather on the body of the bird, it renders it what is called foul-feathered, and is a great blemish and drawback from its value.

The Nun.

"The most beautiful specimens of Nuns," says TEMMINCK, "are those which are black, but have the quill-feathers and the head white; they are called *Nonnanians Maurins*." We have never been so fortunate as to see any birds of this kind, and believe them to be of great rarity. But the most usual sort—and exceedingly charming birds they are—are what BUFFON styles *Coquille Hollandaise*, or Dutch Shell pigeons, because they have at the back of their head, reversed feathers, which form a sort of shell. They are also of short stature. They have the head black, the tail and the ends of the wings also black, and all the rest of the body white. This black-headed variety so strongly resembles the Tern, that some have given it that name. Several other fanciful names have been bestowed upon it in former times and in foreign countries, but none appears so appropriate as that of Nun, especially in the black-headed variety.

The flight of Nuns is bold and graceful. They are very prolific, and by no means bad nurses. A peculiarity in the new hatched squab of the black-headed Nuns is, that their feet are frequently, perhaps always, stained with dark lead color. All the Nuns are great favorites. A flock consisting entirely of the black-headed sort has a very pleasing effect; but one containing individuals of all the procurable varieties of colors would have a very charming appearance.

THE BLUE-ROCK PIGEON,

Is supposed by most writers to be the origin from which our domestic pigeons sprung. "A main characteristic in the plumage of the Blue-Rock is in the absence of *spots*, which are so remarkable a feature in that of the common or Dove-house pigeon. The bill is dark slate-color, with a whitish core at the base; it is much compressed about the middle, both in depth and width, a peculiarity which is common to the whole family of pigeons. The head is slate-color continued down the neck and belly with iridescent hues of green and purple, which are brighter and more gem-like in the male bird than in the hen. The beak and wings are paler slate-color, or a sort of French grey. The quill-feathers are darker toward the tips. Across the wings are two very dark and conspicuous bands, which are formed by a black spot near the end of each of the greater wing-coverts. The rump is whitish: this mark has been greatly, and is thought unduly, insisted upon to prove the derivation of all the fancy pigeons from the Blue-Rock pigeon. We have no room to discuss the question of origin here, merely observing that the


The Blue-Rock Pigeon.

Dove-house pigeon, supposed by some theorists to be derived from the same parentage, fails to display the alleged hereditary mark. The tail is of the same color as the head, each feather being darker at the portion near the end, so as to form a dark semicircular band when the tail is out-spread in flight. In all pigeons the feathers of the body adhere loosely, and easily come off; in some species they are detached from the skin by the merest touch. The feet and toes are coral-red, which color the Arab legend attributes to the birds having walked on the red mud that was left after the subsidence of the waters of the deluge. The claws are black. The irides are bright orange, shaded to yellow toward the pupil, which is black. The average weight of the Blue-Rock is about ten ounces."

THE DOVE-HOUSE PIGEON,

Is the victim which has the most frequently to run the gauntlet for its life in the trials of skill with the gun, called "pigeon matches."

The Dove-house Pigeon.

The low priced fancy pigeons will do, but are objected to, as often affording, by their color, an unfailing easy mark, and apt to be less bold and dashing in their escape from the trap.

THE AMERICAN WILD PIGEON.

Every one who has had any acquaintance with the Passenger, or Wild Pigeon, as he is generally called, will readily admit that he is an exceedingly interesting bird. His extraordinary powers of flight are almost incredible. And it is well that their power of wing is so great; for were the enormous flocks to be confined to one place, they would devour the whole of the grain. They have been killed in this State with Carolina rice in their crops. As their digestion is remarkably rapid, these birds must have flown between three and four hundred miles in six hours, giving an average speed of a mile a minute.

The Wild Pigeon is found in great numbers all over the United States, visiting different sections at particular seasons, and in their migrations

The American Wild Pigeon.

they fly in immense crowds sufficiently dense to darken the air. It breeds in this State, where it is found at almost all seasons of the year. They feed on all kinds of grain, seeds, acorns, beech-nuts, and many kinds of berries. They are excellent food. It is very desirable to reclaim and domesticate this very prolific and hardy species, although its extremely erratic disposition will probably render this difficult; notwithstanding a few years ago Mr. Clark, of Albany, succeeded in raising them in confinement; and from his successful experiment we learn that it lays two eggs, and sits fifteen days. In eight days after being hatched, they are completely feathered, and fly from the nest. They have three or four broods between May and September The same success has attended a gentleman in England, upon a number sent out to him from this country. Their color is so well known that a description is deemed unnecessary.

Audubon gives quite an interesting account of the flight of the Wild Pigeon. He says: "In the autumn of 1813, I left my home on the banks of the Ohio, on my way to Louisville. In passing over the barrens, I observed the pigeons passing from the northeast to the southwest, in greater numbers than I thought I had ever seen them before.

I traveled on, and still met more the further I proceeded. The air was literally filled with them. The light of the sun at noon-day was obscured as if by an eclipse. Before sunset, I reached Louisville, distant from the place where I first observed them about fifty-five miles. The pigeons were still passing in undiminished numbers, and continued to do so for three days in succession. The people were all in arms. The banks of the Ohio were crowded with men and boys continually shooting at the pigeons, which flew lower as they passed the river. Multitudes were thus destroyed. For a week or more, the principal food of the population was that of pigeons."

GOURA VICTORIA PIGEON.

This unique and very singular variety of pigeon, whose figure adorns this page, is a native of the islands of the Indian Archipelago and New Guinea. They live in the forests, and make their nests on the

Goura Victoria Pigeon.

branches of trees; and, like most other wild pigeons, lay but two eggs. Their food consists of various kinds of berries, seeds, grain, etc., which they pick off the ground.

Of the plumage and characteristics of these rare birds, no precise information has reached us. They are a novelty in the pigeon world, and an object of more than ordinary interest, from their attractive head-dress. They have never been noticed in any of the ornithological works that we are aware of; and it is to be regretted that a bird possessing so much beauty should not be introduced into our aviarys.

Specimens of these rare birds were exhibited, a few years since, at a Poultry Show in England, where they attracted great attention. Portraits of a group were taken of them and published in the Penny Magazine, from which our figure is a copy.

The Goura Pigeons are very scarce, and have not as yet, that we are aware of, ever been introduced into this country, and we believe them to be of great rarity.

THE WONGA-WONGA PIGEON.

"This bird is an object of more than ordinary interest, since, independently of its attractive plumage, it is a great delicacy for the table; its large size and the whiteness of its flesh, rendering it in this respect second to no other member of its family—the one at all approximating to it being the *Gropkaps Scripta*. It is to be regretted that a bird possessing so many qualifications should not be generally dispersed over the continent of Australia; but such is not the case. The distribution depends mainly upon whether the surface of the country be or be not clothed with that rich character of vegetation common to the south-eastern portion of the continent. As the length of its *tarsi* would lead one to expect, the Wonga-wonga spends most of its time on the ground, where it feeds upon the seeds and stones of the fallen fruits of the towering trees under whose shade it dwells, seldom exposing itself to the rays of the sun, or seeking the open parts of the forest. While traversing these arborean solitudes, one is frequently startled by the sudden rising of the Wonga-wonga, the noise of whose wings is quite equal to, and not very different from, that made by a pheasant. Its flight is not of long duration, this power being merely employed to remove it to a sufficient distance to avoid detection by again descending to the ground, or mounting to the branch of a neighboring tree. Of the nidification of this bird, no precise information had reached Mr. GOULD, from whose great work the above particulars are taken. It is a species that bears confinement well, and in Mr. GOULD's opinion, with an ordinary degree of attention, may doubtless be rendered domesticated and useful."

DISEASES.

Nothing has been said of the diseases of pigeons, as they are of very rare occurrence when exercise and diet are attended to. The *canker* is sometimes troublesome; it may be caused by their water remaining in tin or metal until it becomes unwholesome. It is recommended to take burnt alum and honey and rub the part every day, or dissolve five grains of Roman vitriol in half a spoonful of wine-vinegar, and mix with the former, and anoint the part.

Parasitic Enemies.—Dovecots, and the pigeons which inhabit them, are sometimes infested with mites, lice, and a parasitic insect of larger size, all which cause great annoyance to the old birds, and sometimes even destroy the young squabs by getting into their ears and eyes, and irritating them to death.

Remedy.—Alter their management, and smoke them with tobacco. A little snuff sprinkled over the birds and into the nest will afford a temporary relief; but the nuisance is the result of want of cleanliness, and must be thoroughly eradicated by burning the infected nests, white-washing the inside of the dovecot with hot lime-water, washing even the nesting-places either with white-wash or tobacco-water, and by taking care not to let the dung of the birds remain too long before it is removed. The parasitic insects found on birds are peculiar species, which do not fix themselves on the human skin; there is, therefore, nothing to apprehend in undertaking the task of cleaning out a dovecot, although a long course of neglect will make it an unpleasant one. Fleas mostly abound in dovecots; white-wash is the best preventive. To warm and stimulate them, give hemp seed, with their common food; also, clary, saffron, cochineal or elder berries, thrown into their water.

Pigeons are occasionally destroyed by the attacks of insects *from within*. Corn, bran, or meal, that has been kept long, and is become *mity*, or full of mites, should never be given to pigeons, or other poultry, to eat, without having been first boiled or baked, to make sure that the mites are deprived of life.

Food.—Their food, peas, tares, rice, barley, oats, wheat, canary, hemp, flax-seed, screenings, Indian corn, and wheat-screenings; but peas, are considered best of all.

Matching Pigeons.—Matching the fancy sorts is sometimes attended with difficulty. To do this readily have two coops placed together, and let two birds each in separate cages, yet feed and drink out of the same places; give them plenty of hemp-seed to make them wanton, and when the hen begins to sweep her tail to the cock they will generally agree, and may be put together; this will mostly take place in two or three days. To make them take possession of any particular nest, make a little cage with stout wire or small lath on three sides, and place the open side before the nest holes so as to confine them to the cage and the nest. After two or three days remove this at night, and they will continue to that nest.

Re-mating.—When a hen pigeon has the misfortune to lose her mate, by casualty or otherwise, she is certainly uncomfortable for a while, but not inconsolable. She does not go pining on in solitude for long refusing to be comforted. When she finds her partner is forever gone, she resigns herself to her fate, and takes up with another, whom, however, she would probably desert were her first love, the original mate, by some fortunate chance to make his appearance.

DOMESTIC RECEIPTS.

Preserving Peaches without Sugar.—Put self-sealing glass cans in pans of cold water, and place them on the stove to heat gradually. Then fill the preserving kettle about one-third full of water, and perhaps half a pound of sugar. Then pare and stone the peaches, and put them—a few at a time—into the syrup; and when they are up to the boiling point, put them into the cans as rapidly as possible. When full, apply the cover—the wax having been softened by the heat of the peaches—the air will be completely excluded. Then remove from the water to a table as soon as each one is filled, and put a weight as heavy as a flat-iron on each cover, until the wax becomes cold.

To make Potato Yeast.—Take two quarts of hops, boil until the strength is out, leaving water sufficient to scald one quart bowl of grated potatoes. Strain it upon the potatoes, and while cooking stir it, adding a handful of salt and two cups of molasses. When cooked sufficient it will be a thick paste. Cool it in a stone jar, and when cool enough, add your yeast for rising.

Fruit Cake without Eggs.—One cup of molasses, one cup of brown sugar, one cup of butter,—heat together sufficiently to melt the butter; two tea-spoonsfuls of cloves, two of cinnamon, one of nutmeg, one coffee-cupful of raisins, (with or without currants,) citron; then add one tea-spoonful of soda dissolved in hot water; one cup of sour milk or butter-milk, and one quart of flour; bake one hour.

Good Pumpkin Pie without Eggs.—One quart of boiling milk; two soda or Boston crackers rolled fine, put to the boiling milk; two tea-cups of strained boiled pumpkin; little salt; one cup of sugar; extract of lemon; little ginger. If this quantity will not make two pies put in a little cold milk. Bake in a hot oven.

Delicious Drop Cake.—One pint of cream, three eggs, and salt; thicken with fine rye till a spoon will stand upright in it, and drop on a well buttered iron pan, which must be hot in the oven. They may be made thinner and baked in buttered cups.

Dough Nuts.—One pint bowl of raised dough wet with milk; knead in a tea cup of sifted sugar, two eggs, and a heaping table-spoonful of butter; let it rise again, roll and fry; fresh-chopped orange peel is the best seasoning.

Exeter Gingerbread.—One cup butter, one cup sour milk or cream, one cup sugar, two cups syrup (molasses will do), three eggs, five cups flour, one tea-spoonful of saleratus in milk, ginger to your taste.

Winchester Pudding.—Half lb. of suet, half lb. of sugar, and half lb. of bread crumbled with four eggs and the rind and juice of one lemon.

Rye and Indian Bread.—Scald three quarts of Indian meal until it is all moistened, but not soft. Water better than milk. Add two tea-cups of sugar, tablespoonful of salt, teaspoon of soda, and cold water sufficient to bring it to the proper temperature; one tea-cup of yeast. Add two quarts of Rye flour, more or less, sufficient to make a stiff dough, but not so as to mold. Set in a warm place. Let it rise two hours, put in deep dishes and bake three hours. Requires a hotter oven than wheat bread.

Quince Preserves.—One pound of sugar to one of fruit, one quart of water, (or enough to cover them,) and let them soak ten or twelve hours, then put them into a kettle, and let them boil gently until you can run a broom splinter through them easily, then turn them out and let them stand a week; then turn off the syrup and boil it down sufficiently. Quinces made in this way will never become hard.

Cauliflower.—This vegetable suffers in the hands of the cook worse, if possible, than the gardener's.

Put a good firm head in a saucepan of *boiling* soft water, cover closely and not cook one minute after a fork will pass readily through the stem. Drain, and pour over melted butter. It is usually "cooked to death."

Coloring Receipt.—For ten pounds of black wool or cotton prepare with one and a half ounce of bichromate potash, one ounce creamtartar. Boil two hours. Drain the goods. Boil two and a half pounds of logwood chips one hour in the goods; boil one hour, rinse and dry.

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THE

RURAL ANNUAL

AND

HORTICULTURAL DIRECTORY,

FOR THE YEAR 1861;

CONTAINING TREATISES ON

THE FARMER'S KITCHEN GARDEN; SHADE AND ORNAMENTAL TREES; MANAGEMENT OF WINDOW PLANTS; CULTIVATION OF EVERLASTING FLOWERS; ORNAMENTAL HEDGES; SULPHUR FOR MILDEW ON THE GRAPE; DESIGNS FOR FARM HOUSES, COTTAGES, SUBURBAN RESIDENCES, BARNS, ETC.; ORNAMENTAL FOUNTAINS; CONSTRUCTION OF GATES; CALENDAR OF OPERATIONS; CULTIVATION OF THE PEAR,

WITH MANY OTHER ARTICLES OF INTEREST AND PRACTICAL VALUE TO

THE FARMER, THE FRUIT-GROWER, AND THE HORTICULTURIST.

ILLUSTRATED WITH EIGHTY ENGRAVINGS.

ROCHESTER, N. Y.:
JOSEPH HARRIS,
(Office of the Genesee Farmer.)
1861.

PREFACE.

The Rural Annual and Horticultural Directory was started in 1856; and a new number has appeared every year since. The design of the work is to furnish, at a cheap rate, and in book form, such practical information as may be useful to Farmers and Fruit-growers, and every one interested in rural pursuits.

In the five numbers that have already appeared (1856–7–8–9 and '60), there are many valuable treatises, written expressly for the *Rural Annual* by men of large, practical experience; and it gives us much pleasure to state that there is a steady demand for complete sets of the work. For the convenience of reference, we give in this number a list of some of the most important articles that have appeared in the five previous numbers.

The work for any year will be sent for 25 cents; or the whole five numbers (1856–7–8–9 and '60,) will be forwarded, postage paid, to any address, on the receipt of $1.00.

JAMES LENNOX, STEREOTYPER,
Rochester, N. Y.
A. STRONG & CO., PRINTERS.

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THE RURAL ANNUAL AND HORTICULTURAL DIRECTORY.

THE FARMER'S KITCHEN GARDEN.

IF we are not greatly mistaken, farmers are beginning to pay more attention to their vegetable gardens. It is one of the hopeful signs of the times — a cheering indication of rural improvement. Still, farmers, as a class, sadly neglect their gardens. Few, in fact, have any garden worthy of the name. Farmers have every facility for raising the greatest variety of garden products; and yet the occupants of small lots in our cities and rural villages have usually better gardens than the majority of farmers. Our hope for improvement in this direction lies principally in the rising generation. Would not farmers do well to let their sons spend more time in the garden? They would there see the advantage of thorough culture, and learn many things that they will, in after years, put in practice on the farm. We hope the youthful readers of the *Rural Annual* will take hold of this matter. To such, a few hints may be useful.

In our cities and villages, where the garden is small and the labor of cultivating it a matter of recreation, all the work is of course done by the spade and hoe; but in the country, where the difficulty is rather a scarcity of labor than a deficiency of land, much of the work may be done with the plow and the horse-hoe. With this object in view, it would be well to have the garden in an oblong form — say three or four times as long as it is wide. The plow could then be used to advantage, and the main crops might be planted in long rows, sufficiently wide apart to admit the use of the horse-hoe.

The point of greatest importance in a garden is to have it thoroughly underdrained. If the land is *naturally* underdrained, of course nothing more is required in this particular; but in nine cases out of ten, artificial drains are needed. All attempts to make a good garden on land that is surcharged with stagnant water at any season of the year, will fail. It is important to plant many crops as early in the spring as possible, and a thoroughly underdrained soil can be worked two or three weeks earlier than one that is not drained. In the one case the water passes off beneath, and in the other the sun has to evaporate it. All the heat of the sun, instead of warming the soil, is expended in evaporating the water. See to it, then, that the land is thoroughly underdrained.

It is usually considered desirable to have the garden on a gentle slope, inclining, say one foot in forty, to the south-east, so that it will receive the morning sun. If sloping to the south-west, however, there is not so much danger of injury from slight spring frosts; as a frost which would injure plants where the sun shines on them early, would prove harmless if the sun did not fall on them before the frost had disappeared. It is the sudden thawing that does the most damage. If the garden can be protected from the north and west winds, with a tight board fence, or a screen of evergreens, etc., it will be a great advantage.

To obtain the best success in a garden, it is necessary to trench it from eighteen inches to two feet deep. Subsoil plowing, if well done, is the next best thing to trenching. By subsoiling, we do not mean deep plowing, or running the plow twice in the same furrow, thus throwing the subsoil to the surface. A subsoil plow is one which is run in the furrow made by an ordinary plow, and which merely breaks the subsoil without bringing it to the surface. If manure could be worked into the subsoil it would be a great advantage. This can be done in trenching, but it is difficult to accomplish in subsoil plowing.

For most garden vegetables, the ground can hardly be made too rich — rapid growth being essential to that crispy tenderness so much esteemed. Even the pea is of much better quality when grown on land moderately rich than on poor soil. In applying manure, the principal aim should be to *mix it thoroughly with the soil.* As much as possible, the manure should be made part and parcel of the soil itself. Perhaps the easiest way of accomplishing this is to spread the manure on the soil in the fall, and plow it under; and then the plowing in the spring will mix it intimately with the soil. We do not think there is much danger of the goodness of the manure leaching out of the soil during the winter, unless it is of a very sandy nature. A good loamy soil has the power of retaining the most valuable elements of manure. If manured in the fall, a little well-rotted manure might also be applied in the spring with advantage.

The first work to be done in the garden in the spring is the

Making and Management of the Hot-bed. — There is no reason why every farmer should not have a hot-bed. He might make the frame himself, and the sash costs but little. He has plenty of manure handy, and it is not lost, as it is about as good after it has been used as when first put in the bed. A little daily care is necessary in the management of the bed, but it need not occupy much time. Then the advantages are very great, and "too numerous to mention." A striking peculiarity of our spring is that it is very short. COBBETT says: "The American *spring* bears no resemblance to that of England, which comes on by degrees from the end of February to the beginning of June; while the American spring cannot be said to be of a fortnight's duration. There is, in fact, no spring: there is a winter, a summer, and an autumn, but no spring; and none would ever have been thought of, if the *word* had not come from Europe, along with many others equally inapplicable. This sudden transition from a winter which not only puts a total stop to, but effaces all traces of, vegetation, to a summer, which, in an instant, creates swarms of insects, or warms them into life, sets the sap in rapid motion, and, in six days, turns a brown rye-field into a sheet of the gayest verdure; this sudden transition presents the gardener, or the farmer, with ground well chastened by the frost, smoking with fermentation, and with a sun ready to push forward every *plant;* but, alas! he has *no plants!*"

The principal use of the American hot-bed is to raise plants for transplanting into the open ground as soon as the warm, settled weather sets in. Tomatoes, melons, cucumbers, cauliflowers, early cabbage, egg-plant, cellery, peppers, lettuce, etc., can only be obtained in good season and in perfection, with any degree of certainty, with a hot-bed to start the plants in.

Horse stable manure is the best material for making the hot-bed. It is best to throw it up into a loose heap, and let it begin to heat a little before putting into the bed. In making the bed, the manure should be all shaken out fine, as it is put in. Beat down each layer of manure as it is put in, with the back of the fork, pressing the outer parts of the bed the most. Some persons tread down the manure in the bed; but in a small bed for a single frame this should not be done. The more manure is pressed, so as to exclude the air, the less likely it is to ferment. If the bed is very large, and it is desirable to keep it warm for a long time, it should be made more compact. When the manure is put in the bed, if it is very dry, it should be watered — the liquid of the stable being the best, if it can be obtained. The bed should be three or four feet high, and a little larger than the frame that is to stand upon it, as shown in the above engraving.

It is sometimes recommended to dig a hole for the hot-bed, twelve or eighteen inches deep; but, in this country at least, it is better to make it on the surface of the soil. If possible, it should be in a spot sheltered from the north and north-west.

When the bed is made, place the frame on top and close the sashes — covering them with mats or loose litter for a few days, till the heat is well up. The soil should not be put on till the bed has fermented a little, and the first-formed gasses, which are thought to be injurious, have escaped. Then put on the earth — say six inches deep over the whole bed. Rich, light garden soil will answer for this purpose; and

Lord Kenyon's Favorite.

if a little well decomposed leaf-mould, from the woods, can be obtained, it might be mixed with it to advantage. The best way is to prepare the soil in the fall, and keep it under cover all winter. A compost of turfy sods, leaf-mould, and barn-yard manure, in equal quantities, mixed the previous summer or fall, and occasionally turned, makes a good soil for hot-beds.

If cucumbers are to be raised, cover the whole bed, three or four inches deep, with soil, and then take a bushel of earth and put it in the center of each sash, making a hill about nine inches deep. When the earth is warmed through, sow the seeds of the cucumbers on the hill, covering about half an inch deep. If three plants grow in each sash, it will be sufficient. When the young roots protrude through the hill, they must be covered with more earth, which should be placed in the bed till it is warmed through before it is put to the tender roots. Into this bed, with the cucumbers, may be placed boxes filled with earth, in which are sown seeds of tomatoes, celery, peppers, purple egg-plant, where they can remain till they are in the way of the cucumber vines, when they may be removed to a cold-frame, to be hardened off before planting in the open ground. In the case of celery, especially, it is best to prick them out in a cold-frame, or in the open ground in some warm, sheltered spot, where they can grow and form stocky plants, before finally setting out in the trenches.

One of the best varieties of cucumbers for hot-bed culture is *Lord Kenyon's Favorite*, of which we annex an engraving.

The heat of the hot-bed should be about 60° by night, and from 75° to 85° by day with sun. If the heat of the bed declines too soon, some fresh manure should be placed around the bed, and covered with boards to keep off cold winds and rain.

The ventilation must not be neglected. This requires some care and attention. Give a little air on all warm, sunny days, by lowering the sash an inch or two; but be careful that no cold wind blows upon the young plants. Watering must not be neglected, and the water should be warmed till about the temperature of the bed.

If it is not desired to raise cucumbers, the bed should be covered all over the surface, to the depth of six inches, with light, rich earth, and seeds of *Early Paris* cauliflower, *Early York* cabbage, radishes, lettuce, peppers, etc., can be sown.

It is a great advantage to start melons in a hot-bed, when properly done. A common way to do this is to sow the seed on small pieces of inverted sod, and when the plants have made a little growth, transplant the whole into the open ground. The objection to this method is, that the tough sod impedes the growth of the roots, and the grass is apt to spring up around the plants when set out. A better plan, is to sow the seed in small open baskets, which will hold sufficient earth to allow the plants to attain a considerable growth in the hot-bed before the roots extend beyond the basket; and afterward, when the basket and plants are set out in the open ground, the roots will push through the interstices of the basket, and the growth of the plant will not be checked by the removal. The best melons we have seen this season (1860), were started in this way. Six or eight seeds may be sown in each basket; and, after they are well established in the open ground, thin out so as to leave only three or four of the strongest plants in each hill.

Cobbett says the following method will produce cucumbers "a month earlier than the natural ground will bring them:"

"Make a hole, and put into it a little hot dung; let the hole be under a warm fence. Put six inches deep of fine rich earth on the dung. Sow a parcel of seeds in this earth, and cover at night with a bit of carpet, or sail-cloth, having first fixed some hoops over this little bed. Before the plants show the rough leaf, plant two into a little flower pot, and fill as many pots in this way as you please. Have a larger bed ready to put the pots into, and covered with earth so that the pots may be plunged in the earth up to their tops. Cover this bed like the last. When the plants have got two rough leaves out, they will begin to make a shoot in the middle. Pinch that short off. Let them stand in this bed till your cucumbers sown in the natural ground come up; then make some little holes in good rich land, and, taking a pot at a time, turn out the ball and fix it in the hole. These plants will bear a month sooner than those sown in the natural ground; and a square yard will contain thirty-six pots, and will, of course, furnish plants for thirty-six hills of cucumbers, which, if well managed, will keep on bearing till September. Those who have hot-bed frames, or hand-lights, will do this matter very easily. The cucumber plant is very tender and juicy, and, therefore, when the seedlings are put into the pots, they should be watered and shaded for a day or two; when the balls are turned into the ground, they should be watered, and shaded with a bough for one day. That will be enough. I have one observation to make upon the cultivation of cucumbers, melons of all sorts, and that of all the pumpkin and squash tribe; and that is, that it is a great error to sow them too thick. One plant in a hill is enough; and I would put two in a pot, merely as a bar against accidents."

He recommends the same treatment for raising early melons, squashes, etc.

Seeding in the Open Ground.—As soon as the frost is out of the ground, and the land is sufficiently dry to work without sticking to the spade, the warmest and sunniest places in the garden should be spaded for a few early crops. It is a great error to spade or plow the land when wet. It is better wait till the ground is in good working condition.

Peas.—Sow a few rows of the *Prince Albert*, or some other early variety, as soon as the ground can be got ready. A quart of this variety will be sufficient for a small family. It is a dwarf grower, and will do without poling—though, of course, much better with. The *Dan. O'Rourke* is one of the best and earliest varieties. The *Champion of England* is one of the very best "second early" varieties yet introduced. It is a vigorous grower, a good bearer, and of most delicious flavor. Peas are generally sown too thick. A pint, according to the size of the peas and the vigor of their growth, will be sufficient for a row from fifty to seventy feet in length. The old practice of treading them in, especially if the ground is moist, should be discontinued. They should be covered with from two to three inches of fine earth. A little plaster scattered on top of the row will be beneficial. We prefer to sow in single rows, from three and a half to four feet apart.

Potatoes.—A few rows of an early variety, such as the *Early June*, should be planted in a warm part of the garden as early as possible, in rows two feet apart, and ten to twelve inches in the rows. The sets may be started in a hot-bed or warm room, with advantage.

Lettuce.—If you have any plants in a hot-bed, transplant them into the open ground, as soon as the weather becomes warm, in rows a foot apart. If not, sow the seed in a warm border as soon as possible. Do not be sparing of seed, as the plants can be thinned out and furnish a supply of small lettuce early. It is best to sow them sufficiently far apart to admit the use of the hoe. Frequent hoeing is very beneficial. There is nothing so good for lettuce as superphosphate of lime. Plaster is also good.

RADISHES are frequently sown broadcast on the onion beds; but we prefer to sow them in drills in a bed by themselves. The seed should be buried a little deeper than the lettuce—say half an inch. Sow plenty of seed, so as to have plants enough for the fly and for a crop.

CABBAGE.—Sow some *Early York* or *Early Winningstadt* cabbage, or *Early Paris* cauliflowers, either on a gentle hot-bed, or in a warm and sheltered spot, as soon the ground is in fit condition. A little Peruvian guano (say four pounds to a square rod), forked into the bed before the seed is sown, will give the plants an early start, and they will be more likely to escape injury from the fly. Superphosphate of lime, sown with the seed, is a still better manure for this purpose. Eight or ten pounds to the square rod may be used. It will not injure the seed, and will cause the plants to grow so fast that the fly can not hurt them.

ONIONS should always be sown in drills sufficiently wide to admit the use of the hoe. In this way much labor in weeding is saved. Onions prefer a rather heavy loam, if it is rich and thoroughly pulverized. A light soil is apt to induce the growth of tops rather than bulbs. If intended to be used while young for salad, a warm sandy soil is best. As a general rule, however, it is best to sow the main crop sufficiently thick to furnish abundance of young plants for salad in the progress of thinning. This must be by no means neglected, or the plants will become weak and drawn up. The crop is frequently injured by thick seeding and neglecting to thin out early. An ounce of good seed, when sown in drills, is sufficient for a bed four feet wide and twenty-four feet long. Like wheat and clover, onions thrive best in a compact soil, and it would be desirable to roll the beds with a hand roller, or to batter them with the back of the spade.

CARROTS.—The *Early Short Horn* is the best carrot for table use. When rapidly grown and not too large, they are delicious. Sow them on a rich, warm, light soil, in rows a foot apart. Do not be sparing of seed, but thin out as soon as the carrots are large enough to eat, or sooner if necessary. No error is more common than leaving plants too thick in the garden. For the main crop, the carrots should be thinned out to at least three or four inches apart in the rows. Much labor in weeding may be saved by hoeing lightly between the rows as soon as the carrots can be distinguished. A few radish seeds are sometimes scattered along the drills with the carrot seed, and coming up early, serve to indicate the rows, before the carrots can be distinctly traced. They should be pulled up before they injure the carrots.

PARSLEY should be sown as early as possible, in rows fifteen inches apart, and the plants thinned out four inches apart in the rows. It may be sown as a border around beds or walks.

TOMATOES.—A New Jersey correspondent of the *Genesee Farmer*, who has been very successful in raising early tomatoes for market, gives the following directions for their cultivation:

"As late tomatoes grow freely without much cultivation, I shall confine myself entirely to the extra early crop. For a market crop, select your ground lying as warm as possible; if protected on the north and west by woods, so much the better; and be very careful to choose ground not subject to late frosts—such as dishing ground between hills and high ridges; such spots often suffer from frost when higher ground escapes.

"By the month of February, cast on the ground a mixture of horse, hog, cow and sheep manure, if you have them, at the rate of ten large two-horse loads per acre, for your compost heap. If the ground is open, cart on the same bulk of rich earth—in this section, marl is used As soon as frost is out in the spring, cut this compost carefully over, heaping up three or four feet high. It is very necessary to have this compost thoroughly rotted; consequently it will sometimes be necessary to work it over the second time before the first of May. If your soil is heavy, plow and work it in dry weather, so as to bring it to as fine condition as possible; but warm sandy ground will prove much earlier.

"About the 10th of May, mark out your ground with a plow, four feet each way. Then, with a hoe, dig out the hills, or the place for them, down to the yellow earth, full fifteen inches in diameter. If you can procure it easily, scatter a tablespoonful of Peruvian guano in the bottom of each hill; immediately put in your compost, the quantity so that your ground will just use up your compost; then with a hoe cover your manure at least six inches deep, making your hills large and high.

"The most expense in raising early tomatoes consists in the management of the plants before they are set out in the open ground. If you are near a good market, it will pay to expend some capital in hot-bed fixtures. Procure good sash and frames, and as many pint pots as you wish to raise plants. But if you are near a pottery, you had better order your pots made five inches deep and four inches wide, inside measure. If I recollect, a sash six feet by three covered 120 pots. Your sash, pots, mats, and frames ready, about the 15th of February dig a pit two feet deep as large as four sash; fill this with fresh stable manure, packed pretty solid so as to hold heat longer; cover this with six inches of rich soil; place on your sash and mats at night; in three or four sunny days your bed will be ready for the seed. Make small drills for the seed four inches apart; sow your seed thickly—the large smooth is the best market kind; cover near one inch deep. In five or six days, if your bed is in good condition, they will be bursting through the ground. If the weather is moderate, give air each sunny day by opening the sash at the top. When about two inches high, thin out to one inch apart. Be careful not to let your plants grow too fast—six inches by the first of April is as large as they should be; aim at having your plants stout—avoid spindling plants. About the 20th of March, pile the earth on each side of your plants about four inches high, which will cause them to throw out new roots. About the last of March, prepare your bed for hardening large enough to hold all your pots. Have ready enough rich mould to fill your pots. In this second bed, your manure need not be over one foot thick; after your manure is in, fill your pots with the prepared earth; place them as close as possible in your bed; fill up all space between the pots with loose earth; place on your sash, and if the nights are cool put on mats. As soon as you find any heat in the pots from the manure, begin your transplanting from the seed-bed to the pots, putting one plant in each, placing them in deeply. Water with warm water; shade from the sun two or three days, and if much heat rises from the manure, air freely in all moderate weather.

"Your plants will need constant care to keep them just right: if too warm they will grow tall and spindling; keep them well wet. Your dirt in the pots will settle much by wetting, and be apt to bake from the heat of the sun. To prevent baking, fill your pots up with sand; this will keep the rich earth under moist, and the water will soak in better when you wet the plants.

"Make it your aim now to have your plants very hardy by exposing them to all the air possible, without entirely checking their growth. By having your plants thus wide in the beds, they will branch much better than if left thick, and the branches will often ripen fruit within a few days of the main stalk. If your bed and plants have been well managed, so as to cause a stout, stocky growth, your plants may be allowed to reach ten or twelve inches high by the first of May, and they should begin to show the buds pretty freely. After this time remove the sash every day, that the plants may become used to the natural air; but if the weather gets very warm, don't be in a hurry to get your plants in the open ground. I have known a very fine patch much injured by frost after the 12th of May. If your plants are in pots, never set them in the open ground before the 20th of May. As that time draws near, you may leave the sash off at night, if you are sure there will be no frost. Keep your beds well wet before the time of setting out — much depends on this; if the dirt on the pots is dry and crumbly when you transplant, and the weather should be and continue dry, many of your earliest buds will blast and set no fruit. About the 20th of May, choose a wet or damp, cloudy day, if possible, to put out your plants. But if your dirt is well wet in the pots, they may be set out in the middle of a very hot day without wilting in the least, if done by a careful person; if it continues dry, many of the buds will blast. It is best, if you have it, to use a spring wagon, and if your patch is near your beds, only cart one tier at once; but if at a distance, cart a double tier.

"In setting out, let one or two hands cart them, and one set them. Let the carters lay them, pot and all, by the hills, the pot on one side; the person setting out will learn to remove the plant, dirt and all, from the pots, with little trouble. Dig a deep hole in the hill with the hand;

take the pot in the right hand, give it a smart slap on the left; then, holding it over the hole, take the plant gently by the right thumb and fingers, pull gently, and let the dirt and roots, all in a solid ball, drop in the hole; pull the dirt well up around the plant with the hand, and it is done. No sticks or tieing up is necessary if your plants have been rightly managed.

"The after culture is very easy and simple. About one plowing and hoeing is all that will generally be needed. Some recommend cutting the tops off to ripen them early. I do not; I have tried it over and over and never saw any advantage; but let each person try it to satisfy himself. If all has thus far been well managed, by June 1st the plants will have on from one to nine tomatoes on each hill, from the size of a large pin-head to a hazlenut. By this course of management, I have succeeded in picking three baskets for market on the 4th day of July; and as it has often been my aim in what I undertook to go ahead of my competitors, so in this I succeeded in beating anything north of Virginia two weeks. One season I took my first ones in New York market on the same day that the first lot of any size arrived from Norfolk, Va. From one hundred and fifty to two hundred and fifty dollars per acre is a good yield. Your pots and sash will last, with care, many years; but neglect and carelessness must not once be thought of. Any person wishing to raise market tomatoes with less expense, may easily do so, but must be satisfied with less profit. Remember, 'Anything worth doing at all is worth doing well.'"

It will of course be necessary to vary the dates given above to correspond with the latitude.

Melons.—The great object in the cultivation of melons, is to get them early. During the hot weather of August and the first part of September, they are one of the greatest luxuries that can be grown in our northern climate. It is easy to raise the plants in a hot-bed, but so difficult to transplant them without checking their growth, that in favorable seasons those sown in the open ground are earlier. A light, warm, sandy soil, should be chosen if possible. If not, it has been recommended to place two bushels of sand where each hill is to be grown. Turf ashes, if they can be obtained, are much better. A gentleman in this city raised a splendid crop of melons in the following manner: The ground received a dressing of old, well-rotted manure from the blacksmith shop, which, containing much hoof-parings, was very rich. This was dug in all over the ground. The seed was planted in hills about three feet apart, the first week in May, and small boxes with a single glass light, were placed over them. Those treated in this way were much earlier than some which were transplanted from a hot-bed. A tablespoonful of superphosphate of lime, placed in some of the hills with the seed, had a very good effect. It is best to sow plenty of seed—say six or eight seeds in a hill; but not more than three or four good strong plants should be allowed to remain. The *Christina* is the earliest and the best musk-melon yet extensively tested.

CUCUMBERS.—Make the soil light and rich; raise the hills a few inches above the surrounding surface; place six or eight seeds in each hill about an inch deep, and, if possible, place a small frame over them. If a glass frame, so much the better; but if covered with gauze, it will be beneficial; and even if not covered with anything, the frame will keep off the cold wind and the bugs, and bring the plants forward much more rapidly than those without protection.

When covered with either glass or gauze, care must be taken to afford ventilation on all warm, sunny days, by tilting the frame or glass, but in such a direction as to keep the wind from blowing in and chilling the plants. Ventilate before the sun gets too warm, and close about four o'clock. Water when dry. Three or four plants in each of the hills, which should be about four feet apart, will be sufficient.

LIMA BEANS.—Let the soil be light, warm, and rich. Make the hills about four feet apart. Stick poles about ten feet long in the hills before planting the seed, so as to avoid disturbing the plant. Bury four or six beans about an inch deep around each pole, and if they miss on account of cold weather, or for any other reason, sow again. Three plants to each hill will be enough. We have found unleached wood ashes, incorporated with the soil, especially beneficial for beans.

STRING BEANS.—Sow a few rows of *Early Six Weeks* beans in a warm, sunny, sheltered situation. A pint will sow about forty feet. The rows should be about two feet apart.

MARTYNIA.—This is a tender annual from Mexico, introduced into England in 1840, and named after Dr. MARTYN of Cambridge. It deserves to be better known in this country. The flowers are very showy, and the seed-pods make pickles equal to the English walnut. Cultivation same as cucumbers.

PAINTS FOR BARNS AND HOUSES.—A cool gray, similar to what would be the tint of unpainted timber after a few years, may be obtained as follows; Indian red, half a pound; lampblack, three ounces; raw amber half a pound, mixed with one hundred pounds of white lead. This color will be changed by the addition of sand, which in all cases is recommended, in a proportion of about one quart to every one hundred pounds of mixed color. The finest and whitest sand should be used. This color, with one-third less white, is very suitable for roofs, and is a cool, unreflecting gray tint, of great softness and beauty.

CREAM COLOR.—A soft, pleasant tint, like that of coffee greatly diluted with milk, is oftentimes well adapted to a building, particularly in regions where sandstone or other similar objects with such local coloring, give a brown hue to portions of the landscape. It may be mixed as follows: Yellow ocher, five pounds; burnt umber, half a pound; Indian red, quarter of a pound; chrome yellow, No. 1, half a pound, with one hundred pounds of white lead. The key notes in this color are the Indian red and the chrome yellow, and the tone may be brightened or lowered by more or less of either, as each taste may prefer.

A FEW WORDS ON GATES.

A GATE may be regarded as a movable portion of a fence. It should be of sufficient width to admit the free passage of the largest vehicles employed on the farm, with their load. Nine feet eight inches between the posts will do so, as it gives a clear width of nine feet when the gate is opened. Farm gates are seldom needed more than four feet six inches above the ground. Allowing the lower bar to be four to six inches from the ground, the dimensions of the gate will be nine feet long and about four feet high.

This rectangular frame, nine feet by four, if suspended by one of its sides, would not maintain its form, but would become rhomboidal, by the falling down of the other sides by their own weight. To maintain the rectangular form, it is necessary to add an angle tie, or an angle brace or strut. For the more perfect understanding of the subject, the frame of the gate may be resolved into a still more simple elementary form, as thus:

Let the diagram, Fig. 1, represent—*a* the hanging-post, *b* the top rail, and *c* the angle-strut of a gate. This is evidently a simple truss, like the jib of a crane; and if a weight *w* be hung on the end of the rail *b*, this rail will be in a state of tension, and *c* in a state of compression; and if the rail *b* be firmly held at *d*, and have an unyielding abutment at *e*, the point of the rail to which the weight is hung cannot drop down.

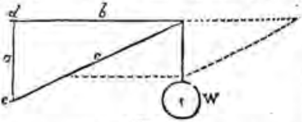


Fig. 1.

Again, in Fig. 2, on the following page, let *a*, as before, be the hanging-style,* *b* the lowest rail, and *c* the angle-tie; it is evident, that, under the same conditions as before, *b* will now be compressed; that is to say, the lower rail would act as a strut, while *c*, the diagonal, will act as a tie. It will be obvious, that on these elementary parts the stability of the gate is entirely dependent; the addition of the other style and rails to complete the rectangular frame, and the filling-in rails or styles, serving only to make the fence.

* The vertical sides of a gate are called *styles:* the one to which the hinges are attached being called the hanging-style, and the one to which the fastening is attached being called the *falling-style.*

From the consideration of these figures, and keeping in view the constructive maxim that iron should be used as a tie, and wood as a strut, we should learn not only what materials to use, but how to use them. Thus, if the construction be that of the diagram, Fig. 1, *b* should be of iron and *c* of wood; and in the annexed figure, *c* should be iron, and *b* wood. But it may be objected, that if this rule were strictly adhered to, it would not be possible to construct a gate of timber, as in any case, there must be evidently ties, as well as struts. Let us consider this objection. The pieces of timber of which a gate is formed, are framed together, and held in their place by bolts, nails, or wooden pins; and the gate is hung to the post by hinges, which are of iron. These hinges are generally made so long as to embrace a considerable part of the length of the rail; and, therefore, may be made subservient to the rendering the timber competent as a tie. Now, a very common method of framing a gate is shown in Fig. 3, where the angle-tie is of wood, nailed to the

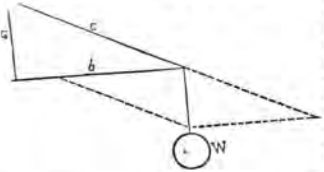


Fig. 2.

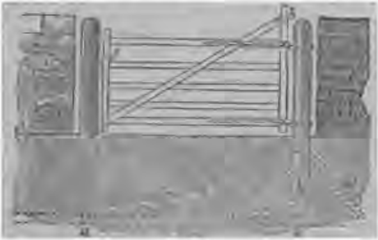


Fig. 3.

posts and rails at its intersections. On examination, it will be seen that the strength of the timber diagonal has very little to do with the stability of the framing; that in point of fact, the stability is entirely dependent on the strength of the nails, and the slight resistance to tearing offered by the fibres of the wood between the nails *a* and the end *b*. This form would obviously be less objectionable, if in place of being secured by nails merely, the diagonal had an iron strap passed round it, and securely bolted through it, so as to extend the resistance of the fibres. But this extra iron work is expensive; and by simply making the diagonal bar a strut, in place of a tie, the iron strap of the upper hinge can be employed to supplement the deficiency of the upper wooden rail as a tie.

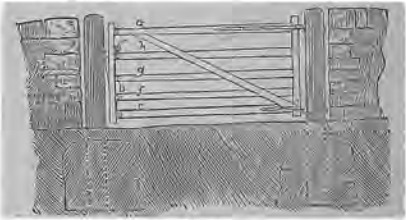


Fig. 4.

In Fig. 4, the top rail, as has been shown by the diagram, becomes a tie; and it is secured to the hanging-post by the strap of the upper hinge embracing it, and being bolted through it. The diagonal is notched into the upper rail at *a*, and abuts against the falling-post at the lower hinge. The elementary frame is thus rendered perfectly rigid, and the addition of the front, or falling-post *b*, and the bars *e*, *f*, *g*, *h*, completes the fence. By this mode of construction, the strain of the tension is thrown on the bolts and iron strap of the hinge.

In a timber gate, then, the diagonal bar should form a strut, as in Fig. 2, and not a tie. Were we merely to consider, in the application of the diagonal bar, the angle which should be the best fitted to insure the frame maintaining its form, we should adopt the angle of 45°. But the bar placed at this angle would not extend half way along the top rail, and the result would be the introduction of a new element of destruction in the cross-strain, to which the top bar would then be exposed; for the point of the strut would be a rigid fulcrum, over which the top bar would be broken, by a weight hung to its outer end. Practically, therefore, it is better that the strut should make a smaller angle with the horizon; that in fact it should be attached to the top bar, at just such a distance from the end of the latter as shall not so much weaken it, as to prevent it forming a perfect abutment to the thrust of the strut; and, in ordinary cases, ten inches or a foot is sufficient. The junction of the strut and top rail should be by the same kind of joint, as the toe of a rafter is let into the tie beam. Fig. 4 shows the general appearance; and Fig. 5 some of the constructive details of a gate, of the construction here advocated. The hanging-style of the gate is four and a half inches square in section; the falling-style is three inches square. The top rail *a* is four and a half inches square at the hanging-style, and three inches by four and a half at the falling-style. It is tenoned into the styles. The diagonal bar *m* is four and a half inches deep, and two inches thick, tapering to the upper end for the sake of lightness. It is tenoned into the hanging-style, and notched into the top rail. The other rails, *e*, *f*, *g*, *h*, are four and a half inches deep at the hanging-style, and taper to three and a half inches deep at the falling-style. They are an inch and a half thick, and are tenoned into the styles — the tenons having only one shoulder on the outside, so as to allow of larger cheeks to the mortices in the styles. In Fig. 5, *b* is a vertical section through the rails and diagonal, looking towards the hanging-style. The upper hinge has its straps prolonged, as seen in Fig. 4, so as to embrace a considerable portion of the top rail, that the bolts and nails which fasten it may have a secure hold in the solid wood. The under hinge does not require this prolongation of the straps, as the force upon it is a thrusting, and not a drawing force, as the upper.

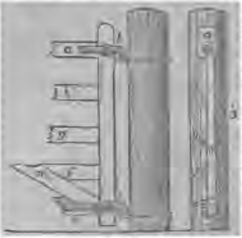


Fig. 5.

As the bottom rail is so much thinner than the hanging-style, a small piece of wood, of the depth of the rail, is generally added at *e*, Fig. 5, as a rest for the strap of the hinge. The tenons of the rails are secured in the mortices by pins, and the diagonal is securely nailed to the rails at its intersection with them. Before putting the parts together, the tenons and intersecting parts of the rails and diagonals should be coated with white lead in oil. The great destroyer of the gate is rain, which, falling on the thin top bar, as usually constructed, soaks into the joints, and induces rot. The wide top rail in the gate described, affords protection against this; and the only parts exposed to it are the intersections of the diagonal and rails; but by making the upper edges of these slightly beveled, so as to throw the water from the joint, the risk of injury from this cause is destroyed. The top rail should be saddle-backed, or rounded on the top. Sometimes vertical bars are added to the gate; but these add to its weight, and not to its strength; and, moreover, introduce new joints, exposed to the action of the rain, and they should therefore be dispensed with.

In an iron gate, the diagonal should form a tie, and not a strut. Iron gates, as usually constructed, are not sufficiently stiff laterally. They are generally made of strips of iron, rivetted together without much attention to any principle; and they are provided with diagonal bars, with curvilinear braces, and with radiating tension-rods, or, at least, with what are meant to be tension-rods, of which the object is generally a mystery.

In an iron gate, the parts essential to its stability are the same as in a gate constructed of timber—the arrangement only being different, to suit the peculiarity of the material. It is not necessary to swell this article with descriptions of all the varieties that may be used, and, having stated the principle, one good example may be quite sufficient for its illustration. We shall therefore proceed to describe the construction of a gate, which has been found adapted in every respect to the purposes of the farmer.

The styles, rails, and diagonals of this gate, which is represented in Fig. 6, are formed of angle iron; the top and bottom rails of an inch

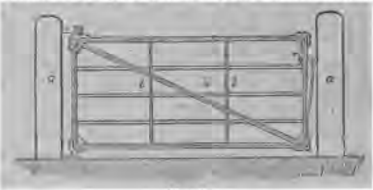


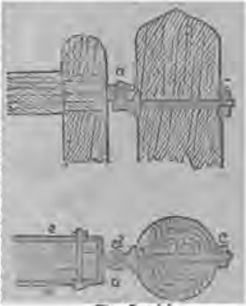
Fig. 6.

and a half on each side of the angle, and the vertical pieces one and a quarter. The styles and rails are secured at their junction to triangular pieces of cast-iron. The fitting-in rails are of hoop-iron, stiffened by being passed through slips in the vertical pieces *b*, *b*, which are also of hoop-iron, but set edgewise.

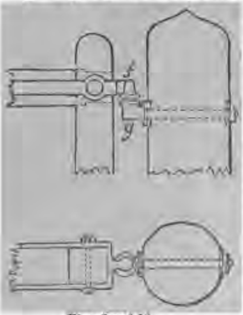
We shall now proceed to consider the mode of hanging the gate. The gate may be hung to a built pillar of stone or brick, to a single stone set on end, or to a wooden post. The best of these is the single stone post—the next is the wooden post; the built pillar ranks last, as it is more easily damaged, and not so quickly repaired, and generally involves part of the attached wall in its ruin. The stone post may be either rough or neatly hewn. It is fastened by simply sinking its lower end into the ground, or by sinking it in a large excavation, and surrounding it with solid building. The hinges are fastened to the post by their bolts being passed through holes drilled or jumped through its thickness, and secured behind by nuts. This is infinitely better than batting the hinge into the face of the stone, as, by the addition of washers to the bolts of the upper or lower hinges, any slight settlement which may take place can be adjusted. The wooden post is generally formed of part of the trunk of a tree, about ten inches diameter, with the bark taken off. It may be fixed by being sunk for about four feet in the ground, the end being previously charred; or it may be secured underground, by being imbedded in a mass of solid masonry, as shown in Fig. 4. It may be also secured in the manner shown by the dotted lines in Fig. 3, where *a a* is a sleeper of plank.

into which the posts *b b* are mortised; and *c c*, *d d* are struts notched into the sleeper, and into the posts, and securely nailed. If the lower part of the fence wall, however, is made to bear close on the posts underground, the struts *d d* may be dispensed with.

The simplest form of hinge used for field gates is the gudgeon and band hinge. This consists of the parts seen in Figs. 7 and 8—the former a vertical section, and the latter a horizontal section through the hanging-style and post of a gate. The gudgeon or joint-pin *a* is fixed to a plate, which is secured to the post by a square bolt *b*, with a



Figs. 7 and 8.

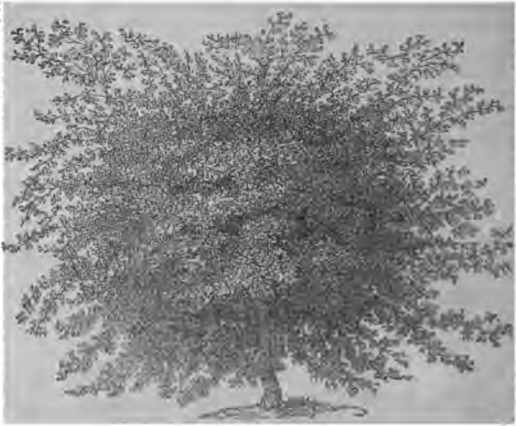


Figs. 9 and 10.

screwed end, which passes through it, and is fastened by the nut *c*. A shoulder on *b* bears against the inside of the post. The hook or thimble, *d*, of the part of the hinge which is fastened to the gate, is fitted nicely to the pin, and its bands, *e e*, embrace the hanging-style and top rail, to which they are secured by bolts and counter-sunk nails.

A much better form of the gudgeon and band hinge is shown in plan and elevation, in Figs. 9 and 10. Here the joint-pin is attached to the part *f* of the bands, and is truly turned to fit a bored socket, or cup, formed in *g*, which is attached to the post by a shank or bolt as before. The cup serves to hold a small quantity of oil or grease, and the shoulders, which are formed on the edges of the cup and gudgeon-piece, prevent any dirt getting into the joint.

How to make Oxen Work Together.—When oxen refuse to work equally well on either side, or when they pull off against each other, yoke them on the side you wish them to work, and turn them out to feed in that way; they will soon become accustomed to it, and work afterward on either side.



Cut-leaved Hawthorn.

SHADE AND ORNAMENTAL TREES.

In the last volume of the *Rural Annual*, we gave beautiful and original drawings of some of our most desirable deciduous and evergreen trees for ornamental planting; and we now present engravings and brief descriptions of others not then alluded to, but which are worthy of greater attention from planters than they have yet received.

The Hawthorn.—Neither the Common Hawthorn (*Cratægus oxycantha*,) nor its numerous varieties have been much planted in this country, and the beauties and merits of these trees are yet to become known and appreciated.

The Hawthorn attains a height of from twenty to thirty feet, and spreads its branches laterally — forming a dense, low-headed tree; the leaves are of a dark, shining green, and those of the variety which our engraving represents (*C. oxycantha laciniata*,) are deeply cut, or from five to seven lobed, while the Common Hawthorn is more generally three lobed.

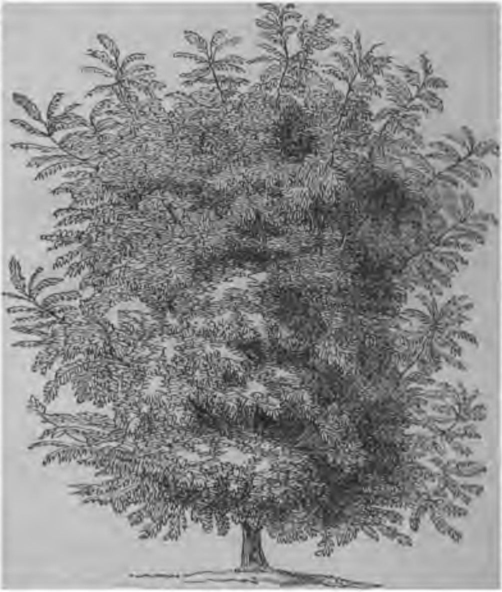
In a plantation of ornamental trees — even a comparatively small one — the Hawthorn, in some of its numerous varieties, should not be omitted. Its dense head, at a height which overtops the shrubs and lies below the taller trees, fills a space to which few other trees are so well adapted; and its white blossoms in May or June, covering it like snow-flakes, and the purple berries or haws which succeed, render it peculiarly attractive.

There are several varieties of *Cratægus*, natives of this country, which may also be employed with equal advantage in plantations.

The most valuable of these are *C. coccinea*, or Crimson-fruited Thorn; *C. crus-galli*, Cockspur Thorn, and *C. cordata*, or Washington Thorn. All the above species grow from fifteen to twenty feet high, and when young can easily be transplanted.

Rose Acacia.

The Rose Acacia (*Robinia hispida*) belongs to the same family as the common Locust tree of this country (*R. pseud-acacia*). Like this well-known tree, it is a native of this country, but is principally confined to the Southern States, while the Locust tree is found from Canada to Carolina. All the varieties of the species are shrubs or low trees, with tortuous and very brittle branches, with leaves and flowers nearly twice the size of the common Locust. They were introduced into England in 1758. Although there are some very fine specimens in different parts of England, they are not much prized as standard trees, on account of their liability to injury by the weather, except in sheltered situations. Loudon says "they form singularly ornamental shrubs for the garden." He recommends training them against an espalier rail; and says, "whenever a magnificent display of fine flowers is an object, it better deserves a wall than many other species; and it is worthy of being associated there with *Piptantheus Nepalensis Wistaria Sinensis*, and other splendid Leguminaceæ. When grafted standard high, and trained to a wire parasol-like frame, supported on a rod or post six or eight feet high, few plants are equal to it in point of brilliant display." The Rose Acacia is quite hardy here, and should be more extensively diffused.



Butternut Tree.

The Black Walnut and Butternut are both natives of North America. They are found in the Canadas, and in the United States north of Georgia. MICHAUX says he found the Butternut no where so fine as in New Jersey, and on the banks of the Hudson. On cold, unproductive soils, interspersed with large rocks, he found them fifty feet high, with trunks measuring ten to twelve feet in circumference at five feet from the ground; the roots extending horizontally, close under the surface, and with little variation in point of thickness, to the distance of forty feet from the tree. The tree, he says, "produces fruit in such abundance, that in some seasons a person may gather several bushels of nuts in a day."

The Black Walnut.

LOUDON, notwithstanding the great difference in the fruits, considered the Butternut only a variety of the Black Walnut; but MICHAUX observes that the two species, when young, resemble each other in their foliage, and in the rapidity of their growth; but that they are distinguishable at first sight when arrived at maturity. The trunk ramifies at a less height than the Black Walnut; the branches extend more horizontally and spread widely, producing a large and flat tufted head.

The Black Walnut is better appreciated in England than in this country. Dr. LINDLEY calls it the "*Noble* Black American Walnut. MICHAUX says he has often seen trees three or four feet in diameter, and sixty or seventy feet in height; and that it is not rare to find them six or seven feet in diameter. "When it stands isolated," he adds, "its branches, extending themselves horizontally to a great distance, spread into a spacious head, which gives it a very majestic appearance." DOWNING well observes: "The Black Walnut has strong claims upon the landscape gardener, as it is one of the grandest and most massive trees which he can employ." It is admirably adapted to extensive lawns, where there is no want of room for the attainment of its full size and fair proportions. Its rapid growth and umbrageous foliage also recommend it for wide public streets and avenues.

Upright-growing Stalk-fruited Oak.

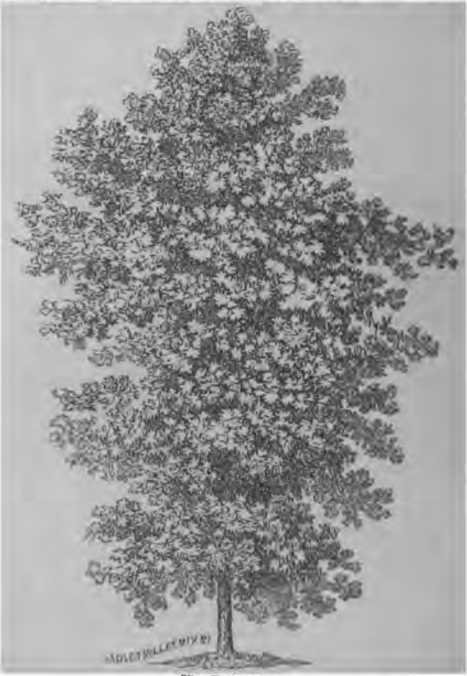
Of the fruit of the Black Walnut, and of the value of the wood, we need say nothing. The tree begins to bear when from eight to ten years old, and age increases its fertility. In New York, the fruit is not as large or as fine flavored as in Kentucky or Ohio; but even here it is highly esteemed.

The wood of the Butternut is as tough, but not so hard as Black Walnut. It makes beautiful fronts of drawers; and light, tough, and durable wooden bowls and shovels. It is valuable for posts and rails, and watering and feeding troughs.

OAKS.—Owing probably to their comparatively slow growth, the Oaks have hitherto received but little attention in this country. And yet it may safely be asserted that no grounds are complete without them. DOWNING well observes, "As an ornamental object, the Oak is the most varied in expression, the most beautiful, grand, majestic and picturesque of all deciduous trees." We give cuts of two varieties; one of which, the "Upright-growing Stalk-fruited Oak" (*Quercus pedunculata fastigiata*), Bosc considered the "handsomest of all the Oaks for ornamental landscape." The other, the Tooth-leaved Turkey Oak (*Q. cerris fullamensis*), is one of the most rapid-growing varieties, and exceedingly graceful in its habit.

Tooth-leaved Turkey Oak.

THE TULIP TREE (*Liriodendron tulipifera*).—This is one of the American trees which Dr. LINDLEY truly calls "magnificent," and the introduction of which into English grounds he earnestly advocates. LOUDON says: "Of all the deciduous trees of North America, the Tulip tree, next to the Button-wood (*Plintanus occidentalis*), attains the amplest dimensions; while the perfect straightness and uniform diameter of its trunk for upwards of forty feet, the regular distribution of its branches, and the richness of its foliage, give it a decided superiority



The Tulip Tree.

to that tree, and entitles it to be considered one of the most magnificent trees of the temperate zone." The elder MICHAUX mentions a Tulip tree that he found in Kentucky, which, at five feet from the ground, was $22\frac{1}{2}$ feet in circumference, and from 120 to 140 feet high.

The Tulip tree thrives best on deep, rich, loamy, alluvial land; but, like most other trees, will grow on a great variety of soils. It is not advisable, however, to plant it on dry, gravelly land. We need hardly say that it receives its popular name from the flowers resembling somewhat those of the tulip.

The Honey Locust.

The Honey Locust.—A tribe of trees, so named from the sweetness of their sap, some of the species of which are found in the United States growing wild on the fertile alluvial bottoms bordering the rivers at the West and South-west. This tribe of trees are of little value except for ornament, and making hedges, for which their rapid growth and prickly limbs eminently adapt them. In some of the Southern and Western States the Honey Locust is being tried as a hedge plant. The negroes of the South also make beer from the leaves and green pods.

The tree represented in our engraving is a variety introduced into Europe from China, and known as the *Gleditschia horrida nana*. It is a rather small and shrubby, but very handsome tree, growing about fifteen feet high, with a spreading habit, and larger and more elegant foliage than the common Honey Locust, and is armed with very long sharp spires, mostly on the trunk and larger branches. It has been found to stand the cold well, and promises to be an acquisition to our shrubberies. The *Gleditschia*, according to DOWNING, stands far above the Locust for the purpose of embellishing scenery. There is a peculiar elegance about its light green foliage, which sways gracefully in the summer breeze, and folds up on the approach of the slightest shower. The branches spread out and form a fine broad head, and there are no dead, unsightly limbs to be seen, as is commonly the case on the Locust. It can be made to assume a variety of picturesque shapes in growing up, and does not produce suckers; and when a limited extent is devoted to a lawn or shrubbery, it is one of the first deciduous trees that should obtain a place, and produces a charming effect when combined with other trees of a heavier and darker foliage.

A CORN HUSKER.—A very convenient thing to assist in husking corn is a peg of hard wood about four inches long, sharp at one end, and fastened to the hand by a leather strap passing over the two middle fingers. The point comes up between the thumb and fingers, just right to use instead of the thumb-nail in tearing off the husk, and out of the way in handling and breaking off the ear. It is of especial use if the corn has been cut a little green, and the husks are thick and tight.

IRRIGATING GRASS LAND.—There are thousands of farms where, at a trifling expense, several acres of meadow land may be irrigated with great advantage. The effect of judicious irrigation on grass land is perfectly astonishing. The late PHILIP PUSEY, of England, states that on irrigated grass land of moderate quality, he has kept at the rate of 36 sheep for five months. The extra produce of a water meadow consumed by animals, will provide an extra quantity of manure for the upland, or arable portions of the farm. BOUSSINGAULT thinks this the only way of increasing the fertility of a farm without going off the farm for manures. The subject is well worthy the attention of American farmers.

TO MAKE LINEN OR COTTON TRANSPARENT FOR GARDEN FRAMES.—Three pints of old pale linseed oil; one ounce of sugar of lead, and four ounces of white rosin. The sugar of lead must be ground with a small quantity of the oil, and added to the remainder, and then the rosin is to be incorporated by means of gentle heat. The composition is to be laid on with a brush after the calico is nailed to the frames. One coat annually is sufficient. It dries in a short time when exposed to the air, and excludes as little light and heat as any thing except glass.

ON THE MANAGEMENT OF A FEW OF THE

CACTI, MESEMBRYANTHEMUMS, ALOES, SEDUMS, SEMPERVIVUMS, ETC., AS WINDOW PLANTS.

WRITTEN FOR THE RURAL ANNUAL BY F. A. BALLER.

N introducing these plants to the notice of the public, the writer has endeavored to confine himself to species that succeed well in the dry atmosphere of the dwelling-house. One very great cause of the failure and disappointment felt in the cultivation of window plants, is the lack of moisture, whereby ordinary greenhouse plants soon fade, turn yellow, and become stunted in their growth — not being able to keep up the excessive waste continually going on. So different is the atmosphere from that of a greenhouse, that they have in self-defence to part with foliage that they would have maintained in health and vigor, in more favorable circumstances. The following plants, being for the most part natives of the hottest and dryest parts of the globe, will be found to possess qualities that eminently fit them for window plants:

CACTUS.

The first mention we have of the Cactus is by THEOPHRASTUS, an ancient writer, who describes it as a spiny plant, used as an article of food by the inhabitants of Sicily. This species is now supposed to be identical with the Prickly Pear of the Western settlers, *C. opuntia*, commonly Indian Fig. It will bear without injury the coldest weather, and is worthy of a place on rock-work or any elevated poor soil, on account of its large yellow flowers and edible fruit.

Cactus opuntia.

A very suitable species for baskets, or for pots standing on a ledge, is *Cactus flagelliformis*, a native of Peru, sometimes called *Cereus flagelliformis*, on account of its long, pendant shoots, and profuse habit of flowering when well managed. If in pots, it should be grown in a mixture of sandy loam and brick rubbish, or broken pots herds and porous stone, with the dust sifted out. The pots should be small and well drained.

Cactus Jenkinsonii, sometimes called *Epiphyllum J.*, is an hybrid variety raised by an Englishman of that name. It is a favorite species on account of its robust habit, as well as its freedom in flowering, which it invariably does under the hardest usage. Plants grown in the house, after flowering, should be set over pans of water with the bottoms of the pots just touching, and have a good allowance of water at the roots; if possible, be sprinkled occasionally, or set out for a short time in rainy weather, to free them from dust, etc. After finishing their growth, they should be set out of doors, in a north exposure, to harden and perfect their flower buds previous to being housed, which should be early in the fall, before frosts have had a chance to nip them. As winter approaches they can be removed to the cellar, where, if it is cool and dark, they will require but little attention till spring, when they can be removed to the windows and watered sparingly — as too much water at this season, if the weather is bright, is apt to induce growth, to the loss of the flowers for that season. It is a crimson-flowered variety, and by impregnation produces fruit about as large as a pigeon's egg, not unlike a gooseberry in appearance, and of an agreeable acid taste.

Epiphyllum.—*Epiphyllum Ackermanii* was introduced some years ago from Mexico, by a plant collector of the name of Ackerman, and is a fine variety, producing scarlet flowers; but it scarcely equals the last in hardiness or freedom of bearing.

E. lateritia. E. Ackermanii.

E. lateritia somewhat resembles the last in general appearance, but differs in the color of the flower, which is dull red. It may be distinguished from *C. Jenkinsonii* by the flat stems; while *C. Jenkinsonii* commonly has a triangular stem, and is also a hybrid variety common in most collections.

Echinocactus—So called from its supposed resemblance to the Sea Urchin. This division of the Cactus family contains some very suitable species for window cultivation. *Echinocactus eyriesii* is one of the hardiest and best of this class. A plant in the possession of a gentleman of this city never fails to flower during the season, and that with the hardest usage. He keeps it in the cellar with other Cacti during the winter months, and sets it out of doors in a shady place during summer, with perhaps a change to the house when it is perfecting its flower buds. It is not equal to *Cactus grandiflora*, or the Night-blooming Cereus, but it approaches it somewhat in character and time of flowering, which is the same. To one who has never seen *C. grandiflora*, it is a great treat. Its dwarf habit and hardiness cannot fail to make it a favorite window plant.

Echinocactus eyryesii.

There are quite a number of species under this head—most of them pretty and desirable. *E. concinna* is one of these. The somewhat celebrated Meloncactus belongs to this division. According to *Capt.* Basil Hall's *Travels over the Pampas*, the Meloncactus furnishes with its succulent pulp sufficient moisture to enable the wild horses and cattle to alllay their thirst. It is said, however, to be a dangerous operation for them, as numbers of them are often seen lamed in consequence of the strong spines becoming imbedded in their hoofs. This is supposed to be identical with the *M. visnaga* of the Mexicans—specimens of which have been known to weigh a ton. Several very large specimens have been sent to England from the West Indies, but never with any success.

E. concinna.

Any of the above species can be propagated by taking off cuttings a few inches in length, and laying them by for a few weeks, or till they are pretty well withered, and then planting them in pots of well drained soil, of the proportions previously described for *C. flagelliformis*.

MESEMBRYANTHEMUM.

From the Greek *Mesembria*, or Mid-day, and the Latin *Anthemum*—Flowering; commonly called Fig Marigold by residents of the Cape of Good Hope, where most of the species are found. They are a very interesting family of plants, but have not, till late years, received half the care and attention they are entitled to. They are becoming very favorite plants for window decoration in England and some parts of the Continent. The florists who supply the London markets, grow a number of the species — mostly the showiest dwarf kinds — which meet with ready sale. Many of them are hardy there; most of them live through the winter with slight protection, providing they are kept dry, and none of them require a higher temperature than the shelf of a green-house. They resemble the Portulacca very much in their habit of flowering — opening in the morning and closing in the evening. A few are annuals, and are produced by seed; but by far the most part are perennials, or Everlasting plants, and propagated by cuttings, which root easily by taking them off and laying them by for a few weeks till they begin to wither, when they should be planted in well drained small pots; the same kind of soil as for Cacti will suit them very well. When they commence to grow in the spring, they should have a moderate allowance of water at the roots, and be syringed occasionally, or set out of doors in a rain storm, to free them from dust. After they have flowered in the house, they should be set out of doors with a north aspect if possible — as that will secure them a more even temperature — and be set on coal-ashes or a plank to keep worms from getting into the pots. When housed for the winter — which should be on the slightest sign of frost — water should be withheld by degrees till on their removal to a shelf in the lightest and coolest part of the cellar. It can be withheld altogether if the temperature ranges from 35° to 40°; if it should be higher than that, they should be examined occasionally, and if any are showing signs of wilting, they should have water given them.

M. aureum.

M. aureum, or Golden, is a favorite on account of its hardiness and freedom of flowering. It grows about a foot in height, and flowers, under favorable circumstances, from March till October; and would be a very suitable species to plant on rock-work during the summer months. It would, however, require to be taken up in the fall and protected through the winter. It is a native of the Cape of Good Hope.

M. crystallinum, or the Ice Plant, is too well known to require anything but a passing notice. It is an annual or yearly plant, and requires to be raised from seed. It is much used as a garnish for dishes, and is grown for that purpose. The flowers are small and uninteresting. This species is a native of Greece.

M. crystallinum.

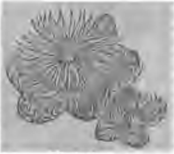
M. nodiflorum.—This species possesses no charms of flowering to arrest the attention; but, according to some writers, we are indebted to it for the discovery of glass. It is a native of Egypt, and the story is, that some travelers, after kindling a fire on the sands of the desert where this plant abounds, noticed some crystals, which the action of the fire on the plant and the sand had produced, and which led to the discovery of glass. This plant is burnt at the present time in Egypt for potash, which it is said to produce of the best quality. It is an annual plant, and grows about a foot in height, and has a white flower.


M nodiflorum.

M. edule—vulgarly Hottentots' Fig—grows about six inches in height, and has pink flowers. It is the fruit, or fleshy receptacle of the seed, that is eaten by the Boers, or Dutch settlers, and Hottentots—hence its name of Hottentots' Fig. It flowers in July and August, and is propagated by cuttings. It is trailing in its habit, and would be suitable for hanging baskets, or a niche in the green-house.


M. edule.

M. tigrinum—so called from the singular toothed edges of the leaves—which might well be compared to a tiger's mouth. The flowers of this species are not very showy; its principal attraction being its curiously formed leaves. It blooms from September to November, and is increased by cuttings, which should have a couple of the lower leaves taken off, and the cuttings secured by pegs when placed in the pots; otherwise they are in danger of falling out, or being displaced in moving them before they are established. This species grows about four inches in height, and might easily be taken for an Aloe when not in flower. It is a native of the Cape of Good Hope.


M. tigrinum.


M barbatum.

M. barbatum.—This is one of the most showy of the species, and may be regarded as one of the best of the type. It will bear considerable cold without injury, if perfectly dry. The common way of keeping them thogh the winter, in England, is in brick pits, with or without fire-heat, and protected from severe frosts; they are also planted out in prepared beds, and protected by dry leaves, mats, etc., when they flower finely. This species blooms from June to August, and has pink-colored flowers. It is of a trailing habit, and about nine inches in height.

SEDUM.

From the word *sedere*—to sit; commonly Stone-crop. Most of these plants are natives of Europe, and delight in exposed, rocky situations, old walls, ruins, etc. Many people plant them on the roofs of out-buildings, sheds, and such places, putting a little earth around them at first. In the moist climate of England, they, with the Sempervivums, form quite an interesting class, treated in that way or grown on rockwork—for which they are well fitted.

Sedum acre, or biting, is perhaps one of the best of them. It is creeping in its habit, and throws down little rootlets as it spreads; these will take hold of the tiles of the roof, or anywhere it may be situated, provided only they are moist. A north aspect would be much the best for any of this class of plants in the United States. It has a yellow flower, and makes a pretty appearance, as it blooms in a mass. June is the time of flowering. It is readily increased by divisions or little pieces of the plant. Many people have them in boxes of poor soil in the windows, in place of Mignonette. They are very hardy, and will stand considerable drouth.

S. Anacampseros is a native of France. Not so dense in its habit as the last.

S. sempervivoides, or Sempervivum-like, very much resembles the Sempervivum. It is only by examining the two species closely that they can be distinguished. It is a native of Iberia, and flowers from July to August. The flowers are of a red color.

Sedum sempervivoides.

S. Sieboldii.—A very handsome species, bearing rose-colored flowers. It is very hardy, and a profuse bloomer—one of the most desirable of all.

S. Ewersii—So called from a collector of the name of Ewer, who introduced it from Siberia in the year 1828. This species dies down at the approach of winter, and comes up again in the spring. It is pretty for flowering in pots in the green-house in fall, placed on a shelf or somewhere where it will show off its pendulous habit to advantage. This is a rose-colored variety, and blooms from August to October.

There are quite a number of other very beautiful species of this class grown by nurserymen and florists, that are well worth a place in any garden, for covering unsightly walls, rockwork, etc.

SEMPERVIVUM.

Commonly Houseleek, or Live-for-ever.

Sempervivum tectorum is a native of Great Britain, and is common on the roofs of houses. Loudon says it is used as a preservative of the roofs of houses in Scotland. This species is much used for burns, cuts or ulcers, among the country people. It seems to thrive best on old, decaying thatch; hence the supposition that it preserved the roof—which it will by running all over it and rooting in it, making it appear like a green bank, while the roots keep it from falling to pieces by running through every part.

S. arboreum, or Tree Sempervivum, is a native of Syria. It attains a height of from six to eight feet. It has the habit of some of the others—namely, throwing down roots from the branches, which spread and would soon form a thicket by itself. In green-houses it rarely attains a height of more than two or three feet. It is pretty as a green-house or window plant on account of its compact, bushy habit and cheerful appearance. Cuttings take root readily after being laid aside to wither a couple of weeks. The same soil suits these as Cacti, though they are not choice at all, provided they are well drained.

Sedum arboreum.

ALOE.

This family comprises a large number of species, many of them small and of the most curious appearance; well suited for pot culture, and generally free bloomers. Some of the species—as *Vulgaris*, *Purpurascens*, and *Arborescens*—are not generally considered distinct species. These, according to LOUDON, furnish the coarse Hepatic or Horse Aloes, and are cultivated in the West Indies for that purpose. The process of making the drug in the West Indies is somewhat as follows: The month of March is the period for cutting the Aloes in the island of Barbadoes. The leaves are cut off close to the stem, and disposed in tubs in such a manner that the juice runs out. After a sufficient quantity of it is collected, it is exposed to heat in copper boilers; and as it thickens by a constant and regular fire, it is ladled from one boiler to another, and fresh juice added until that in the last—which is called *teache*—acquires the consistency of honey, when it is poured into calabashes, and hardens by age. It is brought home in the calabashes, or large gourd shells, that contain from sixty to seventy pounds each. (*Thomson's Materia Medica.*) These, or this species has more the appearance of a tree than otherwise, as it attains a height of twelve feet.

Aloe purpurascens.

Aloe Soccotrina furnishes the true medicinal Aloes, though, according to some writers, a great deal of the Aloes sold as coming from the island of Socotora, is manufactured at the Cape of Good Hope, from *Aloe spicata*, an entirely different species. Like the rhubarb of commerce, the Aloes require to be grown on the poorest soil. The manner of making the drug does not differ much in both places. *A. Soccotrina* has red flowers from February to April, and grows twelve feet high.

A. spicata is a native of the Cape, and does not grow more than four feet in height. It carries its flowers in spikes of a red color from January to September. The season of making the drug at the Cape is July. They are also used both at the Cape and the West Indies for hedges, and the refuse fibrous material that is left after maceration, is used to weave into coarse cloth.

A. retusa, or Cushion Aloe, is a dwarf-growing, pretty species. The flowers are not, however, very showy, as is the case with most of them, particularly the dwarf kinds — being for the most part green, sometimes tinged with white, and occasionally with red. They are all of them tender, and require careful protection from frosts.

ON THE CULTIVATION AND PRESERVATION

OF A FEW OF THE

IMMORTELLES, OR EVERLASTING FLOWERS.

WRITTEN FOR THE RURAL ANNUAL BY F. A. BALLER.

Nothing looks more beautiful in mid-winter — formed into wreaths or boquets, with evergreens and some of the quaking grasses — than the Everlastings. Below will be found a description of a few of the best known and most commonly cultivated, with a few remarks on the sowing of the seed, management of plants, and the care of the flowers.

GNAPHALIUMS.

The foremost in this class are the *Gnaphaliums*, of which the common Everlasting is a species. Most of them are natives of the Cape of Good Hope, and attain to the height of under-shrubs. The common species, or *G. arenariam*, is a native of Europe, and is a perennial or everlasting plant .It thrives best on a poor, sandy soil, or on rock-work. Some people dye the flowers of this species a variety of colors — the French excel in it; but dyed flowers are unnatural, and can not be tolerated by good taste.

Another species — *G. purpureum* — is a native of the United States, and can be found on almost any dry soil. It is a biennial, or two-yearly plant, and flowers from June to September. The flowers grow erect from the top of the plant and the axles ot the leaves.

ELICHRYSUM.

So named by the ancients from the brilliant color of the flowers. They are nearly allied to the last, and many of them natives of the Cape. *E. bracteatum*, the annual species, is a native of New Holland. Seedsmen advertise a number of species, of which *E. bracteatum* (yellow), *E. macrantheum* (pink), and *E. alba* (white), will give all the colors. They are of vigorous growth, and will succeed well in any light, rich garden soil.

RODANTHE MANGLESII

Is the name of another beautiful annual Everlasting. It is also a native of Australia, and was introduced into England some years ago by Capt. MANGLES, from the Swan River Settlement. It is used rather extensively in some parts of England as a bedding plant, and is a general favorite. It is, however, rather tender in its habit, and will require more attention in the earlier stages of growth than some of the others. It is a beautiful rose color, and has a fine effect in beds or masses in bright weather.

ACROLINIUM ROSEUM

Is another fine annual, resembling the last somewhat in habit and form of flower and color, but differs from it in size, being larger than *Rhodanthe Manglesii.* It is also a native of Australia.

GOMPHRENA GLOBOSA,

Commonly called Globe Amaranthus. It is an erect growing, pretty annual. There are several varieties — as the purple, white, orange, etc. The purple variety is the best, though for a collection they are all pleasing. They should not be transplanted till the weather has become settled — say the middle or last of May. Any light, rich soil suits them, and if possible an open, sunny situation.

AMARANTHUS HYPOCHONDRIACUS,

Popularly Prince's Feather, is a well known, showy annual of this class. It is a plant of strong, vigorous growth; more suitable, however, for the shrubbery than the flower-garden. It should be sown three or four feet from the edge of the border or walk, and in masses. They give a pretty effect in autumn, and if cut and dried at the proper season retain their colors for a long time.

BRIZA MAXIMA

Is the name given to a beautiful species of quaking grass. Two species — Minor and Media — are natives of England; two species of Spain and Southern Europe. It is quite indispensable in a collection of dried flowers on account of its graceful, pendulous habit, and the lightness it imparts to the whole. If sown in the open border, care should be taken to mark the exact spot, as they can not be distinguished from common grass till in flower.

DIRECTIONS FOR SOWING SEEDS AND TRANSPLANTING.

The *Gnaphalium*, or common Everlasting, being a perennial plant and not raised from seed, plants will have to be procured from the nurseryman. Early in the fall will be a good time to plant, and if protected with a little litter thrown on them the first winter, they will flower all the better for it the ensuing season.

The *Elichrysums*, being annuals, should be sown on a gentle hot-bed in April; or, where that is not convenient, in pots or boxes in the house, which, after being watered, should be kept covered with bell glasses. Where bell glasses are not at hand, panes of glass, set up around the edge of a square box and covered with another pane, will answer this purpose till the plants begin to show themselves, to keep the germ of the seed from injury by the soil getting too dry — which would most likely be the case if the pots or boxes were left uncovered. Where neither of the above plans are available, seed can be sown in the open ground, and covered with caps made of strong white oiled paper. They can be easily made with willows, and the paper sewed or pasted on them. They will answer a variety of purposes; they have been used with success in England for raising cucumbers and other vegetables.

Rodanthe Manglesii, *Acrolinium roseum*, and *Gomphrena globosa*, should, if possible, be raised in a hot-bed, as they are of a more tender habit than the others. Care should be taken to shade in very bright sunshine, giving a little air at the same time; gradually increase the air and exposure to the sun as the plants gain strength, till the lights can be taken off altogether. Advantage should now be taken of a dull, showery day, to transplant, or if that does not offer, they should be set out in the evening. If the soil in the bed should be dry, water the plants before lifting, as you will be enabled to move them with a little soil, which will be an advantage. If the weather is likely to continue dry and warm, take some rhubarb leaves or pieces of paper and lay over them, which will check evaporation till the plants have made fresh roots, when they can be exposed with safety.

The Prince's Feather will come well from seed sown in the open border in April.

The *Brizas* should be sown in pots, and plunged in the hot-bed till of a size to be planted in the border by turning them out of the pots.

With regard to preserving the flowers, they should be neatly cut from the plants when at maturity, in the middle of the day, or when quite dry and fully expanded, and laid only in a dry, airy room, out of the reach of changes from moisture to dryness — as that, more than anything else, is apt to affect the colors as well as the permanency of the flowers.

TREES should be trimmed when young, in such a manner that there will be no necessity for cutting off *large* limbs. If this were done our fruit trees would attain a good old age, instead of being cut down when they should be in the prime of life, and in full bearing.

ORNAMENTAL FOUNTAINS.*

BY J. VICK.

"And in the midst of all a fountaine stood,
Of richest substance that on earth might bee;
So pure and shining, that the silver flood
Through every channel running one might see."—SPENSER.

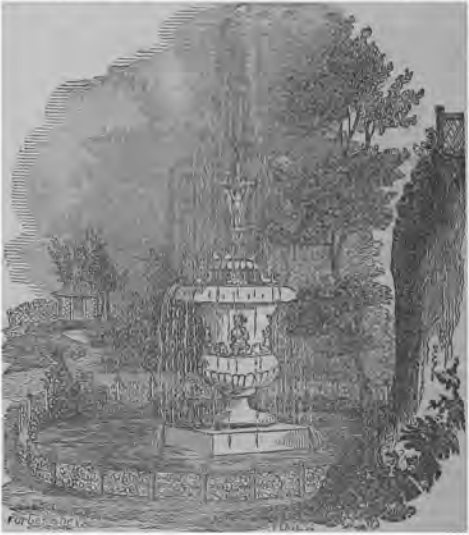
FROM the time when a "river went out of Eden to water the garden"—that earliest and best of gardens, in which grew "every tree that was pleasant to the sight and good for food"—running water has constituted an important feature in ornamental gardening. Although the skill of man has been exerted to its utmost in devising means to adorn and beautify the garden and park, that skill and exertion has produced nothing that imparts such life, such a sense of sympathy and companionship, as the sight and sound of moving waters. In the trees we hear the voice of nature loud and deep—the shouting of the tempest in their lofty tops—and feel its sublimity: or its shrill solemn voice in the firs, depressing us with a feeling of loneliness. But in the moving and rippling of waters there is a spirituality—an angel's voice—that soothes the feelings of the beholder, and gives life and pleasure to all within the sphere of its attraction. Take from the above garden view the FOUNTAIN, and how tame and lifeless it will appear—the matter without the mind, the body without the soul. Running water, in the form of cascades or jets, not only gives animation to the scenery, but in warm climates is almost indispensable, as well from the refreshing sense which the sight of running water always affords, as from the actual coolness it diffuses around.

Artificial jets and fountains are of great antiquity, and were highly esteemed by the ancients, who showed the greatest skill in their design and decoration. Sometimes the pipes terminated in statues of men, women, animals, birds, fishes and gods, and from them the fluid spouted high in the air. Various automata were often put in motion by mechanism concealed in the base or pedestal. The water issuing from these fountains was perfumed on particular occasions. This fact is alluded to by LUCAN in the following passage:

* This article originally appeared in the *Genesee Farmer* for 1849. It is worth reproducing at this time.

"As when mighty Rome's spectators meet
In the full theater's capacious seat;
At once, by secret pipes and channels fed,
Rich tinctures gush from every antique head;
At once ten thousand saffron currents flow,
And rain their odors on the crowd below."

For the last century, the taste for water-works has been on the decline. The manufacture of fountains of cast iron, recently commenced, and the low price at which they are now furnished of the most beautiful patterns, is favorable to their general introduction to public favor.



The above beautiful specimen costs $35, and the one on the next page $15. We would advise none to be frightened, however, even at this expense, as we will tell them in the proper place how to make a fountain so beautiful as to be worthy the notice of all, and yet so cheap as to be within the means of the poorest.

We know of no part of ornamental gardening so sadly neglected in this land; and while such an increasing interest is manifested by our countrymen for improving or embellishing their homes, we hope the FOUNTAIN — so simple, so beautiful, so grateful to almost every sense — will not be forgotten. Every village favorably situated for water should have its public fountain. We know of many in this section of country where fountains could be kept constantly playing, without expense or trouble, when once constructed.

Many are deterred from constructing fountains from erroneous ideas in regard to expense, a notion that a great quantity of water is needed, and ignorance of the proper mode of construction. It shall be my object to present the readers of the *Farmer* a little light on this subject. To those who have a natural head of water, the directions will be applicable with the exception of the water-butt, or cistern, they will also be saved the trouble of raising water.

Place a barrel near your well, or at some place convenient for filling, and at a considerable elevation. It should be out of sight—as behind a wall (as seen in the following figure), or over an arbor, or summer-house, hid by vines and creepers—and having a lead pipe from the bottom leading to the place designed for the fountain. In the above diagram, A is section of wall; B, butt; C, lead pipe under ground. Place the pipe low enough to be out of the way of frost, and as straight as possible, as all elbows and bendings diminish the force of the water. The height of a jet does not depend upon the quantity of water, but upon the height of the head or barrel. By having the jet close to the

surface of the ground, the stream of water is lengthened; for if there was a design of two feet, or any other height, it would be so much taken from the height of water. The rise can be added to by sinking the ground into a hollow around the fountain. The pipe at the fountain end must be contracted to one-fourth its size, and a tube of a few inches in length attached, and the water will rise nearly as high as the head. The barrel can be fill by a force-pump, or in any way preferred. In preparing the basin for a fountain, first choose a location either in the garden, or in the lawn or yard in front of your house; drive a stake for the center, and with a line and stick sweep a circle the size you wish the basin; take out the ground from the center outward, forming a basin ten or twelve inches deep. The earth taken out should be removed, as a raised bank around a fountain does not improve it. By cutting the circle through the turf, you will have a handsome grass edge around the basin. The bottom and sides may be lined with water cement, which will be but a trifling expense. In using cement, mix one-third clear coarse sand with it, and put it on with a trowel, having first rammed the ground hard. Next get clean white pebbles to cover the inside of the basin, and surround the pipe with stones, no matter how rough, in the shape of a cone, something like the pile of rocks forming the base in the second figure.

About twenty-five gallons of water a day is sufficient to supply such a fountain; and as it can be stopped at any time by simply turning a cock, which must be placed in the pipe, it need not play in cool or stormy weather, and only at such time as may suit the convenience or taste of the owner. In this way, a very small amount of water will answer.

In regard to the COST — to the man who has a little time on his hands, and a little wit in his head, the cost of the pipe will be the principal expense. Lead pipe one inch in diameter, which is the proper size for a small fountain, can be purchased for less than a shilling a foot; so if the water has to be conducted forty feet, the cost will be but $5. If the beautiful little design on page 45 is added, the expense will be increased $15 — the price charged for the fountain.

GRAFTING OLD APPLE TREES.—"In the spring of 1846, a Mr. W. was engaged in grafting apple trees in various parts of Rockingham county, N. H., and with the rest, grafted enough to amount to about twelve dollars for Mr. R., of Brentwood, upon an old orchard of natural fruit, consisting of about one hundred trees. Mr. R. thought it rather extravagant to expend so much in an experiment so hopeless, and W. finally proposed that he would go on in subsequent years, and graft as many of the old trees as he chose, do the necessary pruning, and receive for his pay one-half the fruit that should grow on his grafts during the next twelve years, and R. should cultivate the land among them, for his own profit. This was considered a very liberal proposition, and at once accepted, and the contract was reduced to writing, and executed. I happened to be at Brentwood during the autumn of 1850, just after W. had called for his share of the fruit, and learned that the scions set in 1846, for setting which he had charged twelve dollars, produced *sixteen barrels* of marketable *Baldwin* apples, worth twenty-four dollars. Mr. R. had become so far convinced of his mistake, that he offered W. *one hundred dollars* to release his interest in the orchard, which W. promptly declined. I met W. soon afterward, and conversed with him on the subject, and he said that so far from releasing his interest in the contract, for that sum, he would not sell his share of the fruit *for one year*, for that amount, and allow the purchaser to choose it out of the term."—H. F. FRENCH, *in Horticulturist.*

A CHEAP FENCE.—One way to "save the fragments" of a nearly used-up rail-fence, is to take the crooked, broken, and partially rotten rails and cut them into half-lengths, and then make every other length

of the short rails. A rider, with stakes crossing the center of every long length, would add materially to its strength and permanence. Such a fence will last several years, and answer in the room of a better one — a consideration worth while in these days of scarcity in fencing materials.

ORNAMENTAL HEDGES.

WRITTEN FOR THE RURAL ANNUAL BY W. S. L., ROCHESTER, N. Y.

ONE of the most striking features of any country is its fences; so much so, that the various styles of these division lines seem to have almost as much influence in determining its character and general appearance, as the nose on a man's face has in giving expression to his physiognomy. Very many — in fact, the great majority of fences — are excessively ugly. Even those primitive ones in new countries, formed by turning up edgewise the spreading roots of great trees, have the merit of being picturesque — which some have not.

In England, the face of the country is made to wear an aspect of smiling cheerfulness by reason of its numerous hedges; while, in the opposite extreme, in France, where no obvious lines mark the divisions of property, the effect must be quite monotonous. Our own institution — the *rail-fence* — may perhaps give a type of the independence of time and circumstance peculiar to the great American people, but it is not particularly ornamental.

There is no one who can not appreciate and will not acknowledge the great beauty of well-kept hedges. So popular is the idea, that experiments have been made with almost every variety of hardy plants, with a view to test their efficiency in forming suitable hedges. Failure has followed very many of these attempts, and partial success rewarded others. Some few hold their own under all circumstances, as well adapted to make, with proper management, strong and efficient fences. Of these we will not now speak, but leave Buckthorn and Hawthorn, Honey Locust and Osage Orange, each to assert its own claims to superiority as best it can.

But there are many situations where *screens* and *ornamental* fences only are required — not protection against depredators. Many such circumstances will suggest themselves to every one. As a means of shielding certain spots from cold winds, belts of trees or shrubbery are, oftentimes, very efficient, as well as ornamental; and for inside division lines, screens of hardy evergreens can not be too highly recommended — being at the same time very beautiful, rapid in their growth, simple and easy in their construction, and managed without difficulty. To hide disagreeable and unsightly objects; to inclose portions of the garden devoted to half-hardy plants; to separate the kitchen garden from the more ornamental portions of the grounds; and for an indefinite variety of circumstances, each peculiar to its own locality, these evergreen screens are very happily adapted. They are becoming very popular wherever known.

Of all the evergreens employed for this purpose, the *American Arbor Vitæ* (*Thuya*, or, according to some botanists, *Biota*, *occidentalis*,) seems best adapted to succeed, for several reasons. It is easily and cheaply obtained, perfectly hardy, and adapted to a great variety of soils and climates. It is native over a large portion of the American continent, and is found in almost every kind of soil and situation. Its form and normal mode of growth is *pyramidal*—just the *proper* form which we wish to encourage in forming a hedge. The natural tendency of the *Thorn* and *Osage Orange* is to grow into a spreading tree, large at the top and thin at the bottom—just the opposite of what we seek, when striving to distort them into hedges. It is a continual battle, as it were, between man and nature, for the supremacy; and just in proportion as man is enabled to conquer, we say the plant is adapted to hedging; while if the plant is stubborn and dies or droops under the treatment, we say it will not do for hedging—it is a humbug. Sometimes, as in the case of the Osage Orange, it seems to laugh at the efforts of man; and, while he sleeps, shoots up sturdily and fractiously, half a dozen times in a summer, into its old tree form, utterly regardless of what is going to become of the hedge beneath it.

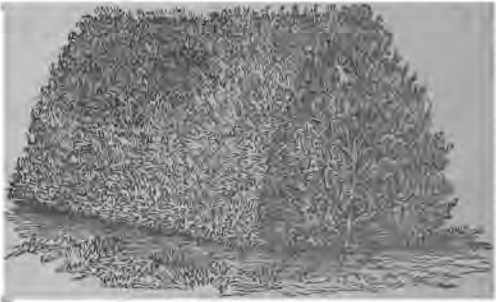
Many of the new and foreign sorts of the Arbor Vitæ are very beautiful, but none of them have been sufficiently tested to warrant a recommendation of them for the purpose of which we are speaking. The *Siberian* is more compact in its growth than the *American*, and keeps its color well in winter; but it is also slower in growing, and moreover is scarce and high in price. The *Golden Arbor Vitæ*, although of a beautiful color, is, unfortunately, not quite hardy.

The engraving on the following page is an accurate drawing of a section of a screen, six years from setting, in the grounds of H. E. Hooker & Co., of this city, now about four and a half feet high, perfectly smooth and dense, and an object of admiration to every one. On the same grounds is another hedge about three feet high, set out three years ago last spring, in length about 800 feet, in which only three plants were lost of the entire planting, and even *these* have never been replaced.

To give an idea of the method of forming and cultivating such a hedge is the object of this article. Attention to a few simple particulars will in a short time yield abundant satisfaction, and allow very few chances of failure.

In preparing to plant, have the ground deep and dry and mellow—not too much enriched with manure. Calculate for a border on either side of, say, four feet, which is to be *kept clean permanently;* and if the soil is mellow and rich, this forms a beautiful situation for the cultivation of low flowering plants, which appear to very pretty advantage in contrast with the deep green background of the Arbor Vitæ. Dwarf-growing roses — especially of shades of red — are very beautiful in such a contrast. Many other flowering plants will suggest themselves to every one.

After preparing the ground — which is always the first thing to be attended to in projecting a plantation of any kind — a very important point is choosing the proper kind of plants. If taken from the woods and planted without further education into the hedge row, probably not more than every other one would live, and of these one-half more would so far fall behind the rest in health and vigor as to make the entire planting a failure. If, then, you are to rely upon the woods and fields for a stock of plants, choose those as uniform in size as



American Arbor Vitæ Hedge.

possible, not more than one foot in height, and well furnished with branches. Set them out in rows in well prepared ground, so that they may be cultivated and kept clean. In two years, the majority of them will have become handsome, stocky plants; and when taken up, will be found to have a mass of fine fibrous roots, rendering them sure to live and well adapted to thrive in their future resting places.

However, these two years of time and labor may be saved; for plants like those described may generally be obtained at the nurseries very cheaply. And as a row of such plants becomes an object of beauty from the very commencement, we may consider that it is money well expended. In short, nothing, in all the operations of horticulture, yields so sure and quick returns as this.

Evergreens should always be set in the spring. When the plants are received and unpacked, carefully separate and spread open the roots; cut off all broken portions, lay them in the ground until ready to plant out, and by all means *avoid contact with wind and sun.* Puddle the roots in a mixture of water and clay, with a little decayed manure:

then plant immediately by a line, taking care not to crowd the roots, but spread them out evenly; cover them with fine earth, and press the ground firmly about the plant. It is well to mulch the ground with coarse manure, but it is not necessary — always supposing the border to be kept well cultivated.

The proper distance for planting is about one foot apart. Nothing is gained by having more than a single row of plants.

The after culture is exceedingly simple and easily remembered. During the first year the plants need nothing but to be kept clean — occasionally, perhaps, cutting off a straggling shoot. The second spring from setting, stretch a line firmly and evenly across the top of the plants, and cut off all shoots appearing above the line. Stretch the line again on either side, at the base of the plants, and trim up to it. Thus we have the bottom or base, and the apex of the hedge fixed, and if these are true, the rest becomes easy. Shear all off evenly between these points, and we have the form of a triangular prism, which, in the opinion of the writer, is the best, both as regards beauty and well being of the hedge. Practically, it should not be sheared quite to a point on top, but nearly so. The shape of the one represented in the drawing is varied a little from that described by being rounded a little; but in practice it is difficult to make this perfectly true, which mars the beauty of the whole. However, every one may consult his own taste; and skill in manipulating the shears is only gained by experience. After the third year, the hedge needs only to be trimmed evenly at midsummer, and it will soon become dense and smooth.

Wall Roses.—The secret of growing roses against a wall might be packed in a lady's thimble. A two feet deep border of strong loam, four or five feet wide, to be as rich as rotten dung can make it; the border to be thoroughly soaked with soft pond-water twice a week in dry weather, and when the roses are in bloom, to keep them thin in the branches, as if they were peach trees, and to play the water-engine on them as for a house on fire, from the first appearance of insects till no more come. There is a reason for everything under the sun; and the reason for insects attacking roses in general, and those on walls particularly, is from too much dryness at the roots, causing the juices to be more palatable through the action of the leaves.

To prevent Rabbits from Barking Trees.—Put two pounds of lime in about three gallons of water, and stir it till dissolved.—Then add several handfuls of soot, and apply the mixture to the trunks of the trees a little higher than the rabbits can reach. The mixture should be applied before winter sets in; but if it has been neglected till frosty weather, let it be done during a bright day, while the sun shines.

Another.—Take three pieces of board two feet long, one, two or three inches wide, the other two six or seven inches wide; set them on the ground in the form of a triangle, and put one shingle nail in top and bottom.

SULPHUR FOR MILDEW ON THE GRAPE.

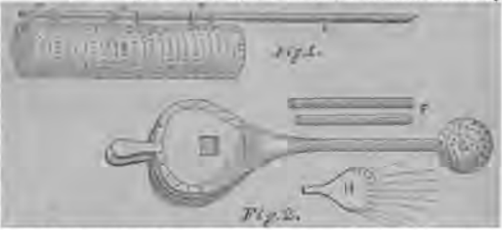
POWDERED sulphur dusted on the affected parts, has, for many years, been known as a remedy for mildew on the peach. It is only since 1846 that the grape mildew has attracted much attention; but since then, its ravages, some years, have been so extensive in the wine districts of Europe as to create much alarm; but it is now demonstrated that the judicious application of sulphur is a certain remedy—and the only one.

The object to be aimed at in applying the sulphur, is merely to bring it in contact with the mildew. This can be done by simply throwing the sulphur on the vines and bunches. Quite a number of machines, called sulphurators, have been invented in England for this purpose, resembling, somewhat, a miniature fanning-mill—the sulphur being scattered on the plants by the force of the wind. They are used extensively in the English hop-yards—sulphur being found equally effectual as a remedy for the hop mildew. We annex a cut of one of the best.

A Canadian correspondent of the *Horticulturist* describes some sulphurators he has used as follows:

"Apparatus Fig. 1 (on the following page,) is a tin pipe, twelve inches long, three inches in diameter, with a button in one end, and a lid C, with a wide band, shutting well on the other, where the sulphur and ball are put in. The ball B is made of twine, and should be a little smaller than the pipe, and well stitched, to prevent its coming loose. D D D are three thimbles, well soldered on, to receive the bamboo handle E, which can be from two to twelve feet, to meet the wants of the proprietor; but should not be less than two feet, in order to keep the sulphur from the operator's clothes. The holes for the escape of the sulphur must be small: a common darning-needle will pierce them quite large enough, and they should be about half an inch apart, all over the apparatus. The ball in the apparatus acts as pulverizer of sulphur, accumulator of wind, and expeller of both.

"Fig. 2, *Hand Bellows*.—F, pipes or joints made of tin, to fit nicely on the nose of the bellows, and by adding joints, any length desirable may be obtained. G, a tin globe, with a short socket to fit nicely on a joint, and through which the globe receives the sulphur for operation. The holes here must be very small, and half an inch apart all over the globe. For the grape-house, where the vines are trained singly up the rafters, a rose similar to that of a common watering-pot will be preferable, with small holes in the end, H. This will enable the operator to shoot close, and hit his mark without difficulty. If the sulphur adheres to the tin, and clogs the holes, slip in a marble, and shake occasionally.



"When much work is to be done with dispatch, No. 1 is preferable, as it is simple and not liable to get out of order; and when the bamboo-handle is playing briskly through the left hand, and the ball going on to the tune of Fisher's hornpipe, the sulphur will be doing its duty, depend on it, flying like drifting snow before a hurricane."

Sulphur volatizes rapidly at 180°, and the fumes destroy the mildew. In green-houses, therefore, a good method is to scatter sulphur on the hot water pipes, or whitewash them with a mixture of four ounces of sulphur (black sulphur is considered the best) and four ounces of quick lime, dissolved in three gallons of water, closing the house afterward from thirty minutes to an hour, according to the virulence of the disease. If sulphur is ignited, sulphurous acid gas is formed, which *destroys the leaves*, as well as the mildew. It will not do, therefore, to burn the sulphur.

Sulphur is insoluble in water. But if one pound of flowers of sulphur, and an equal measure of quick lime, are boiled for ten minutes in a glazed earthern pot, with five pints of water, hyposulphite of lime is formed, which is very soluble. It should be constantly stirred while boiling. It is then allowed to settle, and the clear liquid is, when cool, ready for use, after being mixed with one hundred parts of water. The vines are syringed with this water. This is effectual, economical, and easily applied on a large scale.

The hyposulphite of lime may easily be obtained by leaching the refuse lime of the gas-works. The hyposulphite is very soluble, and the less water used for the purpose the better, in order to avoid dissolving other substances. It should afterward be largely diluted with water, and applied with the syringe, as before recommended.

Sulphur, either dusted on the bunches and foliage, or applied in solution, as a hyposulphite of lime, with a syringe, is a certain remedy *when used early enough*. The reason it has failed in some instances is owing to the lateness of the application. The mildew, or fungus, has advanced too far before the sulphur was used. It should be applied the instant the mildew makes its appearance — and if earlier it will do no harm.

The mildew on the gooseberry is caused by a fungus closely allied to that which affects the grape; and it is quite probable that sulphur would check it, if applied in time.

WEIGHT OF GRAIN, VEGETABLES, ETC.—The following table, giving the legal weight of the different kinds of grain, etc., was prepared by a correspondent of the *Genesee Farmer* — the data being furnished by the Secretaries of the different States:

ARTICLES.	New York.	Ohio.	Pennsylvania.	Indiana.	Wisconsin.	Iowa.	Illinois.	Michigan.	Connecticut.	Massachusetts.	Rhode Island.	Kentucky.	New Jersey.	Vermont.	Missouri.	Canada.
Wheat, lb.,	60	60	60	60	60	60	60	60	56	60	..	60	60	60	60	60
Rye,	56	56	56	55	56	56	54	56	56	56	..	56	56	56	56	56
Corn,	58	56	56	56	56	56	56	56	56	56	..	56	56	56	52	56
Oats,	32	32	32	32	32	35	32	32	28	30	..	33	30	32	m	34
Barley,	48	48	47	48	48	48	44	48	..	46	..	48	48	46	m	48
Buckwheat,	48	..	48	5[illegible]	42	52	40	42	45	46	..	52	50	46	m	48
Clover seed,	60	64	..	60	60	6[illegible]	..	60	..	..	..	60	64	..	m	60
Timothy seed,	44	42	..	45	..	45	..	m	..	m	..	45	..	..	m	48
Flax seed,	55	56	..	56	..	56	..	m	..	m	..	56	55	..	m	56
Hemp seed,	44	..	..	44	..	44	..	..	..	..	..	..	..	..	..	..
Blue-grass seed,	14	..	..	14	..	14	..	..	..	..	..	..	..	..	..	..
Apples, dried	22	25	..	..	2[illegible]	24	..	28	..	..	..	..	..	..	..	22
Peaches, dried,	32	33	..	..	28	33	..	28	..	..	..	..	..	..	..	22
Coarse Salt,	56	50	85	50	..	50	..	..	..	70	..	50	..	..	50	56
Fine Salt,	56	50	62	50	..	50	..	..	..	70	..	50	..	..	50	56
Potatoes,	60	..	..	60	..	60	..	..	60	60	60	..	..	60	..	..
Peas,	60	..	..	..	..	..	..	..	..	60	..	..	..	..	..	60
Beans,	62	56	..	60	..	60	..	..	..	60	..	60	..	..	..	60
Castor Beans,	46	..	..	46	..	46	..	..	..	..	..	..	..	..	..	..
Onions,	57	..	..	57	..	57	..	..	..	50	50	..	..	..	..	..
Corn Meal,	..	..	..	50	..	..	..	..	..	..	50	..	..	..	..	..
Mineral Coal,	..	..	..	70	..	..	..	..	..	..	..	..	..	..	..	..

The United States bushel measure contains 2150.42 cubic inches. Cubic feet may be reduced to bushels by multiplying by 45 and dividing by 56. The English imperial bushel of 32 quarts contains 2178.192 cubic inches. In London, and many other parts of England, grain is sold by the *Quarter*, or eight bushels. The English market reports usually give the price per *Quarter* in shillings sterling. An English shilling is 24 cents. Now, if we multiply the price per quarter (in shillings) by 24, and divide by 8, we have the price per bushel in dollars and cents. Now, multiplying by 24 and dividing by 8 is the same as multiplying by 3. So, if we multiply the price per quarter, in shillings, by 3, we have the price per bushel in cents. Thus, if wheat is quoted at 60 shillings per quarter (60 × 3=180), it is \$1.80 per bushel.

Ice-House Management.—When we consider that damp and heat are the two great agents for thawing, it should be our endeavor to counteract these by every means in our power. To effect this, ventilation must be had recourse to, and non-conducting materials employed in the erection. Of materials, stone is the worst; timber and brick are the best. The usual practice of sinking ice-houses to a great depth under the surface is bad; indeed, it has only one redeeming property, which is the convenience of filling from the top. Its disadvantages are, the difficulty of admitting sufficient ventilation to correct the dampness, which, build them as we may, is sure to exist in underground houses; the conduction of heat from the surrounding soil, and the difficulty of effecting sufficient drainage: these very far overbalance the advantages thus offered. Why are the majority of ice-houses, and most cellars during winter, so much warmer than the surrounding atmosphere? Is it not from the heat conducted through their walls from the surrounding soil? Earth is a much better conductor of heat than air; or, in other words, it communicates its heat to other bodies coming in contact with it, much quicker than that element. Hence the necessity of placing between the earth and the ice some slower conductor of heat; and the slowest conductors we have applicable to the case, are timber or air; both also resist damp, while stone does not, and besides, it is a rapid conductor of heat. Water is also a rapid conductor of heat; and instances have been known where rain water has percolated through the roof of an ice-house, that the temperature within has been raised to 60°. Hence the necessity of keeping such houses perfectly dry, not only at the top, but also all throughout, by efficient drainage of the melted ice, and by ventilation to correct the dampness in the atmosphere and walls. Indeed, the walls of an ice-house, to be in a proper condition, should be as dry as those of a dwelling. Ventilation, if properly applied, will, in most cases, effect this; and should it not, the introduction of a few bushels of unslacked lime, occasionally placing it in boxes over the ice, will completely dry the walls without elevating the temperature much, if the ventilators be open at the time.

As air is a much slower conductor of heat than either earth or water, it might at first sight be inferred, were ice surrounded by it, that it would be the best of all for securing its keeping; and so it would, if kept in a state of quiescence — but this is impossible, owing to the difference of temperature which will exist in that portion of the air coming in immediate contact with the surface of the ice, whether on the top or around the side of the mass, which will be reduced to a much lower temperature — say nearly 32°— than that in contact with the walls of the house, if sunk under the surface, from its receiving heat by conduction through them, so that it is often found to be as high there as 46° or 47°; this difference of temperature causes circulation to take place — the lighter air ascending upward, seeking for escape, and becomes replaced with the colder and more weighty. If this circulation could be interrupted, the melting action on the ice would be greatly diminished.

No. 1.—A SMALL BRACKETED COTTAGE.

RURAL ARCHITECTURE.

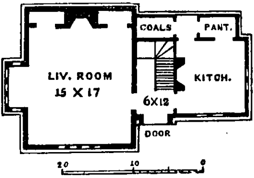
DESIGNS FOR COTTAGES, SUBURBAN RESIDENCES, FARM HOUSES, BARNS, Etc.

No. 1.—A SMALL BRACKETED COTTAGE.

THIS is a very pretty design, the cost of which will be from six to eight hundred dollars, according to the cost of material where it is built. There is a good deal more of feeling shown in this design than the one following. The features which express this are the bay window, the rustic trellises covered with vines, and the bracketed vine canopy over the end window in the principal apartment.

The little rustic arbors or covered seats on the outside of the bay window, may be supposed to answer, in some measure, in the place of a veranda; and convey, at the first glance, an impression of refinement and taste attained in that simple manner so appropriate to a small cottage.

The plan of the first floor of this cottage shows an entry, 6 by 12 feet, containing a flight of stairs to the chamber floor, under which are stairs to the cellar. On the left is the living room of the family, 15 by 17 feet. The deep chimney breast at the end of the room gives space for two large closets. The bay window measures 6 feet in the opening, and is 3 feet deep. On the right of the entry is the kitchen, a small room, 10 by 12 feet. As the living room of the family will, in a great measure, be also the kitchen, this small kitchen will in fact be used as a back kitchen for the rough work, washing, etc.; so that in summer—and, indeed, at any time—the living room can be made to have the comfortable aspect of a cottage parlor, by confining the rough work to the kitchen proper. Back of this kitchen is a small lean-to addition, containing a small pantry, 4



Ground Plan.

No. 2.—DESIGN FOR A SMALL COTTAGE.

by 6 feet, and a place for coals. There is a small passage between this closet or pantry and the coal-hole, and opposite the door opening from the kitchen into this passage is a door which serves as a back door to enter the kitchen without going in at the front entrance.

The chamber floor has two bed rooms, each 9 by 15 feet, and one bed room 10 by 12 feet.

This plan may be easily varied, so as to give a more agreeable and symmetrical effect, with little additional cost. To do this, lessen the depth of the chimney breast at the end of the room, and reject the two closets there. This would make the living room 2½ feet longer, or 15 by 19½ feet. Next place the bay window exactly in the center of the wall, which would add to the external symmetry. By turning the place for coals into a closet, with a door opening into the living room, and having a wood-house or coal-house detached, space would be gained, and the arrangement would be more pleasing, though perhaps not quite so convenient.

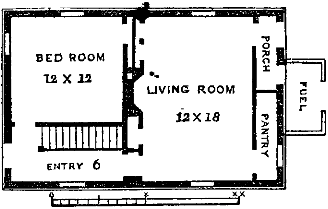
The construction of this cottage is the same as No. 2. Planed and matched, or rough boards, may be used for the vertical weather boarding; we should prefer to have them rough if the cottage is filled in and painted and sanded.

The front door is merely covered with a hood on brackets. Its beauty would be enhanced by making this canopy or hood bolder, and extending it five feet, making the sides of lattice-work, and covering the whole with vines.

No. 2.—A DESIGN FOR A SMALL COTTAGE.

This simple design shows how a very small cottage may be made to look well at a very trifling cost. In form it is a mere parallelogram; and while it is devoid of very strongly marked architectural character, it combines something of home-like, or domestic, expression.

This picturesque character is partly owing to the bold shadows thrown by the projecting roof, and partly to rafter brackets and window hoods.



Ground Plan.

Let any one imagine this little cottage, with its roof cut off close to the eaves—with the rafter brackets that support the projecting eaves omitted—with the windows and doors mere bare frames—and he has an example of how this same cottage would look as we commonly see it built; that is to say, without the picturesqueness of wood clearly expressed by using it boldly (not neatly

No. 3.—DESIGN FOR A FARM HOUSE.

and carefully), by a sense of something beyond mere utility, evinced in the pains taken to extend the roof more than is absolutely needful; and by raising the character of the windows and doors, by placing hoods over their tops.

The single apartment called the living-room, 12 by 18 feet, is the common apartment — the kitchen, sitting room and parlor of the family. Opening the front door of this cottage, we see an entry 6 feet wide, which contains the stairs to the second floor; underneath these stairs, another flight descends to the cellar. On the left of the entry is a small bed room 12 feet square, with a small closet attached, through which a communication may be had with the living room by constructing another door at the back. The living room is of a convenient size for daily use, and is lighted by a window on each side. The chimney being nearly in the center of the house, no heat will be lost in winter. Near one corner of the opposite side of this room is a door opening into a small pantry, which is lighted by a window, and at the opposite corner is another door opening into a narrow porch.

In order to protect the back door which opens into the main apartment, a small porch is made in order to keep off sudden draughts and cold blasts — a point most important in a northern climate, but too often neglected, to the serious discomfort of the inmates of small cottages. From this back porch another door will be seen opening into a small wood-house, so that fuel may be had without going into the open air.

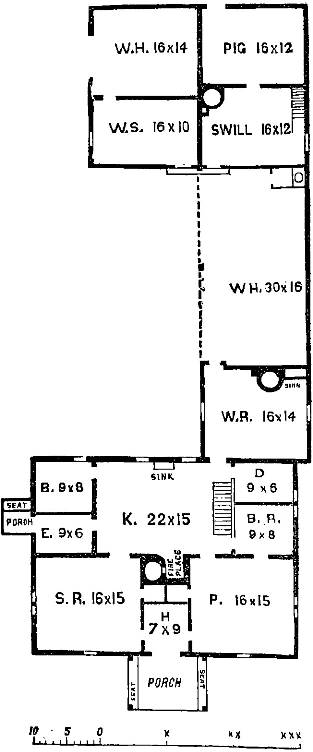
The second floor contains two good sleeping rooms and two large closets. There are no fire-places, but openings are left for stove-pipes in the flues, so that one or both rooms can be warmed.

There is a cellar under this cottage, and the outer cellar door should be provided just beneath the pantry window, if no more convenient position is found for it.

Cottages of this kind generally have the stairs placed in the living room, while the front door opens directly into one of the apartments. We think in this respect our plan has much greater comfort and convenience to recommend it.

No. 3.—DESIGN FOR A FARM HOUSE.

This house may be built either of stone, brick, or wood. The style is rather rustic than otherwise, and intended to be altogether plain, yet agreeable in outward appearance, and of quite convenient arrangement. The body of this house is 30 by 40 feet on the ground, and 12 feet high to the plates for the roof; the lower rooms 9 feet high; the roof intended for a pitch of 35° — but, by an error in the drawing, made less — thus affording very tolerable chamber room in the roof story. The L, or rear projection, containing the wash-room and wood-house, juts out 2 feet from the side of the house to which it is attached, with posts 7½ feet high above the floor of the main house; the pitch of the roof being the same. Beyond this is a building 32 by 24 feet, with 10 feet posts, partitioned off into a swill-room, piggery, work-shop, and wagon-house, and a like roof with the others.



Ground Plan.

A light, rustic porch, 12 by 8 feet, with lattice-work, is placed on the front of the house, and another at the side door, over which vines, by way of drapery, may run; thus combining that sheltered, comfortable, and home-like expression, so desirable in a rural dwelling. The chimney is carried out in three separate flues, sufficiently marked by the partitions above the roof. The windows are hooded or sheltered, to protect them from the weather, and fitted with simple sliding sashes with 7 by 9 or 8 by 10 panes. Outer blinds may be added, if required; but it is usually better to have them *inside*, as they are no ornament to the outside of the building, are liable to be driven back and forth by the wind, even if fastenings are used, and in any event are little better than a continual annoyance.

INTERIOR ARRANGEMENT. The front door, over which is a single sash light across, opens into a hall or entry 9 by 7 feet, from which a door opens on either side into a sitting room and parlor, each 16 by 15 feet, lighted by a double, plain window, at the ends, and a single two-sash window in front. Between the entrance door and stove, are in each room a small pantry or closet for dishes, or otherwise, as may be required. The chimney stands in the center of the house, with a separate flue for each front room, into which a thimble is inserted to receive stove-pipes by which they are warmed; and from the inner side of these rooms each has a door passing to the kitchen, or chief living room. This last apartment is 22 by 15 feet, with a broad fire-place containing a crane, hooks, and trammel, if required, and a spacious family oven — affording those homely and primitive comforts still so dear to many of us who are not ready to concede that all the virtues of the present day are combined in a "perfection" cooking stove, and a "patent" heater; although there is a chance for these last, if they should be adopted into the peaceful atmosphere of this kitchen.

On one side of the kitchen, in rear of the stairs, is a bedroom, 9 by 8 feet, with a window in one corner. Adjoining that, is a buttery, dairy room, or closet, 9 by 6 feet, also having a window. At the inner end of the stairway is the cellar passage; at the outer end is the chamber passage, landing above, in the highest part of the roof story. Opposite the chamber stairs is a door leading to the wash-room. Between the two windows, on the rear side of the kitchen, is a sink, with a waste-pipe passing out through the wall. At the further corner a door opens into a snug bed-room, 9 by 8 feet, lighted by a window in rear; and adjoining this is a side entry leading from the end door, 9 by 6 feet in area; thus making every room in the house accessible at once from the kitchen, and giving the greatest possible convenience in both living and house-work.

The roof story is partitioned into convenient-sized bedrooms; the ceiling running down the pitch of the roof to within two feet of the floor, unless they are cut short by inner partitions, as they are in the largest chamber, to give closets. The open area in the center, at the head of the stairs, is lighted by a small gable window inserted in the roof, at the rear, and serves as a lumber room; or, if necessary, a bed may occupy a part of it.

In rear of the main dwelling is a building 44 by 16 feet, occupied as a wash-room and wood-house. The wash-room floor is let down eight inches below the kitchen, and is 16 by 14 feet in area, lighted by a window on each side, with a chimney, in which is set a boiler, and fire-place, if desired, and a sink in the corner adjoining. This room is 7½ feet in height. A door passes from this wash-room into the wood-house, which is 30 by 16 feet, open in front, with a water-closet in the further corner.

The cellar is 7½ feet in height, and is the whole size of the house, laid with good stone wall, in lime mortar, with a flight of steps leading outside, in rear of the kitchen, and two or more sash-light windows at the ends. If not in a loose, gravelly, or sandy soil, the cellar should be kept dry by a drain leading out to the lower ground.

The building beyond, and adjoining the wood-house, contains a swill-house 16 by 12 feet, with a window in one end; a chimney and boiler in one corner, with storage for swill barrels, grain, meal, potatoes, etc., for feeding the pigs, which are in the adjoining pen of same

No. 4.—DESIGN FOR A COUNTRY RESIDENCE.

size, with feeding trough, place for sleeping, etc., and having a window in one end and a door in the rear, leading to a yard.

Adjoining these, in front, is a work-shop and tool-house, 16 by 10 feet, with a window at the end, and an entrance door near the wood-house. In this is a joiner's work-bench, a chest of working tools, such as saw, hammer, augers, etc., necessary for repairing implements, doing little rough jobs, or other wood work, etc., which every farmer ought to do for himself; and also storing his hoes, axes, shovels, hammers, and other small farm implements. In this room he will find abundant rainy-day employment in repairing his utensils of various kinds, making his bee-hives, hen-coops etc. Next to this is the wagon-house, 16 by 14 feet, with broad doors at the end, and harness pegs around the walls.

The posts of this building are 10 feet high; the rooms 8 feet high, and a low chamber overhead for storing lumber, grain, and other articles, as may be required. Altogether, these several apartments make a very complete and desirable accommodation to a man with the property and occupation for which it is intended.

On one side, and adjoining the house, should be the garden, the clothes-yard, and the bee-house, which last should always stand in full sight, and facing the most frequented room—say the kitchen—that they can be seen daily during the swarming season, as those performing household duties may keep them in view.

In Western New York, this house and attachments complete—the body of stone, the wood-house, wagon-house, etc., of wood—may be built and well finished in a plain way for $1,500. If built altogether of wood, with grooved and matched vertical boarding, and battens, the whole may be finished and painted for $800 to $1,200. For the lowest sum, the lumber and work would be of a rough kind, with a cheap wash to color it; but the latter amount would give good work, and a lasting coat of mineral paint both outside and within.

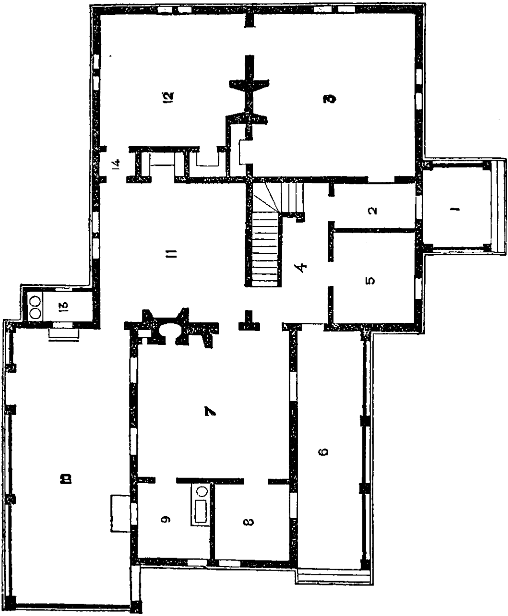
No. 4.—DESIGN FOR A COUNTRY RESIDENCE.

This design is for a bracketed country residence of two and a half stories. It consists of a main body and an L. The main house is square in plan, and measures 36 feet on each side; the L, containing the kitchen and its offices, is 18 by 26 feet, and one story and a half in height. The disposition of the several apartments of the house is as follows:

The front entrance porch, No. 1, opens into a vestibule, No. 2, 5 by 9 feet. From this vestibule we enter the parlor, No. 3, which is 18 feet square, and contains a good-sized closet. At the further end of the vestibule, a door, the upper panels of which may be glazed, opens into the staircase hall, No. 4. This hall contains stairs to the chambers above, under which is a flight leading to the cellar, and opens into the following rooms:

No. 5, office or library for the master of the house, so situated as to be convenient to the door opening upon the recessed veranda, No. 6;

No. 7, kitchen, 16 feet square. No. 8, store-room, 7½ by 8 feet. No. 9, pantry, 8 feet square, containing pump and sink, and leading into the private yard, No. 10; this yard is to be enclosed by a lattice fence 7 feet high.



Ground Plan.

No. 11, living-room, 15 by 16 feet, containing a large closet, and communicating, by means of a passage way, No. 14, with the family bed-room, No. 12. No. 13 is a privy, which opens into the enclosed yard.

The second story contains three large chambers and a child's bed-room, besides the hall and several closets in the main body; and a servants' bed-room, and a large clothes-press, and a bathing-room, in the L.

The third story, or attic, furnishes room for three large bed-rooms and numerous closets.

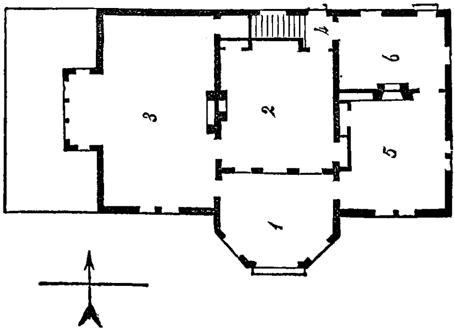
CONSTRUCTION.—This house is to be constructed with vertical boarding and battens for the outside covering, and plain finish, with walls prepared for papering, for the interior. All the lower windows of the main part are to be shielded by hoods (omitted by the engraver,) 12 inches wide. The roof projects three feet all around, and is supported on plain 3½-inch brackets. Height of first story 10 feet; height of second story, 9 feet.

The cost of the above house would be from $3,300 to $3,500.

No. 5.—SUBURBAN COTTAGE.

The illustration here given represents a cottage which costs but fourteen hundred dollars, and will be found within the means of most persons desiring such a house.

The character of the exterior is architectural, partaking something of the Rural Italian. Its low walls, overshadowing roof, wide verandа, and projecting ombra in its southern front, give it an appearance of symmetry and refinement that adapts it to the occupancy of a family of elegance and taste. The material of which it may be constructed may be stone, brick, or wood. If of stone, no change may be made in its form or the nature of its details, unless perhaps making them heavier, and their marked features still more bold. If of brick, we would merely add a projecting face, one brick wide, and projecting two inches round all of the windows, and a band running horizontally below the brackets or cantilevers of the roof about a foot deep, upon which they may rest. If of wood, the covering should be clapboarding or smooth ceiling, not battens and perpendicular planking, as the leading characteristics of the composition are horizontal lines, and would be contradicted by any other direction in the lines of the covering. The roof, of sufficiently steep a slope to carry off all water or snow, should be shingled, and the gable over the center of the southern front be made water-tight with metal strips in the valley formed by its intersection with the slope of the main roof. The chimneys, formed of brick, rise in simple form from the ridge, and as they have no portion of the roof or building higher than themselves, need not extend above the ridge more than sufficient to ensure good proportion of height to width.



Ground Plan.

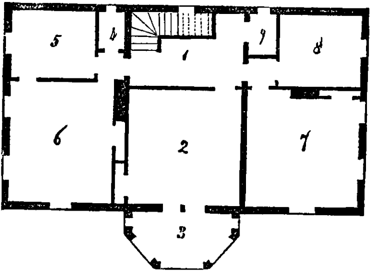
Before proceeding further with the exterior of the building, we will describe the plan. A peculiarity in this design is in the projecting half-octagon porch or ombra, which, from its position, serves the double purpose of a delightful and cool retreat, and that of an entrance-hall; it is marked on the plan, No. 1. In the winter, its sides might be filled with windows, and the opening in front with a glass door, thus making an enclosed vestibule or porch, and rendering the dining-room a very warm and comfortable apartment. From this porch are doors entering into the dining-room, No. 2, the parlor or library, No. 3, and the kitchen, No. 5; and according as a visitor's business in call-ing was to such and such a portion of the house, a door might be opened, thus saving the internal room necessary for a hall, and yet gaining all the advantages of such a portion of the building. The dining-room is a good-sized, pleasant room, 15 by 17 feet, with French windows opening upon the ombra or porch at one end, and a recess for sideboard underneath the stairs at the other. Attached to this room are the necessary adjuncts of china, glass, and store closets—one by the sideboard, and the other in the side of the room opposite to the stove or fireplace. Back of the dining-room is a small vestibule, 5 feet square, enclosed so as to shut off the staircase, and being the passage way from the pantry, scullery, and kitchen, to the dining-room. This entry is marked in the plan, No. 4, and is provided with an outer door. The economy in space attained by the arrangement of this portion of the plan must be evident at a glance, and the domestic comfort and convenience ensured, seem to us to render it very desirable. No. 3 is a large, well-proportioned apartment, 25 by 15, exclusive of a large projecting window in the side of the room. This would serve as a parlor, drawing-room, or country library, as the taste of the occupants lead them to determine. The projecting window opens upon a large veranda extending along the side of the room; and from one side of this bay window a portion of the veranda might, if thought pleasant, be enclosed, forming either a conservatory or a small summer study, attainable at very little additional cost. As this house might in many places be thought adapted for the dwelling of the clergyman of some small society, we would suggest that the room we have just described would very agreeably afford ample space for purposes of clerical use; and the small study thus attached (entered by a door from the side of the bay window,) might be provided with a flue in one of its sides, so as to be warmed by a stove in winter. Few houses of far greater pretension and expense have rooms so spacious and well proportioned as those in this little cottage, and hence its desirableness for erection. No. 5 is a kitchen, back of which is a large scullery and wash-room, No. 6.

Underneath the building, a dry and well-lighted cellar (lighted from one end and the rear side,) might contain a store and flour-room, a larder, etc., with a flight of stairs leading thereto. Back of this building we would propose an enclosed yard, containing wood-shed, and such offices as are better out of doors; and as the pleasant, occupied rooms are all on the other side of the house, the yard so enclosed might extend along its entire rear length, and being conveniently opened into by means of the enclosed vestibule at the foot of the stairs, would be easy of access from the living rooms. This enclosed yard would keep everything neat and orderly in appearance round the building, and give it a refined character in keeping with its more exposed exterior.

The height of the rooms on this floor is 10 feet in clear; the walls to be prepared for paper, and the inside finish of doors and windows of the simplest, plainest description.

The sleeping accommodation in the floor above is adequate to the comfortable use of a small family, and is arranged as follows:

No. 1 is a hall, well lighted and roomy, containing the staircase from below, and from which open the doors into the several chambers. No. 2 is a large room over the dining-room, and extending clear to a line with the front of the house, the recessed portion below being floored over. From this room a window opens upon a large balcony, No. 3, over the truncated projection of the porch below. The room is provided with a large closet for clothes, and a flue for a stove or fireplace.



Chamber Plan.

No. 4 is a large linen closet, well lighted, and formed by the small entry from the upper hall leading to rooms Nos. 5 and 6. No. 5 is a small chamber or dressing-room, in which might be a bathing apparatus, and serving either as a separate single room, a child's sleeping-room, or a dressing-room connected with the larger chamber, No. 6, which is over the library or parlor below, and is provided with a spacious clothes-closet and a flue for a stove or fireplace. No. 7 is over the kitchen, and has also a large closet and fireplace, and No. 8 is a servants' sleeping-room. This room is shut off from the other chambers by an entry similar to that on the other side of the hall; it is sufficiently large for the purpose, and is well lighted and ventilated. No. 9 is a large store-room, well lighted and airy — completing the accommodation on this floor; and the compactness and convenience of the plan must, we think, favorably recommend itself.

The rooms on this floor extend partly into the roof. The walls are 7 feet high to the under side of the plate, and the ceiling follows the slope of the roof sufficiently far to allow the rooms to be 10 feet in the clear. The roof is so framed as to admit this, and by such an arrangement greater internal height and airiness are obtained, with more modest lowliness of the exterior. The sloping sides of the ceiling should be firred down so as to leave a space of dead air (the most perfect non-conductor) between the lathing and the covering of the roof; by this means the rooms will be always cool, and the additional height gained be very valuable. The room over the dining-room having a gable over its ceiling would be a higher and more symmetrical apartment than the others, and hence might be reserved as a guest-chamber, its large balcony making it a very pleasant sitting place for ladies with their books or needle-work.

No. 6.—A SYMMETRICAL COTTAGE.

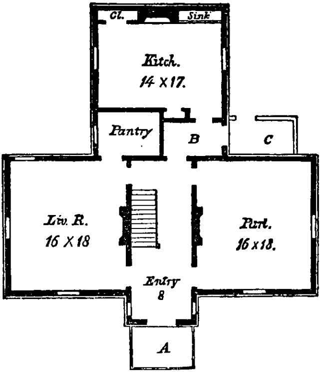
Whoever loves symmetry and the simpler kind of cottage beauty, including good proportion, tasteful forms, and chasteness of ornament, we think, cannot but like this little design, since it unites all these requisites. It is an illustration of a cottage made ornamental with very trifling expense, and without sacrificing truthfulness to that kind of tasteful simplicity which is the true touchstone of cottage beauty. This cottage is designed in the rural Gothic or English manner, but much modified, so as to adapt it to almost any site.

The light, open porch of this cottage may be omitted without injuring the design; but it gives the front an air of so much feeling and refinement, aside from its manifest utility, that we should always hope to see it adopted by those about to execute the design.

In the plan, A is the porch, from which we enter into the hall or entry, 8 feet wide, with the two best rooms, each 16 by 18 feet, on either

No. 7.—DESIGN FOR A CANADIAN FARM HOUSE.

side of it. Connected with the living-room, in its rear, is a good pantry. B is the back entry, communicating with the kitchen. C is the back porch, which may be left open in summer and enclosed in winter, when it serves as a place for coal and wood. On one side of the kitchen fireplace is a closet, and on the other a sink, into which, if possible, a water-pipe should be brought.



Ground Plan.

The first story of this cottage is supposed to be 10 feet, and the chamber story 5 feet on the sides, and 8 feet in the middle of the rooms. The pitch of the roof is a right angle.

The exterior of the cottage is vertical boarding, of planed and matched floor plank, about ten inches wide. The window frames are from 3 to 3½ feet, inside measure, with a center mullion and latticed sashes. The roof of the porch is nearly flat and roofed with tin, so as to form a balcony to the bed-room window over it.

The house is, of course, filled in with brick on edge, set flush with the outside of frame, and the inside walls plastered on the face of the brick.

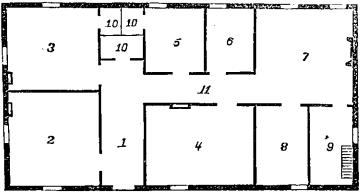
No. 7.—A CANADIAN FARM HOUSE.

This a plain, but roomy house—such a one as will suit the farmer as well as the gentleman. It is built of brick, on stone foundations; the walls are one brick thick, strapped and lathed inside—which is better and more comfortable than two bricks thick, and plastered on the bare wall. The rooms are all on one floor, and lofty and well ventilated; the center chimney being a double flue, one flue for the stove-pipes from the various center rooms and hall, and the other flue having an adjustable ventilator opening into the middle passage. The building seen on the right is a frame 60 by 14, containing at one end a bedroom for laborers, 12 by 12; then a summer kitchen, 12 by 18, fitted with a large boiler, and used in winter for cooking food for stock; the remaining 30 feet being used as a wood-shed.

Description of Plan.—1, hall, 6 by 22; 2, parlor, 17 by 15; 3, bed-room, 15 by 14; 4, living-room, 20 by 14; 5, 6, and 8, bed-rooms; 7,

No. 8.—DESIGN FOR A FARM HOUSE.

kitchen, 17 by 17; 9, pantry, 6 by 14; 10, closets; 11, passage, 4 feet wide, with an open arch to hall, and separated from the kitchen by a glass door. There is a cellar and milk room under 7, 8, and 9, stone walled and with cement floor, and entered from the pantry by a staircase with a trap door, and from the outside by a staircase close beside the back door, built over, and with double doors. The rooms over the cellar could have the ceilings lower, if desired, which would give a loft over them for ripening fruit, and accessible by a ladder through trap door in the kitchen ceiling.



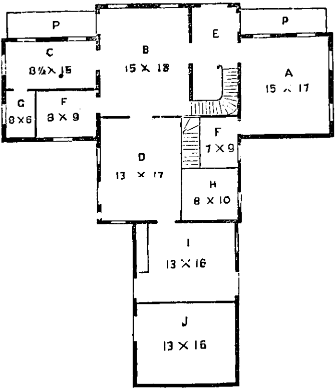
Ground Plan.

It costs about $1,800, including Venetian blinds and veranda.

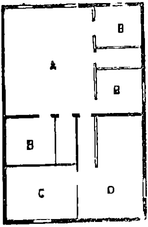
No. 8.—A FARM HOUSE.

This cut illustrates a farm house, erected by one of our subscribers in the town of Mendon, in this county. It costs $2,275.

The following are all the particulars with the exception of the piazzas in front, store-rooms over the wings, two closets or cupboards in the summer



Ground Plan.



Chamber Plan.

No. 2.—DESIGN FOR A SUBURBAN COTTAGE.

kitchen, and one under the hall stairs from the living-room. The basement has two cellars under the upright, divided under the partition, and milk-room under the parlor.

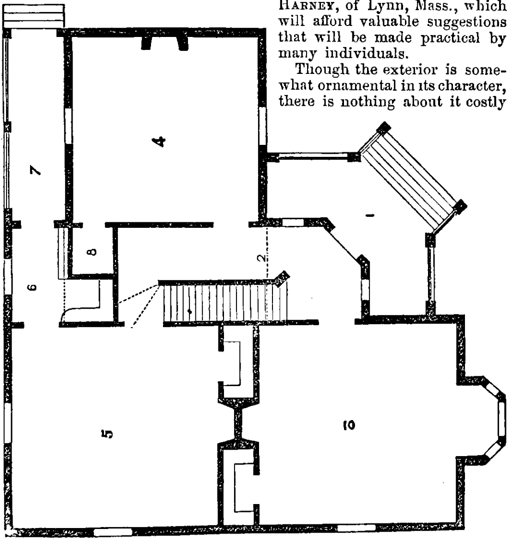
Description of Ground Plan.—A, parlor; B, living-room; C, nursery; D, winter kitchen; E, hall; F, F, bed-rooms; G, clothes-room; H, pantry; I, summer kitchen; J, wood-house; P, P, piazzas.

Chamber Plan.—A, sitting-room, 15 by 18 feet; B, B, B, bed-rooms; C, bed-room for workmen; D, store room.

No. 9.—A SUBURBAN COTTAGE.

This is a very simple and yet very beautiful design by Mr. G. E. Harney, of Lynn, Mass., which will afford valuable suggestions that will be made practical by many individuals.

Though the exterior is somewhat ornamental in its character, there is nothing about it costly or difficult of execution. It is designed to be of wood, and covered in the usual vertical and battened manner. The roof projects



Ground Plan.

No. 10.—DESIGN FOR A COUNTRY RESIDENCE.

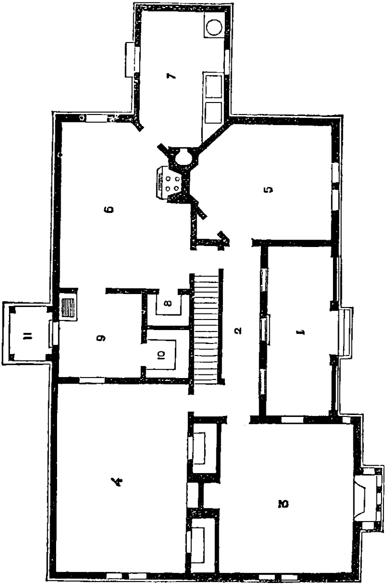
two feet and a half, and is supported on brackets. The house should rest on a foundation projecting at least three feet above the level of the ground. The first story is 10 feet high in the clear, and the second 6 feet at the eaves and 10 feet at the ceiling. Cost — about $1,600.

The plan comprises — No. 1, gallery, 5 feet wide; No. 2, hall, 7½ feet wide and 20 feet long, containing stairs to chamber and cellar. From the hall we enter No. 3, the parlor, 16 feet square, in the front of which, and forming its principal feature, is a bay window overlooking the front yard. No. 4 is 15 feet square, and may be used either as a bed-room or a living-room. No. 5, the kitchen, is 15 by 16 feet; it contains a large closet, and connects with a pantry, No. 6, which opens upon gallery, No. 7, leading to the yard. Under this gallery is the outside entrance to the basement.

The 2d floor contains 4 chambers, each with a clothes-press. Two of them are lighted by dormer windows.

No. 10.—COUNTRY RESIDENCE.

For a situation away from the city, where the owner is not restricted to a four rod lot, but who measures his estate by the acre, we think the accompanying a very appropriate design. We offer a dwelling, the leading features of which are of the Rural Gothic style, characterized by the verge-



Ground Plan.

No. 11.—DESIGN FOR A SMALL FARM HOUSE.

boards, pointed arches of the veranda and porch, lattice windows, and the general prevalence of modified Gothic features.

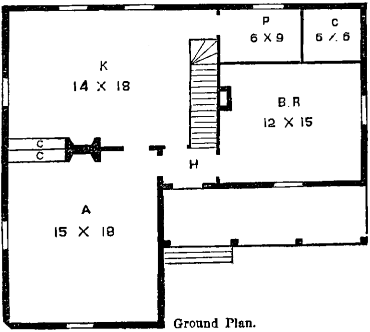
DESCRIPTION OF PLAN.—No. 1, veranda; No. 2, hall, containing stairs to the chambers, with a private, enclosed staircase under these, leading to the cellar. Opening from the hall is the parlor, No. 3, 15 by 16 feet, in the front of which is a bay window, which may be furnished with a cushioned seat. No. 4, living-room, 14 by 21 feet, containing a large closet on each side of the chimney breast, and communicating by means of the pantry, No. 9, with the kitchen, No. 6. The pantry is to be furnished with shelves and sink; contains a store-room, No. 10, and opens upon a small stoop, No. 11, which shields the rear entrance to the house. The kitchen is 14 by 18 feet. No. 7 is a one-story addition, 9 by 15 feet, containing a wash-room, fitted with a boiler and stationary tubs. A door opens from this room to the yard. No. 5 may be used either as a bed-room or a library; it is 13 by 15 feet.

The second story contains four chambers, besides dressing-rooms, closets, a bath-room, etc. Height of first story, 10 feet; 2d do., 8½ feet.

CONSTRUCTION.—This is a frame house; the outside covering to be vertical weather-boarding, of uniform width; the joints to be tongued and grooved and covered with battens. The verge-boards, window and door trimmings, and other ornamental details, to be sawn from 3½-inch plank. The interior is to be plain finished in the two principal stories; the attic may be left unfinished. Cost—$2,800 to $3,000.

No. 11.—A SMALL FARM HOUSE.

The annexed design is for a neat, but not expensive farm house, to be built of stone, brick, or wood, with a cellar under that portion of it where the staircase, bed room and pantry are, 20 feet square—the stairs leading to it being under the main staircase, and entered from the kitchen.



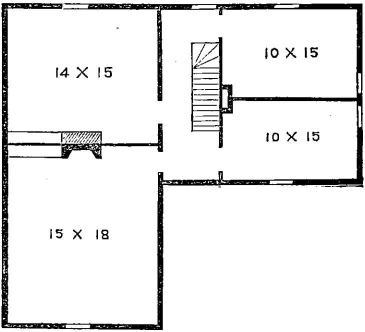
Ground Plan.

The main portion of the house, where the parlor and kitchen are, will be 34 by 20 feet, if built of stone or brick, and 33 by 19 if built of wood; the height of walls, 14 feet to the plates—lower rooms, 10

No. 12.—ENGLISH NATIONAL SCHOOL HOUSE.

feet. A, parlor; K, kitchen; H, entrance, 6 by 5 feet; B, bed-room; P, pantry; C, clōset, entered from bed-room.

Second floor—four bed-rooms. There may be a fire-place in the back bed-room, or the chimney may be carried up plain with a stove-pipe hole, and with a stone in the floor; the room may be warmed by the stove-pipe from the kitchen stove. A fire-place is designed in kitchen for summer use, if desired.



Chamber Plan.

The large front room in the chamber would make a pleasant sitting-room, if desired. Our engraver has made a mistake in putting the two principal windows only two panes of glass wide, instead of three; and the veranda should have a curved roof. The ends of the rafters are trimmed and brought down to appear as brackets, and the ornamental work at the eaves may be sawn out of $1\frac{1}{2}$-inch plank, at small expense. There must be a dormer window at the back, opposite the head of stairs, to give light to them and the landing above, as the stairs are designed to be closed in at both sides—and with a door at the bottom if considered advisable, corresponding with the door from the hall into the kitchen.

The expense of such a building, erected of stone or brick, would vary from $1,200 to $1,4000, according to the price of materials; if of wood, it would be much less where lumber was abundant—say $800.

No. 12.—ENGLISH NATIONAL SCHOOL HOUSE.

The annexed engraving shows one of the National English School Houses erected at Tamon, at a cost of $5,000.

It is interesting chiefly as a study of the quiet domestic character which the English give to this species of building. "One can easily believe," says the late A. J. Downing, "that something of home affections and love for good order and neatness, would naturally grow up in the mind of every pupil educated in such a school."

The first thing that striks an American eye is the "very humble" appearance of the building, arising from the lowness of the walls. But

No. 13.—A WESTERN NEW YORK BARN.

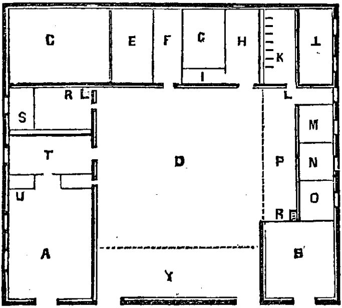
this is, internally, amply made up by the great height of the roof—the whole space being open, and the under side of the timbers and wood-work of the roof being exposed to view. This gives a lofty and spacious appearance to the interior, and an abundant supply of fresh air—connected, as the space is, with every means of ventilation.

There are many details, and some hints in composition about this domestic style, that are well worthy of study by those designing, or about erecting, buildings of this class.

No. 13.—A WESTERN NEW YORK BARN.

This barn is designed for grain-growing and stock-raising, and the saving of manure, which is not thrown out of every door and window about the barn, as is the usual practice. It is all wheeled into the yard every day, and littered over and trampled under foot. The stock are all fed under cover, in racks or mangers, and turned into the yard through the middle of the day.

Description of Plan.—A, carriage-house, 26 by 36 feet. B, work-shop and storage for farm implements or farming tools, 24 by 20 feet. C, yard for lambs and weaker portion of the flock, with hayloft above, 30 by 30 feet, with an out-door yard for them to run out and in at pleasure. D, principal yard for cattle or sheep, with open sheds, (P, Y,) on two sides. E, large bay, 20 by 30 feet. F, thrashing floor, 14 by 30 feet, raised 7 feet from the ground, with storage underneath for chaff, and fall for the straw as taken by the straw-carrier to the stack at D. G, bay, 18 by 30 feet, with granary taken off the end at I, 6 feet wide. H, feeding floor for feeding cattle and for filling over the stables. K, cow stable; the cows stand on the ground, and the manger is up level with the floor, 18 inches from the ground. T, stable for young stock. L, door and passage way for wheeling out manure from the stables. M, N, O, pens for hogs, pigs or calves, with plenty of storage above for corn and hay. P, open shed. R, R, cisterns. S, room for horse feed, off from one end of feeding-room. T, horse stable. U, harness-room between carriage-house and horse stable.

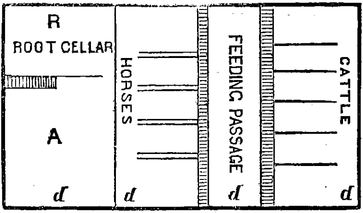


Ground Plan.

No. 14.—DESIGN FOR A SIDE-HILL BARN.

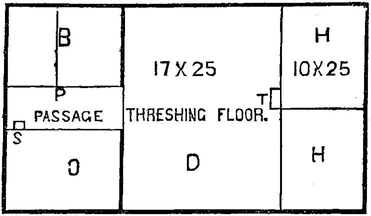
No. 14.—A SIDE-HILL BARN.

This barn is designed to be built on the side of a hill which will allow of excavation sufficient to form the basement floor —which contains five stalls for horses and six for cattle, with a feeding passage between, into which the hay or oats are thrown through the trap-door in the floor above. From this passage the mangers on either side may be filled very handily and with much less trouble and less risk of being kicked, than when a person has to come up behind the animals to get at their heads. A may be used as a carriage or wagon shed, or to store away straw for the use of the cattle or bedding for horses. R is a cellar for roots.



Basement Floor.

On the main floor, H is a place for hay and oats. T, trap-door communicating with the feeding passage below. D, threshing floor, 17 by 25. C and B, cribs for corn and other grain. P, passage. S, steps leading into the basement.



Main Floor.

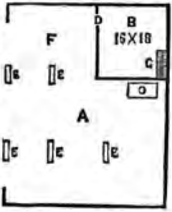
The cost of this barn would probably be between three and four hundred dollars, and perhaps is as good and convenient as can be built for that sum. At least the plan is worthy of consideration.

No. 15.—BARN WITH MANURE CELLAR.

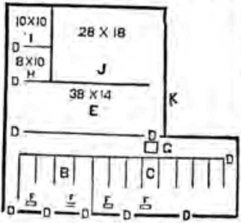
The engraving on the following page is a view from the south-east. The barn stands at the foot of a western hill, running south. The main building is 50 feet long, 38 feet wide, and 18 feet high. There is a building 18 feet square attached to the north-east corner, on the north side—giving to the east side of the barn a length of 56 feet. The whole is framed of strong oak timber, weather-boarded, and covered with slate. Upon the western end of the barn there is a lightning-rod.

Plan of a Barn with Manure Cellar.

Plan of Basement.—A, manure cellar. B, cellar for vegetables. C, a cistern for collecting the liquid manure. The floor of this cellar is so laid that from all sides the liquid matter runs toward the cistern. D, door leading to the cellar for vegetables. E, E, are stone pillars, upon which the frame-work of the building rests. F is used as a wagon-shed, etc. G, stairs leading up to the threshing-floor, directly opposite a door leading into the "fodder-gang" in that part in which



Basement Floor.

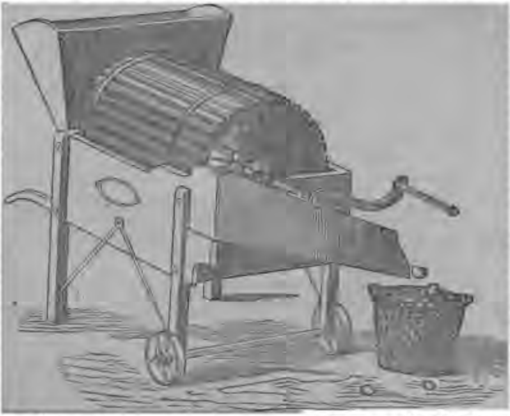


Main Floor.

the cattle are fed. The manure cellar affords to cattle an agreeable protection against cold, rain, and storms, the open side of it being south and facing the barn-yard.

MAIN FLOOR.—A, A, entry and "fodder-gang" (foddering passage), commencing at the east end of the barn, and running toward the threshing-floor; thence along the same and through the attached building to the north side of it, where a window, not marked in the draft, throws light into this passage. B, horse stables. C, cattle stables. These stables are 9 feet high, and can be raised by means of ventilators, shown in the elevation. The animals stand upon a platform six inches high, by means of which a gutter or canal is formed, receiving all their droppings. D, D, doors. E, threshing-floor, 12 feet high. F, F, are trap-doors through which the manure is thrown into the cellar. G, trap-door through which straw, chaff, etc., may be thrown upon the manure. H, cutting-room. I, granary. J, grain mow. K, barn-door.

ROOT WASHERS.—We annex a cut of a machine common on English farms. It is known as Crosskill's Root Washer, and is accounted the



best of the kind yet in use. These implements are considered in Britain to be almost a necessary adjunct to the successful feeding of roots to stock, for the purpose of cleansing turnips, potatoes, etc., preparatory to steaming or boiling them. Even where roots are fed to animals in the raw state, they are considered to be more beneficial if clean, than if covered with impurities that are foreign to the stomach of the animal, and which must therefore exercise an injurious effect upon the digestive organs. Such an implement would be equally valuable here, and might be made by any of our mechanics or implement makers at a comparatively small cost.

Our cut will sufficiently explain itself to render unnecessary a full description of the implement. It is constructed on a frame somewhat resembling a wheelbarrow, for the convenience of moving it from place to place on the farm as desired.

GRASSES FOR LAWNS. — JAMES BUCKMAN, Professor of Botany and Geology at the Royal Agricultural College at Cirencester, England, gives the following list of grasses as well adapted for lawns:

Even to the practical agriculturist the patches of the lawn and park turf, which is nowhere so fresh and green and smooth as in old England, are not uninviting. For such positions, species which possess the following qualifications are especially adapted:

Fineness of herbage, as opposed to roughness and coarseness.

Capabilities of well mixing, to form an equable matted turf.

A constitution to bear repeated clippings or cuttings without dying out.

All grasses or other plants that grow separately or bunchy are to be discouraged; indeed, in perfect lawn, plants, other than grasses — as plantains, daises, and buttercups — are to be especially rooted out.

If with these requisites we can procure species that delight in poverty, so much the better; and certainly the following list is such as will bear great vicissitudes in this respect, namely:

Lolium perenne,* } Smaller in poor than rich soils.
Poa pratensis,† }
Festuca ovina.‡
" " *var dariuscula.*
Cynosurus cristatus,|| — Very small with constant clipping.

Why grasses which can bear poverty should be chosen will be evident, when we consider the constant drain there is upon the soil in the oft-repeated mowings to which turf must be subject, where it is at all kept in proper order.

As regards the keeping of lawn in good condition, we may here be permitted to say that an important requisite is that of very frequent mowing in the growing months of the year, as otherwise it runs to culms and flower, which, if permitted, weakens the turf more than any amount of cuttings of the young grasses, as usually the roots of the flowering culms will either die at once, or be just those that will be preyed upon in the winter. If, however, repeated cutting is found to weaken too much, both the color and permanency of the turf may be greatly advantaged by a winter sowing over it of a mixture of guano and soot well pulverized together, in the proportion of one part of guano to five of soot. In this, besides the manurial influence, the soot is especially serviceable in destroying insects and worms, which greatly injure lawns.

* Perennial Rye Grass.
† Kentucky Blue Grass.
‡ Sheep's Fescue.
§ Crested Dog's-tail.

UNLOADING HAY BY HORSE POWER.—In the *Genesee Farmer* for 1851, page 165, a description was given of an apparatus for unloading hay, accompanied by illustrations. The apparatus has proved useful, so much so that a modification of it has since been patented. Every farmer might easily make one for himself.

The machine consists of three pulleys, about eighty feet of three-quarter inch rope, and a large fork (Fig. 1). The head of the fork is about twenty-eight inches long, and two and one-half inches square, made of good hard wood. The handle is five and one-half feet long, morticed into the head, and secured from splitting by a strap of iron clasped round the head, and extending some distance up the handle.

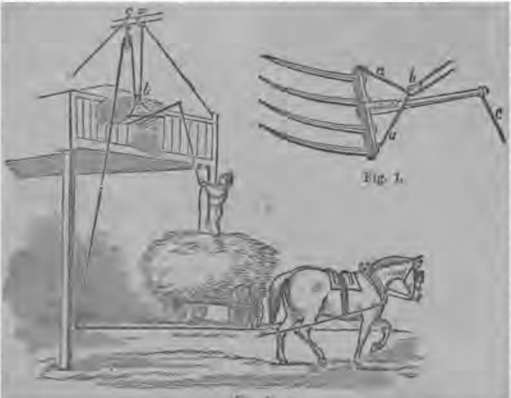


Fig. 1.

Fig. 2.

The prongs are of steel, twenty inches long, three-eighths inch thick at the head, and tapering to a point. Two ropes, or rods of iron (*a a*), three feet long, fastened to the ends of the head, are brought together at *b*, to which a pulley is attached. A small rope (*c*) is fastened to the end of the handle, in length to suit the height of the barn, by which the fork is kept level as it is raised to the top of the mow, where the hay is discharged by slackening the rope. In adjusting the machine, let one end of the main rope be attached to the peak of the rafter, about three feet over the bay, as at *a*, Fig. 2, which represents a section of the barn; thence let it pass through the pulley *b* on the fork; then through the second pulley *c*; then through the third pulley *d*, fixed to the lower part of the door post, to give a level draft for the horse.

HARROWS AND HARROWING.—The harrow is an indispensable implement in the cultivation of the soil, and next to the plow in its importance to the farmer. There are many forms given in its construction; some of these we shall notice and describe.

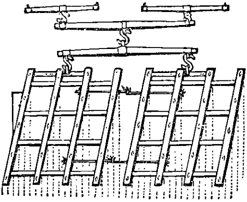


Fig. 1.

The Scotch or Square Harrow, when made of light timber and furnished with small and sharp teeth, is one of the most effectual for the pulverization of smooth land. Fig. 1 sufficiently explains its arrangement and construction.

Another form of square harrow in common use is shown in Fig. 2. It requires less gearing, and accommodates itself to uneven land more perfectly than the former. Sometimes 30 and even 36 teeth are used.

The Geddes Harrow (Fig. 3) is said by good judges to be the best in use. Its wedge-like form enables it to pass obstructions easily; its motion is more even and steady, and consequently easier for the team. An improvement in the draft is effected by attaching a chain to staples on each side, as far back as the second tooth. This prevents the harrow rising in the middle, as it will do if the traces are as short as they should be for easy draught. The timbers of this harrow may be of three by four inch scantling, though for the square harrow three by three inch is sufficiently heavy. Three-quarter inch teeth are large enough for any purpose. They should be pointed with steel, and kept sharp. The cost is somewhat increased, but the improvement is real, to have a shoulder underneath, and a nut screwing on at the top, as the teeth are then firm and cannot drop out. A harrow made of good timber, with a good coat of paint, renewed as often as it is necessary, will last a long time.

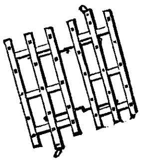


Fig. 2.

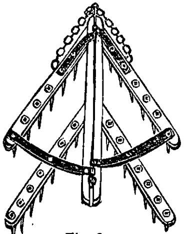


Fig. 3.

In the use of the harrow, the work may be facilitated by keeping the implement clear of sods and stones, and the speed of the team should be increased above that when employed at the plow. A team will soon learn to walk just on the edge of the previously harrowed ground, and it is well to give a lap of at least half the width of the implement.

CALENDAR OF OPERATIONS.

FROM TUCKER'S ANNUAL REGISTER OF RURAL AFFAIRS.

JANUARY.

A TEST of good management is well exhibited in the manner a farmer carries his stock through winter. When an animal is kept comfortable, it keeps fat; when it suffers, flesh wastes. Hence, all wants are to be promptly supplied. If an animal shivers in the cold, shelter it in stables or sheds; if damp and dirt annoy it, curry it, and give it clean litter; if delay in its stated meals causes fretting, then always be scrupulously regular. A bad farmer wastes tons of hay by throwing it under foot in the dirt, instead of into feeding-racks; he wastes other tons by the increased quantity shivering animals, exposed to cold winds, must eat; he wastes the flesh of his cattle and sheep by exposure; by irregular or scant feed and water; by dirty quarters for them; and by not attending to cleanliness and comfort in every particular.

Subscribe for a good agricultural paper.

FEBRUARY.

Every farmer should continue to give the best attention to his domestic animals. It is diligence only that can be crowned with success. The farmer must not trust too much to his help, but see for himself.

Is the COMFORT of his cattle, sheep, and pigs, and their consequent thrift, consulted in every particular? Do they always have enough of good food? Is it regularly given to them, and the fretting and waste of flesh occasioned by delay avoided? Are they kept well sheltered, and not shivering away their flesh in the cold and storms? Are they kept clean, and not losing their flesh by the discomfort of a dirty hide? Are cleanliness and warmth both together well attended to, in the supply of clean litter? Is that other requisite of comfort, plenty of good water, always at hand? Are ruta bagas, carrots, and other roots, freely mixed with dry food, and regularly fed to them? Are feeding-racks and boxes well provided, to prevent waste of fodder, and treading it into mud and manure?

MARCH.

Finish all winter jobs before the driving work of spring comes on. Get tools, implements, and everything else, in readiness for the approaching season. See that plows, carts, harrows, rakes, and other things, are in good order and rigged for work; and clevises, chains, hoes and spades, are all in their places, that men and teams may not stand idle by half-hour searches.

Let all fire-wood be drawn, cut up and housed for use during the coming summer, so that good dry wood may be always at hand, with no interruption to other work—and a smoky kitchen, sore eyes, sour bread, delayed meals, and work behind-hand, all from wet wood, entirely prevented.

Fences should be repaired when the weather will admit, rails laid up, loose boards nailed to posts, and gates kept well hung, in freely-swinging, self-shutting and self-latching order.

Cows with young calves should be attended to.

APRIL.

Repair fences—laying up fallen rails, nailing loose boards, and rebuilding tumbling walls.

Clear, pick, roll and plaster meadows—clearing off rubbish and stones, and thus save a week's work at the grindstone at mowing time.

Prepare ground for crops; draw out manure, harrow it well into the soil, then plow it under—thorough intermixture in this way will render it of double value.

Ground for ruta bagas should be early in good order, and occasionally stirred to destroy all weeds before the crop is sown.

Sow barley and oats. Pull up red-root, cockle, and other weeds, from wheat. Let all the manure be applied to corn, potatoes, ruta bagas, carrots, field beets, and parsneps. Allot a portion of land for sowing corn for fodder. Avoid hasty and superficial plowing, but cut straight, deep, and narrow furrows.

See that working animals are regularly and well fed and watered, and kept in good condition.

MAY.

Make vigorous preparation to put in crops. Let them be planted in the best manner—an additional half day in doing work well, may secure an additional wagon-load of products. Thorough work is economy.

Secure corn from crows by tar and plaster; or by long, stretched cords; or by placing a few empty barrels over the field, which crows suspect and shun.

Plant corn early—more is lost from late than early planting. Plant in straight rows, to admit of easy, clean, and neat cultivation. Plant double seed, and thin out evenly, and avoid the loss of a third of the crop by missing and uneven hills.

Plant field beets, carrots, and other root crops, in rich, mellow, clean soil—and save three-quarters of the labor of hoeing, by hoeing when the weeds are not an inch high, and before they consume the riches of the soil.

JUNE.

The crops for the season being now mostly planted, see that weeds do not devour them. "A stitch in time saves nine," whether applied to pantaloons or potatoes. Would you destroy the enemy that snatches the bread from your children's mouths? then destroy cockle, chess, mustard, and red-root, for these weeds are stealing the wheat; go over the field several times, and let none escape. Plow in Canada thistles, deeply and thoroughly; continue it once a month through the summer, and by mid-autumn they will be killed, and the land fine for wheat.

Sow corn for fodder — strewing it thickly in furrows plowed two to three feet apart, and cover it by cross-harrowing the furrows. Five or six tons of fine, rich, palatable fodder per acre, will be your pay, and the land far less exhausted than by grain crops.

Sow ruta bagas from the first to the middle of the month, in clean, rich, mellow soil.

JULY.

Look well to weeds. Would you avoid an invading army of robbers? Then destroy weeds on their first approach; for they devour more of the riches of the soil and of the weight of the crop, every year in the country, than would feed the army of Napoleon. Would you allow a herd of strange cattle to range your fields a single night? Then why permit an army of weeds to devour their strength a whole season, and then bequeath their pernicious deeds, in the shape of seeds, to a race of successors?

Keep crops well cultivated, passing between the rows often with the horse, to keep the soil well stirred; where land is not stony, let hoes be kept sharp by grinding, and they will cut like magic.

Keep weeds and grass well cleared away from young fruit trees, and the soil clean and mellow. Neither a young tree, nor a hill of corn, can thrive in a weed bed.

AUGUST.

Pursue vigorously, and finish haying and harvesting. Cut wheat a week or two before dead ripe, and the grain will weigh more, give less bran, and not shell out in harvesting; and the straw be worth double. Secure the gleanings by a horse-rake. If it rains, harrow wheat and barley stubble to start the weeds, which plow under as a green crop. Take great pains to have clean seed-wheat, clearing out all foul stuff, and especially the seeds of that deceitful, invisibly insinuating, rapidly multiplying weed, chess. Some farmers, by great pains every year, have at last totally expelled it from their farms.

Cut under-drains through wet ground. Drain muck swamps, and get out and draw swamp muck to mix with barn-yard manure. Still continue to destroy weeds. Plant strawberry beds.

SEPTEMBER.

Put land in the best condition before sowing wheat — manure will do well and much improve the crop, if it is well pulverized and thoroughly intermixed with the soil, by repeated harrowings. Take great pains to sow only the cleanest seed. Just before sowing, wet with brine and dust with slaked lime, to destroy smut. Never sow after wheat, but adopt a good rotation. Sow early, if the midge (weevil) is much feared.

Commence fattening hogs. Feed them *regularly*, and not let them squeal their flesh away by waiting for their stated meals. If apples are plenty, they will fatten finely on the fallen fruit for two months. In feeding corn, let it be ground, and boiled with water, and its value will be nearly tripled; if it cannot be boiled, ferment it for a few days, which will improve it.

Corn sown late for fodder should be timely secured. Mow it, and let it dry by sweating in small cocks.

OCTOBER.

Harvest autumn crops; husk corn; dig potatoes; harvest ruta bagas and field beets by the end of the month. Dig potatoes when the soil is dry and not muddy, and they will be much cleaner, and hence less liable to rot. Potatoes should be kept as cool as possible, well ventilated, and affected ones should be carefully picked out.

Incomparably the best way to keep potatoes, is to bury them first with a foot of *packed* straw, and then three inches of earth. All roots buried in heaps, must be well ventilated by wisps of straw set in holes in the top of each heap.

Winter apples, intended for selling or keeping, must be carefully picked by hand when dry, using suitable ladders, and not bruising the trees.

All fattening animals should be fed with regularity, enough, but not too much.

NOVEMBER.

Finish speedily the harvesting of root crops, if not already done, and see that they are secured from frost.

Collect all tools, as plows, harrows, carts, hoes, etc., and see them kept under shelter.

Transplant hardy fruit and ornamental trees; let them be well staked from the action of the wind.

Throw up a conical bank a foot high for winter, round all young trees, which will secure them perfectly from mice.

Apply manure as a top-dressing wherever needed; it will not now evaporate, but soak into the soil.

Strawberry and asparagus beds should now have a top-dressing of rich manure.

Grafts for next spring may be now cut, and packed in damp moss or sand; grapes pruned and the cuttings preserved. Grape layers made the past summer, may be removed from the parent vine, and secured by burying.

DECEMBER.

Lay plans for the future. Arrange the farm for regular rotation. Let regularity and system be fully carried out. Examine the practice of the very best and most successful farmers in the country, by that most convenient and cheap method, the reading of an agricultural paper, and use judgment and discretion in reducing to practice the many valuable hints thus obtained.

Provide good shelter for domestic animals. Pursue strict regularity in feeding and watering. Have good feeding-racks to prevent waste. Chop corn-stalks fine, that cattle may eat all. Mix cut or chopped hay with straw and with meal. Keep all stables clean, neat and comfortable. Give sheep good shelter, good hay, and chopped roots. Let stock be regularly salted. See that hay is not wasted under foot. Remember that filth and thrift are eternal opponents.

THERE are those, says DOWNING, who are sanguine as to the introduction of the foreign grape in this country, for open vineyard culture. The thing is impossible. Thousands of individuals have tried it on a small scale in various parts of the Union; and several persons — as for example, M. LOUBAT, Mr. LONGWORTH, etc. — of great experience abroad or knowledge at home, joined to abundant capital, have tried it on a small scale. The result in *every* case has been the same: a season or two of promise, then utter failure, and finally complete abandonment of the theory. The only vineyards ever successful in America, are those of American grapes. The only thing we can do for foreign grapes is to cheat them into the belief that they are in the warmer parts of Europe, by putting them in a glass house.

A FRUIT-GROWER in this State put the following questions to the oldest people in his neighborhood, and received invariably about the same answers: "Are your apples as sound now, as those you raised thirty or forty years ago?" "Oh no! they're gnarly and wormy now — *the seasons ain't as good as they used to be.*" "Are the birds as plentiful now, as formerly?" "Oh law, no! they used to make noise enough to deafen you, when I was young." "Do you raise as much poultry?" "Why, no! guess not; we get more butchers' meat now."

RAISE YOUR OWN CLOVER SEED.—Every farmer should grow his own clover seed. There are few things that a farmer can less afford to be sparing of than clover seed. If he grows his own, he will seed down more land than if he has to purchase it from his more enterprising neighbor, or the village seed store. Every farmer, and more especially every wheat grower, should select a piece of his best clover, cut it early in June, and then allow it to go to seed.

CULTIVATION OF PEARS.

The Fruit Committee of the Worcester (Mass.) Horticultural Society, give the following directions for growing fine specimens of pears:

"1st. Deep, generous tillage — by which is meant a trenching and manuring of the soil from one and a half to three feet deep. In other countries, where labor is cheaper and fruits dearer than they are here, this work is often extended to a depth of four feet, receiving a profitable return, even from so small a fruit-bearing plant as the strawberry. It is from a want of such cultivation that the finest pear trees taken from our nurseries often die, or come to nothing. They have 'no deepness of earth'—'no root'—and, as a natural consequence, they share the fate of the wasted seed of the parable.

"2d. Cultivating or mulching of the surface around the trees, for a distance equal, at least, to the drip of their branches. But especial care should be taken to avoid the slightest brusing of the roots, and the mulch must not be so thick and heavy as to smother them.

"3d. Underdrainage, wherever the subsoil is of a retentive nature. But all covered drains, whether of tiles or stones, should be not less than three feet deep, nor less than six or eight feet distant from the trunks of the trees; for many a fine tree set out directly above a shallow underground conduit has been poisoned to death by the foul air therein contained.

"4th. Thinning of the fruit, especially of the class of trees known as 'great bearers.'

"Pruning may be performed at any seassn of the year; but the best time is believed to be about the longest days of summer, while the worst effects that happen arise from using the saw or knife during the full flow of sap in the spring. An exception, however, must be made in cases where it is considered necessary to head in a newly planted tree."

WEIGHT OF PEARS.—Mr. LINCOLN, a member of the Committee, furnishes the following table, showing the weight of some of the principal varieties of pears exhibited in 1859 and 1860.

	Weight in 1859.	1860.		Weight in 1859.	1860.
	oz.	oz.		oz.	oz.
Andrews	6½	7½	Duchess d'Angouleme	12	13½
Beurre d'Anjou	10	11½	Easter Beurre	7	10
" Clairgeau	12½	14½	Fulton	4	5
" Gris d'Hiver	7½	10	Flemish Beauty	12	18
" Montgeron	5	6¾	Gansel's Bergamot	5	7¼
" Bosc	8	9½	Glout Morceau	9	12¾
" Diel	11½	15	Henry IV	4½	5
" Langelier	5	8½	Paradise d'Automne	5	6½
Belle Lucrative	8	10½	Seckel	3½	4¾
Buffum	5	5½	St. Michael	6	6¾
Doyenne du Comice	6½	11½	Urbaniste	9	10
" Boussock	9	14	Winter Nelis	5½	5½

This table shows a remarkable increase in the size of the specimens grown in 1860, as compared with those of the previous year. The Committee think this is due partly to a more favorable season, and to improved methods of cultivation.

We annex the weight of some other varieties shown at this exhibition in 1860:

Bartlett	12	oz.	Marie Louise	8¾	oz.
Beurre Nantais	8¾	"	Swan's Orange	14½	"
" Superfin	13¼	"	Sieulle	9½	"
Dix	9	"	St. Michael Archangel	7½	"
Lawrence	6¼	"			

List of Good Varieties of Seeds for a Small Kitchen Garden.

BUSH BEANS—Early Valentine, Rob Roy.
POLE BEANS—Large Lima, Wren's Egg.
BEET—Early Turnip, Large Red, New German.
BROCOLI—Purple Cape, Walcheren.
BROCOLI OR KALE—Dwarf Curled.
CABBAGE—Early Sugar-loaf, Dwarf Savoy, Dutch Drumhead.
CARROT—Early Horn, Altringham.
CAULIFLOWER—Early Paris, Lenormand, Walcheren.
CELERY—Giant, White Solid, Red Solid.
SUGAR CORN—Adam's Early and Mammoth.
CUCUMBERS FOR PICKLES—Long Green.
EGG PLANT—Improved Purple, and White.
KOHL-RABI—Early White, and Large Purple.
LEEK—Musselburg, and New Giant.
MELON—Early Jenny Lind, and Green Citron.
WATER MELON—Mountain Sprout, and Orange.
OKRA—Improved Dwarf.
ONION—Large Red Portugal, Strasburgh.
PARSLEY—Curled.
PARSNEP—Sugar and Guernsey.
PEAS—Tom Thumb, Early Princess, Early Warwick, Champion of England, Harison's Perfection, Champion of Scotland, White Marrowfat, Bishop's Dwarf, British Queen.
PEPPER—Large Sweet, and Cherry.
POTATOES—Early June, Ash Leaf Kidney, Hume.
SALSIFY, or VEGETABLE OYSTER.
SPINACH—Prickly, and Broad-leaved Flanders.
SQUASH—Early Bush, and Hubbard.
TOMATO—Smooth Red, and New Golden.
TURNIP—Early Dutch, White French, Yellow Stone, Green Stone.

FOR SALADS.

CUCUMBERS—Lord Kenyon's Favorite, Sir Colin Campbell.
CORN—Salad.
CRESS—Triple-curled, and Broad-leaved Winter.
ENDIVE—Green Curled.
LETTUCE—Curled Silesia, Cabbage, Paris Cos
MUSTARD—White.
RADISH—Scarlet Short-top, Turnip-rooted, and Winter.

SWEET AND POT HERBS.

Anise, Balm, Sweet Basil, Barege, Burnet, Chervil, Fennel Sweet, Hore-hound, Hyssop, Lavender, Sage, Summer Savory, Thyme, Mint, Farragon.

Pickling Walnuts.—A lady of great experience in such matters, gives the following receipt for pickling walnuts: "Gather them dry; prick them through with a large pin two or three times; put them into salt and water; shift them every three days for a fortnight; put them into a sieve, and let them stand a day in the air, and then put them into an earthen jar. Boil as much vinegar as will cover them well, pour it boiling hot over them, and let them stand three days; then put them into a sieve, and let them stand in the air another day; then take to every quart of fresh vinegar that may be wanted, half an ounce of black mustard seed, half an ounce of horseradish cut into slices, a quarter of an ounce of long pepper, three cloves of garlic, a dozen cloves, four or five pieces of raw ginger, and a few eschalots; boil these ten minutes, and pour it boiling hot over your walnuts; let it stand a fortnight, then put them into bottles, cork close, and cover the corks with rosin. They will keep for years."

Names Written with Flowers.—A pleasant little surprise to children, the memory of which they would carry to their graves, would be to see their names written in tender green leaves on the fresh earth. This is often done by drawing the name with a stick, in a smoothly raked bed, and sowing the seeds of some annual in the shallow furrow. If the seeds are soaked in water for a few hours, and covered but lightly with the soil, the name will appear almost before the weeds, which must of course be kept out.

Applying Manure on the Surface.—John Johnston, one of the most successful farmers in the United States, has, for upwards of twenty years, applied his manure on the surface. About the middle of September, he spreads the manure on the grass land he intends breaking up for corn the next spring. He thinks it important that it should all be drawn out and spread before the 10th of October, and then, he says, "the grass immediately grows up through the manure, and shelters both the manure and land through the winter; and, even if clay land, it plows up mellow in the spring."

To make Potato Yeast.—Take two quarts of hops, boil until the strength is out, leaving water sufficient to scald one quart bowl of grated potatoes. Strain it upon the potatoes, and while cooking stir it, adding a handful of salt and two cups of molasses. When cooked sufficient it will be a thick paste. Cool it in a stone jar, and when cool enough, add your yeast for rising.

Rose Bugs.—These pests can be certainly destroyed by syringing the bushes with a solution of whale oil soap, two pounds in fifteen gallons of water.

Age of the Rose Tree.—Sprengel mentions a rose tree, still living, which is upward of one thousand years old.

COMMERCIAL NURSERIES

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SMALL FRUITS:

GRAPE VINES—All the fine new hardy sorts.

Currants, Gooseberries, Raspberries, Blackberries, Strawberries, etc.

American Arbor Vitæ, drawn from Nature.

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1st quality, 2 ft. high, $10 per 100
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B. K. BLISS, Seedsmen and Florist,

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COLLECTIONS OF FLOWER SEEDS BY MAIL, POST-PAID.

The following Collections have been sent out from his establishment for the last SEVEN YEARS, and are now favorably known in every section of the country. They will be found to embrace many NOVELTIES, and only such as are well worthy of cultivation. The uninitiated may therefore order them without fear of disappointment, and the experienced cultivator will find them equally acceptable. Full directions for culture will accompany each package, which will be mailed to any address in the Union under 3,000 miles, at the following prices: Assortment

No. 1 consists of twenty choice varieties of Annuals.........................$1 00

No. 2 consists of twenty choice varieties of Biennials and Perennials.......... 1 00

No. 3 consists of ten extra fine varieties of Annuals and Perennials, embracing many of the new and choicest in cultivation........................ 1 00

No. 4 consists of five very choice varieties, selected from Prize Flowers of English Pansies, German Carnation and Picotee Pinks, Verbenas, Truffaut's French Asters and Double Hollyhocks, each of which are sold at 25 cents singly.. 1 00

Any person remitting THREE DOLLARS will receive the FOUR ASSORTMENTS, comprising fifty-five varieties, POSTAGE FREE. The following additional Assortments will be sent at the prices annexed, free of postage: Assortment

No. 5 contains fifteen very select varieties of Green-house Seeds..... ....$3 00

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Instead of pre-paying postage on orders from the British Provinces, SEEDS WILL BE ADDED GRATIS, equivalent to the amount allowed for postage in the States.

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"	"	2 00	"	"	"	"	2 25
"	"	3 00	"	"	"	"	3 50
"	"	4 00	"	"	"	"	4 75
"	"	5 00	"	"	"	"	6 00
"	"	10 00	"	"	"	"	12 00
"	"	20 00	"	"	"	"	26 00
"	"	30 00	"	"	"	"	40 00

Prices to Dealers whose orders exceed the above amounts will be given upon application. ☞ Orders must be accompanied with the Cash. Address

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Particular attention is paid to the REMOVAL AND PACKING OF TREES, so as to cause the least possible injury in transplanting.

Constantly on hand and for sale,

STANDARD AND DWARF APPLE TREES;
" " " PEAR "
" " " CHERRY "

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THE

RURAL ANNUAL

AND

HORTICULTURAL DIRECTORY,

FOR THE YEAR 1862;

CONTAINING TREATISES ON

PLANTING FRUIT TREES; ANNUALS AND THEIR CULTURE; CULTURE OF DWARF AND STANDARD PEARS; CULTURE OF WHEAT, RYE, BARLEY, OATS AND INDIAN CORN; CULTURE OF THE PEACH IN THE MIDDLE STATES; MANUFACTURE OF DOMESTIC WINES; CIDER MAKING; CULTURE OF WHITE BEANS; SPIRÆAS; COVERING GRAPE VINES IN WINTER; TREATMENT OF MILCH COWS; APPLICATION OF MANURE; THE ENGLISH MUTTON SHEEP,

WITH MANY OTHER ARTICLES OF INTEREST AND PRACTICAL VALUE TO

THE FARMER, THE FRUIT-GROWER, AND THE HORTICULTURIST.

ILLUSTRATED WITH ENGRAVINGS.

ROCHESTER, N. Y.
JOSEPH HARRIS,
(Office of the Genesee Farmer.)
1862.

PREFACE.

In no country have the practical arts made greater progress during the present century, then in the United States. The resources of a vast continent have been developed with marvellous rapidity, and means of inter-communication provided which challenge the admiration of the world. Agriculture and Horticulture have prospered no less than the Mechanic arts. We have been blessed with Peace, and our labors have been crowned with Prosperity and Plenty.

The Great Rebellion of the past year has arrested, for a time, this rapid advancement. But an intelligent, enterprising, industrious, Christian people, inheriting a land so "beautiful for situation," and so favorable for the development of all that is great and noble, will soon recover from this temporary check. Even during the past year, the continent has been girded by the wires of the Telegraph, and the Pacific has sent words of Peace and Congratulation to the Atlantic. Our Farmers have supplied the Old World with Breadstuffs, and made America the Granary of Europe. Agriculture was always the main stay and hope of our Country, and this is now more than ever realized. Our Farmers and Fruit-Growers have an inviting field before them. Though gloom has for a time enshrouded us, already the clouds are opening, and bright prospects appear in the not far distant future.

It is hoped that the present Volume of the Rural Annual and Horticultural Directory will be found fully equal, in interest and value, to any of its six predecessors. We have endeavored to make it a useful Handbook to all engaged in the culture of the soil.

In reply to frequent inquiries, we would state that the *Rural Annual and Horticultural Directory* was started in 1856, and a new Volume has been issued every year since. We have a few complete sets of the work. The price of any single volume is 25 cents: the first six—1856, '7, '8, '9, '60 and '61—will be sent pre-paid, by mail, to any address, for $1.20

JAMES LENNOX, STEREOTYPER,
Rochester, N. Y.
A. STRONG & CO. PRINTERS.

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THE

RURAL ANNUAL

AND

HORTICULTURAL DIRECTORY.

PLANTING FRUIT TREES, &C.

THERE are two main reasons why choice fruit is not more extensively raised. One is that some people think that the business requires more time, patience, skill, knowledge and experience than they possess; and secondly, that the vast majority of planters have an idea that all they have to do is to set out the trees and gather the fruit. The first class—a very respectable minority—will not plant because they have not sufficient experience; and the second do not take that care of the trees after they are planted which is necessary to success.

The latter class is the most numerous and the most mischievous. They plant trees; neglect them—and fail to realize their expectations. They become discouraged and, by relating their experience, discourage others, who might do better, from planting.

The former class need to be encouraged. It is true that fruit culture is not a pursuit in which the highest success can be attained without care and skill. But those who realize this, and at the same time are willing to learn all they can, are the very persons of all others most likely to make good horticulturists and fruit growers. Let not such hesitate to plant. The requisite knowledge will be acquired step by step, and a good supply of delicious fruit will much more than compensate for all the labor.

The great error of the majority of fruit growers arises from the opinion that the trees will take care of themselves. It seems impossible to disabuse them of this idea. Even men who cultivate their corn and potatoes in such a way that the land shall be mellow and free from weeds or grass, will set out fruit trees in an old meadow or wheat field. There is little hope that such men will ever succeed in fruit culture till they realize the fact that a choice peach or pear tree needs as good treatment as a hill of corn or potatoes.

The first thing to be done in planting an orchard, is to *prepare the land.* First, select a piece that is free from stagnant water at all seasons of the year. Rolling land or side hill is best; but many of our hill-sides are springy, and must be underdrained before they are suited for orchard purposes.

It is better to plow the *whole* land and bring it into a good condition before setting out the trees. This is better than digging holes, however large, and is less trouble. It is not well to put raw manure immediately under or around the roots of the trees. If needed, let it be well mixed with the soil. It is now considered quite as well to apply manure as a top-dressing in the autumn or early spring as to plow it under. It acts as a mulch, keeping the ground moist as well as adding to its fertility.

APPLES will succeed on a great variety of soils and situations, and will bear harsher treatment than peaches or dwarf pears. But even an apple orchard will well repay for good culture. At all events, let the land be well plowed before the trees are set out, and the soil brought into as good condition as it would be if summer-fallowed for wheat. Then plant beans, potatoes or corn for a few years, so that the land will be well worked and kept free from weeds. Wheat, oats, grass, etc., should not be sown. They rob the soil of moisture and seriously retard the growth of the trees. The usual distance of planting apple trees is two rods apart.

PEACHES of late years have become rather an uncertain fruit. More care in the selection of the ground and in affording the trees shelter from severe winds by natural or artificial belts of timber, would, it is believed, greatly reduce the number of failures. Warm vallies and the south sides of hills are especially to be avoided. An elevated, dry, sandy loam, with a northern aspect and a belt of trees in the direction of the prevailing winds, is the best selection, and the trees should be headed down low, so as to shelter the trunks from the sun, and to escape the severity of the winds. Nothing but hoed crops should ever be planted among peach trees.

DWARF PEARS, on the quince stock, need good culture—as good as corn. We know a farmer in this neighborhood who set out a dwarf pear orchard of several hundred trees. The next year he sowed the land to wheat and seeded it down with clover! We never saw a more pitiable spectacle than these trees presented the past season. Of course the farmer thinks dwarf pear trees a humbug! He would have found corn just as great a humbug if he had treated it in the same way.

Pears like a rather heavy loam. It must be well underdrained, either naturally or artificially. Let it be trenched or subsoiled eighteen inches deep and well enriched. Then, with good varieties, judicious pruning and vigorous disbudding or thinning of the fruit, there is a fair prospect of success.

STANDARD PEARS are better suited for ordinary farm culture than the dwarfs. It is a mistake, however, to suppose that they are less liable to blight. There appears to be no difference in this respect, or if any it is in favor of the dwarfs.

PLUMS, when they succeed, are as profitable a crop as can be raised. The curculio and black-knot, however, are serious drawbacks. We know of no remedy for the former but *jarring the trees*—shaking off the curculio into sheets placed under the trees and then destroying them. Carefully gathering up all the stung and fallen fruit and destroying it would, if persevered in for a few years, greatly lessen the numbers and ravages of this troublesome insect. For the black-knot there is no remedy. A clay soil, *well underdrained*, is the most likely preventive.

CHERRIES ordinarily succeed well and require little pruning. They prefer a rather light, dry soil. In damp places, or water-soaked subsoils, they will soon perish. The dwarf cherry—worked on the Mahaleb stock—has been extensively planted in the West. The low head shelters the trunk from the rays of the sun, and it is therefore more likely to escape the disease of the bark so common in standard cherry trees. The dwarf cherry, too, like all other dwarf trees, possesses the advantages of early fruitfulness and increased size of fruit.

The culture of the GRAPE is attracting more and more attention. There can no longer be any doubt of our ability to raise this delicious fruit in great perfection. Several new, hardy native varieties of most superior quality have been brought into notice during the past few years, and they will soon be extensively planted.

In selecting a site for a vineyard, the first thing to be attended to is the drainage. If not perfectly free from springs or stagnant water, it must be thoroughly underdrained. In a garden where the object is to raise the largest and finest fruit, and where expense is not a consideration, the soil should be thoroughly trenched and manured. Bones, horn-piths and animal matters, such as the waste of the slaughter houses, scraps of hide, leather, hair and wool, can be buried in the trenches with advantage. But for ordinary vineyard planting, there is no necessity for so much labor. A good deep furrow, followed by a subsoil plow that breaks up the subsoil without bringing it to the surface, is all the preparation that is needed.

Cuttings may be planted, but, as our nurserymen have propagated the plants by the million, and sell them at low rates, it is decidedly better to set out rooted plants one or two years old. In planting. cut away all mutilated roots, have the holes made and the fine soil prepared to put around them beforehand, so as not to expose the plants any longer than is necessary, and set them out from six to eight feet apart. Keep the ground well hoed and free from weeds, and let the vines grow at will the first summer. After the vines lying on the ground have grown a foot or so, they should be trained to one cane, and the small lateral shoots produced on the main cane should be pinched back to one leaf. An admirable treatise, giving full details for the propagation and culture of the grape in the open air, will be found in the RURAL ANNUAL AND HORTICULTURAL DIRECTORY for 1858.

There is no reason why every farmer, as well as the occupier of only a few rods of land should not have a full supply of delicious raspberries, strawberries, currants, blackberries, etc. Their culture is very simple and the return safe and abundant.

STRAWBERRIES like a deep, underdrained, rich loam, well exposed to the sun. For garden culture, let the ground be well trenched, and plenty of manure worked into the subsoil. Set out the plants in rows $2\frac{1}{2}$ feet apart, and from one foot to eighteen inches apart in the rows. The best time to do this is in the spring, as early as the ground can be got into good condition, say from the first of April till the middle of May. Keep the ground clean and mellow during the first summer, and remove all the runners except those that are required to form new beds. The young plants may be removed as soon as they become well rooted, and transplant into a separate bed, from whence they can be set out for new beds the next spring. Beds so treated will continue in bearing two or three seasons, and produce the finest fruit.

For field culture, the plants are set out in rows three or four feet apart, and, if of vigorous varieties, such as Large Early Scarlet, eighteen inches apart in the rows. During the first summer keep the wide space between the rows clean and mellow by the use of the horse hoe or cultivator, till the young runners occupy the ground. These young plants will bear an abundant crop the next season. If the plants are too thick they must be thinned out.

RASPBERRIES should have a deep, rich, well-drained, loamy soil. They will succeed even when somewhat shaded. Set out the plants on well prepared soil, four feet apart, and three plants in each hill, with a stake five feet long for each hill of three plants. Cut the young plants down to six or twelve inches in height, according to their vigor; and as the young shoots appear from the bottom tie them to the stakes. These shoots will form strong canes four or five feet high, and will produce a full crop the next season. Throughout the Northern States, the plants should be bent down and the tops of the shoots covered with a little earth to protect them from the severity of the winter.

CURRANTS are so easily grown that very little pains have been taken with their culture. We frequently see the corners of a crooked rail fence filled up with currant bushes, untrimmed and uncared-for. No wonder if they soon become unfruitful. The ravages of the caterpillars of the gooseberry saw-fly have of late years begun to warn us that we must exercise more care in the raising of currants if we expect a good supply of this useful fruit. The currant should be raised on a single stem, say six inches from the ground. If this was done, the caterpillars could be easily shaken from the bushes, and a little tarred cotton around the stems would prevent them from again crawling up to the leaves. To accomplish this result, the young plants should have all the eyes or shoots removed from the bottom as high up as at least one foot. The top should be annually pruned and the branches shortened in, and such as are feeble cut entirely away. In this way, larger fruit will be obtained and in greater quantity than in the old hedge-row system.

The season for the currant may be greatly prolonged by planting on warm and cool ground. In cool situations, the bushes will retain their fruit all through the month of August and into September.

GOOSEBERRIES.—The mildew is the great drawback to the culture of the gooseberry in this country. The comparatively small American varieties are the only kinds that can be generally relied upon. The large English gooseberries are very liable to this disease. A cool and somewhat shaded spot is considered most suitable to the gooseberry in this country. The ground should be well and deeply enriched, and the plants somewhat severely pruned to increase their vigor and secure a healthy growth of young wood. Moisture is very essential to the gooseberry, and soapsuds are said to be highly beneficial. A good deep mulch of manure during the season is desirable for the same reason.

The BLACKBERRY is somewhat a new variety in our gardens. But there is no reason why we should depend on the supply of wild fruit. The blackberry is greatly improved in size by cultivation. As the fruit ripens during the hottest and dryest season, care should be taken to provide a supply of moisture while the fruit is forming and ripening. Rich, deep, moist soil should be selected (if somewhat mucky, all the better), and the plants should be well mulched. Set out the plants in rows six feet apart, and four feet in the rows. The first season nothing need be done except to keep the land clean. A crop of carrots may be drilled in between the plants. The second season it is best to give up the entire ground to the blackberries, and if mulched all the better. The next season the plants should be staked, or trained to a strong wire run along the rows, two and one-half feet from the ground, to which the bearing canes are fastened. The pruning consists in removing the old bearing canes, and shortening the new shoots early in the spring.

We are often asked for a short list of varieties of fruit suitable for general cultivation in the Eastern, Middle and Western States and in Canada West. It is not easy to give such a list of varieties possessing the most desirable qualities, but we think the following may be relied upon. They are all first-class varieties, and although there are many other sorts which possess certain advantages which we can not well dispense with, yet this list contains those which combine in themselves the greatest number of valuable qualities for general cultivation, and will be found entirely reliable in quality and productiveness. Those who plant them may feel sure of having good fruit. Those that are somewhat tender and unsuited to the extreme north are marked by a *.

APPLES.

SUMMER.—American Summer Pearmain, Early Harvest, Early Strawberry, Large Sweet Bough, Red Astrachan.

FALL.—Fall Pippin, Gravenstein, Jersey Sweet, Porter, Rambo.

WINTER.—Baldwin (in some parts of the West, Rawle's Janet is preferable to this sort, especially Southern Ohio, Indiana, Illinois and Kentucky), English Russet, Fameuse, Rhode Island Greening, Roxbury Russet, Talman Sweeting, Westfield Seek-no-further, Yellow Bellefleur.

PEARS—STANDARD.

SUMMER.—*Bartlett, Dearborn's Seedling, Doyenné d' Été, Rostiezer, Tyson.

FALL.—Sheldon, Flemish Beauty, Onondaga or Swan's Orange, Oswego Beurré, Seckel.

WINTER.—Lawrence, Vicar of Winkfield, Doyenné d' Alençon.

PEARS—DWARF ON QUINCE STOCK.

SUMMER.—*Bartlett (sometimes breaks off at the union), Brandywine, Doyenné d' Été, Osband's Summer, Rostiezer.

FALL.—Beurré d' Angou, Beurré Diel, Buffum, Duchesse d' Angouleme, Louise Bonne de Jersey.

WINTER.—Doyenné d' Alançon, Easter Beurré (sometimes does not mature well far north), Glout Morceau, Lawrence, Vicar of Winkfield.

CHERRIES.

HART AND BIGARREAU VARIETIES.—Belle d' Orleans, Black Tartarian, Elton, Gov. Wood, Knight's Early Black, Bigarreau or Yellow Spanish, Napoleon Bigarreau, Elkhorn, Cleveland Bigarreau, Rockport Bigarreau.

DUKES AND MORELLOS.—May Duke (early), Belle Magnifique (late), Royal Duke (late), Reine Hortense, Early Richmond (cooking).

Many of the Heart and Bigarreau varieties are tender in severe climates. When this is the case, the Dukes and Morellos should be employed, worked on the Mahaleb to render them dwarf. Dwarf and pyramidal shaped cherry trees are now fast superseding, in the colder parts of the country, standard trees worked on Mazzard stock.

PLUMS.

Jefferson, Washington, *Coe's Golden Drop (ripens late), Smith's Orleans, Duane's Purple, Lombard, Laurence's Favorite, Huling's Superb, Yellow Egg, Blue Damson.

PEACHES.

The following are good varieties, suitable for orchards wherever this delicious fruit thrives:

Serrate Early York, Coe's Early Red, Cooledge's Favorite, Oldmixon Freestone, Morris' White, Crawford's Early, Crawford's Late, Red Cheek Melocoton, Jacque's Rareripe, Bergen's Yellow, Oldmixon Clingstone, Lemon Cling.

GRAPES.

*Catawba, Clinton, Concord, Delaware, Diana, Hartford Prolific, Isabella, Rebecca.

RASPBERRIES.

Brinckle's Orange, Fastolf, Hudson River Antwerp.

STRAWBERRIES.

Jenny Lind, Hovey's Seedling, Large Early Scarlet, Triomphe de Gand, Crimson Cone, Wilson's Albany.

CURRANTS.

Red Dutch, White Dutch, Cherry, Victoria, White Grape, Black Naples.

GOOSEBERRIES.

Houghton's Seedling, Whitesmith, Crown Bob, Warrington

ANNUALS AND THEIR CULTURE.

WRITTEN FOR THE RURAL ANNUAL, BY JAMES VICK, ROCHESTER, N. Y.

FLOWERS known as ANNUALS are those that flower, perfect their seeds, and die the same season that the seeds are sown. Some varieties that are annuals with us are Biennials or Perennials in a more congenial climate. Within the past ten years much attention has been given by the best florists in the world to the improvement of Annuals, and they are now worthy the attention of every lover of flowers. Only a few years ago, the Aster was a poor, single, or at best semi-double flower, having a ragged, unsightly appearance; now, it is one of our most beautiful autumn flowers, as double as the Peony or Chrysanthemum, and almost as elegant as the Rose.

Those who commence a flower-garden must depend mainly upon Annuals for blossom and beauty the first year, while they are peculiarly adapted to the residents of cities and villages, who change their place of abode quite frequently. But no collection of flowers can be considered good without an assortment of Annuals, for, with the exception of the spring months, they furnish the principal adornments of the garden.

ANNUALS are generally classed as *hardy*, *half-hardy*, and *tender*. The *hardy* are those that may be planted in the Autumn, or very early in the Spring, like the Larkspurs; *half-hardy*, those that should not be planted in the open ground until the atmosphere and soil are warm, like the Balsam; and *tender*, those that require usually some nursing to bring them forward, like the Sensitive Plant.

VEGETATION OF SEEDS.

It is fortunate that our best Annuals are pretty hardy, and may be grown out-of-doors with perfect success, in a favorable soil. And yet many fail, and not one-half of the seeds sown are seen again after being committed to the earth. Disappointment and vexation is the result, and we will endeavor to point out briefly the cause and the remedy.

Many seem to think that seeds will grow anywhere and under any circumstances. They have observed the farmer make a hole and throw his corn in, and in a little while it was up and growing vigorously. They have learned, too, that the seeds of our native trees and weeds grow without planting and care, and from these facts they get the idea that it is of little consequence how or where seeds are planted, so that they are in the ground. But, these should remember that the seeds planted by the farmer produce stronger and more robust plants than those of the florist, and thus are enabled to bear more hardships and to live under more unfavorable circumstances. Still, the farmers are fast learning that the better they prepare the ground, and the more they study the nature and wants of the plants they cultivate, the better the crop. Another fact should be remembered, that not one seed in a thousand matured by our forest trees and shrubs, produces a living plant. We can not afford to purchase costly seeds and lose such a large proportion, which we shall do if we plant in the same manner. Our weeds are hardy and prolific, very tenacious of life, and are able to propagate themselves under the most unfavorable circumstances, otherwise they would not be weeds. Most of our troublesome weeds are of foreign origin, the seeds being brought here by accident. Perhaps the largest part thus introduced have lived for a season and perished unnoticed, while the hardiest became naturalized. If the florist would be satisfied with only the most hardy and prolific flowers, such as would take care of themselves, then he might pursue a careless system of planting and cultivation, fill his garden with dandelions and poppies; but he wants the rare and beautiful flowers of every land, as far as climate will permit, to adorn his garden. He must have those that flourish naturally in warmer climes, and under more genial skies, and to do so, care and skill is required, and a different system of culture than is necessary for the propagation of weeds.

There are others who have altogether an exaggerated view of the difficulties to be encountered in the growth of plants from seed. These views may have been the result of repeated failures. They think a Hot-Bed or a Green-House essential, and that without these conveniences little can be done in growing valuable plants. This is not the case, yet it is a fact that in a Hot-Bed, if properly managed, seeds will grow freely; and it is well that we should ascertain why this is so.

In the first place, however, we will examine the causes of failure. If fine seeds are planted *too deep*, they either rot in the damp, cold earth, for the want of the warmth necessary to their germination, or after germination perish before the tender shoots can reach the sun and air, so that that which was designed for their support and nourishment proves their grave.

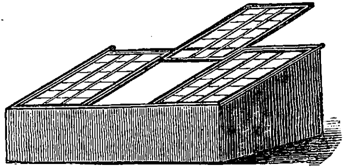
If the soil is a *stiff clay*, it is often too cold at the time the seeds are planted to effect their germination, for it must be understood that *warmth* and *moisture* are necessary to the germination of seeds. Neither of these will do alone. Seeds may be kept in a warm dry room, in dry sand or earth, and they will not grow. They may be placed in damp earth, and kept in a low temperature, and they will most likely rot, though some seeds will remain dormant a long time under these circumstances. But place them in moist earth, in a warm room, and they will commence growth at once. Another difficulty with heavy or clay soil is, that it becomes hard on the surface, and this prevents the young plants from "coming up," or, if during showery weather they happen to get above the surface, they become locked in, and make but little advancement, unless the cultivator is careful to keep the crust well broken.

If seeds are sown in *rough, lumpy ground*, a portion will be buried under the clods and never grow, and many that start will not find a fit soil for their tender roots, and perish. A few may escape these difficulties, and flourish.

All of the above cases show good reason for failure, but there is one cause of failure in which the reason is not so apparent. The soil, we will suppose, is well prepared, fine as it can be made, and of that loamy or sandy character best fitted for small seeds. We will suppose, too, that the seeds were sown on the surface with a little earth sifted over them, and that this was not done until the season was so far advanced as to furnish the warmth necessary to secure vegetation. Under these very favorable circumstances many seeds will grow, and if the weather is both warm and showery, very few will fail. But if, as is very common at the season of the year when we plant our seeds, we have a succession of cold rain storms, many will perish. A night's frost will ruin many more. If, however, the weather should prove warm and without showers, the surface will become very dry, and the seeds having so slight a covering will be dried up and perish as soon as they germinate, and before the roots attain sufficient size and strength to go down where the soil is more moist.

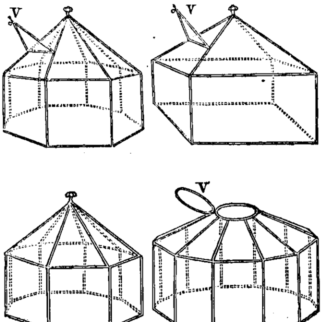
It is to overcome these evils that *Hot Beds* are useful. By being protected on the sides and ends with boards and covered with glass, they confine the moisture which arises from the earth in mist, and thus the atmosphere is kept humid and the surface moist, and the plants are not subjected to the changes of temperature, as a uniform state can be maintained, no matter what the weather may be. The bottom-heat of the hot-bed warms the soil, and enables the grower to put in his seed early, and obtain plants of good size before the soil outside is warm enough to receive the seed. The principal advantages of the *Hot-Bed*, however, can be secured by what is called a *Cold Frame*.

This is simply a hot-bed frame, with sash, as shown in the engraving, placed upon a bed of fine, mellow earth, in some sheltered place in the garden. By the exclusion of air, and the admission of sun, the earth becomes warm, and the moisture is confined, as in the hot-bed. After the frame is secured in its place, a couple of inches of fine earth should be placed inside, and the frame closed up for a day or two before the seeds are planted. As the cold-frame depends upon the sun for its warmth, it must not be started as soon as the hot-bed, and in this latitude the latter part of April is early enough. Plants will then be large enough for transplanting to the open ground as soon as danger from frost is over, and as a general thing they will be hardier, and better able to endure the shock of transplanting, than if grown in a hot-bed. A frame of this kind any one can manage. Watering occasionally, will be necessary, and air must be given on bright, warm days.



Hot-Bed Frame.

These frames when so small as to be conveniently moved by the hand, are called *hand-glasses*. A simple frame or box, with a couple of lights of glass on the top, will answer a very good purpose, though when small it would be better to have the front of glass. A very good *hand*-glass is made of a square frame with a light of glass at each side and on the top. These contrivances, though so simple as to be made by any one handy with tools, are exceedingly useful, as they prevent the drying of the surface of the ground, and afford the plants shelter from sudden changes of the temperature, cold storms and frosty nights. The annexed engravings show several forms of which they may be made.



When these conveniences are not to be had, make a bed of light, mellow soil, in a sheltered situation in the garden, and as soon as the weather becomes settled and the ground warm, sow the seeds, covering them with a little fine earth, and if very small, sift it upon them. Some one has given as a rule that seeds should be covered twice the depth of their own diameter, that is, that a seed one-sixteenth of an inch through should be covered one-eighth of an inch. Perhaps this is as near correct as any general rule can be. If the weather proves very dry after sowing, it is well to cover the beds of small seeds with damp moss, or what is better, with evergreen boughs. Those who heed these hints will have little cause to complain of poor seeds, if they deal with honest seedsmen who understand their business.

After the plants in these beds have obtained their second leaves and made an inch or two of growth, they should be removed to the garden beds or border. This should be done on a dull showery day, if possible; if not, the plants may require shading after removal until they become established. Remove them with the transplanting trowel, and disturb the roots as little as possible. If the plants are not too thick, this is not difficult, and in sowing it is well to have this in view, and sow evenly and thin. As soon as the young plants come up, if too thick, a portion should be removed.

A few plants, with long tap-roots, will not bear removal well. The Larkspurs are the most difficult, and the Poppies and Seabious, and the Bartonia aurea, it is best to sow where they are to flower. Still, there are but few plants but can be removed when young.

SOIL FOR THE FLOWER GARDEN.

The best soil for the garden is a mellow loam, but almost any fair soil can be made suitable by *draining*, *deep digging* and *enriching* with good stable manure, or compost made of stable manure, leaves, sandy loam, etc. If the soil is heavy, sand and ashes may be applied with advantage. The compost or manure, if well mixed with the soil, will mellow it, and work a decided change in its texture in a few years. The thorough preparation of the soil is a very important matter, in fact, the foundation of all good culture, and must not be slighted. We would recommend that the ground should be dug and mellowed thoroughly eighteen inches deep. This may be considered troublesome, but it must be remembered that in the garden everything must be grown in the highest perfection to afford pleasure. If we would obtain flowers such as are described in the journals that treat of gardening, and are figured in colored plates, we must give them the very best of fare. This is the reason why some are disappointed. They read descriptions of choice things, and purchase seeds at a high price, but at the time of flowering they find they are not what they anticipated. The description which induced them to buy was of flowers well grown; they have given theirs no more care than they would a cabbage or a hill of corn: hence the difference.

DESCRIPTION OF A FEW GOOD VARIETIES.

The Annual Phloxes (*Phlox Drummondii*) are among the most beautiful and constant flowers of our gardens. They are now grown of almost every desirable color, except yellow, from the most brilliant crimson and scarlet to the most delicate rose, while the newer varieties are of every shade of bluish purple, striped, and white, with a conspicuous eye or central spot. The variety of colors thus displayed

Phlox Drummondii.

in a bed of these flowers must be seen to be appreciated. No floral display can be more beautiful. Seed may be sown in the hot-bed or cold-frame, or in a warm spot in the garden. If sown about the first of May, they will be in flower in July, and will continue in bloom long after the first frosts of Autumn.

The Double Balsam, or Lady's Slipper, as it is sometimes called, is a beautiful and showy flower. They require a warm and rich soil, and will grow, under favorable circumstances, two feet high. The new varieties, called by the French, *Camellia*, or *Rose* Balsams, are perfectly double. The objection to this flower is, that the leaves conceal the blossoms, and the side shoots hide the centre shoot, so that half the flowers cannot be seen. But if the soil is enriched with liquid manure just as the buds are forming, it will wonderfully enlarge the flowers at the expense of the foliage. In this way, we have made the branches appear like wreaths of flowers. Another plan we have pursued, is to pluck off the side shoots, allowing only the main shoot to grow.

The Ten Week Stock is one of the best of the Annuals, and is of

German Ten-Weeks Stock.

The Single Zinnia.

every variety of color, from white to the darkest purple and brown. Plants should be transplanted to where they are to bloom, as soon as they show the third pair of leaves. They have a long tap root, something like a carrot, and unless transplanted young, receive a check from which they seldom recover. They grow from a foot to eighteen inches in height, with an erect, branching stem, downy leaves, and long spikes of beautiful flowers.

The ZINNIA, DOUBLE and SINGLE. All readers, no doubt, are acquainted with the old Zinnia family, of which Zinnia Elegans was the popular type — a rather coarse but showy and popular annual, remarkable for the variety and brilliancy of its colors. It is well worthy of cultivation; but in the Autumn of 1860 the horticultural world was taken by surprise, on seeing it announced in the European horticultural journals that VELMORIN & Co., of Paris, had exhibited before the London Horticultural Society a number of perfectly double Zinnias, as all previous attempts in this direction had proved entire failures. Seeds were obtained last spring, and we have had the satis-

The Double Zinnia.

faction of seeing perfectly double Zinnias in this country the past Summer. Less than one-third of the seeds sown have as yet given double flowers; but even this will well repay, for what can be imagined more beautiful than a Zinnia, more double than the most perfect Dahlia?

The China Aster, at its first introduction from China in 1730, was a single flower with only two colors, red and white. The Germans have been very successful in its improvement, and the finer sorts were for a long time called German Asters. The French have, however, of late years, taken precedence of the Germans in the improvement of the Aster. There are now eight or ten exceedingly fine varieties, and almost every year adds to the list. They are called Chrysanthemum-flowered, Peony-flowered, etc., from a resemblance to those flowers. The *Giant Emperor* is a monster in size, but we have not yet seen it very perfect in form. The *New Crown*, or *Two-Colored*, is of two colors, a few rows of the leaflets on the outside being red or purple, and the

The China Aster.

The Rocket Larkspur.

inside creamy white, making a most attractive flower. *La Superb* is of large size, fair form, and one of the most brilliant and showy of the whole family. There are several varieties rather dwarfish in their habits and most profuse bloomers, called *Dwarf Bouquet Flower*. Each plant forms a bouquet or pyramid of flowers, the leaves being almost concealed by the bloom. The Aster is our best Autumn flower. It bears transplanting well.

The Annual Larkspurs have been great favorites for more than two centuries. The *Double Dwarf Rocket* is of a compact habit of growth, and its flowers are set thickly around a stem, forming a fine spike of bloom. It requires a rich soil to grow to perfection, and there are few plants that will better repay good culture. The seed should be sown in drills, where the plants are intended to blossom, as they will not bear transplanting. From their compact habit of growth, they require but little room, and may grow within two or three inches of each other, and produce the best effect when grown in masses. The *Dwarf Hyacinth Flowered* is an excellent variety, and so is the *Double*

The Golden Bartonia.

Stock Flowered, which is of pretty tall growth. The latter is particularly desirable for bouquets. All the Larkspurs should be sown as early as possible in the Spring.

The GOLDEN BARTONIA is truly a most brilliant flower. We give Dr. LINDLEY's very accurate description:—"It is only beneath the bright sunshine that its splendid flowers unfold. In the early morning the plant is a shabby bush, with pale greenish-grey branches, and weedy leaves; but as the sun exercises his influence, the petals gradually unroll as if in acknowledgement of his power, till every branch is radiant with gold; and so metallic is the lustre of the inside of its petals, that one would really think they must be composed of something more solid and enduring than the delicate and perishing tissue of a flower." It was brought from California in 1835. The seed should be sown in a rich, moist soil, and in a sheltered situation, as the branches are very brittle, and easily broken by the wind. The Bartonia is very difficult to transplant, and should be sown where the plants are to flower.

The Godetia.

The GODETIAS are a very interesting class of flowers.—There are several varieties, differing in habit of growth and color. The prevailing colors are white, purple and pink, with a bright blotch at the base of each petal. The flowers cluster rather loosely around the flower stem,—forming an open spike some 6 inches in length. The Godetias deserve general cultivation.

The PORTULACCA is a succulent plant, that flourishes in the hottest, driest weather, and on the sandiest soil. The blossoms are of almost every shade of yellow and red, and white and striped. They have an exceedingly brilliant lustre, dazzling to the eye in the sunlight. When once planted, they seldom require replanting, as they grow like weeds, particularly on a sandy soil. The Portulucca may be sown where it is to flower, or may be transplanted at any time.

The GILLARDIAS are an interesting and showy family, though not often seen in our gardens. When sown in a hot-bed or cold frame, they commence flowering the first season in July, and will continue until frost. For sowing in the open ground, a dry location and a warm soil should be selected. There are several varieties, differing principally in the markings, the prevailing colors being dark red, orange, and yellow. *Aristata* has yellow rays. *Bicolor*, crimson and yellow. *Picta*, orange, red, and yellow. *Alba marginata*, dark red, edged with creamy white. No flowers furnish more brilliant yellow and orange colors, particularly desirable for bouquets.

The Gillardia.

SALPIGLOSSIS. — There are many varieties of this flower, differing only in color and size, some being dwarfish in their habit. The flowers are funnel-shaped, like the Petunia, but not so broad. We generally sow them about the first of May, where they are to flower, and in July they are in full bloom. We find them to flourish best on a light, dry soil. It is a native of China, and was first introduced into Europe in 1824.

SWEET PEA, (*Lathyrus odoratus*,) has been popular as long as we can remember, and is one of the most fragrant and beautiful of our annual flowers. It can now be obtained of almost every color, from white to the darkest purple, as well as striped. Seed should be planted just as soon as frost is out of the ground.

MARVEL OF PERU, (*Mirabilis Jalapa*,) we think a very desirable plant. The flowers exhibit a great variety of colors and beautiful markings of white, pink, and yellow. Seed may be sown in a hot-bed or cold frame, or in the open ground about the last of April. In rich ground it will grow nearly three feet in height. It will endure a little shade, and flower the better.

The CONVOLVULUS MINOR, or Dwarf Convolvulus, of which there are several varieties—some of them new and exceedingly fine—is one of the most beautiful of our hardy annuals. The prevailing color is blue, the form of the flower like the Morning Glory, though there are striped, white and double sorts. They grow about eighteen inches in height, and make a showy bed or border. The seed should be sown in the open ground as early as possible. The plants must not be allowed to stand at a less distance than a foot apart.

CLIMBING PLANTS.

No class of plants are more interesting and useful in the hands of the tasteful gardener, than the climbers, for covering arbors or fences, shading windows, etc. First in importance among these is that old favorite, the CONVOLVULUS MAJOR, or Morning Glory, an annual of easy culture and consisting of many varieties, differing in color, as rose, purple, striped, etc. The seeds may be sown early in spring, and support must be provided before the plants show a disposition to climb.

The COBEA SCANDENS is one of the most beautiful of the climbers. If grown in a hot-bed and transplanted in May, it will make a growth of from twenty to forty feet, and afford a delightful shade. The flowers are bell-shaped, large, and purple. The leaves are fine, and the tendrils, which are very delicate and thread-like, attach themselves to anything within reach. If the plants are set out in a large pot or box, they may be taken up and removed to the house in the autumn, and will there flower, making a most admirable winter ornament. The Cobea should be planted in a warm situation, if possible.

The IPOMEA, or Cypress Vine, is another excellent climbing annual, that like the preceding needs a warm situation. The seed may be sown in the open ground during the latter part of May, but it is far better to grow plants in a hot-bed, and transplant about the first of June.

EVERLASTING FLOWERS.

All lovers of flowers feel regret when the buds and blossoms have passed away. Hence our efforts to keep them with us during the whole year, by means of conservatories and pot plants. In the early winter we miss the bouquet from our table, and long for its gay and delicate colors and its delightful fragrance. We have a class of flowers that though destitute of fragrance, retain all the beauty of form and color for years, and therefore are exceedingly useful in the formation of Winter Bouquets and Floral Ornaments. We will describe a few of the best.

The GNAPHALIUMS are most common in Europe, but the better varieties are perennial, and not hardy in this climate. We have several species growing wild on poor soils, but they are of little value.

The HELICHRYSUM is, perhaps, the most interesting and showy family of the everlasting flowers. There are several varieties, all annuals, differing in color and size of flower, some being very double. They are white or cream color, bright yellow, a reddish bronze, and dark, brownish red. For preserving, the flowers should be picked as soon as they open, and they will keep their natural appearance for years.

For the sake of variety, it is best to pick a few buds as well as flowers in different stages of maturity.

The GLOBE AMARANTH, (*Gomphrena globoso,*) is one of the best known of this class of flowers. There are several varieties, differing in color, as the red, flesh-colored, yellow, etc.

RODANTHE MANGLESII is the name of another beautiful annual Everlasting. It is a native of Australia, and was introduced into England some years ago by Capt. MANGLES, from Swan River. It is rather tender in its habit, and will require more attention in the earlier stages of growth than some of the others. It is a beautiful rose color, and has a fine effect in beds or masses in bright weather.

ACROCLINIUM is another fine immortelle, resembling the last somewhat in form of flower, but the blossoms are larger, and it is hardier. There are two varieties, *album* and *roseum*, both desirable.

The XERANTHEMUMS are another interesting family of Everlasting flowers, white and purple in color.

With the above, and a few of the ornamental grasses, bouquets can be formed of great beauty, that will endure for years.

STRAWBERRIES.—A. S. FULLER, of Brooklyn, in an article on strawberries, in the *Horticulturist*, says *Wilson's Albany* is one of the most productive varieties known, (which is doubtless true,) but that it is too acid to become a general favorite. He states, however, that if the fruit is allowed to remain on the vines for two or three days after it colors, it becomes mild and quite good. *Triomphe de Gand*, he thinks, "is the first, if not the only variety of foreign origin that has given anything like general satisfaction. It is magnificent in all its proportions, a strong grower, hardy and productive; fruit very large, flesh firm and very sweet, but rather deficient in flavor." *Hooker* he places at the head of the list for flavor, but with him it is not hardy or productive. (It is apt to winter-kill in this section.) *Bartlett*, a hardy native variety, valuable for field culture, as it is very productive even when quite crowded. He thinks the flesh is too light colored for a popular sort. *Jenny Lind*—very early, hardy, and productive.

APHIDES ON TREES. — These little insects were unusually numerous last year, both in this country and in England. A correspondent of the (London) *Gardeners' Chronicle* recommends syringing the trees, shrubs, etc., with the following mixture :—1 lb. refuse Barbadoes aloes, coarsely powdered; 4 lbs. best soft soap, boiled gently in a gallon of water, stirring frequently for two hours. This to be added to 5 gallons of hot water, in which several handfuls of bruised bay leaves have been infused for an hour; and when poured off from the sediment may be occasionally applied with a light syringe, whilst the young leaves are expanding; the mixture, when dry on the foliage, leaves a film which the aphis will avoid. Let the under surface of the leaves be syringed, as well as the upper.

LOW HEADED TREES.

William Bacon, of Mass., furnishes an able article for the *Horticulturist* on "Low Trees versus High ones." He is much in favor of the former. They are less exposed to severe winds, have less wood, and can elaborate more sap for the fruit, and are less affected by diseases, insects, moss, etc. He says:

"The best specimen of an apple-tree we ever saw made its head so near the ground that a person can without difficulty step into the lower branches, and these branches spread so low that the fruit can be gathered without difficulty by a person standing on the ground. They are long branches, and the top of the tree forms a symmetrical hemisphere. Neither the axe nor the saw has been accessory to forming that tree-head. The hand and the pruning-knife directed the first starting of these branches, and here they stopped, unless two combatant branches so interfered with each other's rights that one of them must be removed. This tree-top is so dense and so wide, that the hot midsummer sun can not send his fiery rays to scorch the unprotected part of the tree. They fall upon its leafy head, and the warm atmosphere is diffused along the trunk and among the branches. No insects have ever disturbed the tree, unless it were some straggling worm that so far forgot the rules of propriety and honor as to commenee its web among its branches. And what is far better, it has never failed of a crop since it commenced bearing."

The editor of the *Horticulturist* remarks that low-headed trees also come into bearing earlier.

The Delaware Grape.—The only drawback to this delicious grape is that the bunches are only of medium size. Tho editor of the *Horticulturist* states, however, that "we do not yet know its capabilities; it is increasing in size every year." He has seen "bunches this year that would weigh half a pound each, and a few that would weigh three quarters of a pound, with berries nearly or quite as large as the Diana." He thinks it is "one of the most productive grapes in cultivation—the most valuable grape we have." We can cordially endorse the *Horticulturist* in its favorable opinion of the Delaware. We know of no better, hardier and more productive grape. Size alone is a poor test of merit—big things are seldom the best. The little *Seckel* is the best-flavored pear we have. The small *Pomme Grise* is one of the best varieties of apples. This popular taste for large fruit should be corrected. Quality first, and size afterwards. Time was when gardeners made a point to get large bunches of grapes. Now, in England especially, the fashion is for less size. Two bunches of Black Hamburghs, weighing a pound each, are considered preferable to one bunch weighing two pounds. No one person wants so large a bunch.

ON THE MANUFACTURE OF DOMESTIC WINES.

WRITTEN FOR THE RURAL ANNUAL, BY C. N. BEMENT.

THE Vine, although held in the emblematical catalogue of plants as the prototype of intoxication, is nevertheless the prolific parent of rare and enviable luxuries. There is no period in the history of man, in which the Vine is not mentioned in language of grateful testimony, that it is a blessing of the highest value. If Bacchus, who is said to have first taught the use of the grape in making wine, had originated the device of manufacturing this exciting beverage in the Nineteenth Century, the people would undoubtedly have held him in as high and grateful esteem as did the Grecians, who conferred upon him the exalted title of a god.

Wine as a beverage is, after water, the most ancient of drinks; it has had the good fortune to be praised in prose and verse, by the writers of every age and climate; throughout Europe it is the favorite beverage of the cultivated classes; and as it agrees with almost every healthy stomach, so it is, in most cases of debility, the best of tonics. The French wines, especially the red, are considered the most healthful, and they will obtain the preference where the taste for other wines has not been vitiated.

The manufacture of wine is one of the simplest operations, and may be done by any one of ordinary capacity. You can crush the juice from a bunch of grapes with your hands, put it into a bottle, tie a piece of cloth over the top, and it converts itself into wine without other human assistance. Let us see now what has caused this change. Pure grape juice contains sugar; fermentation simply converts the whole or a portion of sugar into alcohol. When this conversion is complete, the fluid in the bottle is no longer grape juice, but WINE. It is surprising to think how many there are who set their faces against and will not believe this simple and beautiful miracle.

Upon the quantity of sugar in the grape-juice depends the strength of the wine. Some grapes have but little saccharine, and therefore it is necessary to add sugar to make it strong enough to keep: or, which is worse, brandy or spirits of some kind is added, either before or after fermentation. But we can not do a greater service to our domestic wine-makers, than by pointing out to them that the addition of spirits to the wine is an evil of the first magnitude. The great difficulty with the domestic wine-maker is this: "If I do not add spirits to the wine it will not keep." Not so. If, after you have squeezed your bunch of grapes and made your wine, you do not cork it tight, you will undoubtedly have vinegar. But if you do cork it up, the wine will keep for many years. The only way to keep wine, is to exclude the atmosphere.

One of the most essential things to be observed in the manufacture of wine is in the proper regulation of temperature. If too cool, the fermentation is too slow and apt to sour, while if there is too much heat it will soon go into the acetous state. The best general temperature is between 62° and 64° F. There is little difficulty in maintaining this temperature in a cellar, but it may be observed that the act of fermentation elevates the temperature.

American wines now hold a high rank in the markets of this country, and their fame is fast spreading over the world. In Europe they are exciting quite an interest. The wines of Mr. LONGWORTH, of Ohio — his sparkling Catawba and Isabella — are of the highest character, and are found upon the tables of the nobility and gentry of Europe. His still wines also, of the same name, are of a superior character, and the success which has attended their manufacture and introduction over the world is without precedent. They are also the subject of much discussion in France, among the vintners of long standing.

What will contribute more towards arresting the progress of intemperance in our country, than the manufacture of light, pure and wholesome fruit wines, to be used instead of the brandied and adulterated stuff at present used among us? Our fruits are well adapted to the purpose, and nothing we can see is wanted to effect so desirable an object, but experience, industry and perseverance. We think that if our citizens would consider the great expense, risk and uncertainty of being supplied with wine from the usual source, and with what ease and trifling expense a wholesome and better wine may be made from the materials of our own country, they would use greater exertions than heretofore; and as we have heard of many who have tried, and their wine has spoiled, we will give a few simple recipes for the manufacture of the various kinds of fruit wines, for domestic use.

There has been so much mystery thrown around wine-making, that many are deterred from the effort, that have abundance of grapes. But every family that has two grape-vines on the lot, may make wine enough for home consumption, better and cheaper than they can import from the grocer's factory.

The manufacture of wine is a more simple process than that of cider. Cleanliness and careful exclusion of unripe and decayed fruit, are the great requisites. The reason so many have failed in the manufacture of domestic wine is, that instead of making American wine, they have, by the process of manufacture, attempted to produce an imitation of popular foreign wines. The *Isabella* and *Catawba* are the American grapes most in use for the manufacture of wine.

GRAPE WINES.

ISABELLA.—We gather the grapes when fully ripe, in clear dry weather, look over the bunches, and pick out all the imperfect and decayed berries. Now, have a tub or trough perfectly clean and sweet, and crush the bunches on the stems by hand; as the tub is filled, empty the mass into another tub or vessel equally clean and sweet, and so continue until all the grapes are mashed; stir the whole mash together in the tub, and leave it for fermentation; in a few hours bubbles will begin to rise, and in twenty-four to thirty-six, the mass will become so agitated that it will appear to boil; watch it closely now, and as the fermentation subsides, put the mass into strong bags, and either by screw or some strong lever power, (we use a small portable cider press,) press the juice out; after all the juice is extracted, place it in a clean vessel and try its strength: if an egg will float in it so as to show the size of a twenty-five cent piece, the juice will keep without the addition of sugar; if the egg sinks, add good refined sugar until it rises. Be sure that the egg is fresh. Now strain the juice through a grass-cloth or fine hair sieve, into a sweet cask,— five, ten, twenty, or thirty gallons, according to the quantity of liquid. Set the cask in a quiet, cool cellar; leave the bung out, and from a pitcher of the juice, which should be reserved for the purpose, fill up the cask three, four or five times a day for eight days; in the mean time, all the impurities in the juice will work out at the bung-hole; let it remain eight days longer, then drive the bung in and seal up the cask as tight as possible. Let the cask remain perfectly quiet, and any time after the March following—better when one year old—it may be bottled. It will be no injury, however, to the wine, if it remain on the lees for two or three years before it is bottled, as it ripens better upon the lees; but it may be used as soon as the March after making.

The following recipe for making *Isabella Wine* is given by an experienced fruit-grower in Western New York:

"When the grapes are fully ripe, and have been removed from the vines to the place assigned them for making the wine, they should be assorted, and all the green and decayed ones removed. Then put them into a barrel, about a bushel at a time, stems and grapes, and pound them thoroughly till all the grapes are mashed. Continue the process till all are finished that you wish to make up at a time. The next process is to press out the juice. Then add to every gallon two pounds of refined sugar, and stir it thoroughly till all the sugar is dissolved. It is then put into barrels for the purpose of fermentation, there to remain, with frequent filling up to supply the waste, till the pomace is all fermented off. A supply of the juice should be on hand for that purpose. The barrels should not be bunged up tight until the fermenting process is about completed. This may be easily ascertained by placing your ear to the bung.

If in April or May the wine should be found clear, it may be racked off; but if unsettled, it should be left till fall. If the wine is found to be just what you want at the time of racking, bottle as much as you choose; but if not, let it remain on the lees, and the article will increase in character and strength. We would remark that all grapes in this section of the country do not contain sugar enough, or saccharine matter, to make good wine, without the addition of sugar."

The *Clinton* Grape, as known in these parts, is considered the best adapted to making a high-colored wine. This grape has a small berry, but is very hardy, and always matures itself in good season. This, with the *Isabella* combined, is said to make an excellent wine.

Isabella grape wine, on a small scale, may be made by picking the fruit in clear dry weather when *perfectly ripe,* and after divesting the bunches of all the immature and decayed or decaying berries, put them in a tight box or tub, and mash them with a pestle or pounder, having the lower end square. Reduce the fruit in this manner to a fine mass, *but do not break the seeds* while pounding. The next process is the extraction of the juice, which may be done by placing the mass in a coarse bag or sack, and submit it to pressure. If a cheese or portable cider press is at hand, make use of it; otherwise place the bags between two planks and lay stones on them. When the juice ceases to run, remove the pomace to a tub, and after breaking the cheese fine, sprinkle on a small quantity of clear, soft water, to dissolve and draw out the remaining juice. When all the juice is expressed, (which is usually from 12 to 16 quarts per bushel of grapes,) to each quart of the juice add half a pound of white granulated sugar, stirring and shaking it until all the sugar is dissolved. Put the liquor into a clean cask, which should be full, in order that the impurities may flow over by fermentation at the bung. Some of the liquor should be reserved in a pitcher or bottle, to fill up as often as it sinks below the bung. After eight or ten days, put in the bung tight, and let it rest in a cool, dry cellar, there to remain until March, when it should be racked off into a clean cask, well sweetened with a brimstone match burned within. As the wine undergoes several changes the first year, it is well to let it remain in that state until late in the fall, when it should be again racked off into a cask; and if it is not fine and bright, it would be well to fine it with sweet milk, or with the whites of eggs beat up with sand. In the course of a few weeks, if all works favorably, it will be fine, bright, and fit for use.

HUSMANN'S RECIPE FOR GRAPE WINE.

The grapes should remain on the vines until ripe. Pick off all decayed, dry or unripe berries from the branches. Such berries as are not fully ripe may be put into a separate vessel, to make an inferior wine. They may then be bruised in a washing-tub, with a wooden pestle, or run through a mill made for that purpose. Our mill and press is just the thing, as it will thoroughly grind or crush them without breaking the seeds. I then put them into a large receiving or fermenting tub, with a spile on one side to draw off the must or juice. This is covered with a cloth, and the mashed grapes left to undergo a slight fermentation. I generally let them ferment about twenty-four hours, and then draw off the must and press. Some persons press immediately, others let them ferment two or three days. When pressed directly, they will make a light-colored, mild, agreeable wine, which will soon be saleable; if fermented longer, it will make a wine of a dark color, more aroma, and more astringency, but which will keep much better and improve with age. In the whole process of wine making, the utmost cleanliness should be observed.

After fermenting, the grapes are emptied into the press and pressed several times, until the juice is extracted. The juice is then filled into clean, sweet casks, in a cool cellar. Should the casks be new, soak them ten or fifteen days with pure water: they are then scalded out, and fumigated with sulphur. Fill the cask to within three inches of the bung, and lay a vine-leaf with a small sack filled with sand on the bung-hole, where they should remain until fermentation is over, when the cask can be filled with "must," kept separate for that purpose, and bunged tight. In February or March the wine will be clear. It then should be racked into clean casks and bunged tightly. A slight fermentation will ensue, after which it should be racked again, and may then be kept in bottles or casks, as convenient.

N. Longworth, Esq., of Cincinnati, has experimented extensively in the cultivation of American grapes, and the manufacture of wine; and to him are we indebted for the high character of American wines — particularly his Catawbas, which are so highly valued, not only in this country, but in Europe. His opinions are therefore entitled to attention. We extract the following from one of his addresses:

"It is said we can not succeed with the manufacture of wine, because the addition of sugar is necessary to our grapes, to give them the requisite sweetness. I have wine of my own manufacture, now six years old, the pure juice of the grape. But in all wine countries, unless it be in those where light hard wines are made, sugar is added, or its equivalent. In Madeira and Oporto, various methods are resorted to. The grapes are suffered to hang till a bunch of raisins can be plucked,— or a portion of the must is boiled down till its fermenting quality is destroyed, and its saccharine nearly doubled,— or a portion of the unfermented must is mixed with such a quantity of brandy as to stop the fermentation; and these are added to the must of wine. After the wine is perfected, from five to twelve per cent of brandy is added. Even in the sunny clime of Italy, to enable their wine to keep without the addition of sugar, they boil the must, and the wine so made is called 'Vino Cotto.' In Germany and France, sugar is frequently added. But in all these cases, the fermentation is checked before its completion, and the leaven precipitated by sulphuring and frequent racking. From experience, I am perfectly satisfied that it is immaterial whether the saccharine principle be in the grape, or added to the must in the form of sugar.

"The reason so many have failed in the manufacture of domestic wine, is, that instead of making American wine, they have, by the process of manufacture, attempted to produce an imitation of popular foreign wines.

"The *Isabella* and *Catawba* are the American grapes most in use for the manufacture of wine. The first by age becomes good wine. From the *Catawba*, Adam made a rich, sweet wine. The wine which I manufacture from the *Catawba*," says Mr. Longworth, "is a light, dry wine, resembling those of the Rhine, and will successfully compete with any of them; but they are wines now for the first time coming in use among us, and command a high price."

WINE FROM IMMATURE GRAPES.

It often happens that the grapes on the Isabella and Catawba vines do not fully ripen, and are entirely unfit for eating, — in which cases they may be converted into very excellent wine.

Although wine may be made in any stage of their growth, and of any kind of grapes, it is advisable to have them left on the vines until they have attained their full size; and as the skin and stem of the unripe grape have no bad flavor, the grapes may be used in any stage of their growth. Grapes of different sorts and sizes may be mixed together.

The following recipe is for ten gallons, which may be increased to any quantity, by taking the fruit, etc., in proportion.

RECIPE.

To a tub of the capacity of fifteen or twenty gallons, take 40 pounds of immature grapes, (no matter for the variety, whether wild or cultivated,) and bruise them in successive portions, by a pressure sufficient to burst the berries without breaking the seeds; four gallons are then to be poured into the vessel, and the contents are to be carefully stirred and squeezed by the hands, until the whole juice and pulp are separated from the solid matter. The materials are then to remain at rest for a period of from six to twenty-four hours, when they are to be strained through a coarse bag, by as much force as can conveniently be applied to them. One gallon of fresh water may afterwards be passed through the *marc*, (pulp and skins,) for the purpose of removing any soluble matter which may have remained behind. Twenty-five pounds of good clear sugar, either brown or white, (the latter in all cases preferred,) are now to be dissolved in the juice thus procured, and the total bulk of the fluid made up with water, to the amount of ten gallons and a half.

The liquor thus obtained is the artificial *must*, which is equivalent to the juice of the grape. It is now to be introduced into a tub of sufficient capacity, over which a blanket or similar texture, covered by a board, is to be thrown, the vessel being placed in a temperature of 60° to 75° F. Here it may remain for twenty-four hours or two days, according to the symptoms of fermentation which it may show, and from this tub it may be drawn into casks to ferment. When in the cask, it must be filled to the bung-hole, that the scum which arises from the bottom may be thrown out as the fermentation proceeds; and as the bulk of the liquor in the cask diminishes, the superfluous portion of the *must*, (viz., the half gallon,) which was made for the express purpose, must be poured in, so as to keep the liquor still near the bung-hole. When the fermentation becomes a little languid, which may be known by the diminution of the hissing noise, the bung is to be driven in and a hole bored by its side, into which a wooden peg is to be fitted. This peg may be drawn once in two or three days, for a few minutes, to let the air that has been generated escape, and in about three weeks or a month it may be driven in permanently tight.

The wine thus made must be put into a cool cellar, as it is no longer necessary to promote the fermentation process. If the operator is not inclined to bestow any further labor or expense, he may examine it in some clear cold day in January or February, or the beginning of March, when, if it is "fine" and bright, as it frequently will be, it may be bottled without further precautions. To insure its fineness, however, it is the better practice to rack or decant it toward the end of December, into a fresh cask, (fumigated with sulphur,) so as to clear it of its lees. At this time, also, the operator will be able to determine whether it is not too sweet for his views. In this case, instead of racking it, etc., he will stir up the lees so as to renew the fermentation, taking care also to increase the temperature at the same time. At whatever time the wine is racked, it ought to be fined. Sometimes it may be necessary to rack it a second time into a fresh cask, (if the wine is not perfectly bright,) and again repeat the operation of fining. All these removals should be made in clear, dry, and if possible, in cold weather. In any case, it must be bottled during the month of March.

The wine thus produced will generally be brisk, and similar in its qualities to the wines of *Champagne*, with the strength of the best *Sicily*. Circumstances which can not always be controlled, will sometimes cause it to be sweet and siill, and at others to be dry.

Variation of the Process described above.—The skin of the grape, or the whole *marc*, as well as the juice, may be fermented together in the vat or tub, along with the sugar, in the first stage of the process. The fermentation will thus be more rapid, and the wine prove stronger and less sweet, but it will acquire more flavor.

Cream of tartar may be added to the must, in the proportion of six ounces to ten gallons, or one pound to a barrel.

If it is wished to have a very sweet as well as brisk wine, the sugar may be increased five pounds for every ten gallons. And in this case, if the fruit is increased to fifty pounds instead of forty, or in that proportion, and the liquor kept two years in the cask, it will assume a Madeira flavor, and it will be a pleasanter and a better wine than most Madeira now on sale. If the wine is intended to be less sweet — that is, five pounds less to the ten gallons—if it is bottled in *March*, it will, after the month of August or September, be a better wine than the

French Madeira imported. But in all the above processes, if it is bottled in March, it will seven times out of ten sparkle like Champagne. And all sparkling wines, to drink them in perfection, ought to be drank in from twelve to eighteen months after it is made.

To insure briskness without excessive sweetness, the fruit must be increased to 50 pounds, when the sugar is from 25 to 30 pounds. If during the fermentation of wine thus formed, there should appear any danger of the sweetness vanishing altogether, it may be racked off into a cask fumigated with sulphur, and the fermentation checked by fining. Thus it will speedily be fit for use.

CURRANT WINES.

We have found that currant wine, when properly manufactured, has the flavor of the lighter grape wines, and to our taste, is preferable to the ordinary sherry, or Sicily Madeira, and far superior to most of the wines sold in our shops; and in addition we have the satisfaction of knowing that we are drinking a pure, unadulterated wine, free from the admixture of any foreign, fiery spirit, or poisoned by any vile drug of the distiller.

Those who are only acquainted with the old-fashioned, thick, sweet, heavy currant wine, have no idea of the beautifully clear, light, delicate and aromatic beverage made from currants by the process hereinafter described.

To make first quality currant wine, it is essential that the fruit should be allowed to remain on the bushes until it has become thoroughly ripe, but not too ripe. If over-ripe, the currants are usually shrivelled a little, and are then unfit for first quality wine.

The currants should be picked in a dry day, and the juice expressed from them before fermentation commences, which may be in one or two days after they are gathered, in warm weather. In a small way, they may be crushed with the hands, the same as for jelly, or bruised in a tub, and the juice expressed in a coarse cloth, by squeezing with the hands. On a larger scale, they may be crushed between the rollers of a small cider mill, and the juice extracted in the press.

Recipe No. 1.—Pick the currants when fully ripe, and before they begin to shrivel and dry on the bushes. Mash them in a clean tub, with a pounder, being careful not to break the seeds, and strain out the juice through a bag of open texture, or by means of a press; if a cheese or small cider press is at hand, make use of it. To every gallon of juice add two gallons of clear, soft water, and to this mixture, three pounds of first quality white sugar to each gallon. After thoroughly dissolving the sugar in the juice, put it into a keg or cask, according to the quantity you have, and fill up to the brim, so that the liquor comes up even with the bung-hole; this is to admit of the flowing out of the cask at the bung-hole, the scum and the impurities thrown to the surface during the process of fermentation. You must manage to have left over a little of the mixture, (perhaps a quart or so will answer,) for the purpose of filling up the vessel three or four times a day as it gradually loses in quantity by this process of ejection at the bung-hole, and through evaporation. Water may be used if sufficient juice has not been saved, but the cask must be kept full, except just before closing it, when there must be a space for air between the surface of the wine and the bung. Of course the bung-hole must be kept open while the fermentation lasts. It would be safer, however, to put in the bung loosely until fermentation ceases, which may continue three or four weeks, according to the temperature of the weather and the situation of the cask. We prefer a situation in a cellar, where, at the season of making, the mercury will range from 60° to 65° F., and we let the fermentation continue about the period above named, and close up the cask just before the fermentation has *entirely* ceased, but after the most violent stage of it has passed by. This can be ascertained on examination, in part, by listening to the sound of the effervescence, and noting its gradually diminishing action and force. On closing, bung up tight until the February or March subsequent to the time of making, when it may be drawn off, if bright and fine, into a cask or bottled. It is well to tilt the cask a little when first put up, so as to draw off the contents as near to the bottom as possible, without disturbing the sediment, which, when stirred up and mixed with the wine, spoils its purity and flavor.

Remarks.—We have found it to require at least two and a half quarts of currants, as ordinarily picked from the bushes, with stems mixed in, to make one quart of expressed juice. Every four pounds of sugar dissolved in the juice, will add about one quart to the quantity of the liquid.

We consider the following points of importance in securing a good wine. These are — *First*, the ripeness and state of the fruit when crushed. *Second*, the use of the very best of sugar. *Third*, the removal of part of the impurities in the liquid, by the fermentation in a full cask with an open bung-hole, the aperture thus affording an escape, over the side of the cask, for the scum and froth. And, *Fourth*, the drawing off the wine without the slightest admixture of the sediment deposited at the bottom during the fermentation.

Recipe No. 2. — This recipe we received from one of our neighbors, whose domestic wines we have often partaken of, which was made according to the recipe given. It was, to our taste, quite equal to the wines commonly sold as imported.

Take of expressed juice of currants 8 gallons, clear good water 16 gallons, making in all 24 gallons; to each gallon of this mixture add 3 pounds of Muscavado sugar. Mix these ingredients and put them into a clean cask, taking care that the cask be perfectly filled and kept so; lay the bung loosely over the bung-hole, and suffer it to remain in a cool place for three or four weeks; then put the bung in tight, leaving open only a small vent-hole for the escape of the fixed air formed in the process of the vinous fermentation, until winter or the next spring. At that time, rack it carefully into a well cleansed, sweet cask. If this process is performed by means of a syphon, so as to exclude the contact of atmospheric air as much as possible, it will be the better. Then bung up tight, being careful that the cask is perfectly full, for upon the exclusion of atmospheric air the success depends. In one year this will be found one of the best of drinks to mix with water.

RECIPE No. 3. — The following method of making superior currant wine is recommended in a French publication:

For currants, 9 pounds of honey are dissolved in 15 gallons of boiling water, to which, when clarified, is added the juice of 8 pounds of red or white currants. It is then fermented for twenty-four hours, and two pounds of sugar to every gallon of water are added. The preparation is afterwards clarified with the whites of eggs and cream of tartar.

RECIPE No. 4. — Take 8 or 10 gallons currant juice, to which add 90 pounds of good brown sugar, put them into a brass kettle, which hang over a moderate fire, stir them up together well, and carefully skim off all the scum that rises to the top. Particular care must be taken that the fire is not so great as to make the juice boil; no more heat is necessary than to cause the impurities contained in the sugar to rise so as to be skimmed off. When the liquor becomes pure, pour it into a clean, strong barrel; then fill up the barrel with clear water, and let it stand in a dry cellar, with the bung out, to ferment. Let the fermentation continue as long as it will. The cask must be filled up frequently with some of the liquor reserved, or with sweetened water. When the fermentation ceases, bung up the cask tight, and the process of manufacture is complete.

RECIPE No. 5.—Pick the currants as in No. 1; pick the berries from the stem and weigh them, then crush them with your hands, leaving none whole. For every two pounds of currants put one quart of water, stir all well together, and let stand three hours, then strain the liquor through a grass-cloth strainer; then for every three pounds of currants put one pound of crushed sugar, stir it till the sugar is dissolved, boil it, and keep skimming it as long as any scum will rise; let it stand sixteen hours to cool, before you put it in the cask; stop it very close. If the quantity be twenty gallons, let it stand three weeks; if thirty gallons, it must remain a month before bottling. It should be perfectly clear when drawn off. Put a lump of sugar in each bottle, cork it well and keep in a cool place, or it will sour.

WHITE CURRANT WINE.

RECIPE No. 6. — Those who have not compared the *white* and *red* currants together, are generally not aware of the great difference there is between them in point of excellence. The white we think is far superior to the red. It is much sweeter and pleasanter flavored, when ripe, for table use, and much better for wine. The wine made from it is nearly colorless, of sweet and pleasant flavor, resembling the light, sweet French wines. Bottled at a particular stage, before the fermentation has entirely subsided, it makes a very fair champagne.

CURRANT CHAMPAGNE.

Recipe No. 7. — Ingredients for thirty gallons: — Three bushels or 150 pounds of currants, 75 pounds of white Havanna or refined crushed sugar, three pints white brandy, with sufficient pure soft water.

The fruit should be gathered in dry weather, when ripe; mash them to break every berry, but not bruise the stems; add a portion of the water, and after stirring well, turn the mass on to a strainer over a grain sieve or riddle, rubbing and pressing gently with the hands; by repeating the operation a few times, all the vinous and saccharine matter will be extracted, and much of the pulp kept back; which occasions not only too great a degree of fermentation, but diminishes the quantity of wine by the lees it forms — saving much trouble in comparison to the usual practice of squeezing and wringing through the strainer.

The sugar should be put into a tub or other open vessel, with the brandy, and the liquor strained on to it. When the sugar is dissolved, strain the whole through a fine hair or grass-cloth, into a strong, sweet cask of thirty-two gallons, and fill up to within two gallons, which leaves sufficient room for the fermentation to proceed, and drive in the bung tight.

It is desirable that all parts of the process should go on at the same time, and be finished with all possible despatch, observing the greatest neatness.

☞ The sooner the wine is bottled after it is perfectly fine, the more briskness it will exhibit.

In producing champagne, it is necessary to give air for a short time, to increase the fermentation and deprive it of a great portion of its sweetness. Two and a half pounds of white refined sugar to the gallon is sufficient.

For white wine, or champagne, the Champagne currant should be used. It is a good bearer, the fruit rather inclines to an oval, of an amber tint, and much sweeter, but not so large as the White Dutch.

BLACK CURRANT WINE.

Recipe No. 8. — The difficulty of extracting the juice of the black currant is not generally known, it being more of a jelly than juice, and will not run unless dissolved by water, which may be done this wise: Put the currants, after picking out the stems and leaves, into an open vessel, and cover them with water, keeping an account of the amount; then with a pestle or pounder mash every berry; let them stand for twenty-four hours to dissolve the pulp, then put the mass into a coarse bag and submit them to pressure, when the juice will run freely. After deducting the amount of water, the remainder will be the pure juice, and now, to every gallon of the juice add two of water, including that first put in, and to every gallon of the mixture add four pounds of crushed sugar. Put it into a cask, reserving sufficient to fill up while fermenting. Put the cask in a moderately cool, dry room, to ferment; as the refuse works over at the bung, fill up with the liquor reserved. When it has ceased working, bung it close for nine months, and it will be fit for bottling and use. This will have much of the flavor of Port wine, and makes an excellent article for sacramental purposes. By reducing the quantity of sugar and adding water, you will have a fair imitation of claret wine, for a summer drink.

GOOSEBERY WINE.

Recipe No. 9. — Take a quantity of ripe white or yellow gooseberries, bruise them with a pestle in a tub, and to every eight pounds of fruit add one gallon of cold spring water. Stir them and let them stand twenty-four hours; then strain the mash through a fine sieve, (or a grass-cloth strainer will do). To every gallon of juice add four pounds of white loaf sugar. When all is dissolved, stir it well, and when settled put it into a cask with a little white brandy—two quarts to every ten gallons of juice—and half an ounce of isinglass. Set the cask in a cool place, leaving out the bung until the fermentation has nearly ceased. Then draw off into bottles, and cork tight immediately.

Another Recipe. — For gooseberry wine, the fruit is gathered dry, when about half ripe, and then pounded in a mortar. The juice, when properly strained through a canvass bag, is mixed with sugar, in proportion of three pounds to every two gallons of juice. It is then left in a quiet state for fifteen days, at the expiration of which it is carefully poured off, and left to ferment for three months, when the quantity is under fifteen gallons, and for five months when double that quantity. It is then bottled, and soon becomes fit for drinking.

Covering Grape Vines in Winter. — A correspondent of the Connecticut *Homestead* says the fruit on grape vines that have been covered in winter, will ripen generally from one to two weeks earlier in the fall. The same fact has been observed in this section.

The easiest way of covering, is to lay the vines upon the ground after the leaves have been dropped in the fall, (when the pruning should be done,) and cover them slightly with earth, or what is better, the pruned twigs and leaves mixed with earth, or straw and earth. The only objection to the use of straw is, that it sometimes furnishes a harbor for mice to girdle the vines. Those protected by having been tied in a bundle with straw, above ground, do equally well, but with well trained vines it is more trouble.

Preventing Mischief from Insects. — One who has tried it recommends the erection of a large martin box in the middle of the orchard, sufficient to hold fifteen or twenty colonies. He says they are of great assistance in keeping the orchard free from caterpillars.

ON THE CULTIVATION OF PEARS.

BY DR. JOHN A. WARDER, OF OHIO.

The first question, with regard to Pears, is as to the stock upon which they should be worked—in other words, whether we should plant dwarfs or standards. For him who is advanced in life when he commences planting, there can be no question—he will select those that promise to yield an early return; this he expects from the dwarf rather than from the standard, and with reason, too; but there are advantages in the standard—each have claims upon our attention. The dwarfs yield their fruit sooner, and occupy much less room, more may be crowded together upon a given piece of land, thus the chances of life are multiplied—moreover, the dwarfed pear appears to be less subject to blight than the standard. The small trees are more accessible both for trimming, pinching, thinning the fruit, and for gathering it, and they are beautiful and attractive objects in the fruit garden. The standards, as a general rule, are much longer coming into bearing, they are less accessible; they require more room and are more subject to blight—but they are better able to take care of themselves, they bear neglect with a better grace than the dwarfs. The fruit of the dwarfs is sometimes larger, fairer, and finer, than the same variety upon the free stock, but there are many varieties that are uncongenial to the quince, some that will not grow upon it at all, and few that really do well. On the contrary, there are some that are early bearers upon the free stock, and for these we do not need the dwarfing process.

Some prefer to mix both sorts together. This plan I have tried to some extent, and have seen it tried in a good many places. There is no real objection to it that I am aware of, if the soil be suitable for both the pear and the quince roots—unless it be that eventually the standards will overshadow the dwarfs, if any of them still remain either to shade or to be shaded, for the terrible malady of the pear, known as *blight*, has in half a century of pear-culture, so often swept away whole orchards, that we may consider pear-culture still an experiment, being certain from history, only of its uncertainty.

PREPARING THE SOIL, AND PLANTING.

The best soil for standard pears is generally supposed to be a rich clay—that for quinces or dwarf pears, a deep, friable loam; a good loamy clay will do well for either. For standards, a thorough preparation with the plow and subsoil plow is all that is required on our soils; for quince-rooted, or dwarf pears, it is better to trench the whole ground as deeply as possible—though for a large plantation the trench plow and the subsoil plow will give a very good drainage preparation. The standards may be set as close as 15 feet or 20 feet apart each way. The dwarfs will do very well at 8 feet, or even as close as 6 feet apart, according to the habit of the trees, a matter which should always be carefully studied before laying off the orchard. I have some trees 8 feet apart which interlock their branches at eight years old, while others, planted at the same time, would not touch one another had they been planted but 5 feet apart. The results of my observation and experiments with dwarf pears satisfy me that it is the best policy to prepare the ground very thoroughly, to plant very closely, and to cultivate the ground very highly, keeping the surface perfectly clean by culture or by mulching. No other kind of trees should ever be mixed with the dwarfs, and above all, peaches should never be selected as their associates, for their rapid growth causes them to overshadow and rob the dwarfs; and, when they die out, at the end of a few years, great open spaces are left among the pears, which can not be filled.

THE CULTURE OF DWARF PEARS.

The cultivation of an orchard of dwarf pears should be thorough, but this is often neglected; grass and weeds are allowed to take possession of the ground, to the great injury of the trees—often to their entire destruction. This, the standard trees, with their more penetrating roots, may withstand; and this is an argument in favor of the latter, as already mentioned. Men prefer that crop which will bear neglect. The dwarfs, planted as closely as recommended, can not be cultivated by horse power. After the first year, at least, they must be tended by hand, hence the economy of crowding a great many trees upon a given space. For Duchess d'Angouleme we may allow 5 feet; for Passe Colmar, 5 feet; for Des Nonnes, 5 feet; for Louise Bonne, Clion, Beurre Diel, Seckel, Bartlett, 9 feet; for Glout Morceau, Beurre d'Amalis, Jaminnette, and other strong growers, 8 feet may be allowed. There is no difficulty in arranging this, if we know the natural habit of the trees, and assort them before planting, and bring all the similar growers into the same rows.

PRUNING AND PINCHING.

Trimming, which includes *pruning* and pinching in, should be well attended to. The objects are two-fold: 1st, to form the tree into the shape desired, and 2d, to produce fruitfulness. Both processes should be conducted upon philosophic principles, very easy to be understood, but not by any means easy to explain in langnage, so as to meet the comprehension of another. I dislike to attempt it. To begin with the first cut, then, I should prefer to plant maiden trees, that is, one year old from the bud, whether dwarf or standard, and, in either case, to have them budded low, near the ground. This is particularly essential in the dwarf, as the tree should be planted so deeply as to cover all of the quince stock beneath the surface of the soil. If the tree has been well treated in the nursery, it may be already furnished with side branches. At the time of planting, the main shoot should be cut back severely, say to one foot in height from the bud in a strong plant;

more severely if the tree be more feeble. If there be side branches, these should be spurred into two or three inches. The object of this severe spring pruning is to restore the balance with the wounded roots, and also to insure a vigorous growth of new wood at the base of the future tree, for here is the foundation, whence is to proceed the skeleton of the tree that is yet to be grown.

During the first summer the shoots may be allowed to grow pretty much as they please, only curtailing the most rampant and aspiring branches where they are produced at the expense of their fellows, and whenever two branches interfere, one of them may be removed, or they may be separated by a prop—as a general rule we leave too many branches—we can not have too many *twigs*, but the growth must be so controlled as to prevent the formation of large limbs, except the few that are needed to give symmetry to the tree. The next season, in the spring, the trees will again need a severe pruning. A leader should be selected and well shortened-in, say to six, eight or ten inches, according to the strength of the plant, all other branches are to be well shortened and thinned out—the trained tree should resemble a distaff, with the outer or lower laterals the longest; for we are attempting to produce a pyramidal tree, the natural form of many pears, and this is the most desirable form, but one that is sometimes rather difficult to produce in trees of a fastigiate and upright habit. The third spring, a similar system of pruning should be pursued to insure the development of the desired form, and to produce thrifty growth. Up to this time the trimming has all been done with the view of producing the proper form, and to insure a vigorous growth of wood—these points having been secured, the form and the thrifty growth having been established, we may now begin to turn our attention to summer pruning and its objects.

A new system of tactics is now adopted, founded upon a different principle, physiologically. Supposing that the natural vigor and the encouraged growth of the specimen has by this time produced a strong, wide, stocky pyramidal tree, strong enough to support a goodly crop of fruit, we may proceed to throw it into fruitfulness; if we have not attained this condition, the severe spring pruning must still be continued, or we may find it necessary to cut back to the main stock near the base, to secure the requisite vigor, and commence the work anew; for it may be assumed that though a small dwarf may bear fruit at once, it can never produce a paying nor a satisfactory crop, unless it have become a well developed pyramid of sturdy branches, in a good thrifty condition of healthfulness. Trim every pyramid so that each limb shall be shorter than those below it. The axiom which should be indelibly impressed upon all pruners of dwarf trees, especially, is this: *Prune in winter for wood, in summer for fruit.*

The summer pruning consists in the shortening-in of the branches, which may be done with a knife or with the thumb-nail, according to the watchfulness and judgment with which the trees are tended. The object is to check the wood growth, and to direct the development of the buds, and the enlargement and fruitfulness of the spurs, which are to bear the blossoms and fruit. It is difficult to give definite rules and dates for the performance of this work: the enunciation of the principles that are to be followed, is all that can be attempted. Every man's good sense must be his guide in each particular case. In the growing season, whether May, June or July, when a strong shoot makes its appearance, straggling out of bounds, or towering aspiringly upward, the end may be nipped. The precise point at which this is to be performed will depend upon its strength and the lateness of the season, and the prospect we have of growing weather—the earlier the less severe, the later the more trenchant should be the shortening of such a shoot. If severely cut back in the early part of the season, the vigor of the tree will attempt, immediately, to repair the damage inflicted upon its wood system; a new wood-shoot, or perhaps two or three of them, will start out from the remaining portion of the one that was cut back; if so, let these again be pinched after they begin to harden, our object being to develop the parts below, to direct the flow of sap into them, to diffuse the sap over the tree. If the season have been more advanced when the wood-shoot is observed, or if the pinching have been neglected until the summer solstice, after which we do not expect such a vigorous growth, we may use the knife instead of the finger-nail, and cut back more severely; but still we must endeavor to avoid the rampant breaking of watery shoots, which are not fruitful and must again be shortened—per contra, if we do not sufficiently curtail these shoots, and do it early enough in the season, we shall have to throw away a large share of the wasted energy of the tree, and the lower buds will not have been developed, and the desired fruitfulness will fail to be produced.

With some varieties, early fruitfulness is a fault, so that if allowed to have their own course, our trees would never become well grown—the wood-shoots are few, while the spurs swell very rapidly, and are very abundant. If allowed to blossom and bear, the proper form of the tree will never be developed. Such trees require great severity of pruning, and great discrimination in disbudding or disfruiting them, to encourage the wood growth. Others, on the contrary, have such an excessive tendency to wood, as to have acquired the epithet of slow bearers. Such naturally form the most beautiful trees, with the least trimming, and they need the greatest amount of summer pruning to render them fruitful within a limited period; but when they do bear, they produce the most satisfactory crops.

Mulching the Currant. — Dr. Merrick, of Quincy, Ill., raises excellent currants on a soil and in a climate which is not considered favorable, by mulching the ground under the bushes with corn-stalks. He puts them on thick enough to keep down the weeds.

Common Hard Soap is said to stop the bleeding of recently pruned grape vines.

THE CORK OAK.

THE Cork tree (*Quercus suber*) bears a general resemblance to the broad-leaved kinds of *Q. ilex*; but when full grown it forms a much handsomer tree, although perhaps not quite so hardy. The nuts are sweeter, and have been eaten as human food in cases of necessity. Pigs eat them greedily, and get rapidly fat on them, producing a firm and very savory lard. The Spaniards eat the acorns roasted. The outer bark, the great thickness and elasticity of which is owing to an extraordinary development of the cellular tissue, forms the cork; which, after the tree is full grown, cracks and separates from it of its own accord. The inner bark remains attached to the tree; and when removed in its young state, is only fit for tanning.

The cork tree is found wild, in dry, hilly places in the south of France, in Italy, in a great part of Spain, and in the north of Africa. Its bark forms the cork of commerce, and appears to have been applied to useful purposes in the time of the Romans.

The acorns of the cork tree have been distributed throughout the United States, by the Patent Office.

MILDEW ON FRUIT TREES AND GRAPE VINES.—A correspondent of the (London) *Gardeners' Chronicle* recommends the following mixture for mildew on fruit trees and on grape vines:—Mix well in coarse powder one part of nitre or saltpetre, two parts of sulphur, and two parts of fresh slaked lime, quite dry. When mixed throw it into a fire-proof pipkin or common crucible at a red heat, so that it may be thoroughly deflagrated. After cooling, let the mass be reduced to a finish powder. Now, allowing the above quantities to be in pounds, one gallon of boiling water is to be poured by degrees on the powder, and the mixture is to be kept and stirred occasionally until cold, when some pure blue clay is to be incorporated in quantity sufficient to bring the whole into the consistency of paint, with which the trees are to be carefully dressed when the buds are just beginning to swell, of course carrying the brush from below upwards.

For Vines, half a pound of this sulphuretted compound, added to one gallon of boiling water and stirred up till cool, may be used, clear of the sediment, over the leaves with a fine rose syringe, occasionally, according to the season, shutting up the lights for two or three hours, when, if the sulphuretted vapor remains too strong in the house, the lights may be opened for free ventilation.

SPIRÆAS.

No family of ornamental plants has increased so rapidly in favor, in this country, for a few years past, or been more entitled to the attention which they have received, than the Spiræas. With few exceptions, they are quite hardy, and adapt themselves to a great variety of soils and situations. The different sorts vary much in their foliage and flowers. Many of them are of rare beauty and elegance, and all are highly ornamental and worthy of much attention at the hands of amateur planters. They are of the easiest culture, and are readily propagated either by layers or cuttings.

Spiræa Callosa.

Annexed we give engravings of a few of the more prominent sorts.

SPIRÆA CALLOSA. — Dr. LINDLEY pronounces this "the handsomest flowering hardy shrub of July, after the rose." It is a native of Japan. It derives its name from the presence of a small red callosity seated on the end of each of the numerous notches that border its leaves.


Spiræa lanceolata.

SPIRÆA LANCEOLATA or REEVESII is another beautiful species, with large clusters of snowy white single flowers, that cover the whole plant in the month of May.

The DOUBLE-FLOWERING PLUM-LEAVED SPIRÆA (*S. prunifolia flore pleno*) is also a well-known and beautiful species, with small, double, perfectly white flowers in May. Its habit is slender, erect and regular; and when in bloom, every branch is like a wreath of white daisies.—The color of the foliage in the autumn, too, is a great point of merit, being a bright orange with a light tinge of red.


Spiræa ulmifolia.

SPIRÆA ULMIFOLIA is a well known and beautiful shrub, with broad leaves and large trusses of white flowers.

SPIRÆA GRANDIFLORA is a newer species, discovered by Mr. FORTUNE in the north of China. Its conspicuous large flowers cannot fail to recommend

Spiræa grandiflora.

it as a very desirable ornamental shrub.

Many of the Spiræas are natives of the northern United States —some of Europe and China. A part of them are low shrubs, from three to five feet high; and part are herbaceous plants, which throw up shoots each season, some from 4 to 6 feet high, and which die back at the end of summer.

CUCUMBERS FOR HEDGES.—Don't laugh, reader. We do not mean the common cucumber, but a new plant, *Thladiantha dubia*, introduced by the French Acclimation Society, from China. It is a perennial, and so hardy that M. NAUDIN, one of the corresponding editors of the *Revue Horticole*, recommends it for ornamental hedges. Its leaves are heart-shaped, narrow, pointed and velvety, while its flowers, which appear in profusion during the months of July, August and September, resemble elegant Campanulas of the brightest yellow. The fruit becomes tender and mealy when cooked, but has a bitter taste.

COLD GRAPERIES.—A Delaware correspondent of the *Horticulturist* built a cheap lean-to cold grapery, which has given him such great satisfactfon that he thinks, "if persons can only be made aware of the entire simplicity of the whole business, some day, when peace returns to our once prosperous country, vineries will be as common appendages to our gardens as trellises for native vines now are." He thinks that had he to build again, he would introduce a flue for heating a little when needed. We have heard many others say the same thing.

ON THE CULTIVATION OF THE CEREALS.

EXTRACTS FROM A LECTURE DELIVERED AT NEW HAVEN, FEBRUARY, 1860, BY JOSEPH HARRIS, ROCHESTER, N. Y.

I DESIGN to make a few remarks on the cultivation of our common cereal crops — wheat, barley, oats, rye, and Indian corn.

There is nothing *forced* in thus classing them together, as they have many things in common. They all belong to the same botanical order; have all stiff, silicious straw, and rich, starchy, and highly nutritious seed. In England they are termed the "white crops," and have always been considered much more exhausting to the soil than green crops, — so much so, indeed, that many of the old leases have a clause prohibiting the sowing of two white crops in succession.

There can be little doubt that there is more immediate profit, for the labor and capital involved, from the cultivation of the cereals than from any other farm crop. It is not surprising, therefore, that with too many farmers there is a disposition to sow too great a breadth of grain crops. I regard this as the great error of American agriculture. It is one, however, of which I would speak leniently. The early settlers of a new country are mostly poor; they have little capital, and must get all they can from the soil, as soon, and with as little labor and expense as possible. Hence they grow that which will return the most immediate profit. But the time is come when this rude style of farming must give way to a more complex and scientific system of agriculture. Our object will still be to grow those cereals which are in demand, but we shall introduce other crops for the purpose of preparing and enriching the soil; and thus with fewer crops get a greater product. To be able to do this, is the great secret of successful agriculture. "*How* can we best enrich the soil for the growth of the cereals?" That is the question — at once the most important, and the most difficult to answer.

The soil of a new country is not in a normal condition. It has been heavily manured by nature. The leaves which have fallen on the land for centuries have furnished large quantities of organic and inorganic matter, readily assimilable by cereal plants. By a scourging system of cultivation for a few years, we remove this coat of natural manure. This is the present condition of much of the land in the United States. This natural manure — this accumulated fertility — has been removed. The SOIL is not exhausted: it has been reduced to a more natural condition. The land has been robbed of its manure, and if we would raise as good crops as formerly, we must devise some plan of enriching the soil — of restoring at least a part of the natural manure which has been removed. I do not think it necessary, in order to keep up the fertility of the soil, to restore *all* the elements which plants remove;

for the soil may be able, by annual disintegration and decomposition, to supply *some* elements of plant-food in sufficient quantity.

The two substances most likely to be deficient in the majority of soils, for the growth of the cereals, are ammonia and phosphoric acid.

From the fact that about one-half of the ash of wheat, barley, oats, rye, and Indian corn consists of phosphoric acid, it is usual to speak of the cereals as particularly exhaustive to the soil of phosphoric acid—and this is undoubtedly true. That is to say, that the growth, and the exportation of cereals from the farm, tend very materially to impoverish the soil of phosphoric acid. But it does not follow from this, *that when a soil falls off in its capacity to produce the cereals, that it is owing, necessarily, to a deficiency of phosphoric acid.* We believe in fact, that, with the exception, perhaps, of some portions of the grain growing districts of the South, this is seldom the case. I think it has been clearly proved that a soil requires more available phosphoric acid to produce an average crop of turnips than to produce an average crop of wheat. The same, I think, is true of clover, beans, peas, vetches, and probably other leguminous plants. So that it follows, that so long as a soil produces good crops of clover, or peas, or beans, there is no deficiency of phosphoric acid in the soil, so far at least as the production of the *cereals* is concerned.

When, by a continued course of cropping with the cereals, the phosphoric acid becomes deficient—*not exhausted*—the crops of clover and other leguminous plants will first fall off; and if the farmer, after this, goes on impoverishing his soil by sowing the cereals, he must be content to do it with very small crops. Nature protects herself, and the farmer's capital will be exhausted long before he has so exhausted the soil of phosphoric acid that a good farmer might not render that same soil highly productive, and that too without the importation of a single atom of phosphoric acid.

It is true that it is often the cheaper method of renovating such soils by the direct purchase of bones, guanos, or other manures which contain large quantities of phosphoric acid; or, what is sometimes cheaper still, by the purchase and consumption on the farm of oil cake, cotton-seed cake, etc.

As long as we can obtain good crops of clover, we need not apprehend any deficiency of phosphoric acid. Under such circumstances, I should have little hope that an application of phosphoric acid, to any of the *cereals*, would be attended with any great benefit.

Now, all agree that phosphoric acid is more likely to be deficient than any other ash-constituent of plants; and if my argument is correct—and it is sustained by many well known facts—it follows that, in the majority of cases, there is no necessity for the direct application of mineral manures to the cereals.

But the cereals need manure of some kind. The average yield is not one-half what it might be. "*What is it that we need?*"

I answer, without the slightest hesitation, AMMONIA.

In enriching the soil for the growth of cereals, the main object should be to get ammonia. I know of no system of culture, or of manuring, for the cereals, which experience proves beneficial, that does not, either directly or indirectly, furnish ammonia to the soil, — either by eliminating it from the organic matter in the soil, or by increasing the capacity of the soil for abstracting it from the air, or dews, or rain, or by growing those plants which have this power, or by the direct application of ammonia in the manure. We cannot increase the growth of the cereals without increasing, in some way, the supply of ammonia. I am well aware that neither the cereals nor other plants will grow unless the soil contains *all* their ash-constituents, in sufficient quantity and in available condition. But there is no practicable and economical method of supplying the requisite quantity of ammonia, which does not, at the same time, furnish these ash-constituents in quantity fully equal to the demand of the increased growth of the cereals caused by the application of the ammonia.

I base this assertion on the experiments of Messrs. Lawes and Gilbert, confirmed as they are by the experience of practical farmers. Mr. Lawes has devoted a large part of his home farm at Rothamsted, for the last twenty years, to experimental purposes. One field of 15 acres has been devoted to experiments of different fertilizing substances on wheat, — wheat having been annually sown on the same land for nineteen years. Another field has been devoted in the same way to experiments on turnips; another to experiments on peas, beans and tares; another to experiments on clover, and another to experiments on barley, alone and in rotation with other crops. On the wheat field, it was found that none of the manures used increased the yield of wheat, unless they contained ammonia. Potash, soda, superphosphate of lime, magnesia, the ash of 15 tons of barn-yard manure, the ash of wheat straw, alkaline silicates — in short, none of the ash-constituents of plants, had any effect. But wherever ammonia was used, there we obtained an increased yield; and, within certain limits, the increase of wheat was in proportion to the quantity of ammonia supplied. But here a new and important fact was brought to light. Though the increase of wheat was in proportion to the quantity of ammonia supplied, in no single case, out of many hundreds of experiments which have been made during the last eighteen years, was as much ammonia (or, rather, nitrogen,) obtained in the increase of the wheat and straw as was furnished to the soil in manure. There was evidently a loss of ammonia by the growth of wheat. Professor Way has advanced the hypothesis, that the large quantity of silica found in the straw of wheat and other grains, is taken up by the roots of the plants as an ammonia-silicate — the silica being deposited on the straw, and the ammonia evaporated into the atmosphere. This may, or may not, be the true explanation; but that there is, *practically*, a great loss of ammonia by the growth of wheat, I have no doubt. The same I believe is true of barley, oats, rye and Indian corn, as well as of herds-grass, red-top, rye-grass, and other grasses grown for fodder. I rest this belief on the indications of experiments and on the experience of practical farmers, and not on WAY's hypothesis in regard to the absorption of silica as an ammonia-silicate. But if that hypothesis is correct, it follows as a mattes of course that the plants I have named, and all others having silicious stems and stalks, belong to this class, and their growth involves a great loss of ammonia to the farm.

On the other hand, Mr. LAWES' *experiments on clover, beans, peas and tares, indicate that there is no loss of ammonia during the growth of these plants.* If we apply 50 lbs. of ammonia to a crop of wheat, (which is equal to 3 cwt. of the best Peruvian guano,) the increased growth of the wheat and straw will not give us back more than 20 or 25 lbs.; the remaining 25 or 30 lbs. has been evaporated into the atmosphere. If, on the other hand, we apply 50 lbs. of ammonia to clover or other leguminous plants, or to turnips, it is all, or nearly all, retained. There is little or no loss.

Ammonia, or nitrogen, exists in all soils, but usually in a condition unavailable to plants, except in small quantity. If it existed in an available condition, it would long ago have been washed away; but it lies there, inert and insoluble. *It is rendered active and available by tillage.* Hence the advantage of summer fallows on clay soils. Such soils frequently abound in nitrogen and other elements of plants, but they are in an insoluble condition. The soil is so compact, that light, heat and air — the three grand agents of decomposition — are excluded, and it is only by tillage,— by stirring the soil, by exposing it to the sun and letting in the air — that these inert substances can be rendered available as food for plants. On light, sandy soils, which admit the air more readily, there is not that accumulation of organic matter and other food of plants that there is in the clays, and consequently mere tillage is not so beneficial.

Ammonia and nitric acid, (which probably has the same effect as ammonia,) exist in the atmosphere. A well pulverized soil, especially of a somewhat clayey nature, attracts ammonia from the air, and retains it. Dews and rain hold it in solution, and will give it up to the soil.

We will suppose that the soil, by the decomposition of its organic matter, and by the power it has of attracting ammonia from the atmosphere and from rain and dew, receives annually 50 lbs. of ammonia. If we grow a crop of wheat, barley, oats, rye, or Indian corn, from 20 to 30 lbs. of this ammonia is evaporated into the atmosphere during the growth of the plants, and is lost to the farm. If, on the other hand, we grow clover, beans, peas, tares, or turnips, the whole of this 50 lbs. is organized in the crop, providing there is sufficient available mineral matter in the soil; and if the crop is plowed under, or consumed by animals on the farm, the whole 50 lbs. of ammonia, or nearly, will be retained for the use of the subsequent cereal crops.

This is the key to good farming.

We must grow more green crops, and a less breadth of cereals. LEONCE DE LAVERGNE, an eminent French writer, in his work on the Rural Economy of England, Scotland and Ireland, deduces the same law from his observations of the astonishing results of the English system of rotation, though without offering any satisfactory explanation of its *rationale*. Speaking of England, he says: — "That small country, which is no larger than a fourth of France, alone produces 104 million bushels of wheat, 48 millions of barley, and 90 millions of oats. If France produced in the same ratio, her yield would be 400 million bushels of wheat, 560 million bushels of barley, oats, and other grain — equal to *at least double* her present production; and we ought to obtain more, considering the nature of our soil and climate, both much more favorable to cereals than the soil and climate of England. These facts verify this agricultural law—that to reap largely of cereals, it is better to reduce than to extend the breadth of land sown, and that by giving the greatest space to the forage crops, not only is a greater quantity of butcher's meat, milk and wool obtained, but a larger production of grain also. France will achieve similar results, when she has covered her immense fallows with root and forage crops, and reduced the breadth of her cereals by several millions of hectares."

This is true. English farmers, guided by close observation and experience, have slowly worked out an admirable system of rotation, and now scientific investigations have elucidated the principles upon which it is founded. *We* may not be able to adopt the same system of rotation in this country, but the *principles* are as applicable here as there, and will produce the same beneficial results.

The application of plaster, ashes, superphosphate of lime, and other mineral manures, has rarely any great effect on the growth of the cereals, but superphosphate of lime has an almost magical effect on turnips, and plaster usually increases the growth of clover, so that these mineral manures, when applied to these crops, may be rendered indirectly of great benefit to the cereals.

An English farmer once said to me, "Insure me a good crop of turnips, and I will insure you a good crop of barley and of every other crop in the rotation." Of so much value do British farmers consider the turnip crop, as a means of enriching the soil for the growth of the cereal grains, that they spend more money in preparing the soil for turnips than for any other crop — frequently $50 per acre. The turnip crop has justly been termed the "sheet anchor" of British agriculture. It enables the farmer to keep an immense stock of sheep and cattle, and thus to enrich the soil: the ammonia which turnips obtain from the soil, the rain, and the atmosphere, being retained and left on the farm for the use of the following cereal crops. In the Norfolk or Four-course System of Rotation, one-fourth of the arable land is sown to turnips, followed by barley seeded with clover. It then lies one or two years in clover, followed by wheat at one furrow. After the wheat turnips again follow, and so on as before. Latterly, by the use of superphosphate and guano for turnips, and by feeding large quantities of oil-cake and other purchased cattle food, the land has become so rich that many farmers have found it necessary to introduce an extra grain crop into the rotation, in order to reduce the soil. But hitherto the rule has been never to take two grain crops in succession.

How different from this is the practice of some of our American farmers! Corn, barley, and wheat, often follow each other in succession; then seed down with timothy, red-top, or some other exhausting grass, take off all the hay, and then renew the process. To call this a Rotation of Crops, is absurd. We might as well grow a crop of corn every year. More than one-half the ammonia obtained from the soil, and from the rains and atmosphere, is destroyed by the growth of these crops. There is no ammonia accumulated in the soil one year for the use of the crop the next year, as would be the case even if the land lay in fallow.

We must alternate the cereals with crops of clover, peas, beans, tares, and other leguminous plants, or turnips; feed them out on the farm, and carefully save and return the manure to the soil. To grow these crops and sell them would do no good. They would impoverish the soil as much as the cereals.

On most grain farms, we can not afford to grow the cereals merely as food for stock. We can not afford to *elaborate* their food so much — to concentrate its nutritive matter. Neither is this necessary, except in the case of hogs. The capacious stomachs of the ruminants are capable of extracting nourishment from bulky food; in fact, they do not thrive if the food is too concentrated. This bulky food costs comparatively little to produce it, and the large refuse increases the manure heap, which in its turn enables us to grow in greater quantity the more concentrated and valuable grains.

In agriculture, as in the other arts, we look too much to *immediate* profit. An intelligent farmer of Western New York, who kept a careful account of the expenses and profits of each field and each crop on his farm, told me some years since, when meat was cheaper than it is now, that a crop of red clover often showed a loss of $4 per acre, and seldom any direct profit; and yet he was perfectly satisfied, from experience, that no crop was so profitable in the end. This clover was mostly plowed in for wheat, and the increase of the wheat much more than made up for the apparent loss by growing clover. This is the right view to take of the matter. A crop of turnips in England seldom pays for the expense of its cultivation; it is grown for its effect on the subsequent crops. Sheep and cattle are often fed at a loss, if the value of the manure is left out of the account. One of the most intelligent farmers in England once told me that he considered sheep-feeding profitable, if he got back the money he paid for the pound of oil-cake each sheep received per day. The manure of the sheep he considered equivalent to the value of the turnips, cost of attendance, etc. By buying sheep in the fall when mutton is cheap, and selling them in the spring when it is high, we can do much better than that, here. In England, lean sheep are worth more per pound than fat sheep, owing to the demand for fattening purposes. Here the reverse is the case, and we have a better opportunity of making money by fattening (not raising) sheep, than the English farmer.

In determining which crop to raise for feeding out on the farm, we must not merely ask the simple question, "Which crop will afford the most nutritious matter?" but which will ultimately be most profitable, taking into consideration the effect of its growth on the soil, its value as food, and the value of the manure made by its consumption on the farm? All will admit that to grow wheat to be fed to animals, for the purpose of enriching the farm as the primary object, would be a wasteful practice, no matter how low a price it brought in market; and to grow barley, oats, rye and Indian corn, for the same object, is wasteful also, though perhaps in a less degree.

In order to enrich the soil for the growth of the cereals, therefore, we must grow those plants which do not dispel ammonia. We must feed them on the farm to stock, and if we use any grain or purchased cattle-food, it should be such, other things being equal, as contains the most nitrogen; for the value of the manure—the quantity of ammonia it contains—will be in proportion to the richness of the food in nitrogen. Many farmers think manure is manure, no matter how it is produced. *If the elements which make rich manure are not in the food, they will not be found in the manure, however carefully it is preserved or composted.* Horses fed on herd's-grass and oats might do more work, but their droppings would not be as valuable as though they were fed on clover-hay and peas; for the reason that peas contain twice as much nitrogen as oats, and the clover much more than the herd's-grass.

In determining which food to use, both these facts must be taken into consideration. In regard to feeding sheep, however, there is no drawback to the use of clover. Sheep do better on clover hay than on any other, and it would be the height of folly to grow herd's-grass, rye-grass, or red-top, or any of the natural grasses, for the purpose of feeding sheep. Clover impoverishes the soil less than the grasses; it contains more nitrogen, is at least equally fattening, and makes richer manure. The same may be said of peas and beans, as compared to oats, barley, rye or corn. They impoverish the soil less, contain twice as much nitrogen, are equally fattening when judiciously used, and afford much more valuable manure. The same is true of oil-cake. It is quite as fattening as corn, and makes far better manure.

Whatever we do, in raising crops, in fattening stock, or purchasing cattle-foods, let our object be to accumulate ammonia for the growth of the cereals, and their yield will be soon greatly augmented.

But here, at the very outset of all plans for raising wheat, we meet with the one great, paramount need of American agriculture — UNDERDRAINING. We can not take a single step without it. In a new country, where land is cheap, it may not be profitable to expend from $20 to $30 an acre in underdraining; but in all the older settled States, nothing can be more profitable than judicious underdraining, on all land that is surcharged with water at any season of the year. It frequently doubles the amount of produce; and it must be borne in mind that the increase is all profit. If land without underdraining yields 15 bushels of wheat per acre, and the cost of cultivation is equal to 10 bushels per acre, we have a profit of 5 bushels per acre. If, after draining, the same land yields 20 bushels per acre, an increase of only *one-third*, (which those who have had experience will admit is a low estimate,) there would be a profit of 10 bushels per acre, or double the profit of the undrained land. If it doubles the crop, the *profit* would be *four-fold*.

Any single improvement in agriculture is multiform in its effect. It is eminently so of underdraining. It does not merely remove an evil, but also affords a great number of positive benefits. It develops the latent energies of the soil; accelerates the decomposition of its organic, and the disintegration of its inorganic matter; renders heavy land lighter, warmer, and more easily worked, and also enables it to absorb from rain and dews and from the atmosphere itself a considerable quantity of ammonia. If underdraining is neglected where needed — and it is needed, more or less, on nearly all farms — nothing will atone for it. Good tillage, liberal manuring, and the best of seed and culture, will prove of comparatively little benefit.

CULTIVATION OF WHEAT.

The great aim of the wheat grower, in nearly all sections, is to get wheat early. In Western New York, if we could get wheat into bloom ten days earlier, we should escape that terrible insect pest, the midge. It is this insect, and not, as has been often stated, the exhaustion of the soil of phosphates, that has caused the deterioration of our wheat product. The injury from rust or mildew, another great drawback to profitable wheat culture, would also be greatly mitigated by earlier maturity. Now there is no one thing that will do so much to accomplish this as underdraining. Stagnant water is not only injurious to the growth of wheat, but it renders the soil cold and retards the ripening of the grain. It has been proved by actual experiment, that a soil which needs draining is from 10° to 15° colder than the same soil after it has been underdrained. In our late, cold springs, this would be an immense advantage. Having the soil underdrained, the next thing is to prepare and enrich it for the crop.

The introduction of turnip culture and drill husbandry into England banished summer fallows from all but the heaviest clay soils. There was good reason for this. The turnips required and received extra cultivation. As soon as the wheat crop is harvested, the land is scarified and plowed in the autumn, and two or three times in the spring, and rolled and harrowed and scarified, till it is as free from weeds and as mellow as an ash-heap. Then the turnips are sown in drills, 2 feet to 2½ feet apart. The plants are singled out by hand-hoes in the rows from 12 to 15 inches apart, and the horse-hoe is kept constantly going between the rows, and the hand-hoes whenever necessary. In this way the land is as effectually cleared and mellowed as if it had been summer-fallowed. Hence turnips have been appropriately termed a "fallow crop." But we have as yet no such fallow crop in America. I am aware that Indian corn is sometimes called a "fallow crop," because, like turnips, it admits the use of the horse-hoe; but it is not, strictly speaking, a fallow or renovating crop, because it impoverishes the soil of the same plant-food as the wheat crop requires.

So much has been said in England against summer-fallows, and these opinions have been reiterated so often by the agricultural press of this country for the last thirty years, that there is a very general impression that summer-fallows are unnecessary. This impression, while it may have done some good, has also done considerable harm. Farmers have neglected their summer-fallows. In Western New York it has not been uncommon, for some years, to prepare land for wheat by simply turning under a crop of clover when in bloom, say in June, and then keeping the surface of the land clean by the use of the cultivator and harrow till the seed is sown, without any more plowing in the fall. On light soils this *may* be a good practice, but on heavy soils I think a real old-fashioned summer-fallow would be better,—though I have seen excellent crops produced on heavy land by plowing in a crop of clover: the clover, besides enriching the soil, serving also to render it light. Still, I do not like the practice of plowing in clover for wheat. I believe, in many cases, a good summer-fallow would be much better.

Passing food through the body of an animal, does not increase its ultimate fertilizing power. It adds nothing to it. But the droppings of animals are more appropriate food for plants — at least for wheat — than the food which the animals consumed. It is contrary to the economy of nature, to use plants which are capable of sustaining animal life, for the purpose merely of furnishing food for other plants. For this reason, while I would earnestly recommend the extensive cultivation of clover on all wheat soils, — while I would say to every farmer, "raise your own clover seed, and sow it with an unsparing hand,"—while I believe there is no crop which furnishes so much ammonia at so cheap a rate — no crop so well adapted to our climate and circumstances — no crop which has done and is now doing so much to increase the fertility of our farms,—still I think it is contrary to sound theory and good practice to plow under such a large amount of matter capaple of sustaining animal life, for the simple purpose of furnishing food for the following wheat crop. Fertilizing matter furnished by decayed clover, is not so appropriate food for wheat, as the droppings of animals living on clover. It contains too much carbonaceous matter — the very matter which animals need to keep up the heat of their bodies and to form fat, and which, when the clover is fed to animals, is burnt out, while the nitrogen remains in the form of ammonia, or in compounds which readily decompose and form ammonia. This ammonia is what we most need. It not only increases the crop, but, *up to a certain point*, accelerates early maturity. (If we get too much ammonia, and a moist, cloudy summer, it has an opposite effect — but there is not much danger of our getting too much ammonia.)

On the other hand, the carbonaceous matter, forming four-fifths of the clover, is of little fertilizing value, and certainly, on the majority of soils, is not needed by the wheat crop, while it has a tendency to produce too much straw, and to retard the ripening process.

These remarks will apply also, in some degree, to poor, strawy, leached, weathered manure. *There is not enough ammonia in a ton of such stuff as many farmers call manure, to make hartshorn for a lady's smelling bottle!*

Instead of plowing in so much clover for wheat, then, let us convert it into wool and mutton; and if we can give our sheep peas, or beans, or oilcake, in addition, it will tell wonderfully on the manure and on the crops to which it is applied.

In preparing heavy land for wheat, it is still necessary in many cases to resort to summer fallows. On the light soils we might grow a crop of beans, planted in rows and thoroughly horse-hoed, and sow wheat afterwards. On heavier soils, I have seen an excellent crop of wheat follow a crop of peas, which had been sown instead of fallowing. The great drawback to the peas is, that they are affected by the bug. But if fed out early to hogs, the bugs do not injure them materially, while they are very fattening and make rich manure. You can commence feeding them to hogs on the land, while the peas are still green.

In England, wheat is generally sown on a one or two-year old clover sod, the land being plowed immediately before sowing. As a general rule this practice does not succeed here, because, for one reason, we sow a month earlier than they do in England, and a clover field plowed here the last of August is generally so dry that the seed wheat does not germinate evenly; and it is found, too, that the wheat is overrun with weeds and grass the next season. I think, however, if our land was cleaned as it should be before it is seeded to clover, and was eaten down by sheep during the summer, wheat might be raised here with one plowing, as in England — especially if we used a little Peruvian guano at the time of sowing.

In Western New York manure is seldom applied directly to wheat. Some say it is injurious; but I apprehend that, on most farms, the wheat would be very grateful for a little good, well-rotted manure, either plowed in or spread on the surface a little before sowing. Wheat needs something to give it a good start in the fall, and a little well-rotted manure, not plowed in deep, would be very acceptable. A dressing of Peruvian guano—say 150 lbs. to 300 lbs. per acre—would perhaps be better still. It will pay, if we get $1.50 per bushel for wheat. At one dollar per bushel, the profits from using guano will be very slight, and may be on the wrong side of the ledger.

Gypsum, or sulphate of lime, seldom does any good on wheat in Western New York, although it has a very good effect on clover, and sometimes on peas. Some good farmers sow a bushel of plaster (gypsum) on wheat in the spring; but it is done, not to benefit the wheat, but for its effect on the clover sown with the wheat.

of wheat extend farther, and have a much longer time to take up the elements required.

In England, on heavy land, oats are considered a better crop to precede wheat than barley, but here the reverse is the case—owing perhaps to the shortness of the barley season. In England, three bushels of barley seed per acre when drilled, and three and a half bushels when sown broadcast, is the usual quantity. Here two bushels is considered sufficient, and often only a bushel and a half is sown. I would prefer to sow over rather than under two bushels. As a rule, barley should be the first crop sown in the spring. It should be sown just as soon as the soil is in proper condition to work, but not before,—as, if put in when the ground is wet, the soil will be raw and cloddy, whereas barley requires a warm, loose, mellow soil, more than any other cereal.

The cultivation of *Winter Barley* is attracting considerable attention in Western New York, and hitherto it has been attended with considerable success. It is of better quality than Spring barley, and the yield is larger. Its cultivation is the same as for winter wheat.

CULTIVATION OF OATS.

Oats will succeed on a greater range of soils than barley, and with poorer cultivation. I have seen immense crops, of the finest quality, on cold clay soils, when well prepared; and good crops are often obtained on low swampy land, where wheat or barley would fail. Two and a half bushels on the former class of soils, and two bushels on the latter, is the usual quantity of seed in Western New York. In England, four bushels are generally sown, and formerly five bushels of seed per acre was not uncommon.

CULTIVATION OF RYE.

Of the cultivation of Rye, little need be said. Of all the cereals, it is the best crop for light sands. It will flourish on a shallow, dry, sandy soil, where wheat, barley, oats and corn would fail. With the aid of a little manure, I have known it sown on such a soil year after year, and produce a fair crop. It is almost as grateful for manure as buckwheat. Rye will succeed on heavier soils, but it does not pay to sow rye where you can sow wheat. On soils somewhat too light for wheat, it is common in England and on the continent to sow wheat and rye together—says 2½ bushels of wheat and a peck of rye per acre. Rye can be sown in the fall both earlier and later than wheat. It should be sown when the ground is dry. It germinates slowly, and if the soil is too wet, the seed is apt to rot. It is a convenient crop to follow corn, as corn can be got off the land in time to sow rye, whereas for wheat such is seldom the case without extra labor. It is also sometimes sown among the corn, and harrowed in before the corn is harvested. From a bushel and a half to two bushels is the usual quantity of seed.

CULTIVATION OF INDIAN CORN.

On the cultivation of Indian Corn my remarks shall be very brief. Corn will grow on all soils, from the lightest sand to the heaviest clay,

—amongst granite rocks and on the richest bottoms. It does not need so compact and calcareous a soil as wheat. It delights in a loose, friable, warm, porous, deep soil, abounding in organic matter. It does well on all good wheat soils, yet it often does better on soils too light and mucky for wheat. It is a gross feeder: we can easily make land too rich for wheat, but I have never yet seen any too rich for the production of Indian corn. Like all spring crops, corn requires an active soil. Its growth is very rapid. The atmosphere should have free access. Fine tilth is essential. The soil should be made as fine as possible before planting, and after the plants are up, the hoe and cultivator can not be used too much during the first month. Throughout the vast corn-growing region of the West, if we can remove stagnant water, prepare the land properly, plant in good season, and use the horse-hoe pretty freely, the soil is in the majority of cases rich enough to produce fair and remunerative crops. I have been in a two hundred acre field in Ohio, that has produced annually a good crop of corn for over fifty years, without manure. But it was thoroughly cultivated; not a weed or blade of grass was to be seen. In passing over the magnificent prairies in Illinois, I was much struck with the decided difference of the corn crops. Wherever the soil was dry, and proper care had been exercised in preparing the land and keeping it well cultivated, the crops presented a most luxuriant appearance; but where careless preparation, and negligent, slovenly culture, were rendered visible to the observant eye, by the growth of weeds, the crop was as yellow and sickly as though it had got the ague. It was literally starved in the midst of plenty. Whether grown at the east or the west, on rich land or poor land, corn must have *good culture.*

Corn will succeed on land that is too low and mucky for wheat; but though this is true, it is vain to hope for good crops if the land is surcharged with stagnant water. All the sunshine of our hottest summers can not make such land warm. The heat is expended in evaporating the water, instead of warming the soil. In passing along the various railroads of the country, I have been often saddened at the sight of thousands and tens of thousands of acres planted to corn, which, by a little underdraining, would have produced magnificent crops of this king of cereals, but which presented a miserable spectacle of yellow, sickly, stunted, half-starved plants, struggling for very life. Until the land is freed from stagnant water, all our efforts to produce good crops of corn will prove ineffectual. When this is accomplished, good cultivation will be most abundantly rewarded.

I have made some experiments with manures for Indian corn, on a field which had been under a scourging system of cropping with the cereals, and had never been manured, for twenty years. Unleached wood ashes had no effect on the corn, in this field; and 300 lbs. of superphosphate of lime per acre, though it gave the plants an early start, produced at harvest no larger a crop than 100 lbs. of gypsum. But wherever ammonia was used, the crop was materially increased—more than *doubled* in one instance. The only deduction I would draw from this is, that the majority of our soils, relatively to ammonia, are not deficient in potash, soda and phosphoric acid, so far as the growth of corn is concerned. It is quite probable that there are soils where ashes and phosphates may be needed for corn; but where such is the case, it is certain that they are much more needed for the growth of clover and other leguminous crops and turnips, and that we can not obtain from natural sources sufficient ammonia for the corn without growing those crops or others which, like them, by their growth and consumption on the farm, furnish an increased quantity of ammonia for the use of the cereals.

WHEN TO GATHER CROPS.

This is an important topic. To cut grass when it is "ripe," and grain when ready to shell out, is far from economy. Careful observation and experiments, as well as chemistry, teach us that all grass and grain crops, to be consumed as food for man or beast, should be cut down before maturity. Many of the roots, also, are better for premature gathering. Potatoes may well be ripened in the ground; and, were it convenient to make the separation, we should say let grain, designed only for seed, remain upon the native stalk, in the field, until nearly ready to fall off. As we have said, experiments carefully made prove conclusively that wheat, for example, if cut six or twelve days before full maturity, yields not only a greater bulk and weight, but more and better flour, than if allowed to stand until "dead ripe." We have frequently published the direct trials which have established this fact, and will not take space to repeat them here. Let us look a little into the *reasons* for such a result. It will not be disputed that a pound of gum, or sugar, or starch, is better food than the same amount of wood or woody fibre. Much the largest proportion of the nourishment of wheat or corn, or other grain, is derived from the starch it contains. More than three-fourths of the entire bulk of wheat flour, for example, is really pure starch. The same may be said of corn meal. But all grains contain more or less of woody fibre, in the shell.

Wood, sugar, starch and gum are composed of precisely the same *elements*, and these are nearly in the same proportion. The difference in form and properties is chiefly in the arrangement of the elements. Yet wood is nearly indigestable, and of course fails, in part, to yield nourishment, while sugar, starch and gum are easily digested, and almost their entire elements furnish nutriment.

Examine grain in the milk, and it will be found to consist almost totally of starch, gum and sugar, the abundance of sugar giving it a sweetish taste. Let this grain ripen, and the starch, gum and sugar are hardened, and in part changed to woody fibre, that is, husk or bran. But cut the grain while scarcely out of the milk state, and you stop the natural change into woody matter, and thus secure a large proportion of the desired starch, sugar and gum. It is well known that the earliest flour made from first cut grain possesses a peculiar sweetness. Corn picked while still soft, and dried, retains its sweetness. The only point to be looked to is, not to cut grain before it attains its full development of material. This point has been found to be just at the period when it commences hardening. No grain should be allowed to stand a day after it becomes so solid as to require a gentle pressure to crush the kernel between the thumb and finger-nail. This rule applies to wheat, oats, and indeed to all cereal crops. Gathered at this time, which is usually eight to ten days before perfect ripening, there will not only be more and better nutriment, but the yield of grain, and especially of flour, will be from five to ten per cent greater, and often more, than if the cutting had been deferred ten days. The decidedly superior value of straw cut green, is another important item to be taken into account. The increasingly high price of hay, and the advance in the demand and value of stock, render it important to give more attention to the preservation of straw. Wheat or oat straw and corn-stalks, if left standing until fully mature, are little better, and little else, than so much wood; but stop the ripening process as soon as it is practicable to remove the grain, and you secure straw and stalks worth one-fourth to one-half their weight of hay, as the latter is ordinarily cured. Would it not be better to run the risk of getting a few pounds less of grain by too early gathering, if thereby you secure a greatly superior quality of feed in the straw?

The reasons for cutting grain early apply with equal force to all crops gathered for forage. Taste a stalk of grass just as it is losing its flower, and you will find it sweet, succulent and tender. A few days afterward, it is more like a dry piece of wood. But cut it down at the former period, dry it in small masses to prevent heating and fermentation, and it will retain much of its sweetness, and contain a large proportion of the sugar, starch and gum. We state an undeniable fact, one established by rigid experiment, that *four* tons of hay gathered just as the flowering season is over, will yield more *nourishment* than *five* tons gathered ten to twelve days later. We have the best authority for saying that one acre of grass, which, when cut fully ripe, would yield 1000 pounds of digestible nourishing matter, and 2000 pounds of woody fibre, will, if cut ten to twelve days earlier, yield from 1,500 to 1,800 pounds of nourishing material, and only 1,200 to 1,500 pounds of woody fibre. We will not stop to estimate what an immense saving would be effected to the country were the principles above stated thoroughly understood and practiced upon.

[*Farmers' Journal.*

"ONE YEAR'S SEEDING WILL GIVE SEVEN YEARS WEEDING." — It has been calculated that one plant of sown Thistle produces over *eleven thousand seeds.* Thus one plant gives seed enough to stock 2¼ acres with plants 3 feet apart. Down with the thistles. Do not let one go to seed on the farm, or between the fences, or on the highways.

ON CIDER MAKING.

WRITTEN FOR THE RURAL ANNUAL, BY C. N. BEMENT.

THERE is not, we will venture to say, a more wholesome beverage, nor one better adapted for general use, than the juice of the Apple — a fruit with which the kind hand of Providence has bountifully supplied our country; and no branch, probably, of the farmer's work, that has received less attention, or has been more carelessly managed, than that of cider-making. Like every other artificial preparation, the qualities of cider depend on the selection and management of the materials from which it is made. That there is a vast difference in the quality of the cider brought to market, is evident from the prices obtained. In ordinary seasons of abundance, it is sold at from one to ten dollars the barrel. A farmer should make cider to sell, and it is material to him whether he gets one or ten dollars a barrel. The farmer who sells it for less than three dollars per barrel, makes little or nothing; while he who obtains from three to ten dollars per barrel, need never complain of a surplus of apples. We may here observe that without the proper kinds of fruit, it can not be expected that cider of the best quality can be made; yet we believe that a pleasant and wholesome drink can be made from almost any orchard in the country, provided it is properly made. Still, much unquestionably depends on the kinds of fruit, and what kinds of fruit are mixed.

The production of good cider depends on several contingencies, among which may be named the species of fruit employed — the condition of the fruit — the process of grinding or crushing — vinous fermentation, and the precautions which are taken to prevent the acetous fermentation. The apples for each grinding should, if possible, be all of one kind, so that the fermentation may be complete and uniform. Apples should be selected, the juice of which has the greatest specific gravity, as such juice contains the most sugar, and of consequence makes the richest cider.

We propose to offer some brief remarks under each of these heads. And, first, THE FRUIT. Apples differ not only in their flavor, color, and time of ripening, but in the proportions of their constituent parts, the most material of which are acid, sugar, astringency, vegetable extract, and water. The characteristics of a good cider apple are, a red skin, yellow and often tough and fibrous pulp, astringency, dryness, and ripening at the cider-making season. When the rind or pulp is green, the cider will always be thin, weak, and colorless; and when these are deeply tinged with yellow, it will, however manufactured, or in whatever soil it may have grown, almost always possess color, with either strength or richness. The apple, like the grape, must attain a state of perfection, or perfect maturity, before its juices develop all their excellence; and as many of our best eating apples do not acquire this maturity until winter or spring, this affords a satisfactory reason why winter fruit is seldom or never good cider fruit. In a dry apple, the essential elements of cider are generally concentrated, or are accompanied with a less proportion of water than a juicy one; of course, the liquor of the former is stronger than that of the latter. The acid which gives the peculiar quick and sharp feeling upon the palate in good cider, having been noticed in the apple, although it exists in many other fruits, has been named the *malic* acid. It may not be too much to say that it is the due combination of this acid with saccharine matter — viz., the apple properly fermented — which are the objects to be arrived at in the manufacture of cider. On the selection of the fruit will depend the proportion of malic acid contained in the liquor. The crab has a much greater quantity of this acid than cultivated fruit; and generally speaking, in proportion as we obtain sweetness by culture we deprive the apple of its malic acid. Hence it follows that some delicious table fruits will not make good cider: this rule, however, is not invariable, as the *Golden Pippin* and some other fine apples appear to contain the proper admixture of acid and sweetness which is desirable in the liquor.

The artificial criterion employed to ascertain the quality of an apple for cider, is the specific gravity of the unfermented juice, or its weight compared with that of water. This indicates, with very considerable accuracy, the strength of the future cider. Its weight and consequent value is supposed to be increased in the ratio of the increase of saccharine matter. In making wine of domestic fruit — say of the currant or gooseberry for example — we use sugar until the unfermented liquor attains a certain specific gravity, or until the saccharine matter of the fruit, and that artificially supplied bears a certain proportion to the water. This ensures the liquor strength or body, as the sugar is converted into spirit by the fermenting process. The specific weight of the juice of apples differs materially. That of some varieties is lighter than distilled water, while the juice of others is materially heavier.

Apples should only be used when they have attained their perfect state of maturity, and before they begin to decay, because then they yield the greatest proportion of saccharine matter. The most certain indications of ripeness are the fragrance of the smell and the spontaneous dropping from the tree. Each kind of the apple should be manufactured separately, or those kinds only mixed which ripen at one time, and which experience shall show are not prejudicial to each other. Who would think of making a superior wine from an indiscriminate mixture of a dozen kinds of grapes? And yet we seem to expect good cider from an indiscriminate mixture of a dozen kinds of apples. Fruit, soil and skill make the difference in both; and upon the proper selection and exercise of these depend the quality of the liquor, and the consequent profits of the cultivator. Upon this branch we will only add, that the fruit should ripen upon the tree, and should be gathered when dry, in a cleanly manner, and spread in a dry, airy, covered situation, for a few days, to mellow and throw off moisture by evaporation, which will increase the strength and flavor of the liquor; they should be separated from decayed or rotten fruit, and every kind of filth, stems and leaves, before they are ground. Those that ripen the first are generally the fairest, and make the best cider. The whole produce of a tree never ripens at the same time, consequently there should be two or three gatherings. It is recommended that those with red or green rinds and pulp, without any mixture of yellow, should be separated from those of the latter color, which alone, or mixed with red, produces the prime cider.

For the purpose of making very choice cider, it is essential that the apples for each grinding should be all of one kind, that the fermentation may be complete and uniform. As we have said before, apples should be selected, the juice of which has the greatest specific gravity, as such juice contains the most sugar, and consequently makes the richest cider. The apples should be ground and pressed neatly and cleanly, and every step of the process, from the gathering of the apples to the final barrelling, should be in the same careful and unexceptionable manner. The goodness of cider, and certainly its purity, is in a great degree depending on the perfect manner in which it is freed from all feculent or sedimentary matter. This is usually done at the time of fermentation, at which time, if the barrels are properly attended to and filled, most of the foreign ingredients will run over at the bung, and so far cleanse the cider; but this method, which is all that most cider makers attend to, is very imperfect, and leaves a mass of impurity that soon renders the liquor sour, turbid, and unfit to drink, — or the best kind of vinegar.

The best time to make cider is when the fruit is perfectly ripe, even mellow, before it is ground, and this can only happen late in autumn. As it is known to be more difficult to manage the fermentation of the liquor in warm weather, it would be well to defer making cider till November; if, however, the liquor can be put into a cool cellar after the first fermentation is over, we are of opinion that it might be commenced earlier. The juice of unripe fruit ferments more quickly than that which is ripe and contains more malic acid. Where there is the convenience of a good cellar, the difference of temperature between that and the outward air is greater in moderate warm weather than in November.

The apples should be gathered when dry and perfectly ripe; place them in an open, airy room, spread them evenly or lay them in shallow heaps, to let the moisture pass off by evaporation. After parting with the moisture, the apples become mellow and fit for grinding, when they should be picked by hand, (not scooped, as is generally done,) and all decayed or decaying fruit rejected. Reduce them either by crushing or grinding, for which purpose we prefer the grater mill, as it does not break the seeds. There is a difference of opinion respecting the time the pomace should remain in the vat, before it is put in the press. If it is pressed immediately after grinding, there will be a deficiency of richness and color in the cider; if kept too long, the acetous fermentation will take place before the vinous is completed. To give color to the cider, from 12 to 24 hours exposure to the atmosphere is recommended; the warmer the weather, however, the shorter the time. (The analogy existing between the making of cider and of wine, induces us to suppose that the method of the vintner should be adopted by the ciderist.) Stir up the pomace till it becomes red from the action of the air; then press out the juice slowly, and strain through a coarse cloth or a fine hair seive, (which is much better than straw, so generally used for this purpose,) and put into casks perfectly clean and sweet, bung tight, and immediately place in a tolerably cool, dry cellar, where the temperature is from 60° to 65° F.— not over 68°. Remove the bung, and fill up with cider to the surface. Fermentation will soon commence, and throw off the lighter particles in froth, over the side of the cask. Care must be taken to keep the cask full, to enable the impurities to pass off more freely. When the froth or scum ceases to flow, and the fermentation becomes a little languid — which may be known by the diminution of the hissing noise — the bung is to be driven in, and a small hole bored by its side, into which a wooden peg is to be fitted; this peg may be drawn once or twice in two or three days, for a few minutes, to let the fixed air which has been generated escape, and in about three weeks it may be permanently driven in tight. If the fermentation should continue, and there should appear any danger of the sweetness vanishing altogether, it may be racked into another cask, which has been fumigated with sulphur, and the fermentation checked by fining, as follows: draw off one or two gallons of the cider from a barrel; then take one quart of new milk immediately from the cow after milking, and before any separation takes place, and mix it with the cider drawn, and pour it into your cask and stir it well; leave the bung loose for about twelve hours, and then drive it tight, and in from twenty to thirty days it will be beautifully fine, and bright, and ready for use.

Another Process. — After the liquor has been pressed out, it should be strained through a fine hair sieve or grass cloth, and put into casks well cleansed and free from must, as much depends on everything with which the juice comes in contact, being perfectly sweet.

The next object which claims the attention of the ciderist is the fermentation. Placed in a cellar moderately cool, an evident ebullition takes place, causing bubbles to rise to the surface, and forming a crust or froth, soft and spongy, over the liquor, or about the bung-hole of the cask. As long as the violence of the fermentation continues, bubbles will rise and break through the crust. When the action has gradually subsided, all further sensible fermentation should be stopped by racking off the cider and pure part into open vessels, to stand in a cool place for a day or two, and then put into casks for the winter, or by burning sulphur in the cask when about half full, bung it up, shaking it well with the fumes. If there is difficulty in stopping the fermentation, the cider must again be racked off, put into a cooler place, or a small quantity of cider brandy or pure spirit must be added.

It is in vain to expect to have a pleasant, wholesome beverage, without taking much pains in the management of the fermentation. The common practice of taking the casks to the cellar direct from the press, there to ferment and remain until ready for use, without racking off the liquor, is as slovenly as it is unprofitable; yet no inconsiderable portion of cider drank by farmers, and of that brought to market, is managed in this way. This is generally called "hard cider." In the spring it either becomes vinegar, or is so perfectly impregnated with the bad qualities derived from the lees, settled scum, and other impurities, that it is no longer drinkable, except to vitiated tastes.

Cider, as well as other fermented liquors, is benefitted by close fermentation. All carbonic acid gas in the original juice, (if there be any,) or all that may be generated in process of fermentation, should be put in strong casks before any fermentation commences. Every thing that has a tendency to clear the juice from the pulp and other matter, and charge it with carbonic acid gas, will give that lively zest which is so highly prized in fermented liquors.

Another Method. — To render cider of the best quality fit for drinking or culinary purposes, it should be thoroughly filtered, and thus fully freed from all impurities; it is only in this way that it can be done, and this, properly performed, never fails. For filtration, there is no substance equal to charcoal. In preparing a vat or tub for filtering cider, the bottom stratum must be placed a short distance from the bottom, and must consist of fine charcoal; over this, a stratum of that which is rather coarse, and above all a layer of well washed sand. The several divisions should be supported by flannel cloths, and the number of the filters, or their size, may be determined by the quantity it is required to purify. The sand, as it becomes filled with sediment and clogged, must be taken out and washed, and new charcoal must take the place of the old, particularly in the fine, or lower section.

Another mode is to run the apple juice through a rectifier, made by laying flannels in the bottom of a cask, over which should be a layer of coarse sand, well washed, then a layer of charcoal, recently burned and made fine. Passing the juice through this will deprive it of nearly all that would make lees.

We have already suggested the importance of drawing off the liquor from the scum and sediment, at the termination of the vinous fermentation.

The great secret in the manufacture of cider, is the separation of the pomace from the liquor before the second fermentation commences;

and this may be done by straining the juice as it comes from the press, through coarse cloths, into casks standing on end—the upper head removed—with a tap or faucet inserted in the side, say two or three inches from the bottom. The casks should be covered with one or more blankets, to confine the heat and hasten fermentation, as well as to protect it from flies, etc. The pomace and lighter particles commence rising to the top, and continue to rise and ferment for two or three days. When the vinous fermentation moderates, which may be known by the cracking of the froth or crust, it should be carefully removed with a fine skimmer. Care should be taken not to jar or shake the cask during the operation, or the scum will mix with the clear liquor. Draw off the liquor by the faucet, as long as it will run clear, the heavier particles remaining undisturbed at the bottom. If the liquor is not sufficiently clear, or indications appear of the acetous fermentation having commenced, the cider should be fined either with milk, eggs, isinglass, or sulphite of lime. After the first racking the cask should be bunged close, and further racking be avoided if possible, as every racking renders the strength less, and much of the spirit escapes with carbonic gas which is evolved in the fermenting process. The oxygen of the atmosphere, besides, increases the vinous or vinegar fermentation. But if these methods fail, resort may be had to the means of impeding the natural operations of the mucilage, or vegetable yeast. This may be done by drawing a gallon or so of the cider, in which dissolve six ounces of sulphite of lime to the barrel of thirty-two gallons; pour it into the barrel, and stir the same thoroughly by shaking: or it may be done by filling the barrel half full and burning a rag saturated with brimstone in the cask into which the liquor is to be decanted, after it has been partially filled, and rolling it so as to completely incorporate the liquor with the gas; or by putting a drachm or two of sulphite of potash into each barrel, which will precipitate and render insoluble the remaining leaven or yeast. If the fruit is good and properly managed and ground, and the cider racked from the fermenting casks at a proper time, almost all the subsequent operations will be superceded.

Variation of the Process.—After the juice has been pressed out, and the pomace has been separated, either by filtration or an open cask or vat, the liquid should be strained through a fine grass-cloth strainer into a clean cask, and removed to a tolerably cool cellar for fermentation. Before fermentation commences, insert a flexible tube through the bung, and bend the other end into a cup of water placed on the cask near the bung, to allow the carbonic acid gas which is generated by the fermentation, to escape, and to prevent the oxygen of the atmospheric air from decomposing the saccharine matter. As soon as the gas ceases bubbling through the water in the cup, the fermentation has ceased; then draw off into clean, sweet casks, and place in a cool, dark, dry cellar, where it will continue sweet for any length of time. This method is pursued by many of the best vintners, in the fermentation of wine. The advantage of this process is, that the juice is preserved perfectly sweet, and retains the rich aroma of the fruit, and we are more sure to draw it off at the right moment after fermentation.

It has long been our opinion, that too much carbonic acid gas is suffered to escape during fermentation, producing too much alcohol, or acetous acid. We have noticed some of the best cider-makers recommend the prevention of the escape of carbonic acid gas, by laying light substances, such as leaves or cloths, on the bung-hole while the liquid is under fermentation. It is intended also to exclude a portion of the atmospheric air.

GOOD POINTS.—We consider the following points of importance in securing good cider. *First:* The use of the best ripe apples, free from rot. *Second:* The perfect reduction of the apples to pomace, without breaking the seeds. *Third:* The removal of the impurities in the liquid, by the fermentation in a full cask with open bung, the aperture thus affording an escape over the side for the scum and froth; and, *Fourth:* The drawing off the cider without disturbing the sediment deposited at the bottom during fermentation.

SPARKLING CIDER.

Put the new cider as it comes from the press into clean barrels, and allow it to ferment from one to three weeks, according as the weather is cool or warm. When it has attained a lively fermentation, add to each gallon three quarters of a pound of crushed sugar, and let the cider ferment again until it possesses nearly the brisk, pleasant taste which it is desired should be permanent. Pour out one quart of the cider, and mix with it one quarter of an ounce of sulphite of lime to every gallon the cask contains. Stir it until it is intimately mixed, and pour the emulsion into the cask; agitate the contents of the cask thoroughly for a few moments, then let it rest, that the cider may settle. Fermentation will be arrested at once, and will not be resumed. It may be bottled in the course of a few weeks, or it may be allowed to remain in the cask and used on draught. If bottled, it will become a sparkling cider—better than most of the cheap champagne.

VARIATION.—By substituting for the sugar one pint of honey, you will have a cider much resembling and superior to the famous Newark cider, formerly found in the New York market.

CHAMPAGNE CIDER.

Take late, sound, ripe apples, crush and press them into cider; boil it in a copper or brass kettle for about ten minutes; skim it while it boils; then barrel it like common cider, keeping the cask full. In March, before the second fermentation has begun, bottle in strong bottles—old champagne bottles are best—large or small, and bottle all your cider, leaving a small space between the liquor and the cork; tie a good strong string, or what is still better, small annealed wire, over the cork, and lay the bottles on the side, in a dry, cool cellar. Should it commence bursting the bottles, stand them on end.

Cider treated in this way will make a splendid drink in the course of the summer, sparkling like champagne.

CIDER WINE.

Take pure cider, made from sound ripe apples, (Harrison preferred,) as it runs from the press. Put 60 lbs. of common brown sugar into 15 gallons of the cider, and let it dissolve; then put the mixture into a clean barrel, and fill up to within two gallons of being full with clean cider; put the cask in a cool place, leaving the bung out forty-eight hours; then put in the bung, with a small vent, until fermentation wholly ceases, and in one year the wine will be fit for use. This wine requires no racking; the longer it stands upon the lees the better.

☞ From the Hughes Crab Apple, a sparkling champagne may be made. Gooseberry champagne is world-renowned.

CIDER WINE, NO. 2.

Take good clear sweet cider and let it ferment, then heat till it boils; skim it, and add to each gallon of cider one pound sugar and one pint of pure spirits. To give it a high color, boil in the cider a small bag of dried blackberries.

REMARKS.

It is considered by many as a proof of good cider if it sparkles in the glass; bad cider may do this, and any will which is bunged tight before the fermentation is completed.

The common appellation for cider is correct: we say "*it is fine;*" by which is meant, free from all feculent matter; and no cider should be considered *good* unless it is well "fined."

If it is wished at any period of the fermentation to stop its further progress, it may be done by adding one or two grains of sulphite of potash to each gallon, which will not affect the flavor of the cider.

Seeding with Clover among Corn. — A correspondent of the *Country Gentleman* has been in the habit, for several consecutive seasons, immediately after the last hoeing of corn, (which has been cultivated as level as practicable,) of sowing clover seed by going between each row one way, and carefully scattering the seeds under the leaves and stalks, at the rate of 15 lbs. to the acre, and usually with good success. The corn seems to shade the seed sufficiently to protect it from the too powerful heat of the sun, and if the land is in good tilth, a good catch is secured for pasturing or plowing under.

To Kill Canada Thistles.—An experienced farmer says he has found from experience that a heavy crop of buckwheat, followed by a crop of oats seeded with clover, will almost entirely eradicate the Canada thistle.

AMOUNT OF ROOTS FROM CLOVER AND GRASSES.

THAT the roots of plants left in the soil serve to enrich it, there can be no doubt. It has been estimated that the roots left in an old pasture or meadow field, are equal to four times the weight of that year's hay crop. In other words, if a ton and a half of hay had been reaped, six tons of dry vegetable matter remain in the soil in the form of roots. This estimate is deduced from a series of experiments made by HLUBEK, in the agricultural garden at Laybach. The grasses he experimented on were sown in beds of equal size (180 square feet), and mown on the fourth year after sowing, just as they were coming into flower. The roots were then carefully taken up, washed and dried. The results of some of these trials were as follows:

KIND OF GRASS.	PRODUCE IN GRASS & HAY		PRODUCE IN ROOTS.		Weight of dry Roots to 100 lbs. of Hay.
	Grass.	Hay.	Fresh.	Dry.	
	lbs.	lbs.	lbs.	lbs	lbs.
1. *Festuca elatior*—Tall Fescue-grass,........	124	86	56	22	61
2. *Festuca ovina*—Sheep's Fescue-grass,........	90	30	......	80	266
3. *Phleum pratense*—Timothy-grass,............	90	25	56	17	60
4. *Dactylis glomerata*—Rough Cock's-foot,......	202	67	......	22½	33
5. *Lolium perenne*—Perennial Rye-grass,.......	50	17	......	50	300
6. *Alopecurus pratensis*—Meadow Fox-tail,.....	106	35	......	24	70
7. *Triticum repens*—Creeping Couch or Quack grass,..................................	120	60	......	70	116
8. *Poa annua*—Annual Meadow grass,..........	......	......	......	......	111
9. *Bromus mollis* and *racemosus*—Soft and Smooth Brome-grass,.....	......	......	......	......	105
10. *Anthoxanthum odoratum*—Sweet-scented Vernal-grass,.........	......	......	......	......	98

A mixture of white clover, of ribwort, of hoary plantain, and of couch-grass, in an old pasture field, gave 400 lbs. of dry roots to 100 lbs. of hay; and in a clover field, at the end of the second year, the fresh roots were equal to one-third of the whole weight of green clover obtained at three cuttings—one in the first and two in the second year—while in the dry state there were 56 lbs. of dry roots to every 100 lbs. of clover hay which had been carried off.

The Sheep's Fescue and the Perennial Rye-grass, beside the dead roots which detach themselves from time to time, leave, at the end of the fourth year, a weight of living roots in the soil equal to three times the produce of that year in hay. If we take the mean of all the above grasses as an average of what we may fairly expect in a grass field, then the amount of living roots left in the soil when a four-years-old grass field is plowed up, will be equal to one-sixth more than the weight of that year's crop.

In the case of clover, at the end of the second year, the quantity of dry vegetable mattter left in the form of roots, is equal to upward of one-half the weight of the whole hay which the clover has yielded. We do not know of any experiments that prove it, but we have little doubt that the annual increase of clover roots, after the second year, is far less than in the first and second years, and that there is little gained by letting land lie down with clover more than two years.

As a general rule, whatever increases the foliage of a plant, increases the roots also; and hence it is that an application of plaster to clover, even though all the clover is removed from the soil, proves beneficial to the following grain crop, from the increased quantity of roots left to decay in the soil.

CUTTING POTATOES FOR PLANTING.

After all that has been written on the subject, it is still a disputed point whether it is better to plant large or small potatoes—whole potatoes or sets.

The fleshy matter of the potato unquestionably furnishes food for the young plant; and, on theoretical grounds, it might be supposed that the larger the potatoes—the more fleshy matter there is to each eye—the more vigorous would be the early growth of the plant. This is probably true so far as the growth of leaves and stems is concerned, and it may be of *seed* (balls) also; but it must be borne in mind, in applyiug general principles to the cultivation of the potato, that the object is not to develop the natural growth of the plant, but to increase the formation of tubers—of the underground "*gouty branches*." The present habit of the plant is the result of somewhat artificial treatment; and in order to retain this habit, we must resort to those practices which have been found from experience to induce the formation of tubers, rather than those which are deduced from the general principles applicable to the natural growth of plants. Dr. Lindley—a high authority—says: "I have proved, by a series of numerous experiments, that the weight of potatoes per acre is greater, under equal circumstances, from sets than from whole tubers, by upwards of from seven cwt. to three tons per acre." An excessive amount of alimentary matter in the sets, therefore, is injurious rather than beneficial.

It does not follow from this fact, however, that small potatoes are better for seed than large ones. Small potatoes are apt to throw up too many small, soft stems, which produce smaller tubers than where there is one, or at most two, stout, woody stems. It seems, also, to be proved that a set from a good-sized potato is better than a set from a small one; and it is probably true, as the experiments of the Rev. James Farquharson indicate that large potatoes planted whole will produce a greater crop of good-sized potatoes than small ones planted whole. Yet it does not follow from this that there is not too much fleshy matter in the large potato when planted whole, and that it would not be better, as Dr. LINDLEY states, to plant only sets from the large potato.

It is a curious fact, but one which seems to be well established, that the eyes from the extremity of the potato produce crops which come to maturity from two to three weeks earlier than those from the root end. In some parts of England, farmers who raise early potatoes for market have availed themselves of this fact for many years. They cut the potato into sets, as shown in the annexed sketch. The sets nearest the extremity of the potato (*a*) produce the earliest crop, and are planted by themselves, in warm places, for this purpose. The sets at the root end (*d*) are planted for a late crop, and those in the middle of the potato (*b*, *c*,) are planted for an intermediate crop. The root-end is usually thrown aside for the pigs.

It has been supposed that the reason why the eyes from the point of the potato are more easily excited into growth, is owing to their being more perfectly matured; but this is impossible, as they are the youngest eyes. It seems more likely that the cause lies in the fact that the extremity of the potato is not so ripe as the root end—that, in other words, they are not so perfectly *organized*, and are consequently less able to resist the decomposing influences of light, air, and moisture. "That which thou sowest is not quickened except it die." The organized matter of a plant must be decomposed (or die) before it can reproduce itself. The youngest eyes, being less perfectly organized, would decay soonest and grow earlier and with greater vigor.

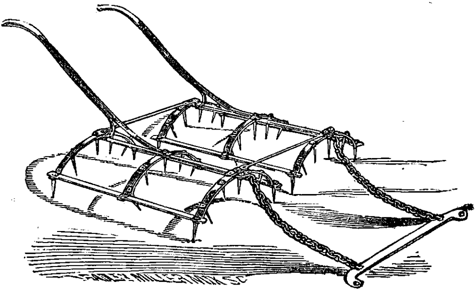
In confirmation of this explanation, we may mention a fact stated at the La Moille Farmers' Club, that "Indian corn gathered *before fully ripe*, and hung up to dry in the house, germinated sooner, and was more forward through the season, than if left to ripen in the field."

GET SEED POTATOES FROM THE NORTH.—PATRICK MATTHEW, of Scotland, states that he took some Perthshire potatoes to Spain for the use of his family, but found them too precious to eat, and distributed them among his friends for seed. The potatoes grown in Spain, without change of seed from cooler climates, are of very inferior quality—worthless, wet, and rank in taste and smell. Those obtained from the Scotch seed retained a portion of their valuable qualities for two or three years, and then rapidly deteriorated. It is necessary to get seed from the north every second or third year.

WARTS ON CATTLE.—A correspondent of the *Genesee Farmer* gives the following remedy for warts on cattle: Slake a piece of lime the size of a hen's egg, add four table-spoonfuls of soft soap, stir the same until well mixed. Apply the same to the warts. They will disappear in a few days, and the skin become smooth.

HARROWING POTATOES.

If potatoes are harrowed just before the shoots are coming through the ground, the after labor of hoeing is greatly reduced. The harrowing also breaks the crust of the soil, and the shoot can penetrate through the ground more readily. It has also another advantage: it removes a portion of the soil from above the plant, and thus the plant receives, during the first stages of its growth, when the soil is cold,



Potato Harrow.

the more direct influence of the sun. We present an engraving of a harrow used in England for this purpose. It is made in two parts, each being convex, and about two feet wide, connected by a bar across them, which admits of their separation to a greater or smaller distance, so as to fill the width of drill; and it is drawn by one horse, which walks between the drills on which it operates.

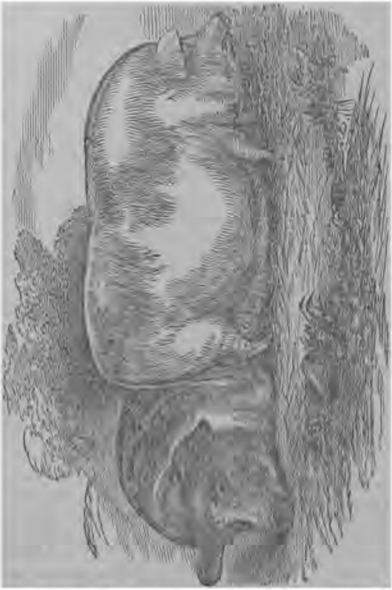
A New Vegetable. — There has lately been exhibited at several meetings of the Royal Horticultural Society a new vegetable which promises to become a permanent institution among kitchen-garden crops. It is a cabbage in the form of Brussels Sprouts. The stem is about a foot high, bearing on its summit a good-size-hearted cabbage of the ordinary character; but the stem is covered with small cabbages about the size of a small dessert apple, and these when cooked form an excellent dish, partaking of the flavor of a nice summer cabbage, and without the strong Savoy flavor which distinguishes the Brussels Sprouts.

ERRORS TO BE AVOIDED.

How many farmers are to be found who can plead "not guilty" in reference to some one or more of the following errors to which the *Country Gentleman* calls attention?

1. Allowing weeds, such as thistles, docks, stramonium, poison hemlock, etc., to grow along the highway.
2. Allowing elders, burdocks and nettles to grow along fences, and Canada thistles, foxtail, pig weed, rag weed, etc., to grow among and sometimes eclipse crops.
3. To plow, harrow, and seed, or plant, land so wet that year after year it yields scarcely enough to pay tillage.
4. To allow boards to become knocked off of board fences, and clapboards from barns; and the hinges of gates to become so deranged that they must be laboriously dragged over the ground in opening and shutting, quickly wearing them out.
5. To pile manure against the side of the barn until it rots it and mires the cattle, instead of spreading it for crops, and leaving a neat, clean yard.
6. To admit pigs to door-yards to root up the grass, and help themselves to swill at the kitchen door.
7. To throw kitchen slops into a puddle at the back door.
8. To build barns on the public road, thus making a barn-yard of the highway.
9. To scatter implements, such as plows, harrows, rollers, etc., about the barn-yard or along the sides of the road, exposed to all weathers.
10. To throw rubbish, brush, etc., into the public road, to the offence of every traveller who has any appreciation of decency, instead of destroying or converting these materials into manure.
11. Badly built board fences, half lifted by frost out of the ground, and leaning half over—occasioned by a shallow and careless setting of the posts, and by not draining the holes.
12. Cornfields with a dense undergrowth of weeds, and potatoes with a dense overgrowth of the same.
13. Hedges and trees planted and allowed to grow up with grass, and consequently never being good for anything—instead of giving them good and broad cultivation.
14. Allowing cows and other animals to run in the streets, to pilfer from neighbors, and dry up by being frequently lost at milking time.

Rat Trap.—A good rat trap, it is said, may be made by filling a smooth kettle to within six inches of the top with water, and covering the surface with chaff. The first chap who gets in makes an outcry because he cannot get out; and the rest coming to see what the matter is, share the same fate.



Chinese Hogs.

CHINESE HOGS.—This breed of swine has long been known in Europe and America, and has done much to improve our native breeds. The celebrated Berkshire hog owes some of its best points to an intermixture with the Chinese; and it is easy to trace the distinguishing characteristics of the Chinese in all our best breeds of swine. They are much prized on account of early maturity, the rapidity with which they lay on fat, and the small amount of offal and bones. They make first-rate "porkers," but are rather too small to be much valued as "bacon" makers.

They are chiefly valuable in this country for improving the large, hardy breed of hogs. They are not sufficiently hardy themselves, ever to be a useful breed, except in a warm climate. Their meat, too, is said to be soft and oily. But by judicious crossing with some of the large, coarse breeds, great improvements could be effected in a short time. American farmers should turn their attention to this subject.

MAKING HAY.—A correspondent of the *Country Gentleman* remarks, in reference to the amount of drying necessary to make hay, that the rule which should be adopted is, "just as little as possible, and have the hay kept sweet and bright in the mow, without any heating. The nearest we can bring our hay out of the mow in winter, resembling grass, and have it sweet, the better will the herd be satisfied. Reference should always be had to the place of storage. If upon an open scaffold, where there will be a circulation of air from beneath, much less will suffice than when put in the bottom or centre of a large bay.

Reference should also be had to the time of cutting. If cut early in the season while in flower, more sun will be needed than cut later, when the juices of the grasses have in a degree left the stalk. If grass is cut when perfectly dry, no rain or dew adhering to it, it really requires but little sunning to save it, as what usually creates the mischief in our mows, and causes the moulding and heating, is the rains or dew which have not been thoroughly expelled.

Some years since I lived neighbor to a farmer, whose rule was invariably to give all of his hay two days good drying before housing it; and consequently to fodder his stock in the winter with this dry compound, was as good as grandmother's snuff-box any time — sure of giving one a good sneeze. Instead of having the hay come out in the foddering season a dull brown color — about the shade of a decayed oak leaf — it ought to be a dark green; and allow me also just to add, the more it can be dried in the cock, the more will it assume this desirable shade. A course pursued by the writer occasionally, has been to take the mower about 10 o'clock, or when the dew is entirely evaporated, and cut what is desired for the day—from one to five acres, as the case may be — turning it when in order, and cocking it the same afternoon; and next day, as soon as the dew is off, it is in fit condition to transport to the barn ready raked. Early in the season this may not be sufficient drying, but it will do in many cases."

In regard to the time of cutting, he thinks the grass should be allowed to stand till it is at least out of bloom.

COVERING GRASS-SEED WITH STRAW. — The (Va.) *Farmers' Journal* gives the result of some interesting experiments with straw as a mulch for grass lands. The straw was spread the 15th of April, and the effect was very great—more than doubling the crop of grass, by actual admeasurement. In another case, half a hay field was covered on the 2d of May, and the result was a crop three times as large as upon the part left uncovered.

The Brown Turkey Fig Tree.

THE FIG.—The history of the Fig is coeval with that of the human race; frequent mention is made of it in the Scripture and other writings that have been handed down to us from antiquity. It has always been highly esteemed as an article of food, and in those countries well suited to its culture, it forms an important item of produce and exportation. As an article of diet, it is used both green and in the dried form. The fresh fig, just plucked from the tree, is sweet and cloying to the taste, and not particularly agreeable, until a relish is acquired for it, when it becomes a favorite and wholesome fruit.

In warm climates, the fig tree attains a height of about twenty feet, with numerous branches, and bears two successive and distinct crops of fruit during the season; the first ripening in June and July, and the last crop during the autumnal months.

The flower of the fig is remarkably curious, being numerously produced *within* a fleshy, hollow receptacle, and consists merely of a single style and three stamens. When the office of the flowers has been performed, the receptacle which contains them increases in size and becomes, in time, the perfect fruit.

Fruit and Leaves of the Brown Turkey Fig.

In the Middle and Western States, the culture of the fig is seldom attempted, except in greenhouses and graperies; but there is no difficulty in producing the fruit in the open air, by merely taking up the plants with a ball of earth attached in the autumn, before the frost nips them, and putting them away in a cellar that will not freeze, and then re-planting each spring. They will bear this apparently rough treatment remarkably well; the only effect it has being to diminish the growth of the wood and increase the fruitfulness—two results, in this case, quite desirable.

The annexed engraving is taken from a specimen growing in this city.

Cut Worm and Corn Grub Killer.—Dr. Asa Fitch, the eminent entomologist of the N. Y. State Agricultural Society, says: "I doubt not you have noticed in plowed fields a large black beetle with most brilliant golden dots placed in rows on its back. It is the *Calosoma calidum* of entomologists, and its eggs produce the *corn grub killer*. It is a most inveterate foe of the cut worm, grasping the worm in its strong jaws, and in spite of its violent writhing and struggling, securely holding it, and when it finds these worms in plenty, it gorges and surfeits itself upon them, till it is so glutted and distended as to be scarcely able to stir—for it never knows how to let a cut worm alone when it meets with one. It is continually hunting these worms, feeding on nothing else if it can obtain them. Both it and the golden-dotted beetle which produces it, therefore, should never be harmed."

SOMETHING ABOUT HENS.

A correspondent of the *N. H. Journal of Agriculture* says: "It is a pleasant recreation to tend and feed a bevy of laying hens. They may be trained to follow the children, and will lay in a box. Egg shells contain lime, and in the winter when the earth is bound with frosts or covered with snow, if lime is not provided they will not lay—or if they do lay the eggs will, of necessity, be without shells. Old rubbish lime from chimneys and buildings is proper, and only needs to be broken for them. They will often attempt to swallow pieces as large as a walnut. I have often heard it said buckwheat is the best food for hens; but I doubt it. They will sing over Indian corn with more animation than any other grain. The singing hen will certainly lay eggs, if she finds all things agreeable to her; but the hen is such a prude, as watchful as a weazel, and as fastidious as a hypocrite—she must, she will have secresy and mystery about her nest—all eyes but her own must be averted—follow her, or watch her, and she will forsake her nest and stop laying. She is best pleased with a box, covered at the top, with a backside aperture for light, and a side door by which she can escape unseen.. A farmer may keep one hundred hens in his barn, and allow them free liberty to trample over his hay-mow, and set where they please, and lay if they please—aud get fewer eggs than one who has a department especially for his fowls, and keeps but half as many, and furnishes them with corn, lime, water, and gravel, and who takes care that his hens are not disturbed about their nests.

"Three chalk eggs in a nest are better than a single egg. Large eggs please them. Pullets will commence laying earlier in life when nests and eggs are plenty, and other hens are cackling around them. A dozen fowls, shut up away from the means of obtaining other food, will require something more than a quart of Indian corn a day. I think fifteen bushels a year a fair provision for them; but more or less, let them always have enough by them—and after they have become habituated to finding enough at all times, they take but a few kernels at a time, except just before retiring to roost, when they will fill their crops. But just so sure as their provision comes to them scantily, so surely will they raven and gorge themselves to the last extremity, and will stop laying. One dozen fowls, properly tended, will furnish a family with more than 2,000 eggs per year, and 100 full grown chickens. The expense of feeding the dozen fowls will not amount to eighteen bushels of Indian corn. They may be kept as well in cities as in the country, and will do as well shut up the year round as to run at large—and a grated room well lighted, ten by five feet, or larger if you can afford the space, partitioned off from the stable or other outhouse, may be used as a hen-house. In the spring, (the proper season,) five or six hens will hatch at the same time, and the fifty or sixty chickens give to one hen. Two hens will take good care of one hundred chickens, until they are able to climb their little stick roosts. They should then be separated from the hens entirely. They will wander less, and do better, away from the parent fowls. Chickens put in the garden will eat up the May bugs and other destructive insects; but for my own part I much prefer four or five good sized toads; for they are not particular about their food, but will snap up ants and bugs of any kind, and will not, if a good chance offers, refuse the honey bees, but will down them in a hurry. In case of confining fowls in summer, it should be remembered that a ground floor is highly necessary, where they can wallow in the dirt, for they like it as well as the hog likes muck."

A Trousand Weeds at One Pull.—A single pigweed (*Chenopodium album*,) left undisturbed, will ripen more than ten thousand seeds, each capable of producing a successor. The seeds of the dock sometimes number over thirteen thousand on a single plant, and the toad flax (*Linaria vulgaris*) leaves provision for more than forty-five thousand plants the following year. Burdock will multiply twenty-one thousand fold, and the common stinging nettle (*Urtica dioica*) ripens one hundred thousand seeds. Scarcely a weed comes to maturity without scattering one thousand or more seeds to injure crops and annoy the cultivator. This is not mere guess work, for painstaking investigators have actually counted and calculated the increase. A single pull at the commencement of the season, will destroy the whole progeny.

It should be remembered that seeds mature sufficiently to vegetate before they are perfectly dry; and again, that the seeds are ripe on one part of the plant while there are flowers on another. Hence it is not safe to wait till the flowers are gone before pulling up weeds. Attack them before they blossom. Pull them up, or, if annuals, cut them off when quite green, and spread them in the sun to die. He who allows the weeds to grow in his potato field until he harvests the crop, is quite sure to sow many millions of seeds for next year's trouble.

This much for annual and biennial weeds. Perennials, like the dock, daisy and the thistle, should be treated with greater vigor. Cutting off the tops once will not suffice. Digging them up one by one, root and branch, is the only effectual remedy. Where they have invaded a whole field, plow up the land in the fall, leaving many of the roots exposed to the action of the frost. Plow again in the spring, taking pains to pick out and carry off every root that appears. Devote the soil to some hoed crop, and let it be repeatedly and thoroughly cultivated through the summer, waging war upon the pests without any relenting. If they are cut off *below ground* several times in the summer, they will grow weaker at every decapitation. The leaves being the lungs of plants, are essential to their breathing, and if this important operation be stopped, they must soon give up the ghost. Remember, every extermination of a weed this year, is the death of a thousand of the future crops.—[*American Agriculturist.*

Hibiscus Rosa Sinensis.

Hibiscus Rosa Sinensis.—This plant is very commonly cultivated in the gardens of China and the East Indies, and is there a fine evergreen shrub, attaining a height of ten feet. With us, however, it can only be grown in the green-house, or, more, properly, a hot-house, and seldom becomes more than two or three feet in height.

The leaves are from three to four inches in length, and two-thirds as broad, supported by a long foot-stalk; they have a dark green, shining, wax-like surface, which renders the plant very attractive, even when not in bloom.

The flowers are about two inches in diameter, of the shape of a single hollyhock, and of a dark, rich, velvety crimson color. The plant in full flower is perfectly gorgeous in appearance, and will always receive especial attention wherever it becomes known.

The above engraving is made from a plant growing in the greenhouse of the late Selah Mathews, Esq., of this city.

CULTURE OF THE PEACH IN THE MIDDLE STATES.

The editor of the Baltimore *Rural Register*, who has had considerable experience in the cultivation of peach trees, remarks that orchards in the Middle States have not borne good crops of late years, and that many orchards in locations once famous for the size and qualities of the peaches grown there have either died out or become worthless.

It is not always easy to account for the causes that have produced this state of things, for they necessarily vary in many instances, and the conditions under which the orchards were cultivated or neglected are not usually known. Late spring frosts also, and intervals of warm weather too early in the season, have not unfrequently led to the loss of this delicious fruit, and he has also noticed that many of the newer peach orchards have been planted in situations and on soils where experience has shown that peaches will not flourish. The failure of a crop through unseasonable weather cannot of course be always prevented, although there are occasions when, as in the case of the late spring frosts, the probability of a fair return of fruit may be secured by resorting to the same simple means which were adopted for that purpose by some of the older and most successful peach growers.

The peach flourishes best in a light, loose soil, rather sandy than otherwise, and as a general rule, on dry uplands better than on the slopes of hills inclined to valleys through which small streams of water flow, and through which cold currents of air are constantly sweeping—such valleys we mean as are subject to have their vegetation injured by those early and late frosts, which do not reach the upland plateaus. Of course where large bodies of water modify the temperature, as on the Eastern and Western Shores of Maryland, the level sandy soils of such districts will grow the peach to perfection, and without much hazard. Elsewhere a sandy or gravelly soil, well elevated above surrounding valleys, and therefore having a dry atmosphere, is the best fitted for the culture of the peach. The orchard should, however, be protected from the north-western winds either by a higher range of hills or by a belt of woodland. If late frosts are to be apprehended, heaps of brush and weeds should be formed on the windward side, and a smothering fire made so as to let the smoke drift among the trees during the night. During high winds this precaution is not necessary, as it is only during moderately calm nights that the frost is apt to injure the young fruit. No crops should ever be grown in a peach orchard except such as are subjected to the hoe — in other words, none but root crops and corn. These may occasionally be grown, but it is far better to plow up the peach orchard every fall, let it lay rough through the winter, and cultivate it throughout the following season without growing any crop on it whatever. If, in addition to these simple rules, the trees are judiciously pruned, are worked annually about their roots, when half a peck of wood ashes should be shread around the stem of each tree; and if they are also carefully freed of the peach worm by following it into its recesses under the bark at the base of the tree, we should hear much less frequently of the failure of the crop.

FRUIT VS. MALARIA. — The *Country Gentleman* says that residents in the Western States, and other regions where intermittents and similar diseases result from malaria, state that a regular supply of ripe, home-grown fruit, is almost a sure preventive. Eat the fruit only when fully ripe, and eat only moderate quantities at a time, and little need be feared. The residents of such regions should, therefore, not omit the earliest opportunity for a supply. Plant large quantities of strawberries for early summer—they will bear abundantly a year from the time they become established. Plant many currant bushes—for these are a most healthy and excellent fruit — very hardy — and if in abundance, will last through all the hottest parts of the summer. The Doolittle and Orange raspberries are profuse bearers—the former very hardy, the latter generally so, but should be laid down and covered with an inch or two of earth for winter. The Rochelle blackberry, if pinched in when three or four feet high, (about midsummer,) will bear abundantly, and prove hardier than if the canes run up without control. The Delaware, Clinton and Concord grapes, are early and hardy, and will bear in two or three years from transplanting. Dwarf apples, on the Paradise and Doucin stock, will flourish in any locality, and begin to bear profusely in three or four years, and on the Paradise stock often in two years. Some varieties bear early on common stock; such, for example, as the Dyer, Lowell, Early Strawberry, Sops of Wine, Oldenburgh, Porter, Belmont, Jonathan, &c., but these will, of course, bear much sooner as dwarfs. The Bartlett, Washington, Julienne, Flemish Beauty, Beurre d'Amalis, Onondaga, Howell and Seckel pears, produce early as standards, and the Louise Bonne of Jersey as a dwarf. Houghton's gooseberry grows with great vigor, is very hardy, and in two or three years affords almost solid masses of berries on the branches.

Such fruits as the above should be planted out on every new place, as indispensible to health as well as to comfort and economy; and emigrants to new countries should take a supply with them, as the best medicine chest they can provide.

PROTECTING PLANTS FROM FROST.—M. BOUSSINGAULT, the well known French chemist, has written a lengthy essay on the preservation of plants from frost by filling the air with smoke. This he does not recommend on nights when the thermometer, at a distance above the soil, indicates a temperature below 32°, for it would then have no effect, nor on windy nights, for there is no frost; but it is found of service in protecting fruit-trees and delicate plants from the late frosts of spring, by which their blossoms are so often destroyed.

KINDNESS TOWARD MILCH COWS. — One of the greatest errors in overcoming cows that are unquiet while being milked, is to whip, beat, kick and bawl at them. This is generally done, and the cow becomes afraid or angry, and instead of becoming better grows worse. Milch cows can not be whipped or terrified into standing quietly, gently and patiently during milking. They dislike to be milked, for they know that loud words and hard blows always attend the operation. They dread to see the milker, as the little urchin dreads to see the birchen rod in the hand of an angry pedagogue, when he expects to have it applied to his back. A cow, kindly and properly treated, is pleased to see the milker, gladly awaits his or her approach, and submits with pleasure to the operation of being milked. Every one having experience with cows knows this to be true. But the cow is opposed to change of milkers; she soon becomes attached to one person who performs the operation, and does not willingly and freely give down her milk to another person; therefore, have one regular milker to certain cows, and bear in mind, if you change milkers, it is at the expense of a loss of milk and of injury to the cow. All animals appreciate kind treatment, and resent abusive treatment. See that those who milk them can control themselves, govern their passions, speak low and kindly under almost any provocation, and soon the cows will learn that they are not going to be abused, and will submit to the operation. Milking should be performed at regular hours, not varying fifteen minutes one day from the other. No talking or laughing should be permitted.

SUMMER PRUNING APPLE TREES.—The *Germantown Telegraph* says:—"It is a pretty well established fact that apple trees—and we would add pear trees—pruned from the middle of July till the middle of August, sustain the operation with much more advantage than if pruned at any other period of the year. If pruned at that time, the wound will heal over and make, what surgeons would say of a properly amputated arm or leg, a handsome stump. If the branches be lopped in winter or spring, the stump generally leaves a perpetual scar; and if after the sap has commenced flowing, a bare bone, as it were, projecting from the living parts of the tree, and remaining there until it rots away, when frequently the decay continues on, as a sort of gangrene, into the very heart of the tree, much to its injury. Who has not observed this in his experience?

We have more than once witnessed the benefits of pruning in midsummer, and have always been impressed with the advantages over the system generally pursued. Six or eight years ago, a first-class farmer upon a leased place, trimmed the apple trees in midsummer, at which the landlord, who had greater pretension to farming than his tenant, was very indignant, and threatened a suit for damages; but in one year after, when we saw the stumps, a more perfect success was never accomplished.

RULES FOR ARRANGING ORNAMENTAL GROUNDS.—*First* of all, ascertain from which direction the prevailing winds blow, so as to give protection by planting, for nothing can scarcely compensate for sweeping winds in winter penetrating the house and raking the garden.

Secondly; examine the finest points of distant view, so that these may be preserved by leaving the planting open, and concealing by dense foliage such points as are undesirable. Where prevailing winds come from the finest points of prospect, a choice of evils must be made, and most commonly a portion of the distant view may be retained through vistas, and most of the grounds be well protected by shelter.

Thirdly, as *economy* is of vital importance—that is, effecting as much as can be done with a given amount of means—grading the ground, the most expensive of all kinds of improvement, should be nearly avoided, and the plan adapted to the ground by arranging the walks to existing levels, and planting trees and shrubs to improve all inequalities of surface, so that what might otherwise seem a defect, may become a positive beauty, and appear as if selected and adopted on purpose. Economy will always be promoted by a large share of grass lawn as compared with flower beds, the lawn quickly receiving its finishing touch with the scythe, while beds are trimmed with far greater labor.—[*Country Gentleman.*

FIRE PROOF WASH FOR ROOFS, &c.—The *New England Farmer* gives directions for making a cheap and incombustible wash for the roofs and walls of buildings. Slake lime in a close box to prevent the escape of steam, and when slaked pass it through a sieve. To every six quarts of this lime add one quart of rock or Turk's Island salt, and one gallon of water. After this, boil and skim clean. To every five gallons of this, add by slow degrees, three-fourths of a pound of potash, and four quarts of fine sand. If desirable, coloring matter can be added. Apply with a common paint or white-wash brush. A correspondent of the above journal, who has used this wash, gives the following recommendation of its merits:

"It looks better than paint, and is as durable as slate. It will stop small leaks in the roof, prevent the moss from growing over and rotting the wood, and render it incombustible from sparks falling on it. When applied to brick work it renders the bricks utterly impervious to rain or wet, and endures a longer time than any paint I ever used. The expense is a mere trifle; in fact, scarcely deserving of mention."

HOW TO TELL SEEDLINGS THAT WILL PRODUCE DOUBLE FLOWERS.—The Journal of the Paris Horticultural Society states that an experienced Italian cultivator of florists' flowers, SIGNOR RIGAMONTI, has discovered how to distinguish between single and double pinks in the seedling state. *Those having, as usual, but two leaves, will be single, while those having three leaves will produce double flowers.* He thinks the test infallible.

THE SOIL BREATHES. — Certainly it does, just as truly as you do. A few years since, if one had asserted that trees had lungs and breathed, he would have been held to an argument to prove it; just as a few years earlier nobody would have believed that a fish's gills, and the leaves of a tree, and the lungs of a beast, all performed the same office, that of aerating the blood or sap.

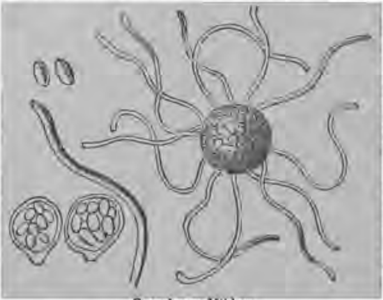
The soil breathes. How does it breathe? Its circulating fluid, the blood of the soil, is water; this comes to it from the air, and is already aerated. True, but this soon loses its gases by contact with the soil, just as the arterial blood fresh from the lungs, loses its oxygen when passing its circuit in all parts of the body. The blood comes back to the lungs for more oxygen, but the blood of the soil can not do this, so we must let the air in, to come in contact with it. We can not here explain the working of the air in the soil, but would thus briefly enforce the necessity of stirring the soil during droughts as deeply as practicable, not to interfere with the roots of growing plants, and those of previous culture, so that a deep and light soil shall invite a free circulation of air beneath the surface. Hot air, the moment it presses beneath the surface, becomes very moist, from the water which it originally contained, and it deposits it, thus not only aerating the soil, but adding to its moisture. Cold air can hold but little moisture, but hot air dissolves an immense quantity, which it deposits when it cools, or on cool surfaces. Who has not noticed of a winter's day, a locomotive leaving behind it a snowy cloud of vapor, like a comet's tail, often floating for a minute after the train has passed? Think of this, and watch the steam car on days when the hot breath, just as full of water as in winter, is puffed out into the eye of the sun, and not steam enough to make a shadow, it is so quickly absorbed by the air.

DESTRUCTION OF PLANT-LICE WITH THE FUMES OF RESIN. — M. DELALEUX writes as follows to the *Revue Horticole:* — "For a long time the greater part of horticulturists who occupied themselves with the culture of the peach, employed, for the destruction of aphides which infested this tree, the fumes of tobacco,—an excellent method, I admit, but which has always appeared to me very expensive: that method I have replaced with success by another, the cost of which is comparatively insignificant. For several years I have used the fumes of resin, which supplies them more abundantly than tobacco, and which thus far has given me results equally satisfactory. It suffices, I think, to point out this expedient to the attention of horticulturists, who should not hesitate to use it, seeing the little cost of the resin as compared to that of tobacco."

RED CAMOMILE TO DESTROY INSECTS.—The *Journal d'Horticulture de Belgium* states that a powder made from the flowers of the red camomile (*Pyrethrum roseum*) emits "an odor so strong and penetrating that it kills all the insects and all the vermin of which until now no certain agent of destruction has been found."

SULPHUR FOR THE GOOSEBERRY MILDEW.—A gentleman in Canada sent over to England a specimen of the mildew so troublesome to the gooseberry in this country. It has been examined by the Rev. Mr. BERKLEY, one of the ablest cryptogamic botanists of Europe, and he pronounces it, in its first stages, an *Oidium*, similar to the mildew which attacks the grape. He gives the accompanying figure of the mildew, as seen under the microscope, and says:

"Our American friends should take a lesson from the grape mildew in behalf of their gooseberries. As the disease in its first stage, like the grape mildew, is an *Oidium*, there is every reason to believe that the same treatment will have similar results, and as sulphur (at least sublimed sulphur) properly applied is a sure remedy in the one case, we have no doubt about its efficacy in the other. We have in Great Britain an allied fungus, which attacks gooseberries. It seldom, however, does any material injury."



Gooseberry Mildew.

There is no longer any doubt in regard to the efficacy of sulphur in checking the grape mildew, when applied in time, and it would be well to try the same remedy on the gooseberry bushes. All that is necessary is to dust the leaves and fruit with the sulphur.

"INGRAM'S HARDY PROLIFIC MUSCAT GRAPE."—The London *Florist* gives a beautiful colored fruit of this grape, produced by Mr. INGRAM, at the Royal Gardens, Frogmore, by impregnating a black seedling of his own with pollen taken from the *Muscat of Alexandria*. It is pronounced by good judges a most delicious as well as a most useful grape, possessing a rich vinous flavor, with a slight dash of musky aroma. It succeeds well in a cold grapery or orchard house.

TRIMMING AN OSAGE ORANGE HEDGE.—S. B. TURNER, an experienced hedge-grower in Illinois, clips his full grown Osage orange hedges with a short scythe, twice a year, in June and September or October —but never during a drouth.

THE ENGLISH MUTTON SHEEP.

SHEEP, in England, are kept principally for their mutton. The value of their wool bears a much less proportion to the value of the sheep than it does with the Merino or other fine-wooled sheep in this country. Thus a sheep that shears say 5 lbs. of wool, worth $1.25, is worth, after shearing, say $10, or *eight times as much as the wool*. Here, a sheep shearing 4 lbs. of wool, worth $1.50, can frequently be bought after shearing for from $2.00 to $3.00.

In breeding fine-wooled sheep, the object is to get as much wool,

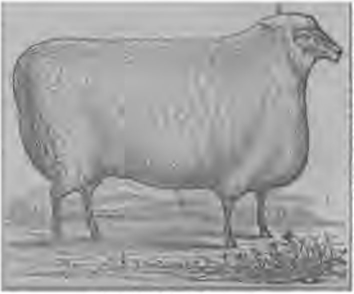
South Down Buck.

and of as fine a quality, as possible. The value of the sheep for mutton is quite a secondary consideration. The sheep are of small size, and furnish a large amount of wool *in proportion to the weight of the animal*. The English breeds of sheep, on the other hand, have been bred for mutton. This object has been kept steadily in view. And it may be safely asserted that no other sheep will produce so much mutton, for the food consumed, as the present improved breeds of English sheep.

The three principal breeds of English sheep are the South Down, the Leicester, and the Cotswold. They have all been greatly improved within the last century. Originally, they were large and coarse, with long legs, heavy bones, and, in many cases, with large horns. By careful breeding the horns have entirely disappeared, the legs are shortened, the amount of bone and offal have been greatly reduced, and the valuable portions of the carcass correspondingly increased. In accomplishing this, the size of the sheep, we believe, has been somewhat reduced.

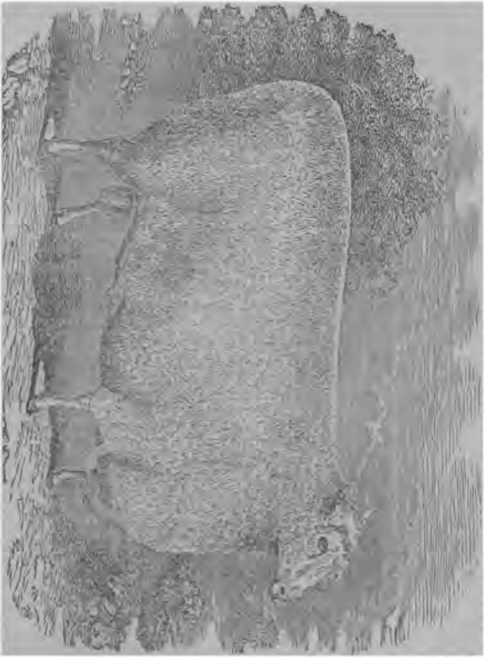
The breed most celebrated for mutton is the South Down. It is the smallest of the English breeds, with short, compact wool. The mutton commands a higher price in the London market than that of any other breed. JOHN ELLMAN was the first great improver of the breed, and to him, and subsequently to JONAS WEBB, is its world-wide celebrity mainly due.

There are several varieties of the South Downs. The *Sussex*, or true South Down, is of the smallest size, but affords the finest quality of mutton. The Hampshire Down is larger, and somewhat coarser. The Shropshire Down is still larger. Till within a few years, little has been known of this breed out of the county of Salop, or Shropshire, where it originated. Now, however, it is attracting much attention in other parts of Great Britain, and some excellent importations have been made into this country. It is larger than either the Sussex or the Hampshire Downs We annex an excellent portrait of one of the prize sheep of this breed.


Shropshire Down Wether.

The Leicesters are larger than the Sussex South Downs, but not quite so large as the Hampshires. They were brought to their present high state of perfection by ROBERT BAKEWELL, of Dishley. Hence they are sometimes called the Bakewell, and sometimes the Dishley sheep, while others call them the "Improved Leicester." There is no necessity for this latter distinction, as—thanks to Bakewell and other breeders—the original, large, coarse sheep of Leicestershire have disappeared. The Leicesters are justly celebrated for their aptitude to fatten, when supplied with abundance of food. Their wool is much longer than that of the South Downs.

The Cotswolds are the largest distinct breed of sheep in the world. The old Lincolnshire sheep were larger, but these are now seldom met with of pure blood. The wool is very long, and of good quality. No



A Cotswold Ram.

sheep fatten so rapidly—none are so profitable, when the mutton commands as high a price as the South Down or the Leicester. In London, however, Cotswold mutton does not bring as high a price as South Down by a cent per lb. In the manufacturing districts of England, however, where the popular taste is not so fastidious, no such difference is made, and there the Cotswold is the most profitable breed.

Mr. Lawes, of Rothamstead, has made some very complete experiments on the various breeds of English sheep. The sheep—fifty of each breed—were obtained from the most celebrated breeders in England. They were about nine months old at the commencement of the experiment, and then weighed on an average as follows: Sussex Downs 88 lbs. each; Hampshire Downs 113½ lbs.; Leicesters 101 lbs.; Cotswolds 119¾ lbs. They were placed in separate pens, and fed on the same food for twenty-two weeks. The average increase per head per week was as follows: Sussex Downs, 2 lbs. 1¾ oz.; Hampshire Downs, 2 lbs. 12 oz.. Leicesters, 2 lbs. 1 oz.; Cotswolds, 3 lbs. 2½ oz.

It will be seen that the Sussex Downs increased the least, the Leicesters next, the Hampshire Downs next, and the Cotswolds much more than any others. All the food consumed was accurately weighed, and it was proved, most conclusively, that the amount eaten was *in exact proportion to their live weight*. The Cotswolds *increased* more in proportion to the food consumed, than any other breed. We must add, however, that when sold in London, the Sussex Downs commanded 14 cents per lb., and the Cotswolds only 12 cents per lb.; and this made the profits of feeding the two breeds equal. But as we have said before, where no such difference is made, the Cotswolds are undoubtedly the most profitable sheep to fatten.

A NOVEL ICE-HOUSE.—The Winstead (Conn.) Herald gives this account of the manner in which Mr. GOODWIN, of New Hartford, fills his ice-house:—"Mr. GOODWIN is supplied with excellent water from a spring at a considerable elevation above his house. Connected with a pipe which supplies the latter is a branch pipe leading to the ice-house, across which it is extended. Within the ice-house this pipe is pierced by twenty or thirty small holes, from which as many fine jets of water rise to the roof, falling back in drops over the whole bottom surface of the house. These jets are only let on when the weather is cold, and the doors and ventilators being open, the water freezes as it falls, and in a few days, or weeks at furthest, the house is filled with a single block of perfectly pure, transparent ice. Mr. GOODWIN's ice keeps through the entire season, with much less waste than that packed in the ordinary way. It costs him nearly nothing."

MANURE SHOULD BE WELL MIXED WITH THE SOIL.—Prof. WAY, in one of his lectures before the Royal Agricultural Society of England, said his experiments showed that the soil was no idle spectator of what took place in it; that it was not a mere meeting place for the roots of plants and the food they were to grow upon, but that it was actually the stomach of the plant. Or he might go further, and say that nature had actually given to the soil the function and office which in animals is performed by the gastric juice and the chyle—that of preparing and digesting the food of plants. This is perhaps somewhat fanciful, but that it is very advantageous to thoroughly incorporate manure with the soil, no observing farmer can doubt.

TOADS AND BEES.—A correspondent of the *Rural New Yorker* visited a beekeeper in Illinois who is perfectly satisfied that toads will eat bees. He says:—We have been watching the work of fifty swarms of of bees which stood on the edge of a locust grove, as they came sweeping down to their Langstroth homes. "Wonderful workers!" said I.

"Yes, they are that,—and how they do travel! I believe they have a range here of a circle of at least twenty miles, which they glean. And yet you would hardly believe that these lively bees, armed as they are, were the victims of great clumsy, black, filthy-looking toads?"

"I have seen it so asserted, but have no further evidence that toads eat bees."

"Well, they do. I did not believe it; but I met an old gentleman at a fair, who told me to kill all toads I found about bee-hives — said they ate bees — I determined to know. Last year at bee swarming, I was watching my bees, and saw a large fat scamp of a black warty toad near the hives. There were a good many bees on the ground, about on the grass where I had just hived a swarm. I determined to watch Mr. Toad, though with little faith that I should prove him guilty.

Pretty soon I saw signs of animation. He gave one or two pretty good jumps in the direction of the bees, then began to crawl, like a pointer after a prairie chicken, until he got within three or four inches of the bee, when 'smack!' went his chops, and the bee was gone! 'My stars!' thought I, 'is it possible that fellow took a bee then? Now hold still,' says I; 'just let me watch you a little longer, my fellow.' I waited and watched; pretty soon, 'snap!' went, and another bee was gone, and I saw the fellow take up a half dozen in that manner. I tell you, my dander was getting up by that time, and I up with a piece of board and keeled the fellow over, and out with my knife and ripped open his pouch of a stomach, and I am willing to take my oath that I took out *fifty-two bees!* whole bees, mind you, besides the partially digested ones. There was nothing but bees in the stomach.

"Now sir, none of those black, dirty rascals stay about my bees. The thing ought to be generally known. Why, they will destroy two or three small colonies in a season. If any one doubts the assertion that toads eat bees, let them cut open the first one they find about a hive. I have cut open a great many since, and have never found one that did not have bees in his stomach, and little else."

A SUBSTITUTE FOR THE POTATO.—At the late exhibition of the Imperial Horticultural Society of Paris, several lots of *Chærophyllum bulbosum* were exhibited, of the size and shape of a Shorthorn carrot. When first introduced, five or six years ago, they were seldom so large as a hazelnut. It is considered a great delicacy, and if its size and productiveness should continue to increase, it is thought that it may take to some extent the place of the potato. It requires to be sown early in the fall, and on this account might not be suitable to our severe climate.

Moss on Roofs. — There is one thing, says the *American Agriculturist*, that nearly all people know if they would only attend to it; that is, to sprinkle slaked lime on the roofs of their buildings, in rainy days. Put it on considerably thick, so as to make the roof look white, and you will never be troubled with moss; and if the shingles are covered ever so thick with moss, by putting the lime on twice, it will take all the moss off, and leave the roof white and clean, and will look almost as well as if it had been painted. It ought to be done once a year, and, in my opinion, the shingles will last almost twice as long as they will to let the roof all grow over to moss. I tried it on the back side of my house, ten years ago, when the shingles were all covered with moss, and they appeared to be nearly rotten. I gave the roof a heavy coating of lime, and have followed it every year since then, and the roof is better now than it was then; and, to all appearance, if I follow my hand, it will last ten or fifteen years longer. The shingles have been on the roof thirty years. There is no more risk about sparks catching on the roof than on a newly shingled roof. Those that do not have lime near by, can use good strong wood ashes, and these will answer a very good purpose to the same end.

Cultivation of the White Bean.—The late Judge Buel says:—"Beans may be cultivated in drills or in hills. They are a valuable crop, and with good care are as profitable as a wheat crop. They leave the soil in good tilth. I cultivated beans the last year in three different ways, viz: in hills, in drills, and sowed broadcast. I need not describe the first, which is a well known process. I had an acre in drills, which was the best crop I ever saw. My management was this: On the acre of light ground, where the clover had been frozen out the preceding winter, I spread eight loads of long manure, and immediately plowed and harrowed the ground. Drills or furrows were then made with a light plow, at the distance of two and a half feet, and the beans thrown along the furrows about the 25th of May, by the hand, at the rate of at least a bushel on the acre. I then gauged a double mold-board plow, which was passed once between the rows, and was followed by a light, one-horse roller, which flattened the ridges. The crop was twice cleaned of weeds by the hoe, but not earthed. The produce was more than forty-eight bushels by actual measurement."

Whitewash. — Whitewash adds so greatly to the picturesque in the cottage and the farm-house, and is such an absorbent of impure odors, that it should be freely used, at least in the spring. Take half a bushel of fresh burned white lime, and slake it either in hot or cold water, in a tub or barrel. When thoroughly slaked, dissolve in the water required to thin the lime, two quarts of common salt, stir it thoroughly, add one quart of sweet milk, and it is ready for use, to put on with a brush, frequently stirring it up. Glues and gums cause it to scale off in hot weather. — [*Hall's Journal of Health.*

Good Advice to Bee Keepers.—If thou wilt have the favor of thy bees, that they sting thee not, thou must avoid some things which offend them. Thou must not be uncleanly; for impurity and sluttishness (themselves being most chaste and neat) they utterly abhor. Thou must not come among them smelling of sweat, or having a stinking breath, caused through eating of leeks, onions, garlic and the like. Thou must not be given to surfeiting or drunkenness; thou must not come puffing and blowing unto them, neither hastily stir among them, nor resolutely defend thyself when they seem to threaten thee; but softly moving thy hand before thy face, gently put them by. And lastly, thou must be no stranger to them. In a word, thou must be chaste, cleanly, sweet, sober, quiet and familiar; so will they love thee and know thee from all others.—[Butler, *Farmer and Gardener.*

Plaster for Preserving Apples and Pears.—There is really very little difficulty in preserving winter pears or apples in barrels, without anything being put among them. But many people seem to think otherwise, and we frequently see it recommended to put bran, chaff, cut straw, shavings, saw-dust, etc., among the fruit, to absorb the moisture. But the last thing recommended is *plaster*. It is said to be excellent; and where farmers are in the habit of using it on their land, the experiment may be tried without any expense.

To Protect Cucumbers and Melons from the Striped Bug.—A correspondent of the *Genesee Farmer* says: Take a small piece of paper, put it on the ground in the centre of your hills, and lay a small stone on each corner to keep it fast; then put on it two or three pieces of gum camphor as large as a pea. Renew the camphor when it is gone, and I will insure the plants against injury from the bug.

Whitewash for Fences.—One ounce white vitriol (sulphate of zinc), and three pounds of common salt, to every three or four pounds of good fresh lime, it is said, will render whitewash very durable when exposed to the weather.

Manure for Evergreens.—A correspondent of the *Gardeners' Chronicle* has found Macadamized road scrapings excellent manure for evergreens. He puts it in the holes when planting the trees.

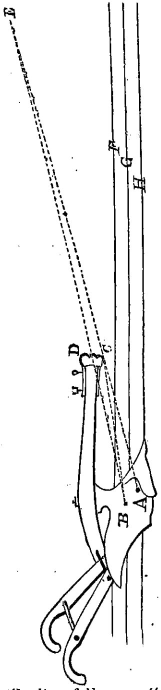
Posts should be set Top-end Down.—It seems to be fully demonstrated that posts set with the top-end in the ground will last much longer than when set with the butt-end down.

The Peach Grub.—It is said that hog manure or tobacco stems, placed round the roots of peach trees in the spring, will drive away the grub.

Vermin on Calves.—If your calves are troubled with vermin, give them a table-spoonful of sulphur every other morning, for a week.

A VALUABLE INVENTION.

In the construction of plows, it has long been the aim of intelligent manufacturers to embody what is termed the "centre-draft principle." In other words, to have the point of resistance in the plow in direct line with the motive power.

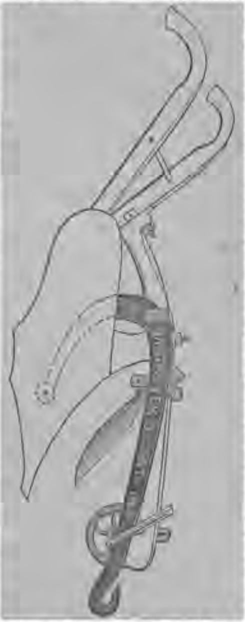


In the annexed cut, the line of draft is shown at different depths of plowing, from E, C, A, or E, D, B. If the plow is set into the furrow to the depth represented by the two line Gs and H, the centre of resistance will be near the point on the mold board marked A. In this case, the line of draft is represented by A, E, and to secure the proper working of the plow, and to preserve a straight line of draft, it is necessary to apply the force at the end of the beam, at the point C. But should the plow be set deeper, say at F, H, the center of resistance would be higher up the mold board, or at B, thereby changing the line of draft from A, E, to B, E, and the power must then be applied on the beam at the point D, instead of C.

H. L. Emery justly remarks (*Genesee Farmer*, 1849, page 236): "Were it not for considerations of convenience, a chain firmly attached to the body of the plow at A or B, in the direction of the line of draft to E, would answer all purposes better perhaps than the wood beam as now constructed."

The arrrngements hitherto used for the purpose of maintaining a straight line of draft, by the aid of a movable clevis, etc., are undoubtedly effective if the surface of the land is smooth, and the same uniformity of depth is preserved. But as changes are constantly occurring, on account of difference in the size of teams, in the inequalities of the land and depth of furrow, there was still something more desirable to fully attain the end sought.

All these difficulties have at length been over come, as it seems to us, by a very simple contrivance invented and patented by Mr. Grover, of Ohio. The illustration on the opposite page will show the nature of this invention at a glance. It is manufactured by Messrs. Alling & Co., of East Townsend, Ohio, who describe it as follows: "A curved wrought iron bar is used for a draft beam (in connection with a short wooden beam, to which the cutter and wheel are attached), and is hinged in between the land side and the mold board, as far forward as possible, and within about 2½ inches of the bottom, where it is made fast by a pin passing through the land side, from which it is extended forward over the mold board to the forward end of the wooden beam. Near the end of the wood beam it passes through a slot, affixed to the wood beam, some eight inches long, which allows it to work up and down, and terminates in a hook to which the team is attached."



They claim in this arrangement "to have obtained the long sought-for centre-draft principle, both up and down and *sideways*, and to have reduced it to practical use, preserving the line of draft from the point of resistance straight to the horses' shoulders, amid all the variations caused by a change in the size of the team, depth of furrow, uneven surface, or any other contingency incidental to plowing."

They state further that by actual test with the dynamometer, there is a gain by using this attachment of full 33⅓ per cent. over all other methods of drawing plows.

We had the pleasure of witnessing a trial of this plow a few weeks since near this city, and were exceedingly well pleased with its operations. The plow to which this attachment was affixed did excellent work, running so steadily that a child might hold it. (In fact, it would run without holding.) The draft was ascertained by a dynamometer, and was found to be *one-third less* than the draft of the plow previously used! Three horses were used on the old plow, and but two on that with the new attachment; and the German teamster was satisfied that the two horses did not have to work any harder with the new plow than the three did with the old. This was the opinion, we believe, of all who witnessed the trial. This attachment can be used with any plow, and we are convinced that it will prove a most useful invention. Further information relative to this improvement, or the sale of counties or States (except the counties of Western New York), may be obtained by addressing ALLING & Co., either at East Townsend, or Norwalk, Huron Co., Ohio. D. C. ALLING & Co., Rochester, N. Y., offer twenty counties for sale, or can supply the plow ready for use.

Anthoxanthum Gracile, Briza, Minima, Medium and Maxima; Lamarkia aurea; Chloris Radiata; Elymus Hystrix; Lagurus Ovatus; Pennisetum Longistilum; Stipa Pennata.

FLOWERS THAT BLOOM SECOND YEAR.

HOLLYHOCK—Fine seed from best Double varieties, of Dwarf habit.
PICOTEES and CARNATIONS—From the best Continental growers.
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THE

RURAL ANNUAL

AND

HORTICULTURAL DIRECTORY

FOR THE YEAR 1863:

BEING THE

Eighth Volume of the Series,

CONTAINING MUCH VALUABLE MATTER INTERESTING TO

THE FARMER, THE FRUIT-GROWER, AND THE HORTICULTURIST.

ILLUSTRATED WITH ENGRAVINGS.

ROCHESTER, N. Y.
JOSEPH HARRIS,
(Office of the Genesee Farmer.)
1863.

PREFACE.

THE RURAL ANNUAL AND HORTICULTURAL DIRECTORY has now been published eight consecutive years. It is our aim to make each succeeding volume better than its predecessor. How far this object has been attained must be left for the decision of our readers. We think much information will be found in the present volume, interesting and useful to every one engaged in rural pursuits.

If this volume should fall into the hands of any one who has not seen the work before, we would say that any of the seven previous volumes, (for 1856-7-8-9, '60, 61, and '62,) can still be furnished at 25 cents each. The whole set of seven numbers will be forwarded to any address, prepaid by return mail, on the receipt of $1.40.

JAMES LENNOX, STEREOTYPER,
Rochester, N. Y.
A. STRONG & CO. PRINTERS.

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Such are a few of the principal articles in the first seven numbers of the RURAL ANNUAL AND HORTICULTURAL DIRECTORY. One volume of any year will be sent, prepaid by mail, for 25 cents. The seven first volumes will be sent, prepaid by return mail, to any address, for $1.40; or five volumes for $1.00.

THE

RURAL ANNUAL

AND

HORTICULTURAL DIRECTORY.

THE ORCHARD AND GARDEN.

WE do not propose to write a treatise on the management of orchards and gardens — the subject is too extensive. A brief allusion to some of the principal points to be observed in planting fruit trees and in the management of a garden is all that we shall attempt.

An apple tree will grow and do tolerably well without much care, either in the preparation of the ground or subsequent culture. But to attain the highest success with an apple orchard, it is needful to select a good site, to prepare the land properly before the trees are planted, and to attend to the culture and enriching of the soil, and the pruning of the trees afterwards. There is no difficulty in this matter. Select, if possible, a soil naturally well-drained. If this cannot be found, it must be underdrained. Dig the drains at least three feet deep, and about two rods apart. If the land could be sub-soil plowed all the better; if not, let it be well plowed, harrowed, and got into good condition, if possible, before a tree is planted. For the first few years cultivate nothing but hoed crops, such as beans, potatoes, corn, etc.

PEACHES.

The peach likes a lighter and warmer soil than the apple. It will succeed, however, on a considerable range of soils, varying from the lightest sand to a rather heavy loam. The trees are perhaps most productive at first on the lighter soils, but those on good sandy loams are more lasting, and less liable to injury from insects.

The site selected for a peach orchard will vary according to the climate. As a general rule, it is well to select, if possible, a spot sheltered from the prevailing winds; vallies, however, must by all means be avoided, as the trees from their more succulent growth are more liable to injury from frost, and the vallies themselves are often colder in winter than the high ground in the neighborhood.

Another important consideration in selecting a site for a peach orchard is the liability of the trees being injured by frosts in the spring. It is very desirable to keep the trees as late as possible from starting into growth. On this account a north side of a hill is more to be preferred than a southern aspect, where the buds are likely to start early. We believe the disease known as the "curl of the leaf," is caused by the warm weather in the spring starting the sap in the trees, while the ground is so cold that root-growth cannot proceed. The sap which should go to form roots is thrown back into the circulation, and become diseased, and the health of the tree is affected. Thorough draining of the land, and planting on the north side of a hill, are the most likely means to correct this evil.

Nothing should ever be sown in a peach orchard, except hoed crops; and in most cases it is better to let the trees occupy the whole ground. Perhaps a crop of beans the first year after planting might be taken without much injury.

Another point in growing peaches, almost always neglected, is the *thinning out of the fruit*. The labor of doing so is not great, and the increased size and beauty of the peaches much more than compensate. The trees too would be more likely to bear every year, than when they are allowed to exhaust themselves in producing too large a crop.

Peach trees are liable to be injured by the cold of winter. It has been suggested to train the trees low, and bend down the branches, and fasten them to the earth with pegs, so that the tips of the branches which bear the fruit would be protected by the snow. Another plan proposed is to bring the branches together and bind them with straw. Whether these plans can be profitably adopted remains to be seen. In the meantime, we must remember that *immature wood* is easily injured by cold, and our object should be to give the trees a healthy, vigorous growth during the early part of the season, so that the wood and buds should be well matured. A well underdrained soil, and the frequent use of the horse cultivator between the trees, in spring and summer, are the two most likely means of attaining our object. They both have a decided tendency to *warm the soil*,—and there can be little doubt that a *cold soil* is the source of many of the difficulties experienced by fruit growers and gardeners.

PEARS.

A good pear is a great luxury. There are those who contend that pears can be as easily raised as apples. We do not believe it—for the simple reason that pears are a greater luxury than apples. It is so ordered that we must work for what we eat; and the higher its quality the more labor is there necessary to produce it. We can raise Mediterranean wheat easier than Soules. Less labor is required to produce a common Seedling apple than a Northern Spy, or a Seedling pear than a Geo. IV., or an Early Ann. So, too, we believe apples can be raised easier than pears. But shall we for this reason give up pear culture? As well might we give up all our choice varieties of fruit, and rest content with those that can be had for the gathering!

Pears like a rather heavy soil. It should be well drained, and trenched, or subsoil plowed, and made moderately rich.

The great drawback to pear culture is the "fire-blight"—a disease which affects the stem, branches and leaves of the trees, killing them in a few days, or it may be in a few hours. We believe the cause of this terrible disease *is a fungus generated by decaying woody matter in the soil, and the spores or seeds of which are taken up by the roots.* When taken up into the tree by the sap, they germinate and grow rapidly, decomposing the sap and blighting and killing the leaves and branches.

The great point in selecting a site for a pear orchard, therefore, is to avoid land where there are old roots and other woody matter in the soil. To plant a pear tree where other trees have recently been grown is the hight of folly. The old roots in the soil in decaying will certainly produce fungus, and this is always injurious.

Another drawback to pear culture is what is called the "cracking" of the fruit. The Virgalieu in the Eastern States has been affected by this disease for many years; and it is now proving troublesome in this section. The disease is not confined to the Virgalieu, but other varieties, such as the Beurre Deil for instance, show symptoms of its approach. At first it appears in little brown spots; the next year they are larger and more numerous, and in a few years more the pears crack open and are worthless. There can be no doubt that this disease is also caused by a fungus which attaches itself to the fruit, and feeds upon its juices. We do not despair of discovering a remedy for this disease, and think that we shall have something satisfactory to communicate on the subject in the next volume of the RURAL ANNUAL. In the meantime, the necessity of destroying every species of fungus, and mould which invests the garden and orchard cannot be too deeply impressed upon the minds of our fruit-growers. It should be understood that fungus is not a *spontaneous* production. It is produced from seeds (though invisible generally to the naked eye) like other plants, only with much greater rapidity. If we do not destroy it our gardens and orchards will soon be overrun. Every affected fruit, branch, etc., should be destroyed; and especial care should be used not to leave any fruit on the tree to decay during the winter. This is one fruitful source of fungus in apple orchards.

In raising pears on dwarf trees, one very essential point is the *thinning out of the fruit.* It is difficult to induce new beginners to thin out sufficiently.

GRAPES.

Much attention is now given to this fruit. Many new and improved varieties have been introduced, and a remarkable impetus given to the cultivation of this valuable fruit.

There is a very general impression that extra care is necessary to prepare and enrich the ground for grapes. But some of our best horticulturists are now of the opinion that such high manuring and expensive trenching, etc., are not needed. There are those, even, who express the opinion, based on their own experience, that high manuring is injurious, by inducing a too luxuriant growth of wood. They think a soil rich enough for corn or wheat is rich enough for grapes. All that is necessary is to have the ground thoroughly underdrained, either naturally or artificially, and if the subsoil is hard and impervious it should be trenched or subsoil plowed. After the vines are planted, the ground should be well cultivated to keep down the weeds. The surface can not be too frequently stirred, especially on loamy soil. The cultivator should not run so deep as to injure the roots, but the more freely it is used the better.

As to the manner of planting, pruning, etc., we would refer to an admirable treatise on this subject in the RURAL ANNUAL for 1858.

PLUMS.

There are two great drawbacks to the profitable cultivation of plums — the curculio and the black-knot.

The curculio is an insect which deposits its eggs in the young plums, and when the eggs are hatched the young larvæ feed on the juices of the plum, and cause it to drop from the tree. A number of remedies have been proposed to destroy this insect, or to drive it away from the trees. For the latter purpose, old pieces of leather, burnt under the trees when the plums are about the size of a pea, is said to be effectual. Another plan for driving away the curculio was recommended some years ago, by the *New York Observer*, and has been very extensively tried. It is as follows:

"To one pound of whale oil soap, add four ounces of flowers of sulphur. Mix thoroughly, and dissolve in twelve gallons of water.

"To one half peck of quicklime add four gallons of water, and stir well together. When fully settled, pour off the transparent lime water, and add to the soap and sulphur mixture.

"Add to the same, also, say four gallons of tolerably strong tobacco water.

"Apply this mixture, when thus incorporated, with a garden syringe, to your plum or other fruit trees, so that the foliage shall be well drenched. If no rains succeed for three weeks, one application will be sufficient. Should frequent rains occur, the mixture should be again applied until the stone of the fruit becomes hardened, when the seas n of the curculio's ravages is past."

Many persons who have syringed their trees with this mixture report that it has proved entirely efficacious, while there are others who report adversely. It s certainly worthy of a trial by all who have not time to adopt a surer method.

This surer method is that known as "*jarring the trees.*" During the day, wheu the sun shines, the curculio can fly readily enough; but early in the morning, while it is cold, it has not this faculty, and can be shaken from the tree — into a sheet and killed. A sharp jar is necessary, and the work must be done faithfully every morning as long as any curculio's are found.

There is another point which is of equal importance. If a stung fruit is examined after it has fallen from the tree, the larvæ will be found near the stone. If these are allowed to live and grow, they will produce curculios next year, just in time to sting more fruit. It is very desirable, therefore, to gather up and destroy every stung fruit that falls to the ground. They should be gathered up every few days and burnt. The "hog and chicken remedy" accomplishes the same object in places where it can be adopted.

The "black-knot" is a disease which affects the limbs and branches of the trees. The sap exudes and forms black knotty excrescences of hard woody matter. Cutting them off as fast as they appear has been recommended. We cannot say that it is always, or even generally effectual, though there are those who assert that they have found it so. As to the cause of this troublesome disease there are many opinions. The late Dr. HARRIS thought it was caused by a too great luxuriance in the growth of the tree, causing the sap to exude. We are rather inclined to the opinion, which we have heretofore expressed in the pages of the RURAL ANNUAL, that it is owing to the coldness of the soil in the spring checking the formation of roots, and throwing the sap which should go to the roots back into the circulation. In graperies, when the border is colder than the house, the vines often throw out roots into the air, for the reason above mentioned. So in the plum, the matter which should go to form roots is exuded in a diseased condition from the limbs and branches. If this is the cause of the black-knot, the only remedy is that recommended to prevent the curl in the leaf in peaches, viz: to thoroughly underdrain the soil and warm it as much as possible, and to plant on the North side of a hill to keep back the trees as late as possible in the spring.

APRICOTS.

Apricots are a delicious fruit, and our climate is well adapted for their production, but unfortunately the curculio proves even more destructive to them than to the plum. If we could get rid of the curculio there would be no difficulty in raising apricots of the highest quality in abundance. The remedies recommended in the case of the plum should be resorted to.

QUINCES.

This is a fruit which receives less attention than the high prices usually obtained for it would lead us to suppose. The tree is very hardy, and this has led to the idea that care and culture are unnecessary. This is by no means the case. The trees richly repay for good culture in the increased size, quality and abundance of the fruit. Salt seems to be a specific manure for quince bushes, especially on new land

THE SMALL FRUITS.

The so-called "small fruits," raspberries, blackberries, strawberries, currants, and gooseberries, are found in every good garden. No one who has a small plot of ground need be without an abundant supply for his family. Of raspberries, gooseberries and currants we have written on other pages of this work. Of the culture of strawberries little need be said. There is no difficulty in raising an abundance of this delicious and healthy fruit. The land should be well trenched or subsoiled, and liberally enriched with well rotted manure — and the deeper the manure can be worked into the soil the better. We prefer to plant in hills, as the land can easily be kept clean, and much finer fruit is obtained than when the plants are allowed to occupy the whole ground. Set out the plants in the spring, in rows two feet apart, and a foot apart in the rows. Keep the land clean by the free use of the hoe, and as the hot, dry weather approaches, mulch the ground with tan-bark, grass, straw, corn-stalks, or anything that will prevent the evaporation of moisture from the soil without excluding the air too much.

GARDEN VEGETABLES.

It is quite an object with every good gardener to get crops *early*. He also desires to have them tender, crisp and well flavored. For this purpose he must have his land dry, warm and rich. It is useless to try to make a good garden unless the land is well drained, as wet soil is always cold, and not unfrequently sour. Good garden crops can not be raised on such a soil. Shelter from cold winds, too, is of great importance. Then the land must be deep, mellow and rich. Everything if possible should be sown or planted in rows to admit the free use of the hoe. This is essential, not only for the purpose of destroying the weeds, but also for keeping the soil loose, warm and moist; for it is a fact that frequent stirring of the soil has all these effects. It makes the soil warm by admitting in the rays of the sun, and moist, in hot weather—by admitting the atmosphere charged with moisture. It also admits the air to the roots, and this is of great importance. "Stir the soil" should be the motto of every gardener.

Artificial manure, such as guano, superphosophate of lime, and sulphate of ammonia, are of great value in a garden. We would not be without the latter on any consideration. They act rapidly, can be applied just when and where you want them, and are free from weeds. Superphosophate has a splendid effect on all the root crops, except potatoes and carrots, and in the flower garden and on the strawberry beds there is nothing like sulphate of ammonia. The former can be sown with the seed, at the rate of two or three pounds to the square rod. The sulphate of ammonia is best applied broadcast on the surface of the ground at the same rate, being careful not to let it touch the leaves of the plant, especially such succulent and tender plants as cucumbers, melons, etc. It should be used in showery weather.

Genuine Peruvian guano is also an invaluable manure for the garden, but like sulphate of ammonia it must be used with care.

Common Hop — (Humulus Cupulus.)

CULTIVATION OF HOPS.

The land best adapted to growing hops is that which is naturally dry, deep, and rich, and which should be made mellow by good culture. Fields gently sloping to the north and east are preferable, as the hop is injuriously affected by the extremes of temperature, and the heat of the sun at noonday. Rolling land is less liable to blight than flats, hollows, and valleys.

It is the practice in Europe to trench hop grounds two and a half to three feet deep; but in this country the plow, and occasionally the subsoil plow with the other, is made to perform the work of preparation. Old meadows are good sites for hopyards, if favorably located. These should be fall-plowed as deeply as possible, and re-plowed and thoroughly worked in the spring. Lime is often added, not only as an auxiliary to the crop, but for the destruction of worms that sometimes remain in the sod. Hop-grounds are in no danger of being made too rich, and should be highly manured before planting. The hop-field should either be on land so dry as not to heave in winter, or else well drained.

Hop-plants are set in rows, for convenience in after-culture. These rows should be from seven to eight feet apart each way, that there may be room to cultivate the ground and allow the vines to grow strong and bear well. Cuttings from well established roots are used for planting, and are generally taken off in the preparation of the field for spring growth. These are sold at from 25 cents to $1 per bushel, of which four bushels are required to plant an acre. It is the practice to put five pieces of root four or five inches long in each hill — one in the middle, and the other four pieces about two inches from it, on each side.

The hop-plant is not what is botanically called *perfect*, the staminate and pistillate flowers being borne on different plants, which renders it necessary to intermingle the male with the female plants, which bear the crop, in putting out a field. They should occur as often as every tenth hill, with the addition of some extra hills on the side from which blow the prevailing winds. In the accompanying engraving, the large cut with the small flowers represents a staminate, or male plant; and the smaller cut the large flowers of the pistillate, or female plant.

The first year, the soil between the rows should be well worked, and may be planted to potatoes or beans, or even corn; but the latter growing taller, shades the vines and retards their growth. The necessary cultivation of the beans will be no more than the hops require, and will do something towards paying for the use of the land, and the manure which should be applied will be beneficial to the hops as well as to the beans.

The vines put out the first year should be trained to poles; and if the plautation was of roots instead of cuttings, they will bear some hops. After the vines have died down in the fall, cut them off and cover the crown of the hill with some earth and leaves, to secure it from injury by the severe winter frosts.

The second year, the soil will require digging over as early in spring as the weather will permit, mixing in a good top-dressing of some fertilizer. For this purpose, decayed barn-yard manure, vegetable mold, guano, superphosphate, ground bones, woolen rags and waste, are used. The hills are opened and pruned of all runners or cuttings and old vines. The cutting off should be between the crown and first joint, as from this point come the most fruitful vines. If cut off too low, the vines will be weakly; and if too high, they grow strong, hollow, and unproductive. While performing this pruning is a good time to work in a top-dressing of rotten manures, of which the growing vines will stand in need.

The hills are now ready for setting the poles. These, where practicable, should be of cedar, or some other light wood, not less than twelve feet long, and as much more as convenient, up to twenty. The most experienced hop-growers use two and some even three poles to a hill. The poles should be set firmly in the ground, the taller ones on the windward side of the field, particularly those to which the male plants are trained. After setting the poles, the ground should be plowed out both ways, and cultivated, so as to insure freedom from grass and weeds. As the vines commence running, two good strong ones should be trained to a pole and the remainder cut away, so as not to interfere with the growing crop. The field will require hoeing two or three times during the season, and such vines as get loose or do not climb well, should be tied fast. Often the leaves are stripped off to the hight of two feet from the ground, the better to admit air and sunshine.

Picking and curing the hops are important operations. When they have a general appearance of ripeness, indicated by a brown color, hard seed, and becoming close and firm, they should be picked with all possible dispatch. When gathered, they should be spread on the floor of the dry-house, with a moderate heat underneath, and dried, care being taken to have them of a uniform and light color.

ARTIFICIAL MANURES FOR POTATOES.

Little is known in regard to the manurial requirements of the potato plant. The following experiments made by the publisher of the *Genesee Farmer*, may throw some light on the subject. The soil selected for the purpose was a light, sandy loam, which has been under cultivation for many years, and has seldom if ever been manured. It was a two year old clover sod, plowed about the first of May, and harrowed till in excellent condition. The potatoes were planted May 22, in hills three and a half feet apart each way. Two or three potatoes were pla ted in each hill, according to size. Each experiment consisted of five rows, with one row between each plot left without manure. The following table will show the result of the experiments:

Number of Plot.	Description of Manures used, and quantity applied per acre.	Yield of Potatoes per acre, in bushels.	Increase of Potatoes per acre, in bushels, caused by manure.
1.	No manure	95	
2.	150 lbs. sulphate of ammonia	140	45
3.	300 lbs. superphosphate of lime	132	37
4.	150 lbs. sulphate of ammonia and 300 lbs. superphosphate of lime	179	84
5.	400 lbs. unleached wood ashes	100	5
6.	100 lbs. plaster, (gypsum, or sulphate of lime)	101	6
7.	400 lbs. unleached wood ashes and 100 lbs. plaster	110	15
8.	400 lbs. unleached wood ashes, 150 lbs. sulphate of ammonia, and 100 lbs. plaster	109	14
9.	300 lbs. superphosphate of lime, 150 lbs. sulphate of ammonia, and 400 lbs. unleached wood ashes	138	43

The superphosphate of lime was made expressly for experimental purposes, from calcined bones, ground fine and mixed with sulphuric acid in the proper proportions to convert all the phosphate of lime of the bones into the soluble superphosphate. It was a purely mineral article, free from ammonia and other organic matter. It cost about two and a half cents per pound. The sulphate of ammonia was obtained from London, at a cost of about seven cents per pound. The ashes were taken from hard wood.

The manures were deposited in the hill, covered with an inch or two of soil, and the seed then planted on the top. Where superphosphate of lime or sulphate of ammonia was used in conjunction with ashes, the ashes were first deposited in the hill and covered with a little soil, and the superphosphate or sulphate of ammonia placed on the top and covered with soil before the seed was planted. Notwithstanding this precaution, the rain washed the sulphate of ammonia into the ashes, and decomposition, with loss of ammonia, was the result. This will account for the less yield on Plot 8 than on Plot 2. It would have been better to have sown the ashes broadcast, but some previous experiments with Peruvian guano on potatoes indicated that it was best to apply guano in the hill, carefully covering it with soil to prevent its injuring the seed, than to sow it broadcast. It was for this reason, and for the greater convenience in sowing that the manures were applied in the hills.

It is well known that Peruvian guano is an excellent manure for patotoes. In the same field on which the above experiments were made, two acres were planted with potatoes, in 1852, without any manure, and two acres with 300 lbs. Peruvian guano per acre, sown broadcast. The two acres without manure produced 238 bushels, and the two acres dressed with guano 410 bushels, or an increase of *eighty-six bushels per acre.*

All our commonly cultivated crops contain precisely the same elements, *but in very different proportions.* Now, it is very desirable to know what element is required in the greatest quantity for any particular crop. We have repeatedly shown that an analysis of the plant affords no conclusive evidence on this point. We can obtain this information only by actual experiment with the different elements of crops. Barn-yard manure contains *all* the elements of plant-food; and when an increase of produce is obtained by its use, we are unable to determine which element or elements had the most beneficial action. The same is true of Peruvian guano, which also contains more or less of all the elements of plants, though in very different proportions from barn-yard manure. When we get an increase of 86 bushels of potatoes per acre from an application of 300 lbs. of Peruvian guano, we cannot attribute the beneficial effect, with any degree of certainty, to any particular ingredient. It is true that Peruvian guano contains a large quantity of ammonia and phosphate of lime, and a very small amount of the other ingredients of plant-food, and any marked effect produced is in all probability due to one or both of these substances; but to which we can not determine, without resorting to experiments with each of them separately and combined. We believe the above experiments are the first which have been made on potatoes, for the purpose of determining this interesting point. They were instituted not for the purpose of ascertaining whether sulphate of ammonia would be a profitable manure for potatoes, but whether ammonia was required for the maximum growth of the potato, and in what quantity. This fact being ascertained, we can use such manures as afford the largest quantity of ammonia at the cheapest rate. And the same is true of phosphate of lime, potash, or any other ingredient of plants.

It will be seen, by reference to the table, that 150 lbs. of sulphate of ammonia per acre gave an increase of 45 bushels of potatoes; 300 lbs. superphosphate of lime, an increase of 37 bushels of potatoes; and the two combined, on Plot 4, an increase of 84 bushels. The ammonia and the superphosphate sown separately both give considerable increase, but they have a much greater effect when sown together, although the total increase is nearly the same from the same quantity of manure in both cases. The result shows that Peruvian guano — which contains both phosphate of lime and ammonia in considerable quantity — would be a much better manure for potatoes than either superphosphate of lime or ammonia alone. These experiments therefore confirm the opinion of practical farmers in regard to the value of this manure for potatoes.

The ash of potatoes consist of about 50 per cent. of potash, and this fact has induced many writers to recommend ashes as a manure for this crop. It will be seen, however, that in this instance at least they have very little effect, 400 lbs. giving an increase of only five bushels per acre. One hundred pounds of plaster per acre gave an increase of six bushels. Plaster and ashes combined, an increase per acre of fifteen bushels.

One fact is clearly brought out by these experiments: that this soil, which has been under cultivation without manure for many years, is not, relatively to other constituents of crops, deficient in potash. Had such been the case, the sulphate of ammonia and superphosphate of lime — manures which contain no potash — would not have given an increase of 84 bushels of potatoes per acre. There was sufficient potash in the soil, in an available condition, for 179 bushels of potatoes per acre; and the reason why the soil without manure produced only 95 bushels per acre, was owing to a deficiency of ammonia and phosphates.

In enriching the soil for potatoes, therefore, the principal object should be to provide a sufficient quantity of ammonia and phosphates. Practically, we may confine our attention to the supply of ammonia; for there is no economical way of providing this "spirit-like essence of the farm," which does not at the same time furnish an abundance of all the other elements required by the plant. Of all *commercial* manures, Peruvian guano is undoubtedly the best and cheapest for potatoes. Of ordinary manures made on the farm, hen dung stands first, and hog manure next, inasmuch as hogs are fed on foods containing much nitrogen and their manure therefore contains much ammonia. The manure ought to be thoroughly decomposed, but it should be fermented in such a way as to prevent loss of ammonia and to retain all the salts of the urine.

No plant enriches the soil so much for potatoes as red clover. A clover sod, plowed early in the spring and thoroughly decomposed, would furnish the potatoes with a considerable quantity of ammonia, though probably not sufficient for a maximum crop.

We may remark that no difference could be perceived in regard to the soundness of the potatoes grown by the different manures. Putrescent manures may have a tendency to increase the rot: but when the manure is thoroughly decomposed and intimately incorporated with the soil, we should apprehend no such effect.

HOEING WHEAT IN THE SPRING.

Since the advent of the midge the great point in growing wheat is to get it into bloom before the insects make their appearance.

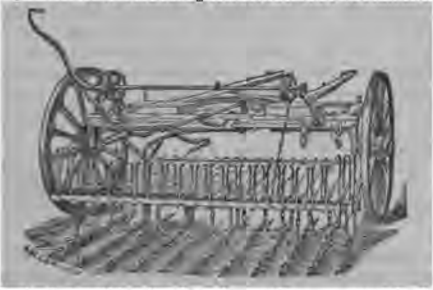
Anything we can do to render the soil warm, facilitates the early flowering of the wheat. Underdraining by removing a large body of water which would otherwise have to be evaporated by the sun, increases the temperature of the soil — in some instances as much as 10° ! It rquires no argument to prove that wheat on a warm, well drained soil, will be earlier than on cold wet land.

Stirring the soil and letting in the sun and air is another means of increasing its temperature. The soil of a summer fallow, or of a well hoed garden is warmer than that which is in grass, or left undisturbed. And it is a question well worthy of consideration whether we could not increase the early flowering of our wheat by hoeing the land in the spring. The wheat should be sown in drills, about a foot apart. Many English farmers have for several years adopted the practice of hoeing their wheat, and the result is highly satisfactory, not only on the wheat itself, but also in cleaning the land for subsequent crops.

Morton's *Cyclopedia of Agriculture* (one of the latest and best English authorities) says: "All drilled wheat should be hoed in spring, both for the purpose of loosening the surface and cutting up weeds; it will always pay itself, either by an increased crop or by saving in the after cleaning of the land, and often it will make all the difference between a very good and a very bad crop."

There is one difficulty in hoeing wheat here which is not met with in England. Our springs are late, and the wheat begins to grow rapidly before the ground is sufficiently dry to hoe. Still, some farmers have adopted the practice here on a small scale, and, we believe, with very encouraging results. Those, too, who have harrowed their wheat in the spring, have found it beneficial.

Unless the land is very hard and foul, the Dutch hoe is the best for hoeing wheat. When the drills are twelve inches apart, wheat can be hoed by hand for about seventy-five cents an acre — and we know of no cheaper method of eradicating redroot and other obnoxious weeds.



In England, a machine has been in use for some years for hoeing wheat. We annex a cut of it. It is drawn by one horse, and will hoe ten acres a day. When the land is free from stones, and not too hard, it makes excellent work. It is made to correspond with the drill used for sowing the wheat. The hoes themselves are fixed to a movable framework, which can be easily moved to correspond with any aberration of the drill. A man with a quick eye and steady hand can guide it so as rarely to cut up any of the wheat, especially if it has been drilled with proper care.

If our farmers will try the effect of hoeing wheat, and the result is beneficial, some of our intelligent mechanics will soon construct a machine which will do the work well, and at a cheap rate.

SCRUBBING AND WASHING TREES.

THE *Germantown Telegraph* thinks early winter the best time for scraping and washing the trunks of trees.

It is well known to all observing fruit growers, that the loose bark of trees is the winter quarters of myriads of insects, where they securely remain until the ensuing spring, when the warm, genial weather warrants them to quit their cosy homes and begin their destrnctive operations for the season. We have found a narrow saw, rather fine toothed, to be an excellent tool in rasping off the superfluous bark. It accomplishes more than a hoe, trowel, or other scraper; a trowel, or a short handled hoe, however, is very good, when the other may not be possessed. After the bark is removed, the trunks should be washed with a preparation of whale-oil soap and water, say in the proportion of a pound of the soap to four gallons of water. It can be applied to large trees with a hickory broom or a stiff whitewash brush, and to small trees, especially dwarfs, with the hand scrub-brush. Sickly trees, which can at this season be easily detected by being covered with a species of fungus, or perhaps more properly a peculiar insectiverous deposit, should be scrubbed so as to completely remove this. The mixture will of itself benefit the tree, while the removal from the stem of all extraneous and injurious substances, will give to it new health and vigor the ensuing season—in some instances to a surprising extent. When whale-oil soap is not obtainable, lye may be used, but it should not be *very* strong.

PRUNING THE PEACH.—The following style of pruning is practised by fruit growers in Southern Illinois:—When the tree is transplanted at one year from the bud, cut it back to a *mere stump* about ten inches high, without any branches whatever. After the young shoots have commenced growing finely, rub off all but four, which should be left on opposite sides, and all the same hight as nearly as possible. This will give a neat *distaff* form. The after pruning consists in keeping all shoots and branches in the center of the top cut out, thereby exposing the fruit more fully to the sun's rays, giving a higher color and flavor. Once a year, during mild weather in winter, or early in spring, all the longer branches are cut back from one-third to one-half of the last year's growth. There are orchards of over four thousand trees pruned in this manner, five or six years old. The branches of many of them can be pressed down upon the ground without breaking.

PLANTING FRUIT TREES.

IS IT BEST TO PLANT THEM IN THE FALL OR SPRING?

THIS is a point on which our best authorities disagree. Dr. LINDLEY says: "I entirely agree with Mr. MACNAB, that the earliest time at which planting can be effected is upon the whole the best." * * "If at that time, a root is wounded, a process of granulation, or cicatrization, will commence, just as it does in cuttings ; and from that granulation, which is a mere development of the horizontal cellular system, roots will eventually proceed. Now, it is obvious that since the root *must* be wounded in the process of transplanting, the sooner it is done the better, because it has the longer time in which to heal; and therefore the earlier in the autumn transplanting is effected, the less injury will be sustained by the plant submitted to the process ; in the technical language of the gardener, it has the more time to establish itself."

LOUDON says: "The best time for planting an orchard is the autumn, as soon as the trees have ripened their wood, and dropped their leaves. If the work be properly executed at this season, the trees will push out fresh fibres the same year, and be ready and able to push out shoots of considerable vigor in the spring."

It would be impossible to cite higher English authorities. But it must be borne in mind that the climate of Great Britain is very different from that of this country. The theory of Dr. LINDLEY is undoubtedly correct, but the practical application of it may be greatly modified by circumstances. Let us examine American authorities on this point.

DOWNING, after giving similar physiological reasons to those of Dr. LINDLEY quoted above, says: "Autumn planting is for this reason greatly to be preferred in all mild climates, and dry soils ; and even for very hardy trees, as the apple, in colder latitudes: as the fixed position in the ground which trees planted then get by the autumnal and early spring rains, gives them an advantage, at the next season of growth, over newly removed trees."

"On the other hand, in northern portions of the Union, where the winters commence early, and are severe, spring planting is greatly preferred. * * The proper time in such a climate is as early as the ground is in a fit condition in the spring."

THOMAS says: "For apple and other hardy trees, autumn is perhaps the best. * * The more tender trees, as apricots and peaches, removed to a colder region, may be in some danger, especially if the roots have been much mutilated, and the setting out badly done."

ELLIOTT says: "With nearly all trees and all locations, fall is the best time to transplant." Reasons, same as those given by Dr. LINDLEY.

It would thus seem that nearly all our best horticultural writers favor fall planting. In a mild climate, or where the trees can be obtained from the nursery at no great distance, and when the trees can be set out in a few days, there can be little doubt that it is better to plant in the autumn. But in a severe climate, and where trees are obtained from a distant nursery, and where frequently the trees cannot be obtained till quite late in the fall, spring planting is best. The trees set out late in the autumn do not have time to establish themselves before the ground is frozen solid, and it is not difficult to understand how recently transplanted trees, so situated, are injured by the winter. It is a well known fact that trees recently transplanted are more liable to injury from severe winters, than those set out the spring previous.

The objection to spring planting is that the trees cannot be obtained from a distant nursery as early as it is desirable to plant them. In such a case, it is better to get the trees the autumn before, and "heel them in" for the winter. Let the trees be unpacked as soon as they arrive, dig a trench in a *dry* soil, and lay them in by the roots, and cover them carefully with soil a few inches deeper than they were in the nursery. Let them remain here during winter, and plant them in the spring as early as the frost is out of the ground. The spot selected for "heeling them in," if possible, should be on the north side of a building, so that the sun cannot shine upon them and start the sap too early in the spring. If sheltered from our cold winds, it would be still better. It would also be advantageous to lay them in the trench in a slanting position, say at an angle of 45°; and if the winter is very severe, the tenderer kinds of trees, such as the peach and apricot, would be the better for having a few branches of evergreens, etc., laid over them. Straw should not be used, as it attracts mice and other vermin.

The advantages of this plan are obvious. The nurserymen are not as busy in the fall as in the spring, and can give more time and attention to digging up the trees, packing, etc. You have the first pick of the trees; they can be sent by the cheapest routes, and you are certain of getting them in season for early spring planting.

THOMAS BATES.

THERE are few who have not heard of the "Duchess" strain of short horns — the most celebrated branch of this most celebrated breed of cattle. Perhaps the young readers of the *Rural Annual* may like to see a portrait of the originator of the Duchess shorthorns, THOMAS BATES, of Kirkleavington. He was a remarkable man. Educated for the law, he abandoned the profession for the more congenial pursuits of agriculture. When still a young man, he mixed some muck or peat with layers of barn-yard manure, and found it beneficial to crops. He used the muck from a deep bed on other portions of the farm in the same way, and this he found was injurious rather than beneficial. This induced him to go to Edinburgh to study chemistry, in order to find out the cause. He found that the sample of muck which injured the land, contained a salt of iron, and that lime would neutralize it.

The young farmer that would go to Edinburgh to study agricultural chemistry, deserved to succeed — and he did.

He did not obtain for himself and cattle a world-wide celebrity at once. For twenty-five years, he did not exhibit at any of the shows — he was, with great care, perseverance and skill, bringing his herd to perfection. When he did exhibit, he carried all before him. Every animal took a prize. He refused $5000 for one bull. At his death, his herd of 68 animals, including calves, etc., brought $21,840.

His farm, when he took it, was "hide-bound with poverty and exhaustion." He "mole-drained" 850 acres of it, and made it the best farm in the neighborhood.

Look to your Cellars. — The *Germantown Telegraph* well says:— Those who have in charge the care of the household, should frequently think of their cellars, and though they may not be often exposed to the eye of strangers, take care that they are always kept in a cleanly condition, from annoyances and nuisances of all kinds. A tidy-kept cellar has much to do with the health of a family, especially in the spring of the year, or wherever "heaters" are introduced into houses. No vegetables, except potatoes, should be stored in the cellar. Especially should cabbages, beets, celery and turnips be excluded. All these are offensive in themselves and injurious to health, while at the same time they are all preserved in a much superior manner out-of-doors. A cellar should be thoroughly white-washed at least once a year, and swept and put in order twice a month.

The air in a properly kept cellar will not become impure when the weather becomes sufficiently cold to render necessary the closing up of the open windows; while on the other hand the air of a cellar, so closed up, which is untidily kept, and filled with vegetables, some of them in a decayed state, may well be imagined. All cellars, however, should have the outside doors thrown open for an hour or two in mid-day, upon clear days, when the temperature is above freezing point.

WHAT DO WE PLOW FOR?

1. We plow to bury the weeds, grass and other vegetation.

2. We plow to loosen and pulverize the land. All soils, but especially those of a clayey nature, have a tendency to consolidate, and soon become too firm and compact for the tender, hair-like roots of young plants to enter. The soil may contain all the plant-food required, but if it is so hard that the roots cannot penetrate, it will be of no avail. It is locked up. Plowing is the key that unlocks the storehouse. The plow is inferior to the spade, because it does not break up and pulverize the soil so thoroughly. If we had a digging machine that could be worked by horses or steam — as we undoubtedly shall have before many years — it would soon supersede the plow.

3. We plow to let in the sun and air. In nearly all soils there is a large amount of inert organic matter, which could be rendered available plant-food by fermentation and decomposition. This is accelerated by the admission of air. Like water, air will penetrate all porous bodies. Large lumps of sugar are long in dissolving, because the water has access only to the outside; but crush it, and let the water get at all its particles, and they are dissolved with great rapidity. So of the soil, if it is in lumps, the air cannot get at it; but loosen it and render it porous by plowing, harrowing, rolling, etc., and the air will be brought in contact with the particles of organic matter, and decompose them. It will also disintegrate the inorganic matter of the soil, and render more or less of it available as food for plants. It must not be forgotten, too, that the roots of plants need air.

The air contains ammonia and carbonic acid, and it is a well known fact that porous bodies will attract these gases. Thus, THEODORE DE SAUSSURE found that charcoal, heated to redness, and plunged while hot into mercury, and afterward, when cold, without being exposed to the atmosphere, plunged into ammoniacal gas, *absorbed ammonia equal to ninety times its volume.* That is to say, a cubic foot of charcoal would absorb one hundred pounds of ammonia — or as much as ten tons of ordinary barn-yard manure contains. The power of fresh charcoal for absorbing and condensing ammonia, is due to its porosity. Spongy or porous platinum will absorb so much hydrogen gas, that the heat evolved by its condensation will ignite it. Now, while a porous soil possesses no such power, there can be little doubt that it does absorb ammonia and other gases by the same attraction which one particle of matter has for another. This power is in proportion to the *surface* exposed to the air, and consequently the more the soil is comminuted, the more it is broken up and loosened, the greater will be its power of attraction.

Most soils, also, contain substances which have a *chemical affinity* for ammonia. Prof. WAY says: "I find that clay is so greedy of ammonia that, if air charged with carbonate of ammonia, so as to be highly pungent, is passed through a tube filled with fragments of dry clay, *every particle of the gas* [ammonia] *is arrested.*" This power of clay to absorb ammonia from the air, is ascribed by Prof. WAY to the presence of a *double silicate of lime and alumina*, and he thinks one reason of the benefit of the application of lime, is the formation of this double silicate. Of course, the more such soils are stirred — the more their particles are exposed to the air, the more ammonia can they absorb from the atmosphere. The power of soils to attract ammonia from the atmosphere, is one principal cause of the well known benefit of summer fallowing.

4. We plow to incorporate manure with the soil. The more thoroughly this is done the better. The carbonic acid generated by the decomposition of humus, has a good effect in disintegrating the mineral matter in the soil. The soil may be regarded as a *stomach*, in which the food of plants is digested and rendered assimilable. It is important, therefore, that the manure should be well mixed with the soil.

5. We plow (in the fall) to expose the soil to the pulverizing action of the frost in winter; to disturb the larva of insects and expose them to the cold.

COLTS WHISKING THEIR TAILS.—This may be done from spite; if so, take as little notice of it as possible. If done when spoken to, take some one along and continue in conversation. By this means, if continued for sometime, the colt will get used to being spoken to, and the disagreeable habit will be given up.

TO CATCH OWLS.— Fasten a board just the size of a steel trap, upon the end of a long pole. Then bind the trap fast, so that the owl cannot light upon it without touching the trench. Set it up so that it will be higher than any object near it. As the owl always alights before it takes its prey, it is sure to light upon it, and you have him.

CULTIVATION OF TOBACCO AT THE NORTH.

For some years past, the culture of obatcco at the North has been gradually extending; and the falling off in the supply from the Southern States, caused by the rebellion, has given a new impetus to the

business. After all that has been said against the use of tobacco, it has continued to enlarge its circle of consumption. The city of New York spends three and a half millions of dollars for cigars in a year — or half a million more than for bread. It is estimated that the human family, chews, smokes, and snuffs, $1,250,000,000 worth of tobacco annually! People will have tobacco. If they cannot get it from the South, they will raise it at the North, and the many inquiries we receive in regard to its cultivation, shows that the subject is attracting much attention.

In this section, tobacco is cultivated to a considerable extent, and for the last two years the profits have been very large. It is desirable to raise the plants in a hot-bed, or cold frame. It is perhaps the better way to start them in a hot-bed, and then prick out the young plants into a cold frame. In this way, strong, stocky plants are obtained, that can be easily and safely transplanted into the open air. This practice, however, is seldom adopted. The usual way is to prepare the bed in the fall by digging in some rich manure, free from seeds, and then in the spring, as soon as the ground is in good working order, rake the bed fine and sow the seed, at the rate of an ounce to the square rod. Roll the bed with a hand roller, but do not cover the seed. The bed must be surrounded with a frame, and covered with glass. In about two weeks the plants will be up, and care must be taken to keep the frame well ventilated. As the plants progress and the weather becomes warmer, the glass may be removed on sunny days, to harden off the plants, covering them again at night. The bed must be well watered, and kept free from weeds, and if the plants are too thick they should be thinned out.

The Hon. GEORGE GEDDES, in his admirable report of the agriculture of Onondaga county, N. Y., gives a full and excellent statement of the culture of tobacco in that county, from which we make a few extracts.

The cultivation of tobacco was commenced in Onondaga county in 1845, by C. MORRIS and N. GRIMES, who hired a man from Connecticut to attend to it. The census of 1855 showed that the preceding year, 471½ acres were occupied by this crop, yield- 554,987 lbs., or an average of 1,178 lbs. per acre. The value of the crop in 1859 was estimated at $150,000.

Plant and Root as should be set.

"When the plants in the bed are three inches high they are large enough to set. To prepare the land, the manure should be applied as early as the ground is dry enough to plow. The last of May plow and harrow again, so as to mix the manure well with the soil. Mark the land one way for rows, three feet four inches. Make hills by hauling up a few hoes full of dirt, and press it well with the hoe. In taking the plants from the bed, care should be taken to keep the roots wet. Unless the ground is quite damp, put a pint of water on each hill half an hour before setting. Make a hole, put in the root, and press the dirt close to it, all the way to the lower end. If any plant does not live, take care to set another. Unless the earth is wet, or at least moist, water the plants soon after setting as may be necessary. In about one week cultivate and hoe. In ten or fourteen days, repeat the operation, and continue to cultivate so as to keep down the weeds. The tobacco worms may appear about the second hoeing; *kill them as fast as they show themselves.* When the blossoms appear, break of the stalk, leaving about fifteen leaves, taking off about seven leaves.

Plant as set in the Hill.

Plant ready for Topping—place indicated by *b*.

"After topping, break off all the suckers. In about another week go over again, breaking off suckers and killing worms. In another week repeat the operation.

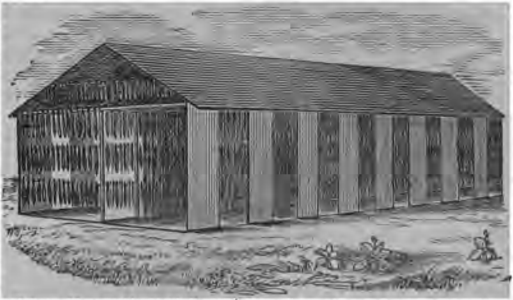
"By this time the crop is ready to begin the harvest.—This may be known by the suckers which start at every leaf, and when they have all appeared down to the lower leaf, the plant is ready to cut, every sucker having been removed as it appeared. The stalks are cut at the root. In a warm day, cut in the morning and evening. In the middle of a hot day, the leaves will burn before they are wilted. The best way is to cut in the afternoon, and lay on the ground to wilt.—

Plant after Topping.

This wilting forwards the process of curing, and so toughens the plant as to make it practicable to hang it without much loss in breaking the leaves. After wilting draw to the house, which should be twenty-four

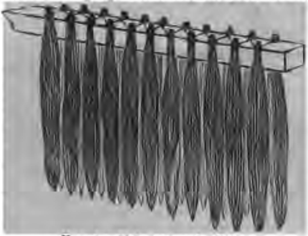
Plant with the Suckers Growing.

feet wide, fifteen high, so as to have three tiers, one above the other. A building of this width and hight, thirty-five feet long, will store an acre, or one ton of tobacco. The girts on the side of the building



Tobacco House, without side doors, end boarding, and end doors—showing the manner of hanging the Tobacco.

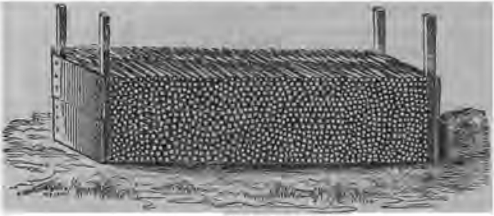
should be five feet apart; a row of posts through the middle is necessary to put girts in, to hold the poles that the plants are tied to. The best poles are made of basswood, sawed one and a half by four inches, and twelve feet long. The plants are handed to a man, who, standing on a movable platform by a light plank, receives them, and beginning at the top tier, he winds a piece of prepared twine around a stalk, fastening the first plant to the pole; the second plant is placed on the other side of the pole, and a single turn is made around the stalk; then again the third stalk is put on the same side of the first, the twine passed around, and the next on the other side, and so on to the end of the pole, where the twine is made fast. About thirty



Hanging Tobacco on the Poles.

or thirty-six are hung on a pole, one half on each side. If this twine gives way, it is manifest that they will all be let loose. The poles are put on the girts about fourteen inches apart. In this way the whole building is filled.

"Skill is now demanded to regulate the ventilation until the crop is cured, which is determined by examining the stem in the leaf, which should be hard up to the main stalk. Then in damp weather the tobacco can be taken down and laid in piles, with the tips together to keep it from drying, and to secure this, cover over with boards. The next thing is the removal of the leaves from the stalks, taking this time to separate the broken leaves from the unbroken ones. They are then made into parcels of 16 or 18, called "hands," and are fastened by winding a leaf around them. Pile these hands tips on tips, the square ends out. This preserves the moisture. The pile should be kept covered with boards, and the sides also covered, leaving the wound end of the hands exposed to the air. If everything up to this point has been skillfully done, in four or five days the tobacco will be fit to pack in cases, and take to market. The cases should be of pine, two feet six inches square, by three feet eight inches, and of inch lumber. Place the hands tips on tips, and the wound ends against the ends of the box, press with a lever or screw until 400 pounds are in, then fasten on the top. The tobacco now goes through the sweating process, and will lose about ten per cent. in weight before fit for use. This tobacco is known in the market as "seed leaf," and is principally used for wrappers for cigars; the refuse is exported. A crop handled in the manner described, and with skill, will sell in New York city at from twelve to fifteen cents a pound; but from want of proper care and



Tobacco stacked after Stripping.

skill, the crop of this county does not bring an average price of more than eight cents.

COST OF CROP.

The plants are worth per acre,	$2.50
Manure, 10 cords, say	20.00
Fitting ground and marking,	4.50
Planting and setting,	5.00
Cultivating and first hoeing,	2.00
" second hoeing,	1 50
Topping, and killing worms, say	1.00
Suckering, first and second times,	2.00
" third time,	4.00
Harvesting and hanging, (four men and team one day)	6.00
Stripping, one ton,	10.00
Five packing boxes,	5.00
Labor of packing,	1.50
Twine, for hanging	1.00
	$66.00

"A ton at 13½ cents, is worth $270. Deduct 10 per cent for shrinkage, and 1½ cents per pound for transportation and commissions, in all $52, leaves $218 as net proceeds. The cost being taken from this, $66, and we have $152 for use of land and buildings.

"This is the best statement that can fairly be made for this crop. If the price be put at the average our growers get, viz: eight cents per pound, we have for the crop, 1,800 pounds after shrinking., $144. Deduct $66 for cost, and $22.50 for commissions and transportation, in all $88.50, which deducted from the amount received, leaves $55.50, as the ordinary profit per acre."

Of course the foregoing estimate will vary wtih the price of tobacco, and as it is now higher than ever before, the profits will be much greater.

LIVE AND DEAD WEIGHT OF HOGS.

The proportion of pork to live weight varies somewhat according to age, breed and degree of fatness of the hogs. Very fat hogs afford 85 lbs. of pork to 100 lbs. of live weight. The usual estimate for good hogs is 80 lbs. of pork to 100 lbs. live weight. This would make:

$2.00 per	100 lbs.	live weight	equal	$2.50 net.
2.40	"	"	"	3.00 "
2.50	"	"	"	3.12½ "
2.75	"	"	"	3.43¾ "
3.00	"	"	"	3.75 "
3.25	"	"	"	4.06¼ "
3.50	"	"	"	4.37½ "
3.75	"	"	"	4.68¾ "
4.00	"	"	"	5.00 "
4.25	"	"	"	5.31¼ "
4.50	"	"	"	5.62½ "
4.75	"	"	"	5.93¾ "
5.00	"	"	"	6.25 "
5.25	"	"	"	6.56¼ "
5.50	"	"	"	6.87½ "
5.75	"	"	"	7.18¾ "
6.00	"	"	"	7.50 "
6.25	"	"	"	7.81¼ "
6.50	"	"	"	8.12½ "
6.75	"	"	"	8.43¾ "
7.00	"	"	"	8.75 "
7.25	"	"	"	9.06¼ "
7.50	"	"	"	9.37½ "
7.75	"	"	"	9.68¾ "
8.00	"	"	"	10.00 "

TO RESTORE A WORN-OUT FARM.

Your main dependence for enriching the soil will be in *thorough cultivation*, and in making all the manure you can on the farm.

Two things must be borne in mind. One is that the growth of some crops impoverishes the soil more than others; and secondly, that some crops make *richer manure* than others. Thus, a crop of red clover does not impoverish the soil as much as a crop of timothy grass, while a ton of clover hay will make manure worth half as much again as that made from a ton of timothy hay. The same is true of peas and beans. The manure from a given weight of these is worth *double* what it is from oats, barley, rye, or Indian corn.

Your object must be to raise all the clover, peas, turnips, mangel-wurzels, etc., you can, *and feed them out on the farm* to stock. This will give you manure — *rich* manure — not rotten straw — manure abounding in all the elements of plants; manure that will *tell* wherever applied and on whatever crop.

If you can raise good clover, you may be sure of raising good crops of everything else,— if the clover is retained on the farm Try a littte superphosphate on clover, say 200 lbs. per acre. It *may* pay. Plaster will certainly pay. Do not plow too much land. Sow only as much to wheat, barley, oats, etc., as you can prepare in the best manner. If you have any low, swampy places, cut a ditch through them, and underdrain as thoroughly as you can. Such soil, when well drained, often proves to be the most productive land on the farm, and the large crops which can be obtained from them, will enable you to make manure for the upper portions of the farm.

To sum up. Underdrain. Cultivate the land *thoroughly*, and thus develop its latent resources. Get all the muck and other vegetable matter you can from the swamps. Bring into cultivation all the low, rich land you have on the farm. Plaster your clover and raise as much of it as possible, and feed it out to stock. Or, if this will not pay, plow it under. Raise all the peas and turnips you can, and feed them out on the farm. Be very careful to save all the manure. Let none of it run away or evaporate. There is not much danger of the latter if you have plenty of straw or muck, and if you spout your buildings there need not be much liquid lost. Sell nothing off the farm except wheat,— and, while the price is so high, *beans* — wool, pork, mutton and beef. Cultivate in the best way, make all the manure you can, and your farm will in a few years be in a high condition.

CHEAP COTTAGE AND FARM HOUSES.

IT is said that Americans dress more extravagantly than any other people; and the reason assigned is, that where there are no well recognized classes in society, there is a tendency among weak men and silly women, to try to gain distinction from the amount of money which they spend in decorating their persons.

This same desire for distinction leads us to build large and costly houses.—Probably in no other country do men, in proportion to their means, erect such expensive residences. It is one of our national follies.

A man makes some money by a successful speculation, and becoming ambitious of distinction, he builds a big house, not because he has a large family and needs it,—not certainly because he has fine architectural taste—but simply because he wishes to outshine his neighbors. Such a man generally goes beyond his means, and when his house is finished, he cannot afford to live in a style appropriate to such a residence. We have heard of an English gentleman who built a palatial residence, and when he had paid for it, he found that the income from the rest of his property would not pay the window tax! How many men have we known who were pecuniarily crippled all their days by a desire to live in a large house? How much happier and better would they have been, had they been content to live in a quiet, modest, comfortable HOME!

Even if a man is rich, it is better to spend less on the house and more on the garden and grounds. To build a twenty thousand dollar suburban residence, and then forego the pleasures of a green-house or cold grapery, exhibits a want of true taste, and an inability to appreciate the good things of this life. A small house, surrounded with handsome trees and beautiful flowers, presents a far more attractive and comfortable appearance, than the largest mansion standing cold and treeless on its bleak and muddy lot.

Let us have smaller houses, and pay more attention to their surroundings. Let us aim at comfort and convenience, and strive to impress on our houses a homelike aspect. Those about to build, will find some beautiful designs in the RURAL ANNUAL for 1857, prepared expressly for this work; and also in the volumes for 1858, and 1861. We now present a few plans for cottages and cheap farm houses, taken principally from APPLETON'S beautiful work on *Village and Farm Cottages*, by Messrs. CLEVELAND & BACKUS BROTHERS.

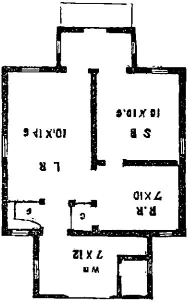
COTTAGES OF ONE STORY.

Design No. 1.

In the accompanying Design, No. 1, it is our endeavor to present an arrangement with the smallest amount of accommodation consistent with a decent and orderly management of the household. It is, of course, fitted only for a family of the smallest size and most moderate circumstances.

Its apartments are a living-room, L. R., to answer the general purposes of kitchen and eating-room; a sitting-room, S. R., for reading, sewing, and the reception of friends; and a bed-room, B. R. Connected with the living-room is a closet, and a passage leading to the wood-room, W. R., in the rear. This may be used for the storage of fuel, and large utensils of the house and garden; and in summer, for washing clothes, etc. The cellar stairs may go down from this room. In the living-room and sitting-room there are openings for stove pipes. The chimney caps are of terra-cotta, and stand on a brick base. The doors are so placed as to make the work and care of the housewife easy, while the sitting-room has all the seclusion that can be desired.

The exterior is equally simple. The wall is covered with vertical boards, and battened at the joints. The window trimmings are plain and cheap, and appropriate to a wooden house like this. These, with the projecting cornice and the entrance porch, make the little structure inviting and homelike, and at once reveal its purpose.



No. 1. Ground Plan

This house, having but one sleeping apartment, is suited to a married couple without children. Should additional room become necessary, a low second story may easily be added. In such case, the present bedroom might be used for stairway and pantries. With its aspect thus altered, the house would look like Design No. 3.

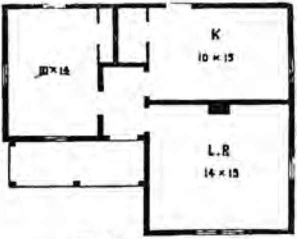
The hight of the rooms is 8 feet 6 inches. The cost of the building is estimated at $575.

DESIGN NO. II.

It is needless to say for whom this plan was intended, as the whole family is in sight. The owner, whom you see so busy with hammer and nail, is of that independent sort, who like to do things in their own way. On the edge of the village he bought a piece of ground, but partly cleared, and which nobody else had thought of. Here, amid the spared trees he put his house. He wanted but three rooms. You see that they are larger than those of No. 1, and differently disposed. A veranda, where he could sit in the shade, and enjoy the fresh air, he was resolved to have. To carry out his own views of convenience and comfort, he disregarded the advice of his neighbors, who insisted that it would be quite as cheap, and much better, to build his house "regular and square." He did nothing for mere fancy. The cornice is unornamented, the front door plain, the window caps are strips of plank sustained by three-cornered blocks. An evident purpose pervades every part of the plan. At first it looked so plain, compared with neighboring houses, which were tricked out in gingerbread finery, that people laughed, and called it barn-like. Not so now. Prairie roses,

No. 2. Cottage of One Story.

planted and trained by the owner's own hand, already supply the want of pilaster and cornice. Honeysuckles will soon climb the slender columns of the veranda, and hang between them in fragrant festoons. Ere long, grapevines will display their clusters, where now the bean poles stand. The maize patch, at present somewhat too near, will be replaced by grass and flowers; and then, perhaps, some of those who once scorned the homely dwelling, will stop to gaze, and long to enter.



No. 2. Ground Plan.

Let them enter. They will find everything in order within. The interior of the house was planned to suit its mistress. Each room is entered directly from the entry, and this being the only connection between them, no one can be used as a passage way to others. The kitchen, with all its sounds and odors, is effectually separated from the sitting-room. Each of these rooms is supplied with a pantry, and a back-door opens out from the latter. The inside walls are neatly papered. The doors and trimmings are plain and substantial.

Hight of rooms 8 feet 6 inches. Cost, estimated at $650.

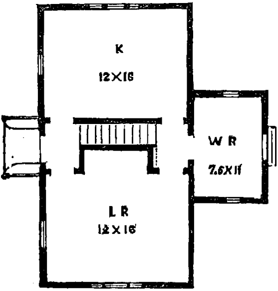
COTTAGES OF ONE STORY AND ATTIC.

As the structures, called story and a half houses, are usually built, the roof is low, and the upper rooms, in consequence, are inconvenient,

No. 8. Cottage of One Story and Attic.

uncomfortably warm, and poorly ventilated. With some reason, then, it is asserted that it is better to give more hight to the side walls, and by means of a flat, or very low-pitched roof, secure a full, though not a high story. It is conceded that such a story is generally more comfortable than one in which the ceiling follows the line of the roof.—But it will often happen that *steep* roofs are preferred, and for the best of reasons, in cases where economy allows only one full story below them. When this happens, the attic rooms may, by care in the construction, be made almost as valuable as those with vertical walls. They can be more easily and perfectly ventilated, and to finish them for use adds but slightly to the expense.

In Design No. 3, the two main rooms are separated by front and rear passages, and by the staircase which leads up from the front entry, and is equally accessible to both rooms. The stairs have a platform above the rear entry, from which they are returned over a recess in the living-room, a little lower than the rest of the room. The rear extension may serve as a back kitchen or wood-room.



No. 3. Ground Plan.

A scaffold over the stairs in the second story, which rests on the two cross partitions, sustains the chimney. The recess in the living-room may be enclosed for a pantry. A closet is made on the stair platform in the second story.

In houses like this, the front door is often near one end, opening into a room. A brick chimney, with a fire place in each apartment, rises from the ground. The stairs are at the end of the house. The points of difference are manifest, and favor, in our plan, both looks and comfort. No outer door opens into a room. No room is made the passage way to another room. The exterior is regular. The little chimney is an ornament, and the porch invites you and offers its shelter. The form and arrangement of the end windows improve the outside look, while they make the inside cheerful. As the cottage is low and would not obstruct the view, it is suitable for a gardener's, or laborer's home, on some large place. Or it might serve as a temporary abode of some young and growing family, to be made, in time, the wing of a larger house. In such case it would be wise to place it with reference to the probable enlargement.

The construction and finish of this house are very plain. Its sides may be covered with clapboards, or with vertical boards and battens.

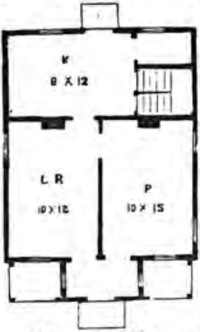
Hight of first story, 7 ft. 6 in. Length of posts, 11 ft. Cost, $820.

DESIGN NO. IV.

In Design No. 4, we have something more picturesque, and what is better, something more commodious and comfortable. We have a kitchen, a living-room, and a parlor. The kitchen has a large and convenient pantry, and each bedroom is furnished with a closet. The arrangement of the doors is meant to facilitate housework. There are

No. 4. Cottage of One Story and Attic.

three sleeping rooms, so that the house will accommodate a family of considerable size. The first story is eight feet six inches high. This leaves two feet six inches (between floor and ceiling) at the side of the chamber. But two feet from the wall, the hight of the room is five and a half feet. This advantage is due to the sharpness of the roof. As the chambers have a space of nearly eight feet square, where an adult can stand erect, they are evidently but little injured by the slant.

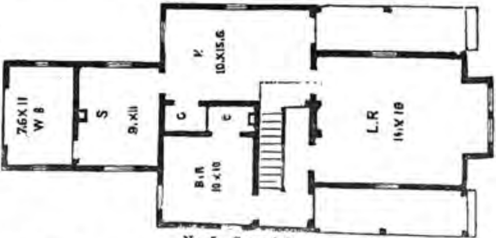


No. 4. Ground Plan.

The exterior is perfectly regular. The side covering is vertical, as better suited to its style. The finish is very plain — the veranda is simply made, with solid posts and brackets. There is a plain shed in the rear. The smoke flues may be carried up as shown, or they may be brought together over the chamber ceiling, resting on the cross partitions. The terra-cotta chimney caps are simple and cheap. The front windows reach the floor and open like doors, for the better accommodaton of the verandas.

Hight of first story, 8 feet six inches. Second story, 2 feet at the wall, and 9 feet at the ceiling. The cost is estimated at $1000.

No. 5. Cottage of One Story and Attic.



No. 5. Ground Plan.

We have here uniformity of parts without formality, and a good degree of picturesqueness, with convenience of arrangement. The living-room or parlor, occupies the entire front, and is of regular shape throughout. The bay-window, seven feet wide and three deep, improves the outward look, and adds immensely to the pleasantness of the interior. One outer door opens into the hall, which commuicates with the parlor, kitchen, and bedroom. The hall contains the stairs, which are not enclosed. The door on the other veranda opens into the kitchen. A lattice screen across the veranda should conceal it from the front. The rear, as shown, has a back kitchen and chimney, with a wood-room annexed. If not needed, this back kitchen may be omitted from the plan, a smaller extension for wood-room being substituted in its place. The chimneys are of brick from the ground. The house is well supplied with pantries in both stories. The cellar stairs open from the kitchen. Let the side covering be vertical boards and battens. Clapboards would seriously injure its character. The picture indicates not only the style of the house, but, to some extent, its appropriate surroundings. Let no such cottage stand in a bleak, open field, as if it had been accidently dropped there, and forgotten.

Hight of first story, 8 feet 6 inches to the ceiling. Second story, 4 feet 6 inches at the walls. Cost of building, $1,100.

THE GREAT SHAKER BARN.

Solon Robinson, in an account of a visit to the Shakers at Lebanon, N. H., alludes to their celebrated barn as follows:

"This barn is 196 feet long, 50 feet wide, five stories high; the walls of good flat, quarried stone, 5 feet thick at the foundation, carefully laid in lime mortar, cement pointed outside, and plastered inside; roofed with tarred paper, cement and gravel. It also has three wings, wooden buildings, which form four sheds about 100 feet long upon the east and west sides of two cattle yards, on the south of the main building, with lofts of straw and grain connected with the barn.

"The lower story of the barn is a manure cellar, and at the west end is level with the ground, so that carts can be driven in and out with ease. The next story is the cow stable, which is on a level with the yard, the cows standing with their heads towards the center, with a passage between supplied with water pipes and cocks. In this passage roots, cut feed or water can be given in iron feed boxes, which swing on a pivot into the passage. Behind the cows the floor drops a couple of inches, a space of three feet, and back of that rises again. The depression is to hold the manure. On the rise behind are iron rails, upon which cars run into the west end and over a space about 25 feet wide, and discharge their loads, the rails and a turn table being so contrived that the manure is well distributed with but little labor. The idea is entertained of making the whole cellar into a liquid manure vat, which could be distributed by its own gravity upon the lower part of the farm, or sent higher up by the water power that drives the mill not far distant. The cows are all fastened in their stalls at each milking, in summer, and all at one movement. They are driven in all together, and each one takes her place, where her name is printed overhead, and then by the pull of a cord all the movable stanchions are closed. They are opened by a reversed motion, and all the cows hurried out in a drove, so that they never make a deposit upon the floor. They are left a few minutes to do that in the yard, before sending them to the pasture.

"There are six large chimney ventilators from the rear of the stalls to the roof. The floor above them supports the great hay mows, between which is the floor for feeding hay, which is sent down to the cows through box tubes, and these, when empty, also assist ventilation. There are openings from this floor into the straw lofts over the sheds, and also to the store rooms for roots and grain.

"The next floor is the grand drive way for loads of hay, 16 feet wide and 196 feet long, with ample space at the west end to turn around. This floor opens upon a public road, and is but little above its level, so that loads really come in easily at the top of the barn. Over this floor is a fifth story, only the width of the floor, to give room for work, and ventilation and light. Half of the many windows are glass and half slatted blinds. The hay is nearly all thrown down, not pitched up from the load. In case of need, the large space at the end could be filled, but it is thought that it will not be necessary, except with corn, which can be husked there and thrown down a spout into a large, airy granary over the western shed.

"Altogether, I look upon this as the most complete barn in the country, and well worthy of a visit by any one who may be about to build, or who may desire to plan a very large barn so as to afford uncommon facilities, and well calculated to afford them for a great length of time. It is true, there are not many situations so convenient as this for the purpose. The cash cost was about $10,000, and probably, estimating the labor of the people at a fair price, $5,000 more, but they consider it money and labor well appropriated."

AN AQUARIUM.

An aquarium, to a person who has any longing to penetrate into the mysteries of nature, or any interest in her varied forms of animal and vegetable life, is a source of intense enjoyment, and of pleasant occupation. But if any one expects to enjoy nature, even within the limited space of a glass tank, without any compensating labor, they will soon turn away disappointed, and will see nothing in her changes but death and decay.

It is for those who like not only to wander by the side of a murmuring brook, and idly toss the pebbles into the sparkling water, but who watch with real interest the animal life which gathers on the surface, or makes the rocky bottom radiant with motion — that an aquarium is a continued source of pleasure. The close dependence of one animal upon another, of the animal upon the vegetable, the uses of even the lowest forms of life and the whole economy of nature—whose seeming profusion and prodigality are in fact but parts of a complete system, in which nothing is made or lives in vain,— all are beautifully taught within its glass walls.

Our object is to give a few plain and practical suggestions to those who wish to stock an aquarium themselves, and are not ambitious to gather rare fishes and plants, but only such as can be readily procured and easily cared for. The object of the aquarium is to be self-supporting; that is, to make the balance of animal and vegetable life as nearly perfect as possible, so that each shall be kept within proper bounds by the other. Before putting in the water, arrange at the bottom a bed of pebbles, white ones are the best if they can be readily procured, with some river sand, both carefully cleaned. Planting is next to be performed. Collect a few small plants, and not more than one or two which will grow high above the water — any lily is pretty for the largest, and the smaller ones can be easily gathered from even the tiniest streams. Some require to have a stone attached to them by means of a thread to keep them in place. All the black and decaying matter should be cut away, and even if they are without roots they will grow and become firmly fixed in their places in about a fortnight. The water when introduced should be pure and bright, and if at all impure it ought to be filtered. Spring water is the best when river water cannot be procured. In filling the tank, hold a plate in the left hand as low down as possible, to receive the dash of the water from the vessel in the right, so as to wash up the sand as little as possible. The tank should be planted and filled within two or three inches of the top, and then allowed to stand about a week before the fishes are introduced. Taking large with small, two or three to every gallon of water is all that should be attempted. Minnows are a necessity,—without them there can be no aquarium. Goldfish and perch, which are the most easily procurable of all fish, are also two of the most interesting species. The common sunfish is also a good addition. Reptiles, too, are required. Tad-poles are indispensable, and newts should be had if possible. One or two varieties of snails are worth the trial, although they sometimes are more destructive than useful, but they are very entertaining. If one or two bivalves, so common in all rivers, can be procured and placed at the bottom, they will add greatly to the beauty of the tank, but are not so useful as snails in keeping it clean. Two or three of the latter are required to every gallon, but if they prove too destructive, a sponge tied to a stick will assist the bivalves in keeping the glass sides free, so that a good view can always be obtained. A too great frenzy for cleaning is injurious, and the sponge should be used carefully. All dead specimens should be instantly removed. If the tank is carefully attended to and not overstocked, the water will not require changing more than once in twelve months.—And then the live stock should be removed by means of a hand net, and placed in pans of water, and the plants put by themselves as carefully as possible. The bottom and glass can be quickly cleaned with fine sand or rotten stone. The temperature should not rise above sixty degrees, and in summer the sun should only shine upon the tank an hour or two in the twenty-four. A south or an east aspect is preferable. If the tank gets accidentally heated, a wet cloth wrapped around it will soon restore the temperature to the proper point. It is a good plan to have a thermometer just below the surface. If there is a want of oxygen, the fishes will either come to the surface or lie on the bottom as though dead. The reason of this is usually too great a supply of animals, and the only remedy is to remove some of them — or to change the water frequently, which is poor management. When a fish becomes diseased, it should be removed and placed in a pan of clear water, in a quiet, cool place, when it will probably recover. In minnows the caudal fin sometimes gets coated with a fungoid growth. It can be cut off, and usually will grow again in a few days.

An aquarium demands patience and care, but the pleasure which success gives, more than compensates for all the trouble.

GUINEA FOWLS—THEIR VALUE, &c.

WRITTEN FOR THE RURAL ANNUAL, BY C. N. BEMENT.

THERE is an unaccountable tendency in the American character to new things. If any new and useful project or business is started, almost every one inclines to engage in it. Progress seems to be the order of the day, and improvement, not only in poultry but in the more costly and valuable stock of the farmer, seems to have attracted public notice.

We have frequently called attention to the rearing and keeping of domestic poultry, not altogether as a money making business, but as a source of enjoyment and useful branch of domestic economy.

Notwithstanding the attention heretofore paid to the common poultry, no one in our circle of acquaintance has ever attempted to rear and keep Guinea fowls in any considerable numbers, though we have before us an account of an Irishman who, it is said, has made himself rich from the sale of the eggs of the Guinea hens in the New York market.

Of all known birds, it is said the Guinea hen is the most prolific of eggs; and in their great aptitude for laying, which seems a natural property, we are inclined to believe they may be made profitable to keep for that purpose, provided suitable accommodations are afforded them. They dislike confinement, and will not thrive unless they have plenty of space to roam. They are naturally shy, and love to make their nests in dark and secluded places — hence the necessity of giving them, if possible, an enclosed wood with plenty of under brush.

In a wild state they are eminently gregarious, assembling in large flocks, which wander about in the day in search of food; as evening approaches they seek the branches of trees, and roost crowded together. This restless, wandering disposition, does not leave them in captivity. In close confinement, the female rarely watches her eggs, the want of freedom interfering with her natural instincts. Few birds indeed are more recluse and shy during the time of incubation, or more cautious in concealing their nest, which is generally made among dense brushwood or secluded retreats. The number of eggs varies from twelve to twenty. They are smaller than those of the common fowl, and of a pale, yellowish red, minutely dotted with dark points. The eggs are small but very nutricious; shells hard, and on that account can be transported with safety almost any distance.

The great drawbacks to the rearing and keeping Guinea fowls, are the vigilance required to watch for their nests, as they give no notice of their laying, and the harsh screaming of their everlasting cry; still, we consider them useful, as by their continued clamor and watchful nature, in protecting the other poultry from the hovering hawks — for which reason, if no other, a few should always be kept in every poultry yard. At night if any footsteps disturb them, their loud cries are sure to give notice that a trespass is committing.

From the earliest times to the present the Guinea fowl has been no great favorite with poultry keepers, and but few patronize them; and it is one of those unfortunate beings, which from having been occasionally guilty of a few trifling faults, has gained a much worse reputation than it really deserves; as if it were the most ill-behaved bird in creation; whereas it is useful, ornamental, and interesting during life, and when dead, if young, the flesh is tender, very superior, much resembling in flavor our partridge, and a desirable addition to our dinners, at a time when all other poultry is scarce and out of season. It is important, therefore to the farmer, who cultivates poultry for the profit of its products in market, to know and to be able to obtain the best and most profitable kinds.

REMEDY FOR BARK LICE.—It is stated in the *Journal of the Illinois State Agricultural Society*, that Mr. A. Sherman uses an effectual remedy against these insects, linseed oil and tar in equal quantities. These are mixed over a gentle fire to dissolve the tar, and the mixture is applied with a brush at any time during the winter or spring. By its application to his orchard the trees have become free from insects, and are healthy and fruitful.

MARKING INK.— In the garden, stakes and labels are often needed for the purpose of designating rows of fruit trees, new varieties of corn or potatoes, flower beds, vegetables, etc. Nothing is so good for this purpose as shellac varnish, into which a little lampblack has been well worked. Such paint will continue legible for years, and it is also the best mixture for use in marking barrels, boxes, bales of goods, etc.

WHEN TO CUT BUSHES.

We have no doubt, says William Bacon in the *Albany Cultivator*, but that late in summer, when the growth of the season is just ended, and the plant has expended all its energies in growing, and is just falling into that rest so essential to vegetable maturity, is an excellent time to behead these plagues of the farm. But we have tried another season, when the labors of the year were not quite so pressing as is usual in summer, or early autumn, and have found it so successful in our case, that we hold it worthy of commendation to others.

Many years ago, there was a dense patch of willows on a swampy spot at one end of the meadow. They covered about half an acre, and were so thick that any animal, bibed or quadruped, would find it difficult to pass through the thicket. It was waste land, good for nothing unless it were for wasps or hornets to occupy in rearing their young, or for the bob-o-link to pour his noisy clatter. More than this, it was a grievous eye-sore, that closely embodied phalanx of willows in full view of the highway, and the first object that greeted the eye in one direction from the windows.

It was our school-boy days, and it so happened, as was then customary in New England, our school adjourned over from Wednesday night before Thanksgiving, until the following Monday, to give the teacher time to go home and visit all his cousins and neighbors, the big boys to skate and attend turkey shoots, and every one to enjoy themselves in the ways best suited to their fancy.

Cold weather had set in, in earnest. The ponds were all frozen over, and the streams flowed noiselessly along under their icy blankets—dark clouds chased each other across the horizon, occasionally spitting snow as from very spite, and the hoarse north wind piped in doleful notes the birth of the season of storms and snow-drifts, of sleigh-rides and singing-schools. Of course, our old enemies, the willows, were firmly lodged in winter quarters. At least Jack Frost had one of them firmly secured in his unflinching, relentless vice. Taking that fact into consideration, in connection with the other more important one that we had two whole days all our own, to do what we pleased, with the proviso that we must not be pleased in doing any sort of mischief, we resolved to open speedy hostilities on our old, hateful enemies, the willows, and accordingly with a sharp axe in hand, we commenced our warfare, cutting them off smoothly and rapidly just below the surface. Our progress in the busines was very good in these two cold days. The improved look of the meadow was an ample compensation. We have no doubt we made better progress in our studies that winter for the triumphs of this two days' labor. But this was but the beginning of the end in this business. The removal of the willows revealed old logs and stumps ; and there must be drains cut to take off the water that had fed the willows. So it was concluded to fence off that end of the meadow for pasturing, while this operation was going on.

The result was this: The bushes were cut so low, that the first thaw covered their stumps with water, which froze firmly over them. Whether they drank too much in this drowning process, we shall not presume to say. This we know, however, that the subsequent growth was a very feeble one, and the browsing of the animals pastured there, completed the work of destruction so effectually, that on restoring the old swamp to the meadow, it was as destitute of willows as the desert of Sahara.

We have another piece of swamp, on which much earth has been carried by artificial means, and which in the year 1859 had become a tangled mass of willows and alders. In January of 1860, we cleared off a portion of this swamp by cutting the crop in the same way as before, just below the surface, when the ground was frozen. Two season's of growth have passed since then, and the new sprouts have but a very feeble show. Another cutting, which can be effected in a very short time, would probably eradicate the bushes entirely.

Now we do not claim that we have taken the best time to cut our bushes. We state when we did it, how we did it, and the result, leaving it for the intelligent agricultural world to draw their own inferences. We think, however, that in the winter, if frost favors the object, and there is no snow to obstruct, it is the best time for us, for then it will not interfere with the ordinary duties of farming, and labor is cheaper. Then the bushes being firmly frozen in, every blow of the axe will tell, and there is no mud to annoy the operator. We have some belief that the freezing and thawing over the stumps, and the water that settles over them in spring, has something to do with drowning out these mischievous aquatic shrubs.

Delaware Grape.—Nearly all the observations made in different parts of the country, indicate the extreme hardiness of the Delaware, and that it escaped unhurt where other sorts were killed.

CULTIVATION OF CURRANTS.

We can hardly apply the word "cultivation" to the treatment which currants generally receive in this country. The plant is so hardy, propagates so readily, and bears so profusely, that currant bushes are commonly left to take care of themselves.

We believe the time is coming when currants will pay for more careful cultivation. The great objection to our present method is, that the eyes are not removed from the young cuttings, and the consequence is, that the bushes throw up numerous suckers from the ground. This may be easily prevented by removing all the eyes from the cuttings except the upper one. Instead of a bush with suckers springing from the ground, we should then have a one-legged bush, resembling a miniature tree.

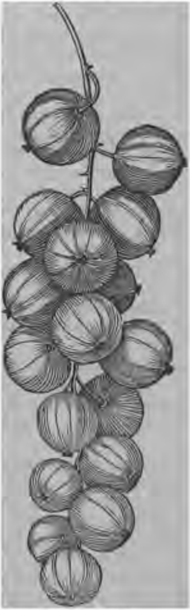
This system is universally adopted in Europe. It has many advantages. The ground can be easily kept clean and mellow, and the bushes more readily pruned; and last, though not least, the gooseberry-sawfly, which has of late years proved so injurious to the foliage of the gooseberry and currant, can be destroyed.

These caterpillars are hatched from eggs deposited by the fly on the under side of the leaves. A sharp jar on the stem of the bush will shake them off, and if some tar is placed round the stem, it will prevent their crawling up again, and they will perish. If thoroughly done, this remedy is quite effectual.

Another mode of training the young plant is the pyramidal form; the cuttings should be prepared as previously described, and a strong, vigorous shoot secured the first year; early in the following spring cut back two thirds of the shoot, and strong side branches will be produced; one shoot only should be allowed to grow upright, which will afterwards furnish more side branches—the side branches during summer must be pinched in and be made to give the plant a pyramidal shape. Attention to pruning will in due time give the desired form.

The proper distance for planting currants is from three to four feet, when grown in bush form or on one leg, but as pyramids, they require six feet.

The time of ripening the fruit may be much accelerated or retarded by the situation of the plants. On the south side of a tight fence they will ripen a week or ten days earlier than when remote from any shelter. On the north side of a fence the fruit will be greatly retarded in its ripening, and will hang long on the stems after maturity. By atten-



La Versaillaise.

Fertile d' Angers.

tion to these points in planting, if it is desired to have the fruit for a long season, it may be in use at least four months.

Although the currant lives and produces fruit in the worst soils and in a state of utter neglect, yet no fruit will quicker exhibit the effects of good soil and cultivation; in a well conducted garden the currant grows thriftily and bears abundant crops of fruit.

To keep the plants in a vigorous condition and insure the largest crops, an annual top-dressing, of well rotted stable manure, is necessary, applied in the fall, and forked in in the spring.

The annual pruning which the currant requires after the tree is properly formed, is only such as is necessary to thin out shoots that are growing too thickly together, and to keep the plant in proper form.

The fruit is borne on short spurs, on wood two years old and over.

With the black currant, however, the fruit is borne on wood of the previous year's growth, and the system of pruning, applied to it, must be one that has for its object a constant supply of young wood, and the destruction of that which has borne.


Hative de Berlin.

The uses of the currant are numerous, and so well known that they scarce need be mentioned; no fruit is more healthy or more generally liked in its fresh state, and for jellies it is prized by house-keepers more highly than any other sort; by bottling in the method now so common, it can be preserved fresh the whole year; and for wine, both the red and the black varieties are next to the grape in value.

The cultivation of the black currant especially on a large scale, for wine, we would recommend without hesitation, as a profitable branch of enterprise.

Of varieties, the *White Dutch* and the *Red Dutch* are too well known to need a description. They have long held and still maintain a high reputation.

White Grape.—The bunches and berries are somewhat larger than those of the *White Dutch*, but in other respects has no advantages.

Red Grape.—Bunches and berries very large; a little more acid than *Red Dutch*. It is very productive.

Victoria.—This sort, which attracted so much attention a few years ago, has become generally known, and is a popular variety. Berries are of large size, bright red, and the bunches are very long. It is a great bearer, and the fruit hangs several weeks longer on the bushes than most other sorts.

CHERRY.— Of all the red currants, this is the most popular, on account of its extremely large size and great productiveness.

Among the new sorts lately introduced into this country, but which have not yet been thoroughly tested, are the following:

LA VERSAILLAISE.— Bunches very long and berries large, of a bright red color, very handsome. Promises to prove a valuable sort.

FERTILE D' ANGERS.— Bunches medium size, berries large, bright red, very productive.

HATIVE DE BERLIN.— Bunches medium size, berries large, bright red color, early and productive.

The specimens from which we took the engravings here represented, were probably not as fine as we may expect to procure another season, on older plants.

Of the black currants, we would recommend the *Black Naples* as superior to all others of its class.

KILLING INSECTS, GRUBS, &c.

THE *Country Gentleman*, under the head of "Hard Ways of Doing Things," makes the following sensible observations:

The cultivator of fruit should always bear in mind that the best way to get rid of destructive insects is to *kill* them. The various remedies, short of this course, are often more expensive or laborious than direct slaughter, and commonly inefficient at best. As an instance, we see the old remedy of tansy for the peach grub going the rounds of the papers again. This remedy may be efficient, yet while the owner of an orchard of a thousand peach trees is setting out a thousand tansy plants at the foot of his trees, and nursing and protecting them, to say nothing of the impediment they would constantly occasion to good cultivation, he might go over an orchard of ten thousand trees, and with the point of his knife destroy every grub in the bark, the external indication of which, by gum and sawdust, quickly enables him to know where to look. We know by experience that a single hand will effectually clear many hundred trees in this way in a single day; and a repetition of the work two or three times a year will keep an orchard clear, where the insects are abundant. There are many other illustrations of the same principle, such, for example, as syringing young fruit trees with lime, tobacco, etc., to repel the curculio, the labor of such repeated application being generally greater than that of killing the insect by the jarring and pinching system. There are a few instances where insects may be destroyed by wholesale, as for instance, the aphis by soap-suds, and the currant worm by dry caustic lime; but there are also many others where it would be more profitable to hire a man to pick worms and bugs by the day, with his thumb and finger, than attempt to frighten them away by outside influences, whether it is scare-crows for birds, miasms for mosquitoes, or pellets of soft grass for pilfering boys. An active man or boy will capture singly 20 insects a minute, when they numerously infest shrubs and bushes, which is 1200 an hour, or 12,000 a day, and is more efficient than offensive nostrums, that often do more harm to vegetable growth than to thick-skinned worms and hard-shelled beetles. Where insects may be shaken into vessels of hot water by wholesale, such a mode is, of course, to be preferred. We have nearly always found direct attack the best way, and very few days' work in the aggregate will keep most gardens clear of them.

MANAGEMENT OF BARN-YARD MANURE.

In the *Rural Annual and Horticultural Directory* for 1858, we gave a carefully written treatise on "Manures for the Garden and Orchard." We need add little to the remarks then made — but, farmers need "line upon line" on the subject of the barn-yard, and we would again urge them to study the principles involved in the preservation of the fertilizing ingredients of the manure heap.

Whatever system is adopted in the management of manure, the three principal objects should be, (1) to preserve all the liquids, (2) to prevent leaching, and (3) to avoid too rapid fermentation.

In cold weather, fermentation proceeds so slowly that we need apprehend little loss from this cause. Our principal danger is from the soluble and more valuable portions of the manure being leached out by heavy rains in the fall and spring, and, in some sections, during the winter months. We suffer more from this than from all other causes combined.

In New England, where straw is scarce, manure cellars under the barns and stables are common. The liquid and solid excrements are dropped through trap-doors into the cellar beneath. It is necessary in this case to provide peat or muck to absorb the liquid and to retain the ammonia and other gases, which would otherwise escape and penetrate through the floors to the upper portions of the barn, to the injury of the animals, and the detriment of the hay and fodder stored above. When properly managed, however, there can be no doubt that a good manure cellar affords the means of preserving the manure with little or no loss. It is always under cover, and there need be no loss from leaching.

In this section, however, and throughout the Western States and Upper Canada, where straw for litter is usually abundant, we think manure cellars in most cases are unnecessary. By spouting all the buildings and sheds, the manure heap can be so managed that it will absorb nearly or quite all the rain that falls upon it, as well as the liquids from the cattle and horse stables. The main point is to mix the manures of the different animals. Horse and sheep dung ferment rapidly, while that from the hog and cow are cold and sluggish. Instead, therefore, of letting the horse manure lie in a heap by the stable door, it should be mixed with the hog or cow manure. Again, the litter or straw should be evenly distributed. It often happens that there is a straw stack in the barn-yard, and immediately around the stack there is a large mound of wet, refuse straw, which of itself would hardly ferment at all, and which, if it did, would make manure of little value. This should be spread about the yard, thereby adding to the comfort of the animal and the value of the manure heap.

We could wish that every barn-yard had a tank in which the liquids could be preserved when in excess, and from which they could be pumped back when the manure became too dry. We are satisfied that such a tank would *pay* for itself in a year on an averaged sized farm. Into this tank we would throw a few bushels of plaster (sulphate of lime). This, *in solution*, would fix all the ammonia, not only in the liquid itself, but also in the manure heap when it was pumped on to it.

To carry out the method we have advocated, it is necessary to have a good wheel-barrow. Without it we have found that the short portions of the manure are left near the stable doors, while the more littery portions are drawn or thrown to a greater distance. A few planks laid on the heap would greatly lessen the labor of wheeling.

When manure is thrown into a loose heap it is apt to ferment rapidly, and in some instances to "fire-fang." When this is the case there can be do doubt that there is a great loss of ammonia. To avoid this, we need compression and more moisture. If we have a tank, the latter is easily supplied, and when the manures are distributed evenly over the yard, the cattle will tread it down sufficiently solid to prevent all injurious fermentation.

A few store hogs should always be allowed access to the barn-yard. They will pick up much that would otherwise be wasted, and they will materiilly assist in mixing the manure, though they necessitate a little more care in leveling the heap.

It should never be forgotten that the value of the manure depends on the food consumed by the animals. However well we manage the manure heap, the manure will be of comparatively little value if the animals are fed on nothing but straw. We must have rich food before we can have rich manure.

Few farmers ever seriously sit down to think how they can make manure. They feed their horses, cattle, sheep, and hogs, a certain quantity of hay, straw, stalks, and grain. A portion of this they know is retained in the animal, or is dissipated into the air with the breath, and the remainder is ejected from the body, mixed with more or less water. This we call manure. Put on the land, it increases the crops. So much is known. But what more is generally known?—What is manure? What is its value? Ask the first farmer you meet, and see if he has ever given the subject any serious consideration. Ask him if he plows under a ton of straw, if that is good manure, and he will tell you it is not worth much. Ask him if he feeds that ton of straw to cattle, if it is good manure then, and he will probably answer yes. *But it is not.* It is as much straw in the one case as in the other. If the original straw was worth very little as manure, it is certainly worth no more after it has been passed through the body of an animal. The animal *adds* nothing to it. It may be in a better condition to apply to the land, but it contains no more plant-food; in fact, it does not contain quite as much, for the animal has abstracted some portion of the food, although it is true the greater portion of that which is removed has not much manurial value.

The vender of a patent apparatus for steaming food, recently told us that the increased value of the manure would of itself pay all the expenses of steaming hay, straw, corn-stalks, etc. The poor man was evidently in earnest, but we could not help laughing at him. We tried to explain that if the food did not contain the requisite elements to make good manure, all the cooking in the world would not develop them. If a ton of straw or corn-stalks contain only five pounds of nirogen, the manure made from it can contain no more. We told him he might rot it, cook it, digest it, or do what he pleased with it, and he would have only the five pounds of nitrogen. He could not make rich manure by steaming food that does not contain the requisite elements. "You cannot make a whistle out of a pig's tail." "Yes, I can," he replied, "for a woman in our town has done it!" and he left, thinking that he had decidedly the best of the argument.

What we wish to urge upon the consideration of our readers is this: to make rich manure you must feed rich food. The manure made from three bushels of peas, is worth more than that made from a ton of straw. One ton of clover hay will make manure worth as much as that made from four tons of straw or stalks.

We must not be understood as underrating the importance of straw on the farm. It is a valuable article, indispensable to the successful and economical management of cattle or sheep. But do not suppose that straw or stalks *alone* will make good manure. John Johnston, whose successful practice we have so often referred to, is careful to preserve his straw, and have his yards well littered with it. But he feeds out large quantities of grain, oil-cake, clover hay, etc., and in this makes rich manure. "What had you for dinner to day?" asked Pat. "Beef and potatoes," replied his friend. "Faith," said he, "an' that was just what I had, barring the beef." Many farmers are just as careful to preserve their straw as John Johnston, and their manure heap is just as good as his, barring the nitrogen or ammonia of the oil cake, corn and clover hay.

"What grains make the richest manure?" Beans and peas make richer manure than any other plants we grow. Corn, barley, oats and wheat, about half as good. Clover hay next, but not far behind.— Then ordinary hay, which is quite inferior to clover hay, and then straw, stalks, etc. Pea and bean straw make rich manure — one ton is worth three or four tons of ordinary straw for this purpose. If oats are cut before they are ripe, the straw then contains a considerble quantity of nitrogen. There is no better or cheaper fodder for horses than such oats, when well cured and cut up into chaff, and a little mill-feed mixed with it. Such feed, too, will make rich manure. A still better plan is to sow half a bushel of peas in with two bushels of oats per acre; cut this all up together, and it makes excellent fodder and rich manure.

Having got the manure save it. How is this best done? Some say, draw it out and spread it on the grass land as fast as it is made. Some are careful to preserve it in cellars; and others erect sheds. The great majority of farmers, however, keep it in open yards. This is the least trouble, and if the yards are properly constructed,— the buildings all spouted, etc., it can be preserved in this way without loss.

GERMINATION—SOAKING SEEDS, &c.

Germination is the first act of vitality in plants; it is the first great change which converts the dormant embryo of the seed into an active, growing body. Three things are necessary for this change: the presence of moisture, atmospheric air, and a certain elevation of temperature. The absorption of moisture softens the integument of the seed; warmth quickens the embryo into vitality, and the air supplies the oxygen whereby the starch, sugar, etc., of the seed are converted into carbonic acid for the use of the young plant. In this case, as in all others, the conversion of the carbon of the seed into carbonic acid eliminates heat — and *force*.

To most land plants, water in a fluid state is injurious, if not fatal. Seeds of our common plants germinated under water almost invariably die and rot. We want a moist, but not a wet soil.

Exposure to light is generally regarded as injurious to germinating seeds; and it is a common opinion that they are covered as much with a view to keeping them in darkness, as for any other reason. "But, experiments," says Dr. Lindley, "by no means confirm these statements; on the contrary, if seeds are deposited upon damp soil, and then covered with a plate of glass, closely pressed down upon them, they germinate as well as if in darkness, though perhaps not so quickly." The covering of seeds with earth is, therefore, to be regarded rather as a method of preserving around them the necessary moisture, than as a means of guarding them against light. In early spring, when the ground is moist, a very slight covering is sufficient for this purpose, and in the case of sowing grass and clover seeds on winter wheat in the spring, the leaves of the wheat plant afford, probably, sufficient covering. While, therefore, we think wheat may be sometimes harrowed in the spring with advantage,—breaking the crust of the soil, killing weeds, etc.—yet so far as covering the seeds is concerned, it is seldom necessary. One thing is certain, there is more of such seed lost from covering too deeply, than from not covering at all.

The temperature at which air and moisture act on the vitality of the germ in seed varies extremely. The only fixed rule is, that it must be somewhere between 32° and 100°. Below 32° (the freezing point), none will germinate; above 100°, if that temperature is prolonged, all perish. It is true, that seeds with very hard coats have been plunged for a short time into boiling hot water, without injury; but in this case, they were not allowed to remain a sufficient length of time for the heat to reach the germ, otherwise it would have perished. With the exception of Indian corn and tobacco, which require higher temperature, our ordinary agricultural crops germinate freely at 40° to 50°. As a general rule, it may be said that all seeds will germinate more readily in a temperature above what they are accustomed to than below it.

Connected with the act of germination is the practice of seed-steeping, with a view to future influence upon a crop. On this subject, we remarked in the *Genesee Farmer* for May, 1860: "Soaking old, dry seeds in a solution of chloride of lime, is said to facilitate the softening of the husk, and thus render germination easier. This is probably true; but that the small quantity of *any* ingredient that seed can absorb will materially help its after growth, is inconsistent with all our ideas of the nourishment and growth of plants. In the majority of experiments that have been made on this subject, it is quite probable that the result would have been just as good if the seed had been simply soaked in water alone for twenty-four or forty-eight hours." We find that this opinion is confirmed by Dr. LINDLEY, who remarks as follows:

"It is alleged that, by the use of certain solutions, in which seeds are to be steeped before being sown, the same effect is producible on a crop as by employing heavy dressings of manure. But there does not appear to be the smallest grounds for these assertions; *steeps all fail in the presence of careful experiment*, and it is certain that, when they seem to have been attended with advantage, the result has been owing, not to the steeps, but to some unexplained peculiarity in the soil. The only exception to this is in the cases where bony or very hard seeds, like beet, are soaked in warm water before being sown. In such instances, steeping is useful, because the swelling of the seed is promoted enough to secure the bursting of the tough integuments that enclose the embryo; but beyond this point, steeping should never be carried; and when even this is practiced, it is indispensable that the seed should be immediately committed to the ground while wet. Otherwise, the act of germination will be arrested by dryness; and once arrested, it can never be restored."

In some experiments we made last year, (1862) with various manures on sorghum, plaster was found to have a most astonishing effect, increasing the yield nearly seven-fold. The plot without manure produced 1 ton 12 cwt. per acre; while the plot dressed with 250 lbs. of plaster produced over 11 tons per acre! We think this remarkable result was owing to the plaster giving the plants an early start, enabling them to throw out roots into the soil, where they were able to find and take up all the food they required. And it may be that there are plants which would be greatly benefitted by soaking the seeds in some chemical solution; not so much for supplying an actual constituent of the plant, but for enabling it to throw out roots with vigor; though it is more probable that a little plaster or superphosphate, applied in immediate contact with the seed, would be more beneficial.

THE TURNIP FLY.—The following method of preparing turnip seed, has been adopted in England for ten or a dozen years, for preventing the ravages of the turnip fly: To a gallon of chamber lye add two ounces of assafœtida. Soak the seed in the mixture for 24 hours, and *dry in the shade.* If dried in the sun the assafœtida evaporates. This remedy is said to be entirely effectual.

Another English remedy, is to take one bushel of fine wood ashes; one bushel of fresh lime from the kiln; 6 lbs. of sulphur; 10 lbs. of soot well mixed together, and got to as fine a powder as possible, so that it may adhere to the young plant. This is sufficient for two acres when drilled at 27 inches, to be applied early in the morning when the dew is on the leaf, with a broadcast machine or sprinkled with the hand carefully over the rows. If the fly continues troublesome, the process should be repeated, always when the plant is damp.

Another receipt, is to take 14 lbs. of sulphur; one bushel of fresh lime; two bushels of road scrapings, or a substance of mould where road scrapings cannot be obtained, per acre, mix together a few days before it is used, applied very early in the morning, or late at night, in the same manner as directed in the above, using the horse hoe immediately after.

TRANSPLANTING EVERGREENS.—A good time to transplant Evergreens is when the buds are swelling in the spring, before they have commenced growth; they may also be successfully transplanted after they have made their first growth, and are in a dormant state—which is usually from the latter part of June to the middle of July.

We would recommend for general planting, American Arbor Vitæ, Siberian Arbor Vitæ, Red Cedar, Austrian Pine, White Pine, Scotch Pine, Balsam Fir, Norway Spruce, Common spruce.

THE FUCHSIA, OR LADIES' EAR DROP.

THERE are few flowering plants more graceful and beautiful than the *Fuchsia*. Unfortunately, it is not sufficiently hardy to stand the rigors of our northern winters; but as a green-house plant, and also

for bedding out in summer, it merits a place in the smallest collections.

For bedding out in the open air, it has one great advantage: It is injured less by shade than almost any other flowering plant. As soon as the weather becomes settted in the spring, the young plants may be turned out from the pots, without disturbing the roots, and set out in a warm, light, well-drained soil. They will flower until cut down by frost in the fall.

In the green-house, they are best trained in the pyramidal form, as shown in the following engraving: In the fall take cuttings from the old plants, previous to throwing them away, and plant into well drained, small sized pots, filled with sand and loam, and place them in a close frame until rooted, when they should be potted off separately in No. 1

pots, and kept in that size pots until side shoots make their appearance, when they may be shifted into a size larger pot, with loose, rich earth—rich it must be, as the object is to have a very strong and rapid growth.

They must be frequently shifted into larger pots, until the eleven-inch size is attained. The side branches to be pinched again and again, until we have a compact, bushy plant, when they may be suffered to grow and flower at random. Nothing can be more elegant and beautiful.

GRAFTING OLD GRAPE VINES.

S. MILLER, the well known grape grower of Pennsylvania, gives the following description of his method of grafting the grape:

As early in the spring as the ground can be got away from the stock to be grafted upon, clean away around the stem two or three inches deep, saw or cut off the vine smooth; then prepare your graft, (which should have been cut from the vine in the early part of the winter,) as shown in figure 1.

If your stock is thick, say one inch or more in diameter, cut out a wedge, see fig. 2, to correspond with the wedge on the graft figure 1; if the stock be less than three-fourths of an inch in diameter, then merely split down clean, as in the usual way of cleft grafting, but if the graft be not held firmly, it is well to tie around the spilt with a bit of matting or strong thread, which will rot off before doing any damage. When you have inserted the graft, draw the earth in and press firmly around the joint where operated upon, and up to and barely exposing the bud, filling in with dry mould if the earth be wet. Use no cement whatever; I believe it is a great evil.

Fig. 1.

Fig. 2.

Be sure to cover your graft with straw or some kind of rubbish that will not pack tight; this is to keep the frost from hoisting out the graft, in case freezing occurs afterwards, which frequently is the case, as I have grafted in February sometimes, as well as to shade the bud and keep the air off somewhat — a necessary precaution. When the graft begins to grow, the natural or stock suckers must be kept down or they will rob the graft. I have usually succeeded in this way with about 80 per cent., while I hear universal complaints of failure. For root grafting in the house, my best success has been obtained when done in the saddle mode; and this done late in the spring when the vines begin to grow.

One important part has also been overlooked. You must select stocks of near similar wood; for instance, Delaware will hardly take at all on a rank fox, while upon Clinton and our wild frost grape it takes very freely. Almost any kind will take upon Isabella.

F. A. BALLER, an experienced horticulturist of this city, furnishes us with the following remarks on grafting old Isabella, Catawba, or Clinton grape vines, with new sorts, such as Delaware, Rebecca, Diana, Creveling, Hartford Prolific, etc.

By the plan proposed, half a dozen varieties can be grafted on a large, old vine, or renew it entirely, without materially injuring the crop of fruit the same season:

"In the first place, select good, sound wood, of the previous year's growth, of the kind desired, before the sap is in motion; lay them by in a cool, damp place, till you perceive the buds beginning to swell on the vine to be grafted. Then take one pound of rosin, one fourth pound of tallow, and one-fourth pound of beeswax, and melt in an earthen or tin vessel; next take strips of strong factory, nearly an inch wide, for tying. This done, take your knife, which should be very sharp for the operation, and make a cut downwards, about half an inch below the bud intended to be used, and half way through; next, enter the blade of the knife half an inch above the bud and bring it down back of the bud till it forms a junction with the first cut. [*See engravings, Fig.* 2.]


Fig. 1.
Stock.


Fig. 2.
Bud.


Fig. 3.
Bud in place previous to being wound.

"Then select a smooth place on the vine that you intend to operate upon, and adopt precisely the same plan on the stock as you have previously done on the scion, by removing a piece of bark and wood corresponding in size to the bud you intend to insert. Be careful not to cut out too large a piece at first, as you can easily enlarge the cut if found necessary. If the cut should be a little too wide for the bud, as is often the case, be careful to fit one side evenly, as the junction of the liber or inner bark of stock and scion is of the highest importance. Next take two strands of copper wire, of sufficient length to go around and fasten; place one around the lower extremity of the bud where the lip of the stock covers it, and secure it on the side opposite the bud; this done, secure the upper part of the bud in the same way. Then take a strip of the prepared factory, and dip into the composition, which should be about blood heat, and wind the bud, taking care not to cover it, yet at the same time render it perfectly air and water tight. To complete the job, dip the finger or a piece of rag in the composition, and fill up any spaces that be may left on the stem of the vine, either above or below the wrapping. It will be necessary to put another strand of wire around the vine, above the bud, to arrest the upward flow of the sap; or what is perhaps better, bend the vine over till the bud has started a few inches; when it has two or more leaves, it has become in a measure self-supporting, and the wrapping and wire can then be taken off, and the vine tied up in its place.

If the graft or grafts are thought of more consequence than the crop of fruit, the head or top of the vine can be reduced at intervals through the summer, as the grafts gain strength, which will help them very materially.

"Of the success of this plan of grafting, I can speak in the fullest confidence. Scarcely one in fifty will fail if the above directions are faithfully carried out. If any grafts should fail, inserted in this way, it will be no detriment at all to the vine, which is one great advantage this plan has over cleft grafting. It is a surer way of grafting, because the tendency of the sap being to the upper branches, by this mode it can be checked and forced into this particular bud. This plan is very useful in vineries where the stems have become naked of fruiting spurs. By careful and good management, canes can be obtained in one season from twelve to twenty feet in length, and of proportionate strength.

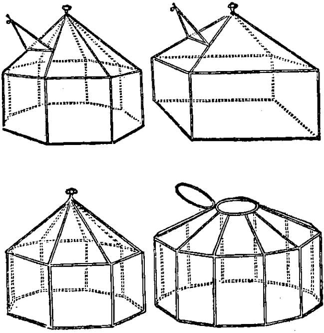
Dwarf Apples.—The apple is dwarfed by grafting or budding on two distinct species of dwarf apples, that are procured from France—the *Paradise* and the *Doucain.*

The Doucain is a small or medium sized tree, and is used for trees that are to be trained in the pyramidal form, or as half-standards.

The Paradise is only a shrub, growing from three to four feet high, and is the stock now in most general use for dwarfing the apple.

PROPAGATING PLANTS FROM CUTTINGS.

Propagation from cuttings is largely practiced, and nearly all kinds of plants and many trees can be multiplied in this way. Currants, gooseberries and quinces, among fruits, can be grown thus, while roses, geraniums, verbenas, petunias, and other showy denizens of our gardens, are grown in the same manner. The fruits above mentioned are grown from cuttings of the last year's wood, but all the other plants in the list, together with numerous other kinds not named, are grown from the wood of the present season's growth, as soon as it has become hard or ripe enough. The ordinary method pursued is to plant the cuttings in a hot-bed, or in the propagating house, in good bottom heat; this causes them to root very freely. They are previously prepared by being cut down to a bud at the bottom, and the lower leaves taken off, then carefully planted in a suitable compost, which is covered with about one inch of clear sand, and carefully watered to prevent them damping off. But cuttings prepared as above can be grown successfully in the open ground, if they are properly planted and protected from the heat of the sun or cold rains.



This can be done in many ways, but the best and most simple method is by means of hand-glasses, made as indicated by the annexed cut: These are generally made of lead or zinc, and may be glazed with common glass, but those done with Hartley's corrugated plate glass are much superior, as the sun will not burn thro' them. Sometimes the whole top is made to be movable, but these are inconvenient to lift, and those made as here illustrated, with about one pane movable, are much superior. Under these, with ordinary care, cuttings will root quickly, and but a small percentage need be lost.—They are useful for covering young seedlings, and also for the protection of tender plants when first put out, or during cold or wet weather. As they are not very expensive, almost any amateur can afford to keep a few of them, and any experienced mechanic can make them from the designs here shown. They may be square, six or eight sided, as fancy may suggest. They are in general use in most English gardens, and would be particularly useful during our changeable spring months, when protection from the vicissitudes of the climate for tender plants, is so much needed.

HELIOTROPES AND THEIR CULTURE.

THESE are very important adjuncts of the plant-house in winter; indeed, indispensable. The best kinds for winter work are, *Paniculatum*, *Beauty of the Boudoir*, *Souvenir de Leige*, and *Gem*. For winter blossoming, these are valuable, and their culture very simple.

They should be propagated annually, by cuttings taken in August, and put into equal parts sand and loam, and placed in a spent cucumber frame, and kept close and shaded until they strike root, and then gradually hardened off. When frost makes its appearance, they should be taken in doors, and placed in the coolest part of the green-house until February, when they may be potted off into No. 1 pots, the strongest plants selected for next winter's blooming, and the others kept for the flower garden in the summer. (*Gem* makes the best bedder.) Plants for next winter's blooming, should receive high culture in the green-house or frame.

In order to render them bushy, they must be frequently pinched; and this pinching may be continued up to the end of June, when they may be allowed to form heads for blossoming. They may be flowered in seven-inch pots in perfection, although it is very convenient to have a lot in five-inch pots also.

By the first of June they should be placed out of doors, in a very sunny situation, as they abhor shade; and all they require during the summer is regular watering.

Those intended to be grown as standards, should have their strongest stems selected and tied to a stake, and all the eyes pinched out, until the desired hight is reached, and then the top may be pinched off, and four or five eyes allowed to grow at the top. When they are five inches long, they should be pinched as directed for the others. The accompanying engraving shows one grown in this way. *Paniculatum* is the best for this mode of growing, and likewise for covering the back walls of green-houses. Few plants are more fragrant or beautiful.

For compost to grow them, nothing is so good as a plain, strong loam. This, with sound drainage, will be found to grow them shorter jointed, and more compact, and will enable them to withstand an hour

Heliotropium Paniculatum.

or two of drought without suffering. In all their stages they require full exposure to sunshine, and when approaching the blooming condition, simply a cool and airy situation in the house.

AN ECONOMICAL ICE HOUSE.

SELECT a spot, if possible, under trees and upon the base of an abrupt slope, which should be approachable, so that the load may be tipped from the level above. The level essential for the house should be made by picking out the bank, or built up with waste stones, which is much better, as a water drain can be easily formed from the center of the ice through the stones.

The great point in keeping ice, is to protect it from damp, and from the too direct action of the air, which both from the moisture and heat that it contains, prevents its preservation. Straw answers this purpose better than anything else, and the best method of forming a wall of it two feet thick, is the best way of making an ice house.

Four posts should be sunk perpendicularly into the ground, at equal distances, so as to form the space required, and to support the thatched roof. Boards should be nailed on these posts parallel to each other, and five or six inches apart. Two feet from this a similar wall should be made, and between these the straw should be placed, and behind this any rough protection can be made, which will keep the straw from rotting. In putting on the roof, which should be a thatch, it must be placed about a foot above this straw wall, to admit of a draught passing right over the mass. The ice should be laid in blocks, one layer after another, and with each one put in a barrowful of crushed ice, to cement the whole together.

If possible, after the first thaw, the place should, if the weather proves frosty, be thrown right open; when the weather again changes effectively, cover with at least two feet of straw, the best of wheat straw, being placed immediately upon the ice. In a house made in this way ice has kept more than two years, and one of the summers was very hot.

The best position for this house, is a north aspect, not too much shaded, and where the wind is not very strong, as wind is as destructive to ice as sun.

ORNAMENTAL FENCES.—The *Horticulturist* suggests that the Virginia Creeper (*ampelopsis hederacea*), a beautiful trailing plant, of hardy, rapid growing habits, should be planted by fence sides so as to run up over them, thereby giving old stump and other fences, a most picturesque and charming appearance. As a creeper, nothing is more beautiful.

HOW TO INCREASE THE SIZE OF FRUIT.

PROF. DEBREUIL, in an article in the *Journal de l' Academie d' Horticulture de Gand*, points out some of the principal operations, whereby the size of fruits may be increased:

1. Grafting the trees on a weak species of stock — for instance, the pear on the quince.

2. Pruning, so as to deprive the tree of a certain portion of its shoots. By this means, the sap which would have been absorbed by the parts cut off, goes to increase the size of the fruit. Summer pruning, which has for its object the removal of a large number of shoots by disbudding and pinching, has the same effect.

3. Let the bearing shoots be as short as possible, and in immediate connection with the main branches. Fruit growing on the stem is always larger than that situated at the extremities of long, slender branches.

4. Thinning out the fruit when too numerous.

5. Shortening the principal branches, at the winter pruning; and checking, in the summer, the vigorous shoots.

6. Supporting the fruits, so that their weight may not become a strain upon the footstalk.

7. Moistening the fruit with a solution of sulphate of iron (copperas.) One of Prof. D.'s pupils, by moistening an Easter Beurre pear, from the time it was fairly set, once a fortnight, obtained a fruit so large that it could scarcely be recognized.

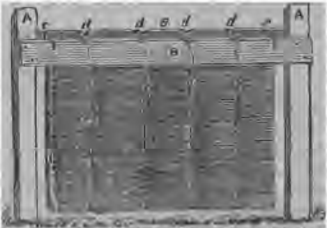
8. Moderating the amount of evaporation from the fruit. Fruits covered by leaves are larger than those on the same tree not shaded. It is necessary, however, in order that shading may not affect the quality of the fruit, to expose it when full grown to the direct action of the sun. To diminished evaporation must be attributed the considerable increase of size which always takes place in fruit introduced into bottles soon after it is set. The mouth of the bottle being closed after the portion of the branch with the young fruit is introduced, the latter is secluded from the dry action of the air, and is constantly surrounded with a moist, warm atmosphere, which keeps the epidermis pliable, and stimulates the growth of the tissues.

9. Ringing the shoot or branch immediately below the flowers. This should be done when the flowers are opening; the longer it is delayed after this period, the less is the effect produced. The incision should penetrate to the wood, and the ring of bark removed should have a width equal to half the diameter of the shoot. The width, however, should not exceed one-fifth of an inch, otherwise the wood will not close up.

10. Inserting on vigorous trees fruit buds, with a portion of wood attached. A tree which, in consequence of excessive vigor, has never produced blossom buds, may by this means be made to produce fruit of large size, from the abundant supply of sap which the inserted blossom buds will receive. But it will be necessary to pinch the shoots of the tree in summer, which would otherwise absorb the larger portion of the sap, to the injury of the fruit.

TO MAKE STRAW MATS.

Straw Mats are often made for covering the hot-beds or cold frames instead of bast-mats, and are found to be much better and cheaper.—They can be made in the following manner:—Drive two posts (*A*, *A*)



into the ground, eight or ten feet apart; the posts should be an inch and a half to two inches wide. To these posts nail two boards, (*B*, *B*), one on each side, so as to leave a space between them one and a half to two inches wide. Near each end of the boards, inside the posts, cut a deep straight notch (*c*, *c*), to allow of cutting the straw off straight at the ends. Notches (*d d*, *d d*) should be cut at intervals of about nine inches on the boards, say one inch deep, to keep the cords in their places. Tarred rope is best. Lay the straw on the cords between the boards in handfuls, and tie them with a single tie, reversing the strings; then put on another handful and proceed as before, till the mat is made of the length desired. The last course should be tied with a double tie.

CULTIVATION OF RASPBERRIES.

From the *London Journal of Horticulture and Cottage Gardener*, we take the substance of the following article, making such alterations as the difference in the climates render necessary. There is no fruit so easily cultivated and none more delicious, and as the varieties which bear transportation, and consequently are found in the greatest abundance in the markets, are not really the best, those who have any land at all, will find decided advantage in gathering berries from their own vines. Unlike strawberries, they will grow year after year in the same spot, without any deterioration in the quality of the fruit.

Situation.—The position of a plantation of raspberries, should be one fully exposed to the sun, but at the same time sheltered from high winds. If this cannot be had, they will grow and bear a light crop under the shade of trees. The berries will ripen later, but will be as highly flavored as in a better place.

Soil.—The best soil for them is a deep, sound loam, on a clay sub-soil; but if the soil is a good loam from a foot to eighteen inches deep, the kind of sub-soil is not so important. A good dressing of rotten manure should be added.

Planting.—Choose the strongest young suckers you can get, and also from a healthy stock. They require but little care in transplanting. They will take root and grow almost immediately, and even if the weather is rather dry, they will not require watering. Plant three or four together in a hill. Place them in rows six feet apart, and five feet from hill to hill in the rows. Let the hills stand exactly opposite to each other, for a reason which will be given under the head of "Training." Then tie the canes together loosely, to prevent them from rubbing against each other with the wind, and place a mulching of short dung around every hill.

As to the time of planting, the English recommend November. In this country the spring is generally preferred. We have set out the young suckers in July and August, four in a hill, with excellent success. If you get plants from a distant nursery, the spring time is best; but if you can get young suckers from your own vines, we should prefer to set them out in the summer, as you get fruit a year earlier.

Winter Treatment.—In our climate, the winters are so variable that it is necessary to lay them down, and cover them lightly with earth, or with a mulch, to protect them from the frost. The first season they will not require pruning.

TRAINING.—The arching system is the best method. The hills being planted directly opposite each other and five feet apart, the shoots ready for bearing, are in the spring, after pruning by cutting them to two and a half feet, bent down and tied to two stakes, as represented in Fig. 1, A. A. Thus the shoots form arches right across the plot occupied with the raspberries. The space between the arches is left open

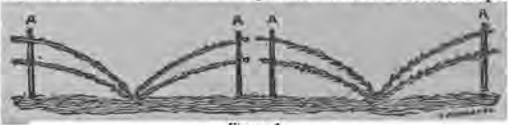


Figure 1.

for the growth of young shoots, made during the current year, to grow up in. In this way the fruit is easily gathered, and ripens well, as it has both air and light.

SUMMER TREATMENT.—The plants should be mulched with freshly cut grass, or anything that is conveniently procured, which will keep

Figure 2.

the ground clean and moist. Only four new canes should be allowed to grow from each plant, choice being made of the most vigorous, and those which are placed nearest to the original stock; the others are removed when about a foot high. The canes A. A., Fig. 2, which were pruned and tied down in the spring, bear fruit; and four new canes, B. B., are produced from each stock. As soon as they are through bearing, the canes, A. A., Fig. 2, are cut away, and only the new canes, B. B., are left.

SELECT LIST OF SUMMER RASPBERRIES.—Antwerp Red—Fair size, flavor excellent.

Antwerp Yellow—Sweeter than the Red, but rather smaller.

Antwerp Hudson River—Very large and solid, not as juicy as the others, but exceedingly sweet, and ripens a little later.

Brinckle's Orange—A fine berry, and a beautiful color, but rather acid.

Fastolf—Red, large and excellent.

CRACKING OF CHERRY TREES.

FROM the accumulated observations on this subject, there is every reason to believe that the disease is caused by the extremes of temperature, to which the bark of the trees is suddenly exposed; the bursting usually takes place on the southwest side, because it is when the sun is in this relative position to the tree, that it throws its most powerful rays, not only upon the trunk of the tree, but also upon the bright white snow at the base, which is again reflected back against the bark, making it to receive nearly double the amount of heat that it would get from direct radiation only.

This condition of things occurs frequently, and in mid-winter, when all parts of the tree are dormant, and contracted to their smallest compass by cold; the cells of the tree, unable to resist this repeated expansion and contraction, are ruptured, and in the spring, when the sap begins to flow, arriving at this point, and unable longer to pass in its usual channels or ducts, whose walls are torn open, forming here one great cell, it collects in a large quantity and oozes through the bark.

If this theory is correct, it would follow that a remedy would be found by shading the body of the tree during winter from the sun—as good a way as any other to do this, would perhaps be to bind straw about the trunk. Trees grown in the pyramidal style, or having their branches start out close to the ground, thereby shading the trunk, are now being planted to considerable extent in some parts of Canada and the Western States, by those who have had most experience with this troublesome evil. The general testimony is much in their favor.

Kilmarnock Willow.

A FEW ORNAMENTAL TREES.

In addition to the many trees described and figured in the previous numbers of the Rural Annual, we have now the pleasure of presenting drawings of a few more, that are eminently worthy of a place in our lawns and pleasure grounds.

The Kilmarnock Willow.—This new variety of willow proves perfectly hardy, and is destined to become one of our most popular drooping trees. The branches are exceedingly pendulous, and so close as to be entirely hid by the large glossy leaves. The accompanying engraving, which is taken from an actual specimen, will give a good idea of its form and habit of growth. It is undoubtedly one of the handsomest drooping trees in cultivation. It was discovered in a nursery of willows, at Kilmarnock, Scotland.

The Virginia Fringe Tree—(*Chionanthus Virginica*) is a small tree or large shrub, which though not new, is by no means as common as its merits warrant. It is a native of the Southern and Middle States, but is perfectly hardy at the North. It is of rather slow growth in dry situations, but thrives well in deep, rich and somewhat moist soil.—Its leaves are large and beautiful, resembling almost the Magnolia, while, in the language of Hovey, "its drooping panicles of snow white, fringe-like flowers, displayed in profusion from its blunt, erect shoots, give an elegance possessed by no other hardy shrub."

Virginia Fringe Tree.

Magnolia Tripetala.—No grounds are perfect without a Magnolia. Though we cannot in our northern climate have the finest of the species—the *Grandiflora*, with its magnificent foliage and delicious fragrance — yet we can have the *Magnolia acuminata*, or Umbrella tree, which is the next to it in size, specimens having been found in the forests of this State sixty to seventy feet in hight. This is perhaps too large a tree for most pleasure grounds, but the *Magnolia tripetala*, (three petaled Magnolia or Umbrella tree,) is open to no such objection. It is much smaller, and we think much more beautiful, both in foliage and flower. It rarely attains the hight of thirty or thirty-five feet, and

Magnolia Tripetala.

four to six inches in diameter. The only objection to it is that it sometimes grows irregular, and is inclined to throw out vigorous shoots near the ground, and thus divide up the tree. In such a case, the tree lacks that elegance of form which is so pleasing to the eye.

THE SIBERIAN PEA TREE — (*Caragana arborescens*) is one of the most beautiful of the smaller growing trees. According to LOUDON, it grows in Siberia, in woods on the banks of rivers, to a good sized tree, but in dry and exposed localities, it is little more than a shrub. It is one of the hardiest of trees. The wood is hard, compact and tough, with a yellowish bark. The flowers are pea-shaped, and of a bright yellow, and appear early in the spring, followed by slender pods.

Siberian Pea Tree.

THE EUROPEAN LINDEN — Is our favorite shade and ornamental tree. It is healthy, hardy, and handsome; a vigorous grower, very symmetrical and graceful in form, with large, rich foliage. The flowers are deliciously fragrant, and special favorites with the bees. Honey from bees having access to the Linden, is justly considered superior to any other. The American Basswood is a species of Linden, but is more robust, and less graceful and fragrant than the European Linden. Still we cannot but regret the wanton destruction of so many noble specimens of basswood or linden trees by the early settlers. To those who have any left, we commend the following extract from LANDOR'S CONVERSATIONS:—"Old trees in their living state, are the only things that money cannot command. Rivers leave their beds, run into cities, and traverse mountains for it; obelisks and arches, palaces and temples, ampitheatres and pyramids, rise up like exhalations at its bidding; even the free spirit of man, the only thing great on earth, couches and cowers in its presence; it passes away and vanishes before venerable trees. What a sweet odor is there! Whence comes it? Sweeter it appears to me and stronger, than the pine itself. I imagine, said he,

European Linden.

from the linden. Yes, certainly. O! Don Pepino, cried I, the French, who abhor whatever is old, and whatever is great, have spared it. The Austrians, who sell their fortunes and their armies; nay, sometimes their daughters, have not sold it. Must it fall? O, who upon earth could ever cut down a linden?"

SCAMPSTON WEEPING ELM.—This recently introduced Scotch variety of Weeping Elm is a most beautiful tree. Mr. SARGENT speaks of it in the highest terms. The droop of the branches is so formal and regular, that it is difficult to believe artificial means have not been resorted to.

Scampston Weeping Elm.

"When grafted as it should be, fifteen to twenty feet high, the branches make a curvilinear droop to the ground, with a growth so regular and symmetrical, as to give the whole tree the appearance of a gigantic arbor; regularly trained and trimmed, and by making an arched opening on one side, it can be well used for this purpose, the thick, umbrageous character of the leaves producing the most agreeable and dense shade." The above cut gives a good idea of the tree..

Cissus Discolor.

Cissus Discolor.—Of all the plants distinguished for their beautiful leaves, none are superior to the Cissus Discolor. Nothing in our green-houses attracts more attention. The size and shape of the leaves are shown in the annexed engraving, but no description can give any adequate idea of their rich color and gorgeous beauty.

It is a climbing plant, and grows with great rapidity, covering in three or four weeks a large wire-balloon frame three feet high. We have seen a plant that covered nearly the whole side of a green-house. Unfortunately it requires considerable heat to enable it to attain its greatest perfection. The easiest way to propagate it is to bend down a shoot from the old plant, and peg it down into a small pot filled with sand. It will soon root, and may then be detached from the plant.

Pyramidal Pelargoniums.—During the past year, much has been said in foreign horticultural journals, in favor of training geraniums or pelargoniums in the pyramidal form. The plants occupy less room in the green-house, and are more beautiful. The plant should be twice as high as it is wide—that is, if the plant at the base just outside the pot is three feet, it may be allowed to grow six feet high. The process of training will be understood from the annexed drawings. The best center shoot of the plant must be preserved, and all the rest cut away. This will increase lateral shoots, which it is the object to produce.

Pampas Grass.

PAMPAS GRASS.—This magnificent ornamental grass, (*Gynerium Argenteum elegans*) is a native of Brazil. It was introduced into England a few years ago, and proves a most valuable addition to the flower garden and pleasure grounds. Set out in the lawn it forms a most striking object. The culms or stems are sometimes as thick as a walking cane, and fifteen or twenty feet high, with a plume of silvery white flowers on the top, one and a half to two feet in length! Nothing can be more graceful and beautiful

The stem and plume can be kept in the house all through the winter. Prof. C. DEWEY informs us that he received one from ELLWANGER & BARRY in the fall of 1861, six feet high, with a plume eighteen inches long, and kept it in the house over twelve months, and it was "perfectly beautiful."

It is propagated like other plants of this species, by the division of the tuft in the autumn. In regard to its hardiness, there are conflicting accounts. In England it usually stands the winter, but the se re cold of 1860-61 destroyed it. Messrs. ELLWANGER & BARRY, of this city, let one remain out last winter covered thickly with leaves, and it flowered finely the next autumn; but the safer way is to take it up and put it in a box in the cellar. We trust that it will soon find a place in all our best gardens and pleasure grounds.

THE VALUE OF PEAT OR MUCK.—Muck varies materially in its composition and value, according to its origin. Prof. S. W. JOHNSON found that the amount of ammonia in the various deposits of dry muck and peat which he has examined, vary from 0.58 to 4.06 per cent. In other words, some kinds of muck contain seven times as much ammonia as others. For the purpose of comparison we may state that ordinary barn yard manure contains only about 0.5 per cent. of actual and potential ammonia. It will be seen from this that dry muck of the poorest description, contains as much ammonia as barn yard manure, while the best deposits contain seven times as much. Dried muck, too, contains five times as much organic matter as well rotted barn yard manure.

BASSWOOD BARK.—Basswood bark is prepared for use in budding by stripping it from the tree in the month of June, when the sap is flowing freely, and immersing it in water for a fortnight or so, when the inner bark may be easily pealed off. It can then be hung up and dried, and afterwards put away for future use.

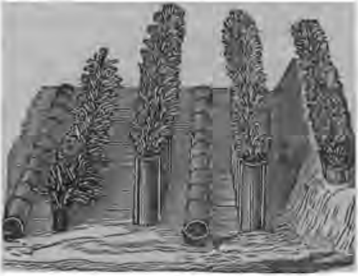
CULTURE AND PRESERVATION OF CELERY.

IT is a matter of surprise to us that so few farmers raise celery. Its cultivation is by no means difficult, and there are few vegetables more healthy or delicious. The seed should be sown in a hot bed early in the spring, and then pricked out when an inch or so high into a cold frame or sunny border. Here they may be allowed to grow till they are strong, stocky plants, say six inches high.

In setting them out, dig a trench eighteen inches to two feet deep, and put about six inches of well rotted manure or compost at the bottom; cover this with two or three inches of rich surface soil, and set out the plants about a foot apart. The plants as they grow should be earthed up in order to blanch the celery.

A correspondent of the *Gardeners' Monthly* adopts the following method of culture:

"A piece of level ground is chosen, and *well* manured all over. The usual trenches are discarded, and the plants set right on the surface,

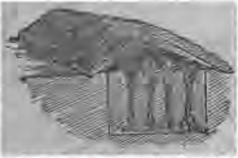


two feet apart. Common pipe draining-tiles are then procured, and after drawing a hoe through the loose ground directly between each row, the tiles are set, as in the above sketch, nearly level with the surface. When it is desired to water, it is poured through the pipe, (one end being closed tight,) and the water percolates through the tiles into the soil, and through and amongst the roots, keeping the soil thoroughly moist, while the surface around the plant is thus left porous and loose as ever. But these tiles perform another important function, which will appear in the sequel.

"When the plants have grown quite long, common horse-shoe draining-tiles are employed, as shown in the plan, for the blanching process. They are set edge to edge, on the opposite sides of the row, a slight earthing being employed to keep them in an upright position. Towards autumn, when the leaves begin to fall from the trees, they are collected and thrown in between the rows, and thus all light is entirely excluded, while air will pass down the tube and around the stems of the plants, rendering them firm and solid in the midst of a perfect blanching process. Any litter will do as well as leaves. It is now that the pipes serving as water conduits prove of value. While air is excluded by the superincumbent mass of matter, it passes through the open pipes and completely ærates the roots, causing them to grow in a surprising manner."

Celery is a rank feeder, and it is difficult to make the soil too rich. A plentiful supply of liquid manure, soap suds, or the greasy wash of the house, will make the plants grow surprisingly.

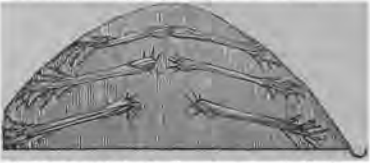
The preservation of celery in winter is not always an easy matter. The method most generally adopted is to put the plants in the cellar, either standing up as they grew, with dry earth or sand between them, or to lay them down and cover them with dry earth, sand or coal ashes.



Another method is to dig a trench two feet wide and two feet deep, and place the plants in it close together, standing up as when growing, as shown in the annexed engraving.—Then form a roof with two boards over the top of the trench, and cover it with soil, leaves, straw, etc.

Another method is to select an elevated piece of ground where the water runs off freely. Then place a double row of celery plants along the ground, with the roots a little the highest, to allow any water to run off that may chance to get in. Then put a thin layer of soil over them, and then another layer of celery plants, a little further in, and so on till the whole is completed. Then cover with a coat of soil and smooth it down nicely like a potato pit, so that it will shed water. Then cover with straw, corn stalks, etc., to keep out the frost.

It can be opened in fine weather, and a supply for a week or so taken out at a time. The following engraving illustrates this method.



McIntosh, in his *Book of the Garden*, gives a method of growing and preserving celery in Scotland The plants are grown in trenches from four to five feet in breadth, setting the plants in rows across. The plants are not earthed up till they have attained nearly their full growth, when the soil is put round them as high as it can be done without burying their hearts. Later in the season, on some day when the leaves are perfectly dry, the plants are tied up loosely, and a horse shoe drain-tile is placed on each side of the plant to protect the leaves above. When they are covered with soil, put in only as much earth

as will keep the tiles in an upright position. The sides of the trench are then banked up as shown in the above cut, with boards and scantling. If this method should be adopted in our severer climate, it will be necessary, as indeed is sometimes the case in Scotland, to cover the whole with straw, corn stalks, etc., to keep out the frost. The boards can be used year after year, and the method is not so troublesome or expensive as may at first appear, and the celery keeps fresher and crisper in this way, than in any other that can be adopted in this climate.

THE CHINESE SUGAR CANE.

ON THE GROWTH AND CULTIVATION OF SORGHUM AT THE NORTH, AND THE MANUFACTURE OF SUGAR.

WRITTEN FOR THE RURAL ANNUAL, BY REV. A. MYERS, OF OHIO.

THE cultivation of sugar cane in our latitudes has become a serious necessity, as all will agree. This is but another demonstration of the veracity of Him who hath said, "I will bring good out of evil." I am aware that there are many in our country, in nearly every State, who have given much attention to the growth of sugar cane, and would hardly read an article on that subject; but there are thousands who are just beginning its study, and are ignorant of its principles; to such, I hope in this short treatise, to be beneficial.

The sugar cane now grown in the loyal States, is as nothing in comparison to what it will be in the future. When once its success, ease, cheapness, profitableness, and importance become fully known, our Northern States will literally teem with this production. I claim no pretention to a prophet, but I think I see the future ten or twenty years hence, when there will be more sugar and syrup produced in Ohio, Indiana, Illinois, and Iowa, alone, in one year, than were ever produced in all the Southern States in the same time. There will be produced in Clark county this year about 1,000 barrels, or 40,000 gallons, which, if all the counties would average this, and I think it a fair average, the State will produce 87,000 barrels, or 3,480,000 gallons. I am aware that many will doubt the correctness of these figures, but I am satisfied from the experience I have with the facts, that the true figures will vary but little from the above.

To the successful growth of sugar cane, the first thing necessary is to have the ground in proper order, at the right time for planting. It matters very much how the ground is prepared, and when it is planted.

There is no use to try to raise a crop of cane, unless we first determine to give it all needful attention. To serve it as we do corn would be a useless effort. There should not be too great haste to get it in early. It is not a plant that delights in chilly weather. In fact, it seldom makes much growth until after harvest; hence, wait until the ground *is warm*, and vegetation growing freely, before you plant.

Having selected a warm exposure for the cane field, let the ground be thoroughly plowed, and deeply too, when it is in the best condition, so that when it is plowed and harrowed it shall be finely pulverized. There should be *no clods*, not even *small ones*. The ground should be as fine as an ash heap, if possible. In selecting a piece of ground for cane, choose the same soil that would be selected for wheat. Let it be a rich upland, well mixed with limestone, or a rich limestone soil. On a soil of this kind the canes will not grow so large as on good corn land, but they will contain more sugar. There will be less labor in handling the canes, less crushing, less boiling, less expense every way, and better syrup.

Having then selected the field and prepared it thoroughly, let it be marked out in rows three and a half or four feet apart, with the sun. The marks should be but *one inch deep*, and in these marks drop the seed every two or three inches apart, according to the strength of the soil. If it is desired to plant in hills, let it be cross-marked every two feet, then drop ten or twelve grains to the hill. The ground will sustain three or four times the number of cane stalks that it will of corn. The seed should previously be soaked in boiling water, varying according to quantity, from a half minute to two minutes. A pint or quart of seed should not be soaked longer than a half minute; a peck or half bushel should be kept in from one and a half to two minutes. Then planted immediately, after being rolled in plaster of paris, lime, or some other substance, to dry it. If thus prepared and the weather is warm and growing, it wlll come up in a few days, and grow rapidly. Care should be taken not to plant after a hard storm, especially after hail; and if a hail storm succeeds planting, examine your seed to see if it is sprouting well — and if not, plant again, as the germ of the seed has probably been killed by the cold. The seed should not be covered over half an inch deep, except in very porous soils.

When the cane is well up the soil should be stirred. The weeds must be kept down from the first; never suffer them to monopolize the ground; let the cane have all the nutriment there is in the soil. Stir the ground freely and deeply between the rows. I prefer a double shovel plow with bull tongues, instead of shovels. It should be stirred through the season to the depth of a foot or more. If dry weather should succeed, which would be better for the cane, the deep plowing will be all the more beneficial.

After harvest the cane grows most; before that time it will appear as if it would "never come to much." But have patience, it will accomplish all you desire when the time comes for it to grow. Keep it clear of weeds from the start, and all the time the ground open and loose to admit the warm rays of the sun and the air to the roots of the plant, during the season of slow growth. If there are from ten to twelve stalks to a hill it is enough; in drills the stalks should stand every three inches at least, and if the ground is rich, every two inches is not too close. I prefer drilling, because it is easier stripped and harvested.

The success of a crop depends almost entirely on proper care and attention before harvest. Up to this time, it should be worked freely and deeply, as we have said, principally because when the plants get two or more feet high, they begin to throw out lateral roots, and permeate the ground that has been cultivated. When this takes place it should have no more cultivation. The plants will grow so rapidly as to entirely shade the ground, and keep down the weeds. When the joints appear, the stalk is tender and liable to be broken. But after this time the plants, if there is a full stand, should be *thoroughly suckered.* Should there be only a partial stand of original stalks, the first pair of suckers may be left, as they will mature nearly as soon as the rest of the plant. If the suckers are left on, when there is a full stand, it will be to the detriment of the crop. If not suckered, some of the stalks will be green, and these will injure the quality of the syrup. Again, the suckers are easily blown down, and a red fungus appears at the break or bruise, which, if there is much in the cane, will color the syrup red or very dark, and give it an unpleasant flavor.

The cane should not be stripped or topped until it is ripe, or very nearly so. Some advise to commence work before it is fairly ripe; but this is not desirable, as this year's experience fully demonstrates. If the blades are torn off, or the cane topped before it is ready to be harvested, the quality of the syrup is undoubtedly injured. It is like taking the lungs away from an animal. It is death to it. It had better be killed by frost. The leaves and top are given to it to assist in its maturity, and in the fall, during the dry, hot days, and cool nights, they rapidly perform their work.

Preparing it for the mill should be done when it is fully matured, or if not mature, immediately after it has had the first heavy frost, after the leaves have been killed. It will not improve any more on the stalk after a hard frost. It should then be cut up and stripped. If it ripens before frost, it should be stripped, topped, and cut up at the same time. It will not injure by lying in the field after being cut. It should not be worked up immediately out of the field. Indeed, it ought not to be worked short of two weeks after it is harvested. From the field it should be hauled to the barn floor or sheds, and there stood on end and remain under cover two or more weeks, in order that the collar of the leaf around the stalk, which contains a disagreeable acid, may become perfectly dry. The longer it stands without being frozen and thawed successively, the more the water will evaporate out of the stalk. The sugar never evaporates; hence, after remaining a few weeks in the shed, a perceptible difference will be seen in the sweetness of the juice. The syrup will be better, because there will be less acid in it, and it can be reduced to syrup in a shorter period of time — proving a fact well known to all manufacturers, the shorter the period of reduction to syrup, the lighter the color and the better the quality of the syrup.

In selecting aparatus for manufacturing the syrup, be cautious how you purchase mills. Those that have been successfully tried for several years, and proven to be fully capable for the work, or such as from their appearance would evidence sufficient strength to resist the pressure of tons of weight, alone should be selected. When the manufacturing season comes on, not one day should be lost to make repairs. Much money has been lost by worthless machinery. In the field of evaporators there are many useful and profitable machines. That evaporator which removes the most impurities,— which makes the most syrup in the same time and with the same fuel, is the best. Those pans which boil the juice in a large body are not as good. The syrup should be boiled in a shallow body, that the feculences may easily rise and be removed, or thrown to the side and there remain until removed.

When the pan and mill are set up for use, it should be seen that everything is in proper order — that the mill works freely — that there is no chafing in the cog gearing, and that the rollers are perfectly parallel. If a three roller mill is used, the front rollers should not be closer than three-sixteenths or one-fourth of an inch, and the hind roller not further off than the thickness of a sheet of paper; or at least so close that the stalks would be sometimes separated at the joints, and the pulp appear white and down-like. *Green cane* should not be crushed so dry, because it is brittle, and will mash up and flow out with the juice, and unless the strainers are perfect, this mashed cane pulp will get into the pan and make the syrup dark colored, and unpleasant to the taste,—indeed spoil it altogether. The pan should be carefully set, and especial care taken that all *seams* be closed where air can get under the pan. There should be no air admitted to the fire except through the fire grates. In case air comes in all along the pan to supply the blaze, the surface of the pan will be so much cooled, that you can scarcely boil the mass, although in a shallow body. If all the seams are closed, the fire will have its full force on the fluid, and it will boil vigorously all over the pan, and especially toward the end where the syrup is finishing.

The juice should be well filtered before it enters the pan. It should be strained with a seive at the mill, and before it enters the pan should be passed through a flannel bag. The more it is free from crushed cane and cane pulp, the purer will be the syrup. Care should be taken that the supply of juice to the pan is equal to the evaporation and discharge of syrup, where the continuous plan is followed, and for general purposes no other plan is profitable or practicable. The batch at a time plan may do for small works, where a few neighbors combine together to work up their own cane. When the fire is once up, nothing should stop from daylight until dark; and in large concerns, should run day and night, *one day in seven excepted.*

The syrup when run from the pan, should show a strength of 36° or 37°, by the saccharometer, or 40° when cold. I do not approve of the use of neutralizing agents for home use. The little acid in the syrup when heated as above, is preferable. The stomach desires and requires some acid with the sweet. This acid is not a sufficient cause of fermentation in warm weather, if kept in the cellar, or in a moderately cool house. Again, if it does ferment a little, it is all the better for baking purposes, and not at all unpalatable; whilst the neutralizing elements harden the syrup, and make it like the New Orleans molasses. They in the South must neutralize, because of the excessively hot climate, and the exposure in exportation. When we make molasses and syrup to export, it will be time enough to neutralize.

If the operator has no saccharometer, the syrup should appear very thick when the skimmer is lifted out of the syrup, it should incline to flow off in one stream — appear to be tenacious, delighting to cling together, and to break off like paper; it is then thick enough, and should be removed from the fire, and left in an open tub or box to cool, that all the steam which rises may pass off freely. The syrup as it runs from the pan, should be strained through a very fine strainer, that all the scales which rise from the bottom of the pan may be removed.

If it is desired to make sugar, a warm room must be provided where the syrup can be placed away for several days, at a temperature of from 80° to 90° Farenheit. The syrup should be boiled to a temperature of 228° to 235° Farenheit, before it leaves the pan, or to a density, when hot, of 37° by the saccharometer,— or that when the skimmer is lifted out the syrup breaks from it in flakes. At this state it must not be scorched. Then it is run into a trough or box, two by three or four feet, and about three or four inches deep, and placed in this warm room to granulate. If kept at a temperature of from 80° to 90°, it will granulate in a few hours, or at least in a week, according to the polarity of the syrup. I have seen some that granulated in three hours, others in twenty-four hours, and again others that did not grain under four weeks. That it may grain freely, the syrup must not be chilled, but should at once be be removed from the pan to the warm room.

The waste of the pan and mill should not be thrown away or burned. The bagasse, or crushed stalks, are an excellent substance to mulch potatoes with the following spring, as they pack closely over the plants, and allow no weeds to grow except the vines, exclude the rays of the sun from the tubers, are not easily blown away by the wind, retain the moisture in the ground, and are easily removed in the fall, when the potatoes are found to be large and well flavored. It is also an excellent article to make the ground porous and light. The skimmings and washings are exceedingly valuable for vinegar, and also for making wine.

Note by the Editor of the Rural Annual.—Mr. Myers has had an extensive experience in the growth and manufacture of sorghum, and we feel great confidence in his recommendations. We have no doubt that he is right in saying that cane grown on dry, calcareous soil, will yield more sugar than that grown on the rich bottom land of the West. In other words, that a "wheat soil" is better for sugar cane than rich "corn land," abounding in organic matter. The same is true in regard to beets, when raised for sugar. Another point is of great importance: The land should not only be thoroughly cultivated to keep down the weeds, and to let in the warm air during the growth of the cane, but especial pains should be taken to get the soil into a mellow condition before the seed is planted — it should be made "as fine as an ash heap."

During the past summer, we made some experiments with various artificial manures on sorghum, with a design to ascertain their influence on the growth of the plant, and also on the amount of sugar which the cane grown under the different conditions contained. The experiments on the latter point are not yet completed, but in regard to the *growth* of the cane, one result was obtained which is worthy of mention. The yield of cane from the plot having no manure of any kind was 1 ton 7 cwt. per acre, while from the plot dressed with 250 lbs. of plaster (gypsum or sulphate of lime), the yield was over *eleven tons* per acre!

The growth of sorghum during the early stages of the plant is exceedingly slow; the seed is quite small, and it would seem that it is very essential to have a good supply of available "plant-food" in immediate contact with it. In the case of corn, the seed is so large that its decay affords considerable food for the young plant, but this is not the case with the small sorghum seed, and its seems desirable to supply some substance which shall furnish the needed matter for the young plant. Of all the manures used, plaster had the greatest effect. It gave the plants an early start, and when the roots fairly occupied the ground, and the soil was warmed by the summer's sun, the growth was very rapid.

The main points in the cultivation of sorghum for syrup or sugar undoubtedly are: First, to provide a warm, well-drained soil; Second, to get it into a mellow condition before planting; Third, not to plant until the soil is warm enough to allow the seed to germinate freely (say in this latitude, on the first of June); Fourth, to keep the land well stirred and clean during the slow growth in the first stages of the plant, so as to render it as *warm* and mellow as possible. In this way, we believe that sorghum can be cultivated for syrup with profit, even in the more Northern States.

In regard to the best kind, Mr. MYERS prefers the Sorghum or Chinese sugar cane. He also informs us that he has used COOK'S Evaporator for five years, and with the recent improvements he thinks it cannot be excelled. In selecting a mill, the main point is to get one that is strong enough to do the work well without breaking. A mill that is liable to break is not worth having at any price.

PLASTER FOR OATS.—In some experiments we made in 1860, with various manures on oats, plaster gave the best results. The plot without manure produced 36 bushels per acre; that dressed with 600 lbs. of plaster produced $55\frac{1}{2}$ bushels. The experiments were made in the same field where plaster had such a good effect on sorghum last year.

FECUNDITY OF HENS.—It is asserted by BUFFON that a hen, well fed and attended, will produce upward of hundred and fifty eggs in a year, besides two broods of chickens.

The editor of the *Massachusetts Ploughman* says, from eighty-three hens seven thousand two hundred eggs were obtained, which would give to each hen eighty-four eggs for the year.

A remarkable instance of fecundity in the hen is related by a correspondent of the *Genesee Farmer*: Three pullets of the Poland breed, hatched in June, commenced laying in December following, and, from that to the next December, laid five hundred and fifty-four eggs, averaging one hundred and eighty-five eggs to each hen.

HOW TO SHOVEL CORN FROM A WAGON.—In unloading corn in the ear, it is generally found necessary to take out a few basketfuls by hand before the shovel can be used to advantage. This difficulty can be easily overcome by placing a board a few feet long slanting from the bottom of the wagon to the top of the tailboard. Along this board the shovel can be used at once, and those who have never tried this simple plan, will be astonished to find how much labor and time are saved by it.

LAMBS FOR THE BUTCHER.—SOLON ROBINSON says truly, that if a South Down ram is crossed upon ewes of the common stock of the country, lambs may be obtained of an average value to the butcher of 25 per cent. higher than lambs of the same age, from the same stock, of the native breed. Where South Downs cannot be obtained, the Leicesters will do nearly or quite as well.

TO MEASURE CORN IN A CRIB.—Multiply the length, breadth, and highth together in feet, multiply this product by four, strike off the right hand figure, and the result will be shelled bushels.

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