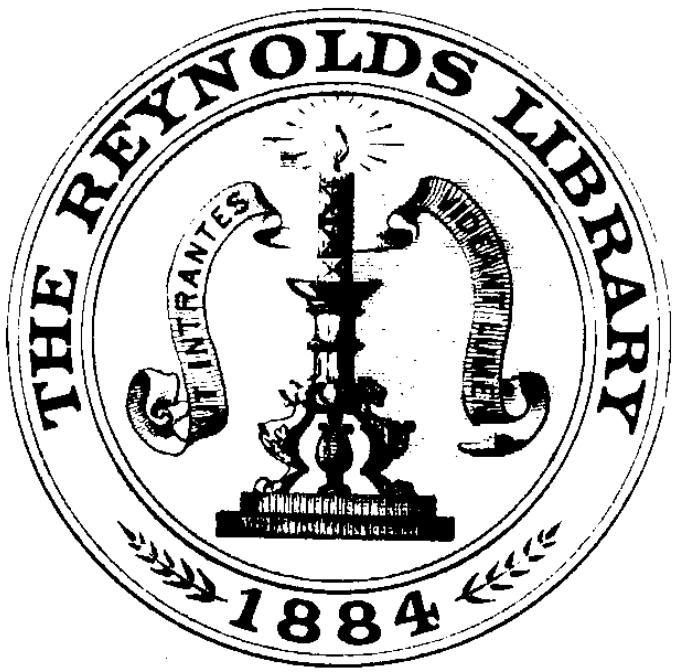

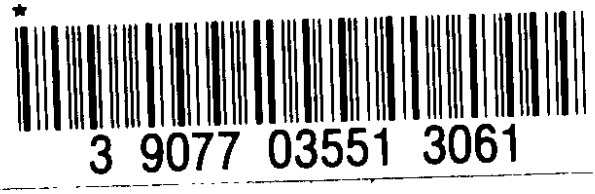

THE

RURAL ANNUAL

AND

HORTICULTURAL DIRECTORY

FOR THE YEAR 1864:

BEING THE

Ninth 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.)
1864.

PREFACE.

THE RURAL ANNUAL AND HORTICULTURAL DIRECTORY has now been published nine years, and in issuing the number for 1864, it is scarcely necessary to say anything of its character and object. It is intended to furnish in a cheap and permanent form a rural hand book containing information calculated to interest every one engaged in the cultivation of the soil.

The present number is not as well illustrated as many of those which have preceded it. But the space which would otherwise have been thus occupied is filled with matter which it is hoped will prove interesting and instructive to every intelligent farmer and fruit-grower.

As this number of the RURAL ANNUAL may fall into the hands of some who have not seen the previous numbers, it may be well to say that a complete set of the work (for 1856–7–8–9, '60, '61, '62 and '63) can be furnished, and will be sent to any address, by mail, prepaid, on receipt of $1.60.

We have also these eight numbers, with the advertisements omitted, handsomely bound in two volumes, which will be sent prepaid by mail to any address for $2.50.

JAMES LENNOX, STEREOTYPER,
Rochester, N. Y.

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THE

RURAL ANNUAL

AND

HORTICULTURAL DIRECTORY.

HOW SHALL WE ENRICH THE SOIL?

HIS question is attracting more and more attention each year, as the original fertility of the soil becomes exhausted. In the older settled portions of the United States the demand for artificial manures is steadily on the increase, and is destined to be enormous. The peculiar conditions of American agriculture all point in this direction. The farmers in the comparatively poor New England States, and all along the great Atlantic slope, are brought into direct competition with the rich land of the West.

From the fact that the freight on beef, mutton, pork, wool, etc., is much less in proportion to their value than on the cheaper and more bulky products of our agriculture, we think it will be found that the competition will be keener in the production of these articles than in the case of corn, wheat, oats, etc. In other words the West is destined to become the great meat producing region of the country, while the poorer land in the East will be devoted to the production of those bulky products which can not be cheaply transported long distances.

Now, to enable us to produce these articles, we need manure. Where shall we obtain it? We all know that if we can feed stock we can get manure, but in feeding cattle, hogs and sheep, the West has a greater advantage over us than in raising grain. Is there no other way of getting manure?

Artificial manures afford the most direct and immediate resource, and we have no doubt that they can often be used to great advantage. If we were sure of obtaining a good article the demand for it would be very great. Already manure is made from fish, that chemical analysis and actual use in the field alike pronounce a valuable article. There is scarcely any limits to the manurial resources of the ocean. The rain which washes our hill-sides carries fertilizing matter to the rivers, and ultimately to the ocean. This process has been going on for ages, and it is high time that some of these elements of fertility were brought back again to the soil in the shape of fish, sea-weed, etc.

Bones, when finely ground, constitute one of the most permanent manures. They contain about 50 per cent. of phosphates, and 5 per cent. of ammonia. In the latter constituent they are *ten times* richer than ordinary farm yard manure. When good bone dust can be obtained for less than $20 per tun we know of no cheaper portable manure.

Superphosphate of lime is especially valuable for turnips and other root crops. No gardener should be without it. Such plants as lettuce, radishes, cucumbers, melons, etc., are greatly benefitted by a slight application of it to the soil in immediate contact wth the roots.

Peruvian guano is the most active and powerful of all fertilizers, but the price at the present time puts it beyond the reach of ordinary farmers. Our products must bring extravagant prices to render an application of Peruvian guano profitable at $100 per tun. In the garden, where the aim is not so much profit as large and succulent vegetables, superior fruits, flowers, etc., Peruvian guano will be found an exceedingly convenient and excellent article. There is an article, however, which is still more convenient for use in the garden: *sulphate of ammonia.* It is quite soluable in water, free from smell, and acts with astonishing rapidity. It can be used either in the dry form, or in solution. But, like Peruvian guano, it should never be placed in immediate contact with the seed. In applying it to succulent plants, such as melons and cucumbers, great care should be exercised not to have it touch the leaves, as it will wither them up and injure or destroy the plants. For such crops it is better to mix it thoroughly in the soil for a foot or so around the hill. A mixture of equal parts of sulphate of ammonia and superphosphate would form a manure of great value for the garden. Two pounds to the square rod will be a fair dressing.

Phosphatic guanos, such as Jarvis or Baker's Island, will prove useful on many farms, especially on those which have been impoverished by a scourging system of cropping. They contain from seventy to

eighty per cent. of phosphate of lime, a portion of which is in a soluable condition. For turnips and other root crops they are especially valuable. They will also be found very useful in the garden. They can be used with far more safety than Peruvian guano, though this in itself is far from being any evidence of their value. On all soils where phosphates are required these guanos will be found the cheapest and most available manure that can be purchased.

Poudrette, made from nightsoil, is extensively used in the neighborhood of New York. A good article of this kind, if it can be obtained at reasonable rates, is undoubtedly valuable. It is made by mixing the nightsoil with dried muck.

How far artificial manures can be profitably used on the farm depends on three things: 1. The cost of the manure. 2. How much they will increase the crop; and 3. The price we can get for the product.

This latter point is not generally taken into consideration. It is, however, of vital importance. If we could get $3.00 per bushel for wheat, Peruvian guano or sulphate of ammonia at $100 per tun would be a profitable application. But if we only got $1.50 per bushel its application would not pay. It is so with other crops. There are crops which bring a much higher price *per acre* than wheat, corn, etc., and it generally pays to manure such crops liberally even if we have to buy the high priced artificial fertilizers. Tobacco is a case in point. If by manuring we could increase the growth one-third the profits would be much more than if we increased a crop of wheat one-third. So with onions. And when potatoes bring a good price the same is true of this crop. If we have a field of potatoes that would yield without manure, one hundred bushels per acre worth 50 cents per bushel, and another field that would yield without manure ten bushels of wheat per acre, worth $1.50, and we apply to both these fields three hundred pounds of Peruvian guano per acre, it would probably *double the crop* in both cases. But in the one case we should get *an increase* of one hundred bushels of potatoes worth $50, and in the other case ten bushels of wheat worth $15.

In the New England States, where a large portion of the people are engaged in manufactures, and where good prices can usually be obtained for garden vegetables and other articles that can not be transported long distances, farmers can use artificial manures with far greater profit than can be hoped for in ordinary agriculture.

Before the introduction of artificial fertilizers into England, LIME was the chief reliance of farmers as an auxiliary to barn yard manure. As

yet in this country lime has received comparatively little attention. Unlike barn yard manure, guano, superphosphate, etc., lime does not act so much from supplying an actual constituent of plant-food as by decomposing the elements of plants lying dormant in the soil and otherwise rendering them soluable and available for plants. It is an old proverb, "Lime is wealth to the father but poverty to the son." On many soils lime acts like a charm; but unfortunately there is no easy method of pointing out the kind of soil that needs liming. Every farmer must determine the question for himself by experiment. We believe, however, that there are few soils that would not be benefitted by an application of lime. It might not pay the first, second, or third year, but will do so in the end. It must be remembered that lime is one of the most lasting of all manures. Or, rather, its beneficial effects on the character of the soil are visible for a long period — even after all traces of the lime have disappeared. We once had pointed out to us in England a case in point. Thirty years before, half a field had been limed and the other half left without liming. Otherwise the whole field had been treated precisely alike. When we saw it the field was in barley, and the crop on the half which had been limed was full five bushels per acre better than that on the other half — and this after a period of thirty years!

We do not think small dressings of lime are of much use. One bushel per square rod, or one hundred and sixty bushels per acre is none too much. We should use enough to change the chemical and mechanical condition of the soil, and it will then prove useful for many years. We are persuaded that lime will prove of great value in American agriculture.

We have no doubt that lime would be of great benefit in gardens that have been for years heavily manured. It would "sweeten" the soil. It would destroy worms and the larvæ of insects. It would accelerate the decomposition of organic matter and render it available. Plants and vegetables would be healthier and less liable to attacks of mildew, rust, and other forms of fungus.

Plaster or gypsum (*sulphate of lime*) has a most remarkable effect on some soils. In Western New York one hundred pounds per acre, sown broadcast on clover and on peas, or dropped in the hills of Indian corn, is generally beneficial. In other sections, especially near the sea coast, no such benefit attends its application on any crop. It seldom does any good on wet land.

The same remarks are applicable to salt. There are many instances where three or four bushels per acre has had an excellent effect on

wheat, grass, etc; while in other instances no benefit has been derived from its application. Nearly all soils contain salt enough for the growth of the plants, and the effect of its application is to be ascribed to its influence on the soil rather that to its supplying an actual constituent of the plants.

SWAMP MUCK, OR PEAT.

Farmers in the New England States are fortunate in possessing excellent beds of swamp muck or peat. This substance furnishes organic matter in a cheap form. When decomposed by composting with fermenting manure, or with lime, it must certainly prove of great value on all soils deficient in organic matter — and this is characteristic of much of the thin upland soils of New England, and of the eastern counties in this State.

Muck varies very much in its composition and value. Prof. S. W. JOHNSON analyzed thirty-three different samples of muck from various sections of Connecticut, and found the amount of potential ammonia in absolutely dry peat to vary from 0.58 to 4.06 per cent. In other words the richest sample contained *seven times* as much ammonia as the poorest.

The average amount of ammonia, in the thirty-three samples of chemically dry peat, was 2.07 per cent.

Common barn yard manure seldom contains more than half of one per cent. (0.5) of ammonia; and it is an unusually good manure that contains one per cent. We are safe in assuming that air-dried peat, of average quality, contains twice as much potential ammonia as an average sample of barn yard manure. Prof. J. institutes a comparison between a good specimen of peat and well-rotted farm yard dung of good quality. We have not space for the table, but the peat contains about four times as much ammonia, (2.92,) three times as much sulphuric acid, (0.33,) a little more lime, (2.43,) and more than twice as much magnesia, (0.36,) as the manure. On the other hand, the manure contains nine times as much potash, (0.49,) twice as much soda, (0.08,) fifteen times as much phosphoric acid, (0.45,) twice as much chlorine, (0.02,) and three times as much soluable silica, (1.68,) as the peat. The principal characteristic of peat is its large quantity of organic matter. One tun of air-dried peat contains five times as much organic matter as a tun of well-rotted barn yard manure.

Prof. JOHNSON, in commenting on the analyses of peat and manure, well observes: "We see thus that peat and yard manure are excellently adapted to go together; each supplies the deficiency of the other. We see, also, that peat requires the addition of phosphates (in

the shape of bone dust, or phosphatic guano,) and of potash, (as unleached wood ashes,) in order to make it precisely equal in composition to stable manure." A tun of manure contains about nine pounds of phosphoric acid and ten pounds of potash; a tun of peat a little over half a pound of phosphoric acid, and not quite one pound of potash. A bushel of ashes and thirty pounds of bone dust would make the tun of peat equal in potash and phosphates to a tun of manure. In other respects, so far as compossition is concerned, it is superior to the manure.

Aside from its value in furnishing food for plants, peat has many properties which render it useful in improving the texture and other physical characters of soils. Among them Prof. JOHNSON mentions —

1. *Its remarkable power of absorbing and retaining water, both as a liquid and as vapor.*

2. *Its power of absorbing ammonia:*

3. *Its action in modifying the decay of organic (animal and vegetable) bodies:*

4. *Its effect in promoting the disintegration and solution of meneral matters, (the stony mntters of the soil:) and*

5. *Its influence on the temperature of the soil.*

1. *Its absorbent power for liquid water* is well known to every farmer who has thrown it up in a pile to season for use. It holds the water like a sponge; and after exposure for a whole summer, is distinctly moist to the feel.

Its absorbent power for vapor of water is so great that more than once it has happened in Germany that barns or close sheds filled with dried peat, such as is used for fuel, have been burst by the swelling of the peat in damp weather, occasioned by the absorption of moisture from the air. This power is further shown by the fact that when peat has been kept all summer long in a dry room, thinly spread out to the air, and has become like dry snuff to the feel, it still contains 10, 20, 30, and in some of the specimens I have examined, even 40 per cent. of water. To dry a peat thoroughly, it requires to be exposed for some time to the temperature of boiling water. It is thus plain that no summer heats can dry up a soil which has had a good dressing of this material, for on the one hand it soaks up and holds the rains that fall upon it, and on the other, it ahsorbs the vapor of water out of the atmosphere whenever it is moist, as at night and in cloudy weather.

2. *Absorbent power for ammonia.*

All soils that deserve to be called fertile, have the property of absorbing and retaining ammonia and the volatile matters which escape

from fermenting manures, but light and coarse soils may be deficient in this power. Here again in respect to its absorptive power for ammonia, peat comes to our aid.

Experiments made by Prof JOHNSON show that peat will absorb from one to two per cent. of ammonia which is adequate for every agricultural purpose.

3. *The influence of peat in modifying the decay of organic matters deserves notice.*

Peat itself, in its native bed, or more properly the water which impregnates it and is charged with its soluble principles has a remarkable anti-septic or preservative power. Many instances are on record of the bodies of animals being found in a quite fresh and well preserved state in peat bogs, but when peat is removed from the swamp, and so far dried as to be convenient for agricultural use, it does not appear to exert this preservative quality to the same degree or even in the same kind.

Buried in a peat bog or immersed in peat water, animal matters are absolutely prevented from decay, or decay only with extreme slowness; but if covered with peat that is no longer quite saturated with water, their decay is indeed checked in rapidity, and the noisome odors evolved from putrefying animal substances are not perceived, still decay does go on, and in warm weather, no very long time is needed to complete the process.

The effect of peat in modifying decay is analogous to that of charcoal, and is probably connected with its extreme porosity. If a piece of flesh be exposed to the air during summer weather, it shortly putrefies and acquires an intolerable odor. If it be now repeatedly rubbed with charcoal dust and kept in it for some time, the taint which only resides on the surface, may be completely removed, and the sweetness of the meat restored, or if the fresh meat be surrounded with a layer of charcoal powder of a certain thickness, it will pass the hottest weather without manifesting the usual odor of putrefying bodies.

It does, however, waste away, and in time, completely disappears. It decays, but does not putrefy, it exhales, not the disgusting gases which reveal the neighborhood of carrion, but the pungent odor of hartshorn. The gases which escape are the same that would result if the flesh were perfectly burnt up in a full supply of air, viz: vapor of water, carbonic acid, and *ammonia.*

If we attend carefully to the nature of decay thus modified by charcoal dust, we find that it is complete, rapid, but regular, and unaccompanied by unhealthful or disagreeable exhalations.

Peat has all the effects of charcoal with this advantage, that it permanently retains the ammonia formed in decay, which, contrary to the generally received opinion, charcoal does not.

From its absorptive power for water, it maintains a lower temperature under the sun's heat than dry charcoal or a light soil, and this circumstance protracts and regulates the process of decay in a highly beneficial manner, so that if a muck-dressed soil receive an application of stable manure, fish, or guano — in the first place, the ammonia and other volatile matters cannot be formed so rapidly as in the undressed soil, because the soil is moister and decay is thereby hindered — and in the second place, when formed they cannot escape from the soil, but are fixed in it by the peculiar absorptive power of the vegetable acids of muck.

4. *Peat promotes the disintegration of the soil.*

Every soil is a storehouse of food for crops; but the stores it contains are only partly available for immediate use. In fact, by far the larger share is locked up, as it were, in insoluable combinations, and by a very slow and gradual change does it become accessible to the plant. This change is chiefly brought about by the united action of water and carbonic acid gas, or rather of water holding this gas in solution. Nearly all the rocks and minerals out of which fertile soils are formed — which therefore contain those inorganic matters that are essential to vegetable growth — though very slowly acted on by pure water, are decomposed and dissolved to a much greater extent, to an extent, indeed, commensurate to the wants of vegetation, by water charged with carbonic acid gas.

The only abundant source of carbonic acid in the soil, is decaying vegetable matter. Hungry, leachy soils, from their deficiency of vegetable matter and of moisture, do not adequately yield their own native resources to the support of crops, because the conditions for converting their fixed into floating capital are wanting. Such soils dressed with peat or green manured, at once acquire the power of retaining water, and keep that water overcharged with carbonic acid, thus not only the extraneous manures which the farmer applies are fully economized; but the soil becomes more productive from its own stores of fertility which now begin to be unlocked and available.

It is probable, nay, almost certain, that the acids of peat exert a powerful decomposing and ultimately solvent effect on the minerals of soil.

5. *The influence of peat on the temperature* of light soils dressed with it may often be of considerable practical importance. A light, dry soil

is subject to great variation of temperature, and rapidly follows the changes of the atmosphere from cold to hot, and from hot to cold. In the summer noon a sandy soil becomes so warm as to be hardly endurable to the feel, and again it is on such soils that the earliest frosts take effect. If a soil thus subject to extremes of temperature have a dressing of peat, it will, on the one hand, not become so warm in the hot day, and on the other hand it will not cool so rapidly, nor so much in the night; its temperature will be rendered more uniform, and on the whole more conducive to the welfare of vegetation. The regulative effect on temperature is partly due to the stores of water held by peat. In a hot day this water is constantly evaporating, and this, as all know is a cooling process. At night the peat absorbs vapor of water from the air, and condenses it within its pores, this consideration is again accompanied with the evolution of heat.

It appears to be a general, though not invariable fact, that dark colored soils, other things being equal, are constantly the warmest, or at any rate maintain the temperature most favorable to vegetation. It has been repeatedly observed that on light colored soils, plants mature more rapidly if the soil be thinly covered with a coating of some black substance. Thus LAMPADIUS, Professor in the School of Mines at Friberg, a town situated in a mountaneous part of Saxony, found that he could ripen melons, even in the coolest summers, by strewing a coating of coal dust, an inch deep, over the surface of the soil. In some of the vineyards of the Rhine, the powder of a black slate is employed to hasten the ripening of the grape.

GIRARDIN, an eminent French agriculturist, in a series of experiments on the cultivation of potatoes, found that the time of their ripening varied eight to fourteen days, according to the character of the soil. He found on the 25th of August, in a very dark soil, made so by the presence of much humus or decaying vegetable matter, twenty-six varieties ripe; in sandy soil but twenty, in clay nineteen, and in a white lime soil only sixteen.

It cannot be doubted then, that the effect of dressing a light, sandy or gravelly soil with peat, or otherwise enriching it in vegetable matter, is to render it warmer, in the sense in which that word is usually applied to soils. The upward range of the thermometer may not be increased, but the uniform warmth so salutary to our most valued crops is thereby secured.

The best manner of applying peat is a matter of great practical importance. It is sometimes used in the raw state with considerable benefit but as a general rule it is better to compost it. There appears

to be much difference in the character of muck in this respect. In this section raw peat placed underneath fruit trees at the time of planting proves absolutely injurious. It poisons the roots. On the other hand there are samples of peat in the eastern counties of this State which can be used in a raw state on fruit trees, not only without injury but with decided advantage.

We have seen raw peat applied to grass land with good effect; but on the same land, peat composted with manure proved so vastly superior to it that it is evidently unwise to use it in the raw state. Peat at all events should be thrown up and exposed to the atmosphere for several months before it is used, as in this way we get rid of a large quantity of water, and save much labor in cartage. Peat is usually thrown up in the latter part of summer, because the swamps are then most free from water, but when it can be done in winter there is manifest advantage in doing it at that leisure season of the year.

Prof. JOHNSON says, "a well made compost of two loads of muck and one of stable manure is equal to three loads of the manure itself."

There are various methods of composting the muck. The manure may either be removed from the stables, and daily mixed with the appropriate amount of muck, by shoveling the two together, at the heap, out of doors; or, as some excellent farmers prefer, a trench, water tight, four inches deep and twenty inches wide, is constructed in the stable floor, immediately behind the cattle, and every morning a bushel basketful of muck is put behind each animal. In this way the urine is perfectly absorbed by the muck, while the warmth of the freshly voided excrements so facilitates the fermentative process, that, according to Mr. F. HOLBROOK, of Brattleboro, Vermont, who first employed and described this method, *much more muck can thus be well prepared for use* in the spring than by any of the ordinary modes of composting. When the dung and muck are removed from the stable, they should be well intermixed, and as fast as the compost is prepared, it should be put into a compact heap, and covered with a layer of muck several inches thick. It will then hardly require any shelter if used in the spring.

On the farm of Mr POND, of Milford, Connecticut, Prof. JOHNSON says he has seen a large pile of this compost, and has witnessed its effect as applied by that gentleman to a field of sixteen acres of fine gravelly or coarse sandy soil, which, from having a light color and excessive porosity, had become dark, unctuous, and retentive of moisture, so that during the drouth of 1856, the crops on this field were good and

continued to flourish, while on the contiguous land they were dried up and nearly ruined.

Guano may be composted with muck to great advantage — say a bushel of guano to eight or ten of muck. Fish and muck make an excellent compost. S. HOYT & SONS, of New Canaan, Connecticut, have employed 220,000 fish for this purpose in one season, and use ten or twelve loads of muck to one of fish.

A layer of muck one foot or more in thickness is spread upon the ground, and covered with a layer of fish; on this put another layer of muck and another of fish; and so on until the pile is several feet high, finishing with a good layer of muck.

In the summer, when this work is usually attended to, the fermentation begins at once, so that no delay must be allowed after the fish are taken, in mixing the compost, and in a short time the operation is complete; the fish disappear, bones excepted, and by shoveling over, a uniform mass is obtained, almost free from odor, and retaining perfectly all the manurial value of the fish. Lands well manured with this compost will keep in heart and improve, while the use of fish alone is ruinous, in the end, on light soil.

It is obvious that any other easily decomposing animal matters, as slaughter-house offal, soap-boiler's scraps, glue waste, etc., etc., may be composted in a similar manner, and that all these substances may be made together into one compost.

In case of the composts with guano, yard manure, and other animal matters, ammonia is the alkali which promotes these changes; and it would appear that this substance, on some accounts, excels all others in its efficacy; but the other alkaline bodies potash and lime, are scarcely less active in this respect, and being at the same time of themselves useful fertilizers, they may be employed with double advantage in preparing muck composts.

It must never be forgotten that all our attempts to enrich the soil with manures will prove comparatively of no avail if the land needs underdraining. This is the great need of American agriculture and horticulture. It is useless to attempt to raise good crops of grain, fruits or vegetables on lands surcharged with water at any season of the year.

There is much land in all sections of the country that now produces little or nothing, which, by a judicious system of drainage, would become the richest and most productive of all soils. There are few farms where there is not more or less land of this character. The soil abounds in every element of fertility; but it is useless so long as it is water-

logged. Underdrain it, and raise large crops. Consume these crops on the farm and the manure thus obtained will serve to enrich the upland portions of the farm.

The same remarks will apply to irrigation. The extra produce which we obtain from the irrigated land will enable us to make an extra quantity of manure and serve to enrich the whole farm.

An intelligent farmer will avail himself of all these sources of fertility, before he resorts to the purchase of artificial manures. But after he has done this he will find great pleasure and profit in a judicious employment of some of the many portable fertilizers which experience, united with science, has discovered.

STUMP PULLING MACHINES.

A CORRESPONDENT of the *Genesee Farmer* gives the following description of a cheap and simple stump machine, where the land is not very heavily timbered and the stumps considerably decayed:

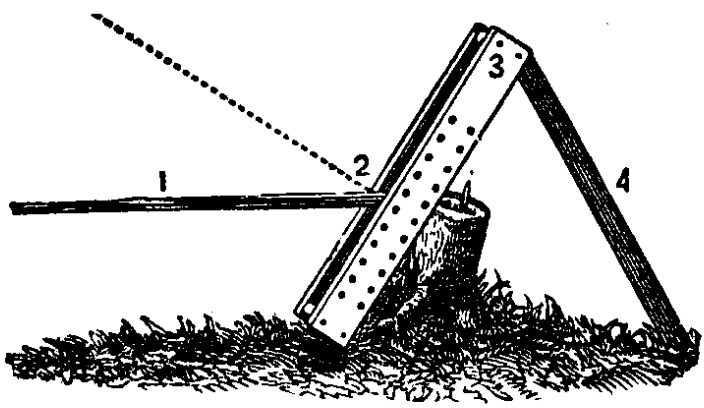

FIG. 1.

"In the sketch, 1 is a round pole ten feet long, four inches in diameter at the largest end, which is well banded. Into this is inserted a bar of iron 2 by 2½ inches, drawn to half that size at the end inserted into the pole, and 2 feet long. Near the end of this two notches are cut, a little over 4½ inches apart. In the middle between these, a hole is punched, and a link 6 inches long inserted, as seen in Fig. 2, which represents the bar, large hook to hitch under a root of the stump, a link inserted in each, and a connecting hook. The links are made of round ⅝ inch Swede's iron, the connecting hook of 1⅛ do.; the large hook of a bar of old sable iron 18 inches long, bent round edgewise;

3 is a frame consisting of two oak planks 3 inches thick, 8 wide, and 7 feet long, pinned together at the end through a piece of four inch scantling, between the planks. There are two rows, 4½ inches apart, of 1¼ inch holes through these planks, the holes being 3½ inches apart in the rows, from centre to centre. The holes in the right hand row are one inch lower than the opposite ones in the left. Through these holes two iron bolts, as large as the holes, are made to pass, for the bar or lever to rest upon.

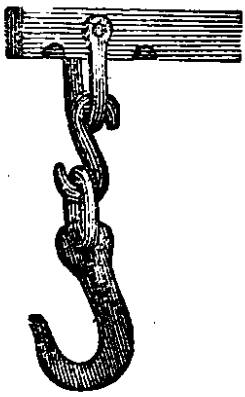

FIG. 2.

To use this machine, it is set up as seen in the figure, 4 being a board for a brace, the lever placed between the planks, the notches resting on the two bolts, and the hook hitched under a root. Now elevate the end of the lever, (which needs a short pole attached by a ring to the end of the long one,) withdraw the left hand bolt and raise it one hole higher; now depress the end of the lever and raise the right hand bolt; and so on as high as you wish. The cost of the machine was $7 — iron $4, making $3. Any blacksmith and carpenter can construct one. With a team and sled, and stone-boat to draw the machine about, I have seen two hands, on a lot that had been cleared fourteen years, pull in a day from sixty to a hundred stumps, mostly from ten to eighteen inches in diameter."

WILLIS' stump machine is highly recommended by those who have seen it work. It is not only used for pulling stumps, but is applicable to moving buildings, rocks, etc.

A strong chain is put around the foot of the stump to be removed, as represented in the engraving on the left. This chain passes over shears, or strong timbers so placed as to give the power at the stump an upward direction. In many cases this part may be dispensed with, and the chain pass over the stump. The chain continues onward to the lever, on wheels, to which the horse is attached. This lever is fastened to an ordinary stump. When the horse has passed on, according to his present position, the length of the lever, he is turned in the other direction, and at the same time, the outer chain is dropped and the inner chain is hooked into the leading chain, and the horse passes to the extent of the lever in the other direction.

A pair of oxen may be used, if more convenient. When the stumps are thick, a large number may be pulled without removing the lever from the stationary stump. The largest stumps may be easily extracted with this machine. A pair of horses or oxen is a sufficient team to take it from place to place.

WILLIS' STUMP MACHINE.

VALUE OF MANURE

FROM DIFFERENT KINDS OF FOOD.

In the *Rural Annual and Horticultural Directory* for 1859, we called particular attention to the fact that the composition and value of the manure derived from any animal depended, other things being equal, on the composition of the food which the animal eat. Since that time J. B. LAWES, of Rothamsted, England, has published a table showing the estimated value of manure obtained from the consumption of one tun of different articles of food; each supposed to be of good quality of its kind. We have reduced the gross tun to our common tun of two thousand pounds, and give the price in dollars and cents. The following is the table:

Description of Food.	Estimated money value of the Manure from 1 tun of each Food.
1. Decorticated Cotton Seed Cake,	$17.86
2. Rape Cake,	21.01
3. Linseed Cake,	19.72
4. Malt-dust,	18.21
5. Lentils,	16.51
6. Linseed,	15.65
7. Tares,	15.75
8. Beans,	15.75
9. Peas,	13.88
10. Locust Beans,	4.81
11. Oats,	7.40
12. Wheat,	7.08
13. Indian Corn,	6.65
14. Malt,	6.65
15. Barley,	6.32
16. Clover Hay,	9.64
17. Meadow Hay,	6.48
18. Oat Straw,	2.90
19. Wheat Straw,	2.68
20. Barley Straw,	2.25
21. Potatoes,	1.50
22. Mangolds,	1.07
23. Swedish Turnips,	91
24. Common Turnips,	86
25. Carrots,	86

This table deserves to be profoundly studied by every farmer.

Mr. LAWES has been engaged for many years in experiments on this subject, and we have no doubt that the table correctly states the *rela-*

tive value of the manures obtained from the different foods; that is to say, *if* the manure obtained from the consumption of a tun of meadow hay is worth $6.43, that made from a tun of clover hay is worth $9.64, or half as much again — and this is true everywhere. The estimates are based on the value of manure in England, and are undoubtedly correct; but of course the figures are only true relatively where manures of all kinds are of less value, as is the case in the newer sections of this country. In the vicinity of this city, manures are quite as high as in England, and here the estimates may be adopted without any qualification; and the same is true of a great portion of New England, and nearly, if not quite, throughout the entire length of the Atlantic slope, where the use of guano or other artificial fertilizers is profitable.

"But is it then true," we hear it asked, "that the manure made from one tun of clover hay is worth as much as that made from a tun and a half of timothy or meadow hay?" There is no doubt on this point; and it is a fact we have often mentioned. It is one reason why we so repeatedly urge the importance of an increased growth of clover as a means of enriching the soil. But in addition to this, it is also true that clover does not impoverish the soil so much as timothy or other grasses when both are consumed on the farm. If both the clover and the timothy are sold off the farm, the clover may impoverish the soil as much as the timothy, though there is some doubt on this point.

It will be seen that beans and peas afford very rich manure. The remarks we have made in regard to clover will apply also to those leguminous plants as compared with the cereals, oats, barley Indian corn, etc.; they not only afford richer manure, but their growth impoverishes the soil far less than the cereals. It will be seen that the manure obtained from a bushel of peas is worth twice as much as from a bushel of Indian corn.

Malt dust, it will be seen, affords rich manure. We do not know what is done with it at the breweries, but if it can be obtained at a reasonable rate, it might be purchased to advantage. It has long been used in England as food for stock.

It will be seen that the manure from a tun of clover hay is worth as much as that made from four tuns of straw; while that from one tun of oil-cake is worth as much as that from nearly nine tuns of straw.

The reasons why the root crops are so low down in the scale is that they contain such a large quantity of water. Leaving the water out, they afford about as rich manure as clover hay.

Bran is not included in Mr. LAWES' table. The manure from a tun of ordinary bran or middlings is worth $9.00.

PROTECTION TO ORCHARDS.

It is well known that peach and other fruit trees, in many sections of the country do not flourish as they did in former times. Some of the older inhabitants of the country can well remember peach trees that were thirty or more years old and still vigorous, and continued to bear annual crops of good fruit. What is true of peaches is also true in some degree, of apples and other fruits. These trees do not survive as long, and continue fruitful as they did in the times of the early settlement of the country. Some have attributed this to the exhaustion of the soil. But this is not satisfactory, because the effect is the same when the trees are planted upon the virgin soil. Others assert that the seasons have changed, without giving any cause for such a change. It may not, perhaps, be difficult to account for this change in the durability and faithfulness of the orchards of the present day, from natural and known causes. During the last forty or fifty years immense tracts of forests have been removed, giving place to open, cultivated fields. This has caused the summer showers to fall less frequently, and has resulted in the drying up of many of the small streams, and exposing the entire country, more or less to the fierce, blasting winds of winter; and,so far as these causes operate, have changed the the seasons. It is no doubt the effects of these cold winds of winter upon the open and exposed country that has caused the destruction of thousands of our peach trees, and wrought serious injury to other fruits. The only partial remedy for this is to select the most sheltered and favorable locations for orchard sites, and when practicable to shelter the most exposed sides by planting belts of evergreen and deciduous trees. The benefit of such practice was made most strikingly in an instance that came under the writer's observation during a severe winter that occurred some years since. Two extensive fruit gardens, both devoted to the various fruits, and occupying adjoining enclosures; one was protected on the north-eastern to the north-western side by a belt of young native timber, and the other was open and exposed to the winds from these points. A severe cold wind occurred during the winter. In the exposed grounds the trees and vines were more or less injured, and many were killed outright — while in the other enclosure, protected by the young timber, not a tree was killed, and few sustained any injury at all.

WATERING NEWLY PLANTED TREES.

THERE is an increasing disposition throughout the country to plant both fruit and ornamental trees. The largest proportion of the trees that are now planted are by persons whose previous experience affords but little knowledge of the requisites for successful cultivation, and hence we meet with many that undertake planting who fail of complete success. Trees that have been removed from the nursery and transfered to the orchard or the lawn, are generally deprived by the process of many of their minute and tender rootlets, which constitute the mouths through which they receive their nourishment from the soil. In order that the trees may recover from the check sustained by removal and loss of roots, it is not only necessary that they be again set with care in well prepared, rich soil, their roots extended in their natural position, and as deep, but no deeper than they grew in the nursery; but in order to re-establish a free and vigorous circulation and thrifty growth, frequent watering, in seasons of dry weather, is necessary. But as this is too often done it proves of but little benefit if it does not result in absolute injury. Besides moisture, trees and other growing plants require the free access of a certain degree of heat and air to the roots. The method of watering practiced by most persons tends, in some degree, to deprive the tree of both these essential elements, while the water that is applied is rapidly evaporated, caused by the formation of a hard and almost impervious crust upon the surface of the ground, around the trees. This may be prevented by removing an inch or more of the surface soil around the tree before the water is applied; and when it has entirely settled the loose earth should again be replaced. Or a better and more economical method is to cover the surface of the ground, for some distance beyond the roots of the tree, with old straw, saw-dust, or light litter of any kind. A covering of this character renders the surface light and mellow, and will retain moisture for a long time; and when the work is otherwise properly done secures almost certain success. When it is necessary to apply water let it be done copiously and at longer intervals, which is better than to apply a less quantity more frequently. There are many persons who are otherwise good cultivators, and bestow the requisite attention upon their garden and field crops, but who seem to think that trees need no further care and cultivation after they are once set in the ground. This is a mistake. No annual crop requires more thorough culture than trees, of whatever kind.

CONNECTION BETWEEN LEAVES AND ROOTS.

WRITTEN EXPRESSLY FOR THE RURAL ANNUAL AND HORTICULTURAL DIRECTORY, BY THOMAS MEEHAN, GERMANTOWN, PA.

THE relationship between roots and leaves is generally known to a certain extent, but how very close this relationship is, is not so well understood; or, when known, is as much practical value derived from the knowledge as ought to be?

If we place a cutting in the earth, it grows bofore it roots. A grape vine, for instance, will push forth its buds an inch in length, and have leaves of considerable size before a root appears. This shoot and leaves feed on the matter stored up in the wood during a previous growth, just as a seed feeds on the matter stored in the seed leaves, or an unhatched chicken on that which is in the egg; but it is only after new roots have been formed that real growth commences. Without the partial expanding of the bud new roots would not form; and, on the other hand, without the formation of young roots there would be no new growth. Both processes must go on together.

It is useful to remember this fact, for one reason particularly, that we can make the knowledge very useful in the treatment of transplanted trees. To allude again to our illustration of the grape vine cutting: Many persons would suppose when they saw the buds burst and the leaves form that success had been achieved; but the practical gardener knows then is the most critical time; and not until he sees absolutely new foliage, which can readily be distinguished by a delicate green growth from the old bud-leaves, does he feel at all safe. So a transplanted tree may push out in the spring, and remain all summer covered with foliage, and be in great danger of death the following year. Remembering that it is only when new growth is formed, that roots are at the same time produced, we should have a care that our transplanted tree grows, as well as bears leaves, or it will have no roots to support it.

If trees retain their vitality and yet do not make a new growth of wood, the reason is that there is too much evaporating surface. The

old roots have been so much injured by transplanting that the limited supply of moisture they are able to imbibe from the soil, scarcely supplies the demand of the atmosphere on the branches, and growth is out of the question, if absolute death do not at once ensue; but if we pluck off a portion of the leaves, or what is better, cut back a portion of the branches, thus lessening the demand on the weakened roots for moisture, a new growth at once commences, new roots are immediately formed, and a renewed vigor of growth again follows.

There are a few apparent exoeptions to the rule that roots do not grow without a corresponding production of healthy growing shoots. For instance, if we transplanted a tree just after the leaves have fallen, and in a few weeks after that take it up and examine again, we find that a lot of new fibres, from a quarter to half an inch in length, have been produced; and if we lift a tree at any time through the winter, we find below the reach of frost a few rootlets with their points or spongiolets in an apparently active state; but an examination in spring of trees transplanted late in the fall or winter, shows that they have produced no new rootlets; and the others, transplanted very early in the fall, also show that the roots are but of the same length as then — one-quarter to one-half an inch long; clearly proving that the real growth of roots was limited to a very short time after the fall of the leaf, and was, indeed, but a lingering relic of leaf action; just as in animal bodies life will often be found in some one member sometime after all the rest have been, to all intents and purposes, quite dead. The evidently active appearance of rootlets in winter is not that they are really growing in winter, but that they are absorbing moisture. This they do all through the winter when not absolutely encased in frost. Many pounds of water are gathered together in the wood of plants in spring, that have been collected by the rootlets through the winter, though much of what they absorb is again taken from the tree by evaporation which goes on through the bark all the winter, and great in proportion to frost and wind. The error that roots grow in winter is a very prevalent one, and leads many excellent men who fall into the extreme of thinking too much and observing too little, in opposition to the contrary extreme of discarding all "book learning," into an indiscriminate recommendation of fall planting, so as to gain the supposed advantages of a long winter root growth. But when we take into consideration that heavy evaporation is going on all winter, and that root growth is very small indeed, it will be seen that the risks of fall planting must be very great; and, indeed, so it is found in practice. If trees can be moved within say two or three weeks

after the fall of the leaf, there is a manifest advantage in fall planting, as roots do continue growing for that period; and with such a chance to collect and store up moisture for the sudden and exhausting demands of bud-bursting time, the tree will stand a much better chance of doing well than if transplanted at the usual spring season.

The reciprocal action of leaves and roots have also a great bearing on the pruning question. Although it is not true that the roots extend from the trunk only so far as the branches extend — for we know a Lombardy Poplar will send out its roots perhaps fifty feet, while its branches may not be fifteen feet wide — yet they do in a certain sense depend on the absolute length of the branches; for when we cut away many branches roots die in proportion. A grape vine that is never pruned sends out its roots a long way, but one that is annually cut back never sends its roots far. They die in proportion to the quantity of pruning performed.

The result of summmer pruning, however, is very different from winter pruning; although the effect, namely: the destruction of roots, is the same in both instances. In winter pruning, though many rootlets die away by the pruning, the proportion to the amount of stem left is usually in excess, and it causes the stem to push forth with great vigor, but so great is the loss of roots that the greatest amount of vigor apparently induced by pruning, never enables the tree to anywhere approach one left entirely unpruned. If two willows are planted side by side, one suffered to grow as it will, the other annually headed down to about four feet from the ground, as is customary in basket making, the neglected tree in ten years would probably be four feet in circumference, while the osier bush would not probably reach two feet. In summer pruning the proportion of roots left is to the disadvantage of the branches. By taking off the growing leaves not only do the old roots die, but the plant can with difficulty form new ones. A few new leaves will push from any matured buds that may have had time to perfect themselves, and by these new roots will be enabled to push; but if these be again destroyed before they have had much time to afford assistance to the vast producing power, death is almost inevitable.

This fact that roots die whenever a plant is pruned, or its foliage torn away, is a very important one to the farmer, for other purposes than the management of trees. The mass of carbonaceous matter which roots introduce into the soil from the atmosphere is no mean item in a calculation for the improvement of the soil. In the history of the earth, a piece of wood perhaps no larger than a man's hand has

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floated on almost still water of some mighty lake. On this some coarse moss, generated by small sperms, floated perhaps hundreds of miles through the atmosphere, would take root and thrive. Dust and sand blown through the air in windy weather, would settle and get collected by the moss, which, by this, and by its own debris, gradually became, in the course of ages, acres in extent, and many yards in depth, sinking by the weight of animal life and death gradually, till it touched bottom and the sides of the main land, when washings from the steep hills around commence to overflow the moss, and in after ages beds of rich peat are found far under the surface of the earth. This is the origin of peat beds, in the formation of which the production of roots form so conspicuous a part; and the rich value of which, in an agricultural sense, every one understands. All of this is derived from the atmosphere, and the production of roots in the natural soil, is a sort of peat making process, with the only difference of earth for water as the supporting medium. Peat is called turf in some countries, and in others what we call in this country a tough sod, is called turf, so that by a sort of natural instinct, language apart from agricultural science, traces the analogy between the two in its own way. Continual growth of grass would in time produce this peaty sod. Whenever with the end of the growing season the foliage or blades of grass dies away, the roots or fibres follow suite, and as this process goes on every year as in the peat beds, the soil soon becomes filled with subcarbonized matter in the shape of decaying roots. This process can be much accelerated by cutting away the foliage several times a year. This is the effect of pasturing. Every one knows how productive an old pasture is when broken up. Corn and potatoes particularly thrive so well under no other circumstances. Many refer this excellence of old pastures to the manuring from the animals — returning to the soil what they take from it as food; but this is by no means a sufficient explanation. Much of the matter taken from the soil as food gets away, especially in the milk of cows. The formation of new fibres in the soil by the constant cropping has much to do with the matter. Every blade bitten off causes another blade to push, and this process embraces each time the death of old fibres and the production of new ones. The whole surface in one year of pasturage will become such an interwoven net-work of fibres that it can be pared off half an inch thick, and rolled into solid masses like a flannel pudding, and as tough as a roll of tow.

There is another consideration which the relation between roots and leaves suggests in the management of lawns and permanent meadows

or pastures. To have a lawn green in summer it is important to have the roots run deep. To this end we sub-soil and underdrain in order to encourage a loose, cool under stratum into which the roots may be coaxed to go during the severe drouths of summer. But if the rootlets die when we cut back the blades of grass, the roots can go only so far before they are arrested and destroyed, and it follows that the oftener we cut the grass, the less chance have the roots to penetrate deeply. When, therefore, it is desirable to give the grass a good start by long roots, the grass should not be cut often; and this will generally be the case with lawns the first year of their being seeded down. It should not be cut more than once or twice the first year; after that the natural fineness of foliage, which is the chief charm of well-kept lawns, though indicative of a weakened constitution in the grass, may be secured by frequent mowings, without the risk of entirely destroying some of the stock. We have known lawns made of Perennial Rye grass entirely destroyed by mowing too often the first year of being seeded down.

In the management of hedges, also, the weakening process of disturbing the relations between roots and leaves has been well taken advantage of. Most plants employed for live fences or hedges are quick growing trees, as the Honey Locust or Osage Orange, Norway or Hemlock Spruce. We can not wait for hedges of a slower growth. Human life is too short. It does not pay, especially as by judicious annual pruning we can so weaken these trees as to make them to all purposes mere shrubs. The topmost branches of a tree, for reasons which it is foreign to our subject here to explain, always grow the strongest. By cutting away the strong top shoots while they are in the green vigor of youth, we accomplish two good purposes. One is, that the natural arborescent vigor of the plants are checked by the act, as already fully explained, and the other, by leaving the weaker side shoots untouched, they, immediately after the fall of their dominant brethren, have their roots encouraged, and these in the nature of the law of reciprocity, also explained, fall to in strengthening their growth, until the sides of the hedge, which, in a state of neglect or mal-practice, is the thinnest and meanest portion of the hedge, becomes as strong as the top, and the whole face of the hedge, from bottom to top, is as a hedge should be—a truly protective fence.

There are a great many practices in agriculture and horticulture which a clear perception of the relation between leaves and roots will enable one to understand to much greater advantage, than he can who is ignorant of this knowledge; but the limit of this chapter will not

permit of their being severally touched on. One of them, however, is of such close connection with the now debated question of the best management of orchards, that we can not refrain from alludi g to it; leaving the reader to form his own conclusions, or to apply the information to his own practice. By the exhalation of water from the soil, the latter becomes heated; as when water escapes, the heated air enters. Water heats slowly. Soil that has little water heats rapidly. Close, compact soil heats rapidly—not because it is close and compact, but because it has few small spaces or pores to retain water. Coarse, gravelly soils heat as rapidly as hard porous ones, because the cavities are too large to hold water, and the hot air easily circulates through without obstruction. Hard, "baked" surfaces, hence, soon become hot and dry. "Cultivated," as we generally term loosely broken surfaces, also soon dry, because they have, generally, clotted surfaces, which means large spaces as in coarse, gravelly soils; though usually there is so much finely broken soil that it does not become so hot or dry as the "baked" surface. If a heavy roller could be constructed to go after the cultivator so as to crush the loosened soil finely, it would be a great advantage. Long grass suffered to nearly reach maturity also dries ground rapidly, because the unchecked growth does not encourage strong surface fibres, but rather a few deep, vigorous ones, which, while in the absence of surface fibres to make the soil porous, enables the sun to dry up the rain-beaten top soil, and draws up all the moisture in the sub-soil, to be evaporated by the foliage.

In all these circumstances soils dry, as we have said, fast and rapidly. But if the grass be cut several times through the season, so that the roots are not enabled to run deep, so that they are induced to become very fibrous towards the surface, and so that a dense tuft of non-conducting material is produced to entirely cover the surface, a constant fibrous porosity is maintained, the sun's rays are in a measure excluded, and the cool moisture is not drawn from the soil—circumstances all favorable to the healthy summer growth of trees.

We are offering no opinion here on the merits of cultivating or grassing orchards — that is not our subject; but simply to point out that where summer coolness and a moderate retention of earth moisture is considered a desirable object, the regulation of the depth, direction and quantity of roots by constant cropping of the grass foliage, will readily effect it. No one would suspect what a difference there is in the temperature of a clean, cultivated surface over one under a regularly mowed lawn. The day of this writing (August 8th) the thermometer one foot under a cleanly cultivated grape border on the

grounds of JAMES WRIGHT, Esq., of Philadelphia, as tested for me by Mr. W. JOYCE, his gardener, stands at 98°. Only four feet from this spot, on a closely kept lawn, and at the same depth of one foot, the thermometer is but 82°. Of course if the grass were suffered to grow to maturity, and thus have its roots run deep, and all the moisture abstracted from the soil, there would be very little difference in the temperature between either. The result is entirely owing to the management of the roots by checking the foliage as it grows.

HIGH FEEDING. — In fattening cattle and sheep, or in keeping milch cows, few farmers appreciate the advantages of high feeding. A large amount of food is required to keep the animal alive, and the milk or flesh and fat which we obtain is derived from the food given in excess of this quantity. If a horse will draw a tun, and the empty wagon weighs 15 cwt., we can only take a load of 5 cwt.; but attach another horse and we can take a load of 25 cwt. In other words, the effective power of the two horses is five times as much as the one.

It is so in feeding milch cows and in fattening cattle and sheep — it is the few pounds of extra feed that we give which produces the desired milk and fat. To give only enough food to keep the animals in a stationary condition, when the object is to get them fat, is manifestly absurd, and to give them only a little more than is necessary, and thus get only a little fat, is also very poor economy, when by a few pounds more food we might double or treble the amount of fat or milk.

LET YOUNG ANIMALS HAVE GOOD CARE AND GOOD FOOD. — It is as unprofitable as it is cruel to starve young animals. They never get over it. Better put the old ones on short commons. They can stand it, on a pinch. But young animals are growing, and need plenty of good food to furnish bones and sinews. We believe in the importance of a good pedigree, but it must be admitted that there is much truth in the proverb, "the breed goes in at the mouth;" and this is especially the case while the animals are young.

THE best method to preserve cabbage in the winter, is to gather them early, say about the first of November, when they are perfectly free from moisture, and hang them up in a cool, dry cellar. The great secret lies in their being kept dry until needed for use.

TEN RULES

TO BE OBSERVED IN MAKING BUTTER.

In making good butter, there are several nice operations to be gone through with which require an eye to cleanliness, forethought, and some little experience :

1. On milking clean, fast, yet gently, regularly twice a day, depends the success of the dairyman. Bad milkers should not be tolerated in a herd ; better pay double the price for good ones.

2. Straining is quite simple, but it should be borne in mind that two pans, about half full each, will produce a greater amount of cream than the same milk if in but one pan ; the reason of this is the greater surface.

3. Scalding is quite an important feature in the way of making butter in cool weather ; the cream rises much quicker, the milk keeps sweet much longer, the butter is of a better color, and churns in one-half the time.

4. Skimming should always be done before the milk becomes loppered ; otherwise much of the cream turns into whey and is lost.

5. Churning, whether by hand or otherwise, should occupy forty to fifty minutes.

6. Washing in cold, soft water is one of the preserving qualities of butter, and should be continued until it shows no color of the milk by the use of the ladle ; very hard water is highly charged with lime, and must in a measure impart to it alkaline properties.

7. Salting is done with the best kind of ground salt ; the quantity varies according to the state in which the butter is taken from the churn — if soft, more ; if hard, less ; always taking the taste for the surest guide.

8. First working, after about twenty-four hours, is for the purpose of giving the butter greater compactness.

9. Second working takes place at the time of packing, and when the butter has dissolved the salt, that the brine may be worked out.

10. Packing is done with the hands or with a butter mall ; and

when butter is put into wooden vessels, they should be soaked two or three days in strong brine before using. After each packing, cover the butter with a wet cloth, and put a layer of salt upon it; in this way the salt can be removed at any time, by simply taking hold of the edges of the cloth.

Butter made in this way will keep any length of time required. — *J. C. Adams, in Genesee Farmer.*

Proper Time and Mode for Cutting Flowers.—*The Irish Country Gentleman's Journal* says: "Those who wish to retain the beauty and perfume of their cut flowers would do well to take the following advice: never cut your flowers during the intense sunshine, nor keep them exposed to the sun or wind; do not collect them in large bundles, nor tie them tightly together, as this hastens their decay. Do not pull them, but cut them cleanly off with a sharp knife, not with a pair of scissors. When taken in-doors, place them in the shade, and reduce them to the required length of stock with a sharp knife, by which means the tubes through which they draw up the water are left open, and the water is permitted to ascend freely, whereas, if the stems are bruised or lacerated, these pores are closed up. Use pure water to set them in, or pure white sand in a state of saturation, sticking the ends of the stalks in it, but not in a crowded manner. If in water alone, it ought to be changed daily, and a thin slice should be cut off the ends of the stalks at every change of water. Water about milk-warm, or containing a small quantity of camphor dissolved in spirits of wine, will often revive flowers that have begun to fade. Place a glass shade over them during the night, or indeed at all such times as they are not purposely exhibited. Shade them from very bright sunshine, and when uncovered, set them where they may not be exposed to a draught of air. A cool temperature during the summer is favorable for them, and the removal of the slightest symptoms of decay is necessary. When carried to a distance, carry them in a shallow, air-tight tin case, or cover them with paper to exclude them from air and light. Charcoal saturated with water is also a good media to stick them in, and the thinner they are kept the better."

One of the best English rose growers, Mr. Wood, says that roses must not grow many years together in the same soil. He is undoubtedly right, and the same may be said of many other plants.

A FEW WORDS ABOUT LIME.

LIME is not as was once supposed, an *element*, but consists of the metal calcium united with the gas oxygen, and is properly an oxide of calcium, just as potash, soda and magnesia are oxides of potassium, sodium, magnesium. It is never found pure in nature, except occasionally in the craters of volcanoes, but is usually united with carbonic acid, for which it has a strong attraction. In this state it is neutral, and insoluble in pure water. When limestone or any other form of carbonate of lime is exposed to a sufficiently high temperature with access of air or moisture, the carbonic acid gas is driven off, and the lime which remains is called *quick* or *caustic*, from its strong alkaline re-action. When such lime is plunged into water for a short time, or water is poured upon it, heat is evolved, the lime swells, cracks, gives off much watery vapor, and finally falls to a powder. This powder, or slaked lime, is a *hydrate* of lime, water being chemically combined with it. In this state it is still caustic, though somewhat milder than when fresh from the kiln.

The rise of temperature is so great when large heaps of good lime are suddenly slaked, as to inflame gunpowder and scorch wood; it certainly exceeds, according to PELLETIER, 500°; and when the operation is performed in a dark place, light is also evolved. All sorts of imaginary causes have been assigned to account for these phenomena. They are referable, however, to a very simple and universal law. All substances during their change from a gaseous to a liquid, or from a liquid to a solid state, evolve heat, and *vice versa*. The intense cold produced by liquifying ice or snow by admixture with salt is a familiar instance of the latter; and the heat evolved in solidifying carbonic acid under intense cold and pressure, is sometimes dangerous evidence of the former — the expansion of air consequent on the sudden liberation of heat from the carbonic acid in the moment of congelation, not unfrequently shattering the vessel to atoms.

Lime in slaking will absorb one-fourth its weight of water; but the slaked lime is not more moist than before. The water unquestionably, therefore, is chemically combined with the lime, and becomes *solidified*; and it is simply owing to this solidification of the water that heat is evolved.

Caustic lime has a strong affinity for water and carbonic acid. When

kept in a dry place, it gradually slakes, cracking, splitting and crumbling to powder with the evolution of heat — which, however, is not so perceptible on account of the length of time during which the process is extended — just as though it had been slaked by pouring on water. In this case the lime has obtained the twenty-five per cent. of water it needs to slake it from the atmosphere. There is this difference, however, between *air-slaked* lime and that which is water-slaked. The former is slaked precisely as the latter by the absorption of water, but it also absorbs carbonic acid from the air, and instead of being simply a *hydrate* of lime as when water-slaked, it is a definite compound of hydrate and carbonate of lime, 42.6 per cent. of the former, and 57.4 of the latter. *Air-slaked* lime, therefore, is far from being so caustic as water-slaked lime — upwards of one-half of it being reconverted into the same chemical state as it was in before burning.

After the lime has absorbed sufficient water and is completely fallen to pieces, carbonic acid is absorbed much less rapidly, especially in damp situations. In fact, though there is a constant tendency in lime to return to the state of carbonate in which it existed previous to burning, yet, by mere exposure to the air, it does not attain this state in any assignable time. In some walls six hundred years old, the lime has been found to have absorbed only one-fourth of the carbonic acid necessary to convert the whole into carbonate; in others, built by the Romans eighteen hundred years ago, the proportion absorbed has not exceeded three-fourths of the quantity contained in natural limestone.

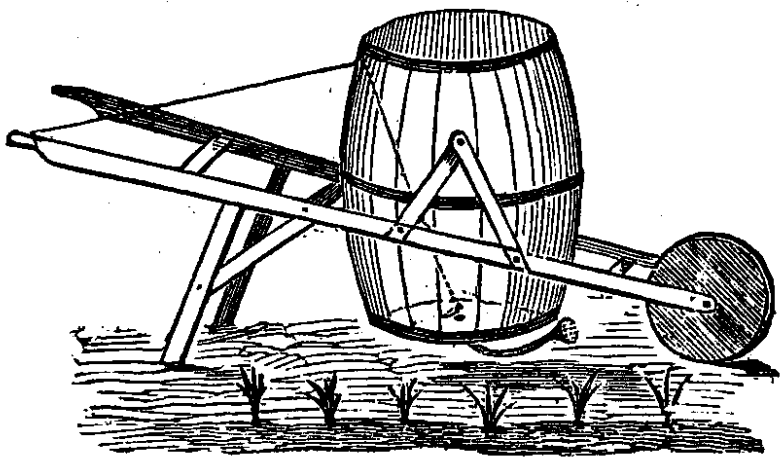
When slaked in the ordinary way, by the application of water, lime falls to pieces without the absorption of but little if any carbonic acid. But when slaked and exposed to the air, the absorption of carbonic acid is at first very rapid, but it gradually becomes very slow, and probably the same definite compound of hydrate and carbonate of lime is formed as in the case of air-slaked lime.

The original limestone, or any other form of carbonate of lime, then, is perfectly mild. By driving off the carbonic acid by heat, we get lime which is very caustic. By slaking this with water, we get a less caustic substance — hydrate of lime. By allowing it to air-slake, we get a still less caustic compound — a definite compound of hydrate and carbonate of lime. And by exposing it to the air for a sufficient length of time, we ultimately get the whole reconverted again into its original mild form — carbonate of lime.

The commonly received notion that air-slaked lime is stronger than water-slaked lime is an error. It is, in fact, not so strong.

A WATERING BARROW.

In describing this barrow it is desired to bring into notice, not only a very useful apparatus, but also one that every gardener may make for himself. There are plenty of excellent machines for watering gardens, but they cost money. In nine cases out of ten this one need not cost a cent.



The arrangement, as may be seen by the cut, is very simple. Having selected a good water tight barrel, put through it a strong wooden bar, with the ends rounded and projecting two or three inches from the sides. This bar should be a foot from the top of the barrel. A hole is then bored in the bottom of the barrel, and a piece of leaden pipe, about two and a half feet long, inserted and secured. A valve with a leather hinge is then placed over this hole. A string from the valve is passed over a pulley, which may be made of a common spool, near the top of the barrel. This being done, mount the barrel on such a barrow as is shown in the cut, put a rose upon the leaden pipe, fasten the valve string to the right handle of the barrow, and the machine is made. If there are no unused barrow wheels on the premises, one may be made by sawing two thick pieces of plank in a circular form, and nailing them together, with the grain of one at right angles with the grain of the other. Bore and chisel a square hole in the centre of this and insert an axle, which is easy of construction.

The peculiar convenience of this watering barrow is, that it may be wheeled along a row of vegetables or flowers, and by pulling the valve-

string with the fore-finger of the right hand, the water will flow from the rose until the barrel is empty, and the row will be watered with very little trouble and much expedition. If another pipe and rose be placed so as to project from the other side, both valves may be worked as easily as one, and two rows watered at the same time. The pipe being flexible, may be bent so as to suit the distance between the rows, the height of plants, etc. This apparatus is particularly adapted to places where there is much "row watering" to be done. — *F. R. S., Burlington, N. J., in Gardeners' Monthly.*

VALUE OF LEACHED ASHES.

In conversation with an agricultural friend, sometime since, he mentioned that he had found great benefit from the application of old leached ashes to wheat, especially on sandy soils. In one instance, one hundred bushels of ashes per acre, spread on the soil after the wheat was sown, gave him an increase of ten bushels per acre. He has spots on his farm where he can see the beneficial effect of unleached ashes, applied nine years ago, every time the lot is sown with wheat. He has tried unleached ashes with no benefit to wheat, though he thinks them good for corn. To what is the fertilizing property of old leached ashes owing? We cannot definitely answer this question. We are inclined to think, however, that it is owing in some way to a substitution of the alkali ammonia for the potash and soda, which have been leached out. It may be that they contain the double salt of silicate of alumina and soda, to which clay owes its power of retaining ammonia. If this is the case, by adding leached ashes to a sandy soil, we add ammonia, or at least, the means of retaining the ammonia brought to the soil by rain from the atmosphere; and that, too, in the best condition for assimilation by the plant. Taking this view, it would follow that the older the ashes, and the more they had been exposed to rain, the better and stronger they would be for manure.

But whatever difference of opinion there may be as to the cause or reason of the fertilizing value of leached ashes, all agree that they are valuable for wheat on sandy soils.

There are in many parts of the country old asheries, from whence

leached ashes can be obtained at a mere nominal price; and it is truly surprising that they are not more extensively used. The fall is the best time to apply them, though they might be spread on the wheat, while more or less snow is on the ground in the winter, to advantage.

SHEEP NEED WATER. — Some farmers think that sheep need little or no water in winter—or at least they think if they need any they can eat *snow*. JOHN JOHNSTON, one of the best farmers and most experienced sheep men in this State, has a pump in his sheep yards, and is particular to pump up all the fresh water his sheep will drink. In Mr. LAWES experiments on sheep each sheep drank on an average over forty pounds of water per week. Now does any one think they would drink three quarts of water per day if they did not need it?

To deny sheep water in winter is manifestly injurious; and to compel them to obtain it from snow is very unwise. A great portion of the food consumed by all animals in winter is expended in maintaining the heat of the body, and the heat required to melt the snow which the sheep eat, is so much taken from the animal, and enhances the demand for food. Some years ago we recollect seeing a statement in the *Boston Cultivator* that a livery stable keeper in that city found it very advantageous to give his horses warm water. We have no doubt that they would require less food, and it is certainly more economical to warm water with wood or coal than with hay and oats.

BUGS ON CUCUMBERS. — Many plans are recommended for driving away or destroying bugs on cucumber and melon vines, but the following is certainly effective: To exterminate striped bugs, visit your vines at least twice each day, sprinkle with water so that the rebels can't fly away, catch them between your thumb and finger, and *press hard*. You will save your vines, and in the end will find it the surest and cheapest method.

DUST ON TREES A PROTECTION FROM FROST.—A French horticulturist, M. JULES DE LIROR D'ARIOLES, proposes to cover fruit trees with fine powder or ashes to protect them from frost, as he says it has often been remarked that fruit trees planted near a public road were not as much affected by frost as those in the interior of the garden, and it is thought that the dust arising from the road is the cause of this difference.

MULCHING WITH MANURE.

THE *Illinois Farmer* truly says: "The difficulty with our summers is that there is too much drouth. A rich, mellow soil is, in part a preventive of this. A coat of straw, sawdust, tan-bark, or almost any covering, will prevent the sun from striking the soil, and the ground will consequently be kept more moist. But these applications require labor. To remedy this when manure is applied to enrich your land, let it be done as much as possible as a top-dressing, we mean on grain as well as meadows or pastures. Draw rank manure — any manure — early in the fall, upon your meadows or grass lands, spread at once, but on cultivated land manure can only be applied to the surface after the harrow has left it, and then it should be applied. It may be harrowed in or not. It will not only add fertility to the grain, but at the same time afford covering against the sun and wind of great importance. This is getting to be understood now. It is the protection from the sun that makes it so advantageous. Raw or unfermented manure may be used on grain in this way with perhaps little, though some, injury at first. But not so much as on meadows. Rank manure is bad applied on meadows in the spring. It is beneficial then only as a mulch. Let farmers try little spots of grain in this way for an experiment, and they will see what a discovery they have made. It will not do to say the soil is rich enough — the soil is deteriorating; and increased richness adds increased abundance of most products. When once exhausted it will be too late. We will then have the soil of Italy, Ireland, Egypt and Greece, and all the ancient domain. It is considered an impossibility to reclaim such soils. This should be avoided, the soil kept good, and now is the time to do this. Land mulched with manure has the advantage both of moisture and fertility; two things gained in one. Mulching is assuming an important rank in agriculture. It is the coat that protects."

HOW TO HAVE SOUND APPLES.— Pick up all the fruit that falls from the trees, and boil them for the pigs, or if nothing more, throw them into the pen, so that the worms or larvæ may be destroyed, and save so many from perpetuating their kind for another season.

THE CULTURE OF ROSES IN POTS.

D. THOMPSON writes in the *London Cottage Gardener* a long and excellent article on this subject, from which we make the following extract. It is given in reply to a correspondent who asks for information how to grow potted roses in quantities :

"Although you do not say so, we infer that your object is to get up a stock of roses in pots, for blooming under glass in spring and early summer, and there is scarcely any other object in the whole round of gardening that is so likely to prove a source of pleasure to those who are fond of that which is sweet and beautiful. Supposing, then, that you desire to have roses in bloom next spring, there are two ways by which your end can be attained : you can either procure plants that are already established in pots and in a fit condition to be gently forced into bloom, or you can get plants from the nursery rows in autumn and pot them yourself. And as it is your object to grow extensively, the latter is the course that is to be recommended, as being not only the cheapest way of obtaining a large stock, but will, by following the directions which shall here be given, prove perfectly successful.

"You should go to some good rose nursery early in autumn, and get the first pick of the number you require from the nursery rows. Choose those that have broken from three or four buds, that have made half a dozen strong, healthy shoots, and have stocks only a few inches high, or, perhaps, better still, that are grown on their own roots. Let your selection be marked, and having secured them, leave them where they grow till the middle of October, about which time they have generally pretty well matured their growth and are shedding their bottom leaves. This is the proper time to lift and pot them with the view of getting them to form fresh roots before winter, and by gentle forcing to secure a crop of bloom the following spring.

"The plants should be lifted with care, preserving every twiggy root, and shortening with the knife those that are strong and pithy. Pot them firmly in pots ranging in size from six to eight inches. The soil most suitable for them is a rather heavy loam, with about a third of well rotted hot-bed manure or cowdung, with a slight addition of road grit or coarse sand. The pots should be well drained, and in potting

the roots should be nicely distributed among the soil. When potted and watered plunge them at once in a pit or frame where there is a gentle bottom heat. Keep them rather close for ten days, and when the days are dry syringe them morning and afternoon, and keep them shaded from the sun. After the first fortnight the lights may be taken off them for a few hours in the morning and evening, always putting the lights on for the night; but do not shut them down closely.

"The gentle bottom heat and the close moist atmosphere will maintain the action of the roots and leaves, and by the end of November they will have made fresh roots to a considerable extent, and the buds on the last season's growths will be as firm and prominent as those which have not been disturbed at all. The leaves will be all shed, except a tuft at the top of each shoot. If by this time the bottom heat has not entirely gone they should be removed to some cool place. Their removal from such quarters will in most cases be a matter of necessity, as few are the places where there is such accomodation to devote to wintering plants that can be otherwise protected. They can be plunged in some sheltered place where heavy rains and severe frosts can be guarded against. Sawdust or cinder ashes form excellent material for plunging in, as either of these is not so subject to the destructive inroads of worms, and forms a better protection to the roots than common garden soil.

"The time to prune roses thus treated must be regulated and determined by the time that they are required to bloom in spring. In our own practice we have several times had roses in bloom, under similar circumstances, early in March; and when required so early they should be pruned by the middle of December. It gives the plants a much better chance the first year; and, looking at them as permanent objects, it is far the best way to keep them at rest till the middle of February. Let it, however, be supposed that you would desire a few of them to flower in March, that few must be pruned at the time named above. Cut them back to two or three eyes, according to the strength of the shoots, always cutting more closely in the case of the weaker growths.

"By the first week in January they should be introduced into a temperature of 45° to 50° at night, and if they can be afforded a bottom heat of 60° it will be much to their advantage in causing them to break regularly and strongly. They should be kept near the glass, and be freely syringed with tepid water at least twice a day—morning and afternoon.

"As soon as the shoots attain about an inch in length increase the

temperature by 5°, and on every favorable opportunity admit a good supply of fresh air. Keep them away from the heating apparatus, and shut up early in the afternoon with a moist atmosphere. There are few things more adverse to roses than a dry atmosphere. Increase the temperature gradually to 60° by the time they show their bloom-buds.

"Green fly is a great pest to forced roses, and must never be allowed to gain a footing; but their most treacherous and destructive enemy is the small black maggot, with which all rose growers are familiar. It folds itself up in the leaves, from which retreat it sallies and eats into the centre of the rosebud when little larger than a pea. There is only one way, that I am aware of, that you can cope with this enemy, and that is to look over the plants every day; and wherever you see the leaves folded up or sticking two together, there you will find a maggot which you will destroy with a hearty good will, and put an end to his gluttonous repast. When the buds show themselves above the foliage, be sure to give a free admission of air on all occasions when weather will permit, at the same time avoiding currents of cold air. If this is not attended to, the flowers and their stems will be weak and short lived.

"Immediately the flowers begin to show their color the plants must be removed to a house where the temperature ranges about 55°, giving the plants plenty of room, light and air. Here they will not only open their flowers with a higher color and a greater perfume, but the stems and leaves will acquire a degree of stiffness and strength so desirable in roses, and which cannot be attained in a higher temperature and a moister atmosphere. When in full bloom a temperature of 50° is sufficiently high. Under such circumstances they will remain in bloom a long time, more particularly if shaded from the sun, and carefully attended to with water at the root — that is, if the soil is preserved in that genial condition so commonly described by gardeners as 'neither wet nor dry.' Under such circumstances as these you can have the enjoyment of a display of this queen of flowers next March; but as already stated, it is the better way for the plants to let them break the first season of their own accord, and let them be bloomed with less artificial heat."

The best roses for pot culture, Mr. THOMPSON says, are the Hybrid Perpetuals; and that the Teas, although very fine, do not bear early forcing as well as the Hybrid Perpetuals.

There is no comparison between the roses grown in this way and those grown in the open air. Indeed, it is the only way that some varieties can be seen in any degree of perfection at the North.

THE MOLE AS A WORM EATER.

"NOTES on the Mole," by the Rev. J. G. WOOD, in Messrs. GROOMBRIDGE'S entertaining magazine, show how well worthy of accurate study by the naturalist our native animals are. Some young friends captured a mole, and brought it to that naturalist, secured in a large box. It ran about with great agility, thrusting its long, flexible snout inte every crevice. A little earth was placed in the box, when the mole pushed its way through the loose soil, entering and re-entering the heap, and in a few moments scattering the earth tolerably evenly over the box, every now and then twiching convulsively and shaking the loose earth from its fur. At one moment the mole was grubbing away, hardly to be distinguished from the surrounding soil, completely covered with dust; the next instant the moving dust heap had vanished, and in its place was a soft, velvety coat. The creature was unremitting in its attempts to get through the box, but the wood was too tough for it to make any impression, and after satisfying itself it could not get through a deal board, it took to attempts to scramble over the sides, ever slipping sideways and coming on its forefeet. The rapid mobility of its snout was astonishing, but its senses of sight and smell seem to be practically obsolete, for a worm placed in its track within the tenth of inch from its nose was not detected, although no sooner did its nose or foot touch one, than in a moment it flung itself upon its prey and shook the worm backwards and forwards and scratched it about until it got one end or other into its mouth, when it devoured it greedily, the crunching sound of its teeth being audible two yards away. Worms it ate as fast as supplied — devouring fourteen in thirteen minutes, after which it was supplied with a second batch of ten. It was then tried with millepedes, but invariably rejected them.

Having heard from popular report that a twelve hours' fast would kill a mole, Mr. WOOD determined to give his captive a good supper at eight and an early breakfast the next morning at five or six. So he dug perseveringly a large handful of worms and put them in the box. As the mole went backwards and forwards it happened to touch one of the worms and immediately flew at it, and while trying to get it into his mouth the mole came upon the mass of worms and flung itself

upon them in a paroxism of excitement, pulling them about, too overjoyed with the treasure to settle on any individual in particular. At last, it caught one of them and began crunching, the rest making their escape in all directions and burrowing into the loose mould. Thinking the animal had now a good supply, two dozen worms having been put into the box, Mr. Wood shut it up with an easy conscience; but it happened the following morning, that the rain fell in a perfect torrent, and, hoping for remission, he waited until nine o'clock before he opened the box. Twelve hours had just elapsed since the mole had received its supply, and as it had taken probably another hour in hunting about the box before it had devoured them all, not more than eleven hours had probably elapsed since the last worm was consumed. But the mole was dead. "I forgot," Mr. Wood says, "to weigh the worms which he devoured, but as they would have filled my two hands held cupwise, I may infer that they weighed very little less than the animal who ate them." The extreme voracity and restless movements of the little creature here recorded, show its value to the agriculturist "as a subsoil drainer who works without wages," and its great usefulness in keeping down the prolific race of worms — themselves useful in their way as forming in the main, the fertile soil itself.

Ducks as Garden Helps.—These are wholesale devourers of insects, the slug, and beetles occasionally, but not when any other food is plentiful; the larvæ, however, they gulph down should they make their appearance near the surface. They also destroy wire worms and dew worms, but seem to respect them when fecundating in July; and they put their bills into strawberry beds, breaking some plants off or trampling them to death and into Thrift and Box edgings, and mostly suck in something, as often bits of sand and quartz as anything else. In reality they are useful in a garden, and of great service to the gardener. In point of damage they break succulent plants, as Calceolarias, aud sodden the ground by their putting some four pounds pressure so frequently in one place, and the dirt made by them is not pleasant to the eye.

A couple of ducks are enough in a garden of one acre, and they may rear their young until five weeks old, when they must be put out of the garden altogether.

It is advantageous to have a small pond in which they can swim and

wash themselves; but it is not absolutely necessary, for a shallow galvanized basin (ours is two feet by six inches,) will answer the purpose of drinking, a wade trough, and a wash besides. They must be fed once daily in the morning in summer, and twice daily in winter during severe weather. The reason thev are not to be fed at night is to make them forage.

Where there is the convenience of a pond, Ball, Pintail, and other small breeds are not only ornamental but useful; and as they are shyer than the Aylesbury, Rouen, etc., their excursions are taken during early morn and night, but they never wander far. Even they must be fed at least once in twenty-four hours.

WATERING PLANTS.—Watering plants is usually badly done. Water is poured upon the surface, enough, perhaps, to wet down an inch or two. The water washes the fine earth into the chincks and interstices, and there the plant stands with dry or only moist soil below, but with a baked mass on the surface which shuts out warmth, air, and the moisture that would be derived from its free circulation. One of two methods should be adopted. Remove the service earth and pour on water enough to reach the wet sub-soil, and when the water has soaked in, replace the dry surface soil, to be moistened from below; or, make a hole as near the plant as you can without disturbing the roots, and fill this with water two or three times, and afterwards fill it with the dry earth first removed. At all events, when you water at all, water freely, and with the foot or a hoe throw a little dry earth over the surface as the water settles away. A few plants thus well cared for will yield more than three times the number carelessly treated.

CABBAGE PLANTS.—The *Genesee Farmer* describes a novel way of raising cabbage plants practiced by a farmer who is usually very successful: "He takes an old hog trough in the fall and fills it with soil, and puts it on the top of a fence, or any place that will be five or six feet from the ground. Here it remains all winter. The frost mellows the soil, and in the spring it will be fit to 'work' much earlier than the soil in the garden. He sows the seed in the trough, and has all the plants he wants, and some for his neighbors, and earlier, we are told, than they can be raised in any other way. A frost which will kill tender plants on the surface of the ground does not trouble those on the fence in the hog trough."

TREES AND WALKS IN LAWNS.

MR. THOMAS, in the *Country Gentleman*, lays down the following rules for planting trees and shrubs and laying out walks in lawns and gardens:

DISTRIBUTION OF TREES AND SHRUBS.

Avoid the old, stiff, geometric mode of planting in straight lines, unless in particular cases along roads or avenues, or strictly for purposes of utility.

Imitate the graceful groopings seen in the most beautiful, natural plantations, or in landscape pictures.

In the absence of any other guide, the novice may copy in his groupings, the irregular and scattered drops of rain on a flagstone, or the position of the stars in the sky.

Plant so as to conceal boundary fences, and leave the view partly open towards some of the further corners of the grounds, to prevent a cramped or confined appearance. The extent will be apparently increased by placing trees of light or fine foliage towards those distant parts.

In order to avoid abruptness, gradations from one kind of trees to another — as, for instance, from evergreens to deciduous — should be somewhat gradual, or by intermingling the two together.

WALKS.

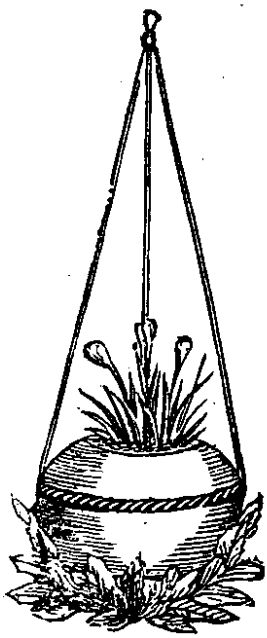
No part of pleasure grounds are more expressive of the character of the keeping than the walks. The finest gardens, with rough, irregular and unfinished walks, convey an expression of bad management; but if smooth, graceful, and well kept, even though a wild, natural shrubbery, they impart a graceful air to the whole.

Avoid abruptness in curves, but let a long curve pass gradually into a short one.

There should be an apparent and obvious reason for every curve — either for the purpose of sweeping around from one object to another, or to avoid such an object as a flower-bed, or mass of shrubbery, pIced in the direct line. Hence it is advisable to place such an object on the inner side of any curve.

The only part of a walk visible to the spectator, should, in general,

be that portion immediately before him; the other parts, therefore, should be concealed by plantings, or by rising ground. A walk should not pass very near the boundary, to avoid a feeling of narrowness or confinement.



A CHEAP CROCUS HOLDER.—A correspondent of the *Cottage Gardener* makes a crocus holder by hollowing out a turnip, leaving about half an inch in thickness all round, and taking care not to injure the base leaves. It is filled with soil, and the crocus root planted, and the turnip suspended by wires, as shown in the engraving. The moist soil starts the leaves of the turnip, which turn upwards, and grow in a short time so as to completely hide the root. It is simple, cheap, and very pretty.

LAND SHOULD NOT BE WORKED WHEN WET.—The hoe is a great fertilizer. We use it to kill weeds, but it enriches the soil at the same time. The same may be said of the spade and the fork. But do not dig or hoe when the ground is wet; it does more harm than good. We have a border where early plants have been raised for some years, but the soil last spring was so hard that it was difficult to get it into good working order, and the only reason we can assign for this is that it has been dug in the spring for a number of years before the ground was dry enough to work properly. Land worked when wet bakes and packs, and does not recover from it during the whole season.

TAR AND OIL FOR SEED CORN, ETC.—An Ohio farmer recommends strongly the preparation of seed corn by mixing it with tar and a little lard. Afterward add some wood ashes and stir together. This will make the seed much better to handle. He also uses the same preparation for his peas, beans, melons, pumpkins, etc. The editor of the *Germantown Telegraph* says he has for a number of years greased his Lima beans before planting, and never a single seed has failed in germinating. It is complete protection against wet weather, which rots the beans, and frequently makes two or three plantings necessary.

CURCULIO ON PLUM TREES.

We have little faith in the permanent efficacy of any application to drive away the curculio from the plum trees. It may answer for one season, and on a few trees, but we apprehend that the curculio will soon get used to it. Perhaps the better way would be to apply it on a portion of the trees only, abandoning the remainder to the curculio.

One of the best of these applications is that recommended by the *New York Observer*. It is as follows:

"To one pound of whale oil soap, add four ounces of flour 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 season of the curculio's ravages is past."

We know of instances where this application has proved quite efficacious on plum and apricot trees. On the other hand there are those who have tried it with little or no benefit. With this as with all other methods of driving away or destroying insects, the application must be *thorough*, and be repeated from time to time during the season of the insect. A few days neglect may render the whole labor useless.

Another article that has been recommended to drive away the curculio is coal oil. A gentleman in carrying some of this oil, accidentally broke a bottle, and the oil saturated the sawdust in which the bottles were packed. This saturated sawdust he put at the foot of a plum tree, it being about the time of blossoming of the plum trees. The result was watched, and it turned out that the curculio, which ravaged the other plum trees in the orohard, gave this one a wide berth, and the plums were saved to ripen.

This circumstance led to still further exprimients, with like favor-

able results. The sawdust was saturated — which can be done with the cheapest kind of coal oil — retains the odor for a long time, which is quite offensive to the very fastidious taste of this little pest. The borer, also, it is said, will not put his gimlet into the trunk of a tree which is encircled with such stuff.

How to Catch Rats.— A correspondent of the *London Field*, in answer to an inquiry, gives the following method:

"For the benefit of your readers, I will give, by your permission, my experience on the subject. I was very much troubled with rats, and tried every known dodge for catching them, without success, until I adopted the following plan: I set an ordinary steel trap in their run, and covered it over with a duster or cloth, and within a few hours I caught every rat on my premises. A clean cloth is necessary every time the trap is set. I found a butter cloth the best decoy. I am informed by my son, who was stationed at Bermuda, that a convict was rewarded for revealing his secret for attracting rats, which was cantharides steeped in brandy, (Tr. Lyttæ;) but I cannot make out the number of drops used. The best way to catch rats with a steel trap is to put the guard up, and lay the trap down as if set; feed the rats for a few days, always putting the meat on the kettle-board; they will eat it and get quite familiar to it; then all at once begin and catch them; wait upon the trap, and if they have been well fed, they may be taken nearly as fast as it can be set. I have taken by this means seventeen in one hour, and at one time I had two — one by the nose and the other by the fore foot — and I had only one trap set."

Training the Tomato.—The *New England Farmer* says: "Knock a flour barrel to pieces, take one of the hoops and two of the staves, sharpen one end of them, and nail the other ends to the opposite sides of the hoop, set it over the plant and drive it into the ground; the vines will hang over the edge of the hoop free from the ground. Set the staves in the next hill at right angles with those in the first, and let the hoops just come together, and tie them with a string in such a way as to support each other. Thus, at a trifling expense of time and money, you may effectually train all your tomatoes."

ORIGINAL KOLB-RABI.

THE EFFECT OF CULTIVATION ON PLANTS.

In *Gerard's Herbal*, published in 1633, there is a cut of the Kohl-Rabi, of which that on the foregoing page is a *fac simile.*

As showing what may be done by cultivation to change the character of plants, we annex a cut of the Kohl-Rabi as it is now grown.

The turnip has undergone equally important changes, and to those raising seed it is very important that these should be understood. In the wild state the turnip has little or no bulb, and *runs up to seed the first year.* This tendency to run to seed has been checked by sowing late in the season, and by selecting those plants which show an inclination to form bulb. The result we all know. But few seem to realize that the modern turnip is an artificial plant, and that it has a constant tendency to run back to its original state — of running up to leaves and seed rather than to form bulb.

To raise good turnip seed, it is necessary to select good bulbs and *transplant them.* If, as is now sometimes done in England, they are allowed to go to seed in the drills where they are grown, the plants will have a tendency to run too much to top. The transplanting seems to arrest this tendency. We cannot but think it would be desirable for our farmers to raise their own turnip seed, instead of, as now, sowing that which is imported from England, and which may have been raised in the careless manner alluded to. We could thus be *sure* of having good seed.

An instance on a large scale once came under our observation, which illustrated, in a deplorable manner, this tendency in the turnip to return to its original habit of running up to seed the same year instead of forming bulbs. John Hilditch, of Stanton, England, sowed some fifty acres of turnips very early in the season, thinking to get a larger crop than by sowing later, at the usual time. The plants came up and grew splendidly, and everybody thought he would have a magnificent crop, and so he had; but the weather continued mild late in the fall and winter, and the whole field very soon showed an unmistakable tende[illegible] to run up to seed, and he was obliged to turn his sheep int[illegible] and also to set men to work with scythes to cut off the [illegible] Under such circumstances of course the bulbs wer[illegible] and the loss was very great.

Now there can be no doubt that if these turnips had been allowed to go to seed, and this seed had been sown, the next crop would have had a still greater tendency to run up to leaves and seed, while the bulbs would have been very small; and if the process had been con-

LATE GREEN KOHL-RABI.

...ed for a few years we should have had a plant that produced little ... but which run up to seed the first year.

...marks are equally applicable to cabbage and cauliflowers. ... has been great complaint of cauliflowers not head- ... is undoubtedly owing in a great degree to bad

seed — not bad in the sense that it fails to germinate, or that it is not a genuine variety, but bad because it has not been raised from good plants.

The "head" of a cauliflower, like the bulb of the turnip is not the natural production of the plant. It is the result of cultivation. The plants naturally would run up to seed without forming a head. We have by careful *breeding* obtained this desirable quality, but it is not of so permanent a character that we can dispense with care in raising the seed.

The term "*breeding*" as applied to plants is something new in agricultural and horticultural literature. We have long had thorough*bred* cattle, and their value is well understood, but no one has yet advertised "thoroughbred turnip seed," "thoroughbred cabbage," or "thoroughbred cauliflower," though the English agricultural papers advertise "*Pedigree Wheat* at one guinea a bushel!" And this wheat really has a "pedigree." The original ear selected to "breed from" was about four inches in length. By judicious selection and careful breeding for four years ears were obtained nearly *nine* inches long, containing over one hundred and twenty grains of wheat!

Much can be done to improve our agricultural plants by raising new varieties. In fact, nearly all the improvement that has taken place of late years has been in this direction. But there is still room for improving the varieties themselves. The *Early Paris* cauliflower is one of the best early varieties of this delicious vegetable yet introduced. But we all know that the individual plants differ greatly in size and quality. They all belong to the same variety, but some are much better than others. Now the first object of the seed-grower should be to select the best plants for seed. It should be borne in mind that the cauliflower has a constant tendency to return to its original state. In other words, that it has a tendency to run to seed instead of forming the "head" which we desire.

To raise good cauliflower seed, we must sow the seed in September or October, and preserve the plants during the winter and let them head next spring. Some of the plants will form nice compact heads, while others will have a tendency to run up to seed. These latter must be pulled out, and only the good heads be allowed to go to seed. But unfortunately the seed-growers do not seem to understand this. Judging from the results, it would seem that they let all the plants go to seed whether they have good heads or poor ones. In fact, the seed is sometimes so poor that one is inclined to believe they must cut all the good heads to eat and leave only the poor ones for seed!

The same remarks will apply to cabbage. They have the same tendency to run up to seed. All such should be thrown out and only those having good heads should be selected for seed.

Many frequently complain that lettuce will not form good heads. If we could ascertain how the seed was produced we should doubtless find that it was raised from plants that were the very poorest that could have been selected for the purpose. Those plants which have the least inclination to go to seed are the best lettuce to select, but generally those are allowed to go to seed that are inclined most to do so. The result is that the lettuce raised from such seed do not form good heads — they have a tendency, like their parents, to run up to seed.

The production of new varieties better than the old ones is very important; but it is not less important to use proper means to improve the old ones. One reason why varieties so frequently "run out" is the want of care in selecting good plants to raise seed from. In the case of new varieties, special pains are generally taken to raise seed only from the best specimens, till the reputation of the variety is established. As it becomes more common less care is used, and the result is that it rapidly degenerates. Horticulturists have it in their power to improve our garden vegetables to an extent that would surprise those who have never given the matter any attention.

THE BEST CLIMATE FOR SHEEP.

We were recently talking to a Western New York farmer who now resides in Wisconsin, and he remarked that sheep did much better in Northern Wisconsin and Minnesota than in Western New York, because the climate was not so moist and changeable. There can be little doubt that he is right in this opinion.

Sheep can stand cold weather without injury if it is *dry*. Sudden changes and cold rains are very injurious. We have often heard it remarked that the South-western States on account of their comparatively milder climate must be very favorable to sheep raising. We think this is a mistake. In fact it is found by experience that sheep require shelter quite as much in the Southwest as at the North. The weather though not as cold is more changeable, and the sheep frequently get thoroughly soaked to the skin. In this condition a cold, raw wind and a damp soil must certainly carry off much of the heat

which is necessary to the well-being of the sheep. The natural heat of the body of sheep (105°) is much higher than that of horses and cattle. This heat is kept up by the consumption of food (or burning of fuel) in the lungs, etc., of the animal. To prevent this heat from flying off, the sheep are provided with a good warm coat of wool. To be effectual, however, the coat must be kept dry. In a cold, dry climate, if the wool gets a little wet on the outside it is soon frozen, and this acts as a coat of mail, with a good warm lining of dry wool inside, so that the heat from the warm body within does not fly off. It is said that the Scotch Highlanders in olden times when exposed during frosty nights, wet their plaids before lying down to sleep, and by holding them a short time from their bodies they were frozen in a stiff, hard board, sufficiently thick and impervious to defend them from the cold. The slight coat of frozen wool acts in the same way. And it is for this reason that the steady, cold winters of Vermont, and of the extreme Northwest, are so favorable to sheep raising.

HOW TO GROW GOOD CELERY.

JOHN HAGUE, a successful English celery grower, gives the following directions for its cultivation:

"In the first place it is necessary to get good seed and of a good kind; and in the next it is indispensable that the seedlings be not raised too quickly. I have found that if the seed is forced in too much heat the plants are liable to two faults—namely, running to seed, and to be hollow.

"In commencing to raise celery, it will be found a good plan to get some well rotted turf and well decayed cow or horse dung in equal quantities. Mix them well together. If the dung is wet, dry it till it can be handled without sticking to the fingers. Place two inches deep of the mixture in a shallow box or seed pan, and about half or a quarter of an inch of fine soil on the top of this. Make it level, then sow the seeds, carefully covering them with fine, light soil or sand, but taking care that they are not buried too deeply; a covering of an eighth of an inch is plenty. Place the box or pan in some place near the glass so that the young plants will not be drawn, and never let the

heat get above 65°. Give a dose of clear liquid manure once or twice a week when the plants are up.

"When they are grown so large as to have two leaves besides the seed leaves, prick them into beds or boxes, and let the soil into which you prick them be the richest you can get. Put them into some sheltered situation if not possessed of frames. They generally grow well enough if pricked out in April where old bags or pea rods can be thrown over them on severe cold days and nights. I raise my main crop this way, and have not had half a dozen bad sticks in five hundred.

"I have found it a good plan to make celery trenches, leaving a little soil in the middle to insert the plants before manuring, putting the manure in afterwards with a basket. It is a little more labor than the old or common plan of putting in the manure first, but I think it pays better before the end of the season.

"The celery being naturally a marsh plant, requires in its cultivation a cool bottom with plenty of moisture. This is one reason why I prefer planting before I put in manure, as the manure laid on the top, or rather up each side of the plants, helps to keep in the moisture. It can also be kept in by placing layers of short grass, or litter, or old sawdust, mixed with equal parts of good rotted manure and common soil. This I like better than common manure alone for growing them in for the table.

"Never allow the plants to want water in dry weather, and give once or twice a week a dose of liquid manure, which may be made of guano or cow, sheep, rabbit, or horse dung; also, of potash or common house slops.

"The great point in celery culture is to keep the plants steadily growing without too much heat. There are many plans for blanching celery, but the best and easiest is to put in a handful of clean sawdust into the centre of the plants when soiled up for the last time. The soiling is best performed in three or four operations, and not all at once, but just as the plants keep increasing in size."

LIME.—The tendency of lime in composts is to promote decomposition—hence, it should never be used in connection with fermenting or decomposing substances, as it hastens the formation and evolving of ammonia, which takes from our manures their most valuable properties for promoting strong growth in crops.

GATHERING FRUIT.

THE *London Gardeners' Magazine* thinks "Most people are disposed to gather the Autumn fruits too soon. They hear the trees creaking in the wind, and they find the ground strewn with windfalls; from these premises they jump at the conclusion that the fruit ought to be gathered. But a certain per centage of a crop may fall, from various causes, before the crop is ripe. The diseased portion will lose its hold, or the wind may dislodge what is sound, long before the portion which remains firm is fit to gather. A rule is generally adopted by gardeners, that if the pips of apples or pears are turning brown, the crop may be taken; but we should rather say that a decidedly dark and settled hue of the seed is a better criterion. As to the objection that waiting late into the autumn causes a loss of the fruit by falling, it has little weight; because it is by this process that the weaker and less sound fruit is got rid of, while the best remains. Taking the crop too early will not only injure the good fruit, by causing it to shrivel, but will also render frequent removals necessary, in order to separate from the stock the rotten ones, which would of themselves have fallen from the tree if more time had been given. A most important matter is gathering the fruit without bruising it in the slightest degree. Apples and pears bought in the market are generally much specked, by which their beauty is spoiled; and most of this is occasioned by blows received both in gathering and rolling the fruit from one basket to another. This can scarcely be avoided when orcharding is carried on largely; but amateur gardeners cannot well give too much attention to gathering their fruit. Any falling should be obviated, and what does fall should be placed separately. A coat, with deep side pockets, is better than a basket hung to the ladder; and such receptacles, being quite under command, may be made to hold a good deal. The kind of weather during which the gathering is performed is a matter of importance. The trees should be thoroughly dry, and a windy day chosen if possible."

Coats with "deep side pockets" are seldom worn in this country, but Yankee ingenuity has given us a receptacle just as good for the fruit and far more convenient. It is the invention of J. J. THOMAS, and is figured in the *Country Gentleman*. It is merely a common grain-bag,

with one corner of the bottom tied to one corner of the top, and slung over the workman's left shoulder. A stick, sharpened at each end, and about a foot long, props the mouth open, leaving a triangular opening, into which the apples are thrust as they are picked from the branch. The way in which the lower and upper corners are most conveniently tied together, is by placing a small stone or pebble in the lower corner, (to form a sort of button,) and then passing the bag strings around closely above it, and tying them firmly. A piece of stiff leather, buttoned on to the shoulder, serves to protect it from becoming sore if the picking is continued several days.

In most cases the operator may stand on the ladder, and use *both hands*, thrusting the fruit rapidly into the open mouth of the bag, which is gradually raised up a little over the shoulder as it becomes filled. Over half a bushel may be placed in it at a time, without becoming inconveniently heavy, and the time for filling it once is not usually over five minutes.

Fruit gathered in this way is less liable to become bruised than when baskets are used, or in any other way; and when the bag is filled it may be placed on the very bottom of a barrel in emptying, without that rattling and contusion caused by inverting a basket.

OXEN VS. HORSES.—Oxen cost far less and can be kept cheaper than horses; the wear and tear of the yoke and chain is less than that of a set of harness; and if an accident, such as breaking a leg, should happen to one, he is not a dead loss—for, if kept as he should be, and as any farmer will find it to his interest to keep his cattle, he will make beef, while a horse in like circumstances would be a dead loss.

ON THE CULTURE OF THE HOP.

WRITTEN FOR THE RURAL ANNUAL BY T. S. HARISON, ESQ., MORLEY, N. Y.

THE first thing to be considered is the choice of a field for the hop yard. Any land that will grow corn will grow hops. The richer the better to start with. But while low, alluvial soils in some seasons produce great crops, they are also in other seasons subject to failure from disease or insects. Drainage, natural or artificial, is essential to uniform success, and the years in which low lands fail will be usually the years of high prices. A naturally drained gravelly loam, sloping well in any direction, but if possible to the south-east, is in the long run the best. But by no means ever plant in a situation exposed to high winds. One gale may destroy half a crop; and a hop-yard exposed to the prevailing winds will almost always give rusty hops. The perfection of soil and situation would be the south-east slope of a good "corn ridge," a fine gravelly loam, and belt of wood on the south-west. Many plans have been proposed for protection from the wind. Let no one trust any of them in this climate, but rather seek a situation naturally protected. The choice of site is of more importance than people at first think. It is one thing to plant a hop-yard and bring it to a healthy and luxuriant growth in August, and a very different thing to find half the poles blown down before harvest, or at least that rusty tinge in the hop that gives such a depreciated value to the produce. Rust is mainly caused by the wind, and no sulphur will cure it, and no rusty hops will "go first sort."

Having determined on a site, the next thing is to engage your roots or sets for planting. Find out a good, healthy, productive yard, whose produce brings a good price, and engage with the proprietor for the roots you want, about three bushels to the acre; be sure you engage enough. Agree for roots or runners to be *dug* expressly for you with the spade, (not runners torn off by the plough,) and get them early, taking care to have some roots from male hills dug and put up separately. Pay a good price for the extra labour of hand digging, (profit of so doing about three hundred per cent.,) bring your

roots home, keeping them moist, cut them carefully into sets of four to six eyes each and plant two sets in a hill eight inches apart in the hill, and the hills eight feet apart each way. But is the ground ready? It is ready if in a clean and tolerably productive state, free from sods, stones and rubbish, and ploughed deeply and fine. Then plant your sets, three to four inches deep, according to the warmth and looseness of the soil, and stick a small split stake about a foot high, in the middle of each hill. The ground should be marked carefully both ways so that the hills will come in true lines, and every eighth hill of every eighth row should be planted with male roots and such hills permanently marked. The planting should be early, as early as the ground can be prepared, say two or three weeks before corn planting. Late planting always makes "missing hills," and missing hills are very difficult to fill up.

The ground being planted, the vacant space may be occupied by any low-growing, hoed crop, but at any rate the land must be kept cleanly tilled. The hops themselves will require no care, beyond this, the first season and will yield no crop. In the fall, about the last of fall work, go over the yard, cut off all the vines about eighteen inches from the ground, and cover each hill with manure — q. s., that is, what you can afford, but at least a good shovelfull to a hill, and this must be done every year.

The next spring prepare for a small yield of hops. Provide your poles in time, and have them well and carefully sharpened. The only material for poles, worth buying, is cedar. Of course you must take what you can get, but the best pole is a good strong cedar, say six inches at the butt and eighteen to twenty-two feet long, well trimmed except the extreme tip, and with the bark all on. (Hops will run on poles having no bark, but there is more trouble in training.) Poles *may* be too long. A hop vine will run forty feet in a season, if allowed, and not bear so many or as early hops as if it grew only twelve feet.

The poles being ready, as soon as asparagus begins to start and ploughing may be done, uncover your hills and spread the manure. Then set one pole to each hill, getting it deep enough to stand a heavy blow, (for the great danger is from wind.) Then plough the ground lightly both ways. By this time the vines will begin to show. Cut off all but one from each of the two setts in the hill, retaining the strongest and those nearest the middle of the hill, and train these two on the pole, tying them with woolen yarn, or other soft string, until fairly set running up the pole. They will only turn one way, so do

not try to coax them the other way. Meantime keep the ground clean and loose, going over it once a week, if necessary, until the second week of August and then leave it alone.

The third year and following years require the same but rather deeper tillage, and the third year two poles may be set to a hill, and afterwards three; no more than two vines ever being allowed to the pole. The third year the roots will begin to throw out runners, and these must always be kept down, first by the plough, run as close to the hills as is safe, as soon as the poles are set in the spring, and afterwards by the hoe, hand and knife. It is usual to run the plough through twice in the early part of the season, once each way. The first furrow is usually turned toward the hill, but if there is any prospect of the hills becoming too high, (and it is very desirable to keep them level,) the furrow may be turned from the hill without injury, provided the cultivator follows to level again. Hand hoeing and weeding the hills is always more or less required, and a sort of grubbing hoe, (an old adze makes a good one,) is useful in uncovering and leveling the hills in the spring. The plough is drawn by one horse, and he should be able to run a small two-horse plough six inches deep. The whifletrees should be short so as not to strike the vines. The cultivator may be of any kind that will effectually kill weeds. The common cultivator tooth is of no use in a hop-yard. KNOX's horse hoe does very well, but the best cultivator is one with horizontal, thin cutting blades, running under the ground, fastened to a plain, straight shank. The writer uses one whose teeth came out of a "Garrett horse hoe," originally intended for wheat. The object is to cut up the weeds, not to cover them up, at the same time loosening and mellowing the soil.

The vines having been carefully tended, and the ground kept clean and mellow, the branches will begin to appear, or they will begin to "arm out," about the first of August and will soon be set with hops. As soon as they show the seed fully formed and the pollen plentiful at the base of the leaves, and the seed begins to assume a grayish-blue colour, they are fit to harvest, generally about the first of September in New York. Of course, if the yard is large, picking must begin earlier than in small yards.

The picking is done by girls or women, attended by boys or men, who cut the vines about eighteen inches from the ground, and raise the poles, laying them in a convenient position over or near the boxes to receive the hops. The boys also collect the hops when picked and carry them to the kiln. Many plans are used in picking. One great

object is to jar and shake the hops as little as possible before they are laid on the kiln. This is best attained by using small boxes, four feet long, twenty inches high and the same in depth, and having handles at each end. Each picker then has her own box, and the boxes being numbered, carless picking may be detected, and the hops may be carried to the kiln in the box without being handled or disturbed. A box of this size will hold hops that, when dried, will weigh about ten pounds. The pickers are paid by the box, and a good picker, under favourable circumstances, will fill two boxes a day. Few will do more, and only good pickers can do that. If many children are in the yard the average will not exceed one box per day per hand. The poles are stacked as fast as unloaded, and the boxes, as fast as filled, carried to the kiln.

The size of the kiln will depend on the number of hands employed. The hops should be dried as soon as possible. For a ten acre yard, employing fifty pickers, a kiln twenty-five feet square is small, thirty feet would be better. The drying floor, made of slats, on which a hempen cloth made for the purpose is stretched, should be nine feet at least, (better twelve,) from the floor on which the stove stands, and a hopper-shaped casing should be made between, thus confining the heat, and leaving the stove room (outside the hopper) cool. The stove may be enclosed with brick walls, each wall ten inches or so from the sides of the stove, except at the stove door, and rising three and a half feet high. From each upper corner of this furnace chamber a timber (like a rafter) may be set against the corner of the drying floor, and timbers between, which may be boarded over, and plastered over the boards. The stove pipe, long enough, and turned enough for economy of heat, should enter the chimney below the drying floor, inside the hopper, (accessible by a trap door,) and the chimney be securely built against one side of the kiln. Such a kiln, twenty-five feet square, with a stove burning four foot wood, using hemlock, will dry from twenty-five to forty boxes at a time in twelve hours. Of course the kiln is going night and day, but for convenience it is better to have, if possible, two kilns.

The kiln must be well ventilated. Cold air admitted under or near the stove and ample openings in the roof and sides above. These are to be left open, unless on the windward side, until the most of the steam has passed off. The side openings above may then be closed, and when the hops, unturned and undistured, are so dry that the stems and leaves are crisp, (or break short,) they are dried enough and may be taken to the storage loft, where they lie spread until cool, and

are then shoved into a heap to lie some days or weeks before pressing. It should be noted that "clean picking" is of the highest importance No leaves, or stems, or dead hops should go in. No one can prevent pickers putting in some, but constant watchfulness should be exercised and all careless pickers at once admonished, and if necessary, dismissed. The best crop of hops may bring an inferior price on account of careless picking.

The screw press is now in general use, to the exclusion of the old fashioned lever and pulleys. Its construction is simple. There is a box with two moveable sides, (on hinges,) the size and shape of the bale. Into this the hops are tramped and then they are compressed as tightly as possible by forcing down the moveable top of the box with a powerful screw. A very heavy frame is required and some little contrivances are needed which there is not time to describe here. The beginner had best copy the simplest and most effective press to which he can get access, and add such improvements as his mechanical talent may suggest. The tighter the hops are pressed, generally speaking, the better they will look, and the better they will keep. The bales, too, should be neat in appearance, with good straight lines and square corners

The hops being then ready for market the grower will find it a very difficult part of the business to dispose of them properly. The market is very uncertain, very changeable, and most of the dealers are as "uncertain" as the market. Every producer will have to learn for himself when and how to sell. When a fair price is offered at home it is generally best to take it. If not offered a fair price at home, the grower had best find some honest commission merchant, not specially a hop dealer, to whom to consign his crop. As a general rule more is lost, however by holding too long than by selling too soon.

Milking Young Cows.—It is said that young cows, the first year they give milk, may be made, with careful milking and good keeping, to give milk almost any length of time deemed desirable; but that if they are allowed to dry up early in the fall, they will, if they have a calf at the same season, dry up at the same time each succeeding year, and nothing but extra feed will prevent it—and that only for a short time. Two drachms of sugar of lead dissolved in a quart of water, is good for inflamed teats.

TAR WALKS IN GARDENS.

ASPHALTED walks, or, as they are sometimes called, tarred walks, are becoming very common in English gardens. Mr. J. ROBSON, gardener to Viscount HOLMESDALE, Linton Park, speaks of them in the highest terms, and gives the following directions for their construction: "Where the traffic of foot passengers has to be sustained, a coating of gas tar and small gravel over stones makes an excellent pathway, rolling and smoothing at the same time. Generally, however, the formation of a walk on a foundation of another kind is adopted, the conditions for that being far from difficult to obtain in almost any position; one of the most necessary qualifications for that purpose is a little descent one way to carry off the water, for, although railway platforms are sometimes level, in general most other places done with this material have a sufficient declivity to insure the water being all carried off. If the water be allowed to stand in shallow pools on the face of the walk, it quickly rots and perishes the material and a break up is the result. The outlet side also must be clear — no kerb to stop the water and form a stream on the asphalted part of the walk; but if there be a kerb, let it be slightly below the face of the walk, so as to allow the water to run off freely. In fact, it is the due preparation of the foundation, rather than the care and skill in putting on the material, that constitutes the quality of the walk.

"In laying down asphalt, an ordinary hard beaten footpath of the proper level or inclination, and a fine hot day to do the work in, are all that are wanted. Those accustomed to the work have a boiler and fireplace moveable on wheels, which they take from place to place, and some well sifted gravel about the size of peas and beans, and free from sand and anything larger than a small marble. The tar being heated in the boiler, is run out into iron pails and carried to the walk, and is roughly spread, or, rather, thrown on by one man with a ladle, while another spreads it with a long handled brush made on purpose, and a third with a barrow throws on gravel with a shovel at the same time. When a few yards are done, the roller is drawn over it several times. The quantity of tar laid on must fall short of half an inch thick, but as much gravel is given as will adhere to it, so that the mixture

may be a good inch thick and often more. After repeated rollings a part of the loose gravel is swept off, and it is again rolled; but sufficient gravel is at all times left on to insure the feet of the pedestrian always treading on the gravel rather than on the tar. The latter, however, by being well heated over the fire before putting on, loses much of that soft stickiness it had before; and the gravel, being left on rather higher than the tar, works down by wear, so that the walk is better some weeks or months after it is made than it is at first. It gets smoother by wear; and the cold weather of autumn and winter removes, in a great measure, the liability it might have to get soft. It must not, however, be sapposed that such a walk is of everlasting wear; on the contrary, it wants renewing like other things, and a slight coating of tar and gravel, as before, is given every two or three years where there is a great deal of traffic, the quantity of material given being much less than was the case when the foundation sucked in so much at the first doing.

"Asphalted walks are not recommendable in the front of mansions or dwelling houses, where they approach close to the windows, the smell being disagreeable in not weather; and I have been told of a case of which I have the fullest reliance, that the strong smell of the coal tar used in this mode of making paths penetrated into a house, and even the food tasted of it, milk particularly so. It must, therefore, be used with caution in such places; and if it be advisable to do it under such circumstances, it would be better done, if possible, when the family are from home. That the smell goes off in a measure every one knows; but a very hot day will revive it to a certain extent, and we all know it is not agreeable. A perfectly level place is not adapted for asphalt, as it is almost impossible to prevent the existence of some slight hollows or basins in which water will stand; and it quickly decays the tarred substance, besides looking badly, as there is always a stain left where water has no other way of escaping than by evaporation. For general purposes we would, therefore, advise extensive level plots — as terraces, promenades, etc., to be done with something else than asphalt."

Lettuce and Cut-Worms.—A gentleman of experience assures us that by scattering a few lettuce seeds in different parts of his garden, he is never troubled with the cut-worm. The worms get under the leaves of the lettuce and live on them, and do not touch any other plants. Scatter the lettuce seed freely, and when the plants get to be in the way pull them up or otherwise destroy them.

PASTURING SHEEP IN ORCHARDS.

THE effect of pasturing sheep in orchards, both on the trees and the animals, is of some interest to those who keep sheep and have orchards which it is desirable to keep in grass rather than in other crops. A good turf is so much nicer to pick and sort apples upon, to speak of no other advantage, that we would like to keep orchards always in grass, could we do so profitably. Unless the trees are altogether too high, one cannot well pasture horses or cows in an orchard; and if we could, these animals do not secure that close, clean sward, desired. Sheep, too, are said to enrich the soil upon which they feed, as well as to improve the land by the destruction of coarse and noxious vegetation.

But we will mention some results of the practice. Some years since, in answer to our inquiry through an agricultural journal, one farmer stated that he had pastured an orchard with sheep for several years. When he first turned them in, there was so little growth that he could not cut a graft from the orchard, there being no recent growth of sufficient length and thrift to furnish scions. In three years time the trees improved materially, making from a foot to eighteen inches of new wood every year. Another reported that sheep pastured in an orchard for two or three years, made great improvement in the fruit. Neither spoke of any injurious effect on the flock.

We have pastured sheep in an old orchard, more or less, for two years past, and to its manifest improvement. The grass is better than before, and the trees have a more thrifty look. As to the flock, they have done better than usual. This we attribute in part to changing them from pasture to pasture, frequently, and to the liking they have for their orchard pasture, especially in the hot season.

Orchards often suffer from the want of grazing. They get overrun with weeds and briars, as they will not when sheep are kept in them a portion of the time.

When the fruit begins to fall in any amount, we turn off the sheep and put on the pigs and calves. These remain until the apples are about ripe; then the orchard is cleared entirely, until the fruit is cared for. The sheep are afterward allowed to return, but not to remain to eat the grass down too closely. We rather save a good bite over for spring; or rather save it that the grass may be earlier and better in spring.

PRESERVING GRAPES.

To keep American grapes for winter use there is probably no better way than to place them in boxes, with paper between each layer of grapes. This is usually done by opening a newspaper and laying it on the bottom of the box; then put in a layer of grapes, and turn down the sides of the paper over them. Then lay another paper in the box in the same way, and then another layer of grapes, turning down the paper over each layer till the box is full. The box may hold as much as a bushel of grapes. After the boxes are filled, fasten down the top and place them in a cool, but not damp room — the cooler the better if it does not freeze. Diana Grapes have been kept in this way till April, and Rebecca till after Christmas.

M. Rose Charmeux, of Thomery, (one of the best growers of Chasselas Grapes at Thomery, and son of the celebrated M. Charmeux who improved the Thomery mode of training vines, now in general use,) has contrived within a few years a new way of preserving the foreign varieties of grapes, which may be useful to some of the readers of the Rural Annual.

Contrive a place in a properly arranged fruit house. Fasten against the sides a series of small racks with notches in them, similar to those in which wine glasses are arranged in pantries, and place one above the other at about twelve inches apart. Place in each one of the notches of these racks a small bottle three-quarters full of water, to which must be added a small quantity of powdered charcoal to keep the water sweet.

Gather the grapes at the usual time, selecting the handsomest and most perfect bunches, and those which have been thinned out. Cut those branches which bear two bunches, and place the lower end of the branch in one of the bottles. These grapes must be examined every week, and the imperfect berries taken off with the scissors. Chloride of calcium is to be used to absorb the dampness of the atmosphere.

Mr. Rose Charmeux preserves the largest portion of his Chasselas, and even his Frankenthal (Victoria Hamburg) Grapes until the end of April. This method is so successful that the grapes are as plump and the stems as green as when taken from the vine.

The following is the plan of DUBREUIL for using the chloride of calcium: Until now the only means used to get rid of the dampness which arises from the fruit in a fruit room, has been to ventilate it during ten days before closing up the house. The plan has serious objections. In the first place, it causes the temperature of the room to become the same as that of the open air, which often injures the fruit. It also introduces air less charged with carbonic acid, which is quite as objectionable; besides, it is exposed to the light, which hastens its maturity. Besides, this method can only be used in dry weather, and when the temperature is above the freezing point. Now, as this is seldom the case in winter time, the fruit is consequently subjected to the dampness of the fruit room.

To overcome this difficulty, we recommend to use chloride of calcium, which must not be confounded with chloride of lime. This comparatively cheap article absorbs nearly double its weight of moisture, and becomes deliquescent after being exposed a short time to the damp air.

In order to make use of the chloride of calcium, make a wooden box lined with lead, twenty inches square and four inches deep, which must be raised about sixteen inches from the floor, on a small stand inclined a little at one side. In the middle of the inclined side place a spout. The apparatus being placed in the fruit room, put in it about three inches deep of chloride of calcium, very dry and porous. As it melts the liquid runs out through the spout into a stone jar underneath it. If all the chloride of calcium is melted before all the fruit is taken out, you must renew it. About forty pounds are sufficient to keep a fruit room dry, used at three different times.

The liquid which is obtained by this plan should be carefully kept in stone jars and tightly covered until the next fruit season. Then, when the fruit room is again filled, pour the liquid into an iron pot and evaporate it. It is then again fit for use the next year.

CABBAGE WORMS.—Break off a large leaf from the bottom of the cabbage, and place it on the top, upper side down. Do this in the evening, and in the morning, it is said, you will find nearly or quite all the worms on each cabbage have taken up their quarters on this leaf. Take off the leaf, and kill them, or feed them to the chickens, and place the leaf back, if there be any more to catch.

PROPAGATING VERBENAS AND OTHER BEDDING PLANTS.

MR. D. THOMPSON, of the Archerfield Gardens, and one of the editors of the *London Journal of Horticulture*, gives the following account of his method of propagating verbenas, geraniums, and other bedding plants:

"After having tried a good many methods of preparing a stock that is at the same time healthy and numerous enough to enable short work to be made of the spring propagation, I have found something like the following order of things to be the most satisfactory of any course that I have yet tried, although others may arrive at precisely the same end by different routes.

"Early in August about a foot of last autumn's tree leaves are put into the bottom of a cold frame, and beat firmly down. Over the leaves is put about three inches of soil, consisting of equal parts of loam, leaf mold, and sand well mixed together. This is beaten firmly down with the back of a spade, or any similar appliance, and in this state the frame is in readiness for the cuttings; the required number of the different kinds is selected from the margin of the beds, or from wherever they can be most readily had. There is not much ceremony about the selection and preparation of Verbena cuttings only that they are short, stubby, fresh cuttings that have not yielded blooms, and that the leaves are removed from the bottom joint to prevent damping. They are made, dibbed into the frame, and watered with as little delay as possible, so that they are not allowed to droop and get injured by being dried up. When the necessary number is in they receive the water through a very fine rose sufficient to moisten the three inches of soil. The frame is closely shut down, and rather thickly shaded during sunshine. In fact, everything is done to keep them as cool as possible. If the evenings are calm the lights may be entirely drawn off for a few hours, and when put on for the night air is left on. In the morning, if the day is likely to be hot, they are dewed over through a very fine rose or syringe. Under such treatment they root with little trouble and without making much growth at the top—at least, as compared with similar cuttings struck later in the season in warmer quarters. The object is to get roots formed with as little

heat and stagnant atmosphere about the cuttings as possible, and so prevent their being drawn and weakly.

"When they have made roots about an inch long they are pricked off into round earthenware pans, fourteen inches in diameter and seven inches deep. The pans are prepared by placing a thin layer of rather finely broken crocks over the bottom, then a layer of old mushroom-bed dung, which consists chiefly of horse droppings, and they are filled up with a good substantial compost consisting of equal parts of a rather sandy loam and the same sort of dung already named, with a very slight addition of sand. About thirty plants of such as verbenas and alyssum are put into each pan, and as soon as possible after being pricked off they are fully exposed to all weathers except heavy rains. By housing time you might shear armfuls of fine healthy cuttings from them. They are, of course, repeatedly stopped and kept free from bloom buds as they grow, and carefully attended to with water. We make up about eighty or a hundred pans of verbenas in this way; and they are wintered in any cool, airy, dry place, and kept moderately moist at the root; and even with such varieties as the Purple King, which is largely grown, mildew rarely makes its appearance.

"In spring almost any amount of cuttings can be had from such a stock. Last spring we struck about twenty thousand verbenas alone in a very short time, and three times the quantity could have been struck if needed. As compared with plans that I have formerly adopted, and which used to be in vogue, this is found to be attended with far less labor and much better results.

In the case of geraniums the middle of August is considered a good time to make a commencement (except in the case of Golden Chain, which is always surest if in a fortnight earlier;) and if all can be put in by the middle of September it is a great deal better than later attempts. After trying a good many ways in striking all the different varieties of variegated geraniums I prefer striking them and wintering them in eight inch pots. They are not very heavily but carefully crocked. Over the crocks is placed a layer of mushroom dung; and the pot is filled to within three inches of the brim with one part loam and one part leaf mold, and is then filled up with the same soil after mixing another part of coarse pit sand with it. The number of cuttings put into each pot varies from eighteen to twenty-four according to the size of the sorts. Large cuttings are preferred as those which root soonest, are least likely to damp off, and make the finest plants in spring. There are dibbed into the pots immediately they are made, watered,

and placed in a position where the pots will staud on a dry bottom, and be fully exposed to the sun all day long, with no covering at any time, unless it be to throw off heavy and continued rains. Most of the larger leaves are removed in making the cuttings, but in no case are they dried before being put into the cutting pots, never being able to discover what was gained by such drying—except mischief. In hot days, when water may not be needed in the soil, the cuttings are slightly dewed over in the evening when the sun has left them.

"I have found that cuttings struck and wintered in pots of the size recommended keep much better, and are more conveniently managed, than when put into either smaller or larger sizes or into boxes. The advantage over boxes I conceive to be derived from the better drainage secured, and the more free play of air and light anong the plants when in smaller and round detachments. The earthenware has also a little to do in the matter. The whole winter they are kept very dry, and in spring when shaken out of the soil there is a great amount of irritability about the whole plant, and their bunches of white roots are almost ready to take up the very sand itself.

"The common scarlet varieties are struck and managed in the same way, except that the great bulk of them have been put into boxes to economize space. But from the conviction that they do so much better in pots fewer of them will be put into boxes in future, but will be managed the same as detailed in the case of the variegated sorts. There are usually struck more than fifteen thousand plants, and a little calculation will show that at the rate of eighteen to twenty in an eight inch pot it will not require such a vast space to winter them in."

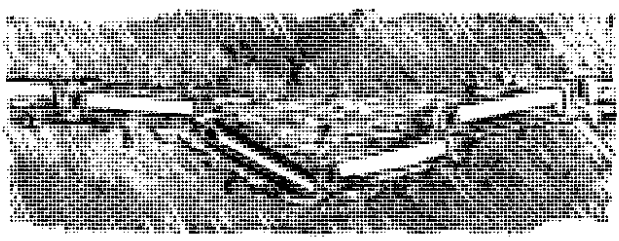
How to Catch Sheep.—Never seize them by the wool on the back. It hurts them exceedingly, and in some cases has been known to kill them, particularly in hot weather, when they are large and fat. The best way is to avoid the wool altogether. Accustom yourself to catch them by the hind leg, or, what is still better, by the neck, placing one hand under the jaws, and the other on the neck just back of the ears. By lifting up the head in this manner, a child may hold almost any sheep without danger to the animal or himself.

Buckwheat for Fodder.—It is said that when buckwheat is cut and cured as soon as the kernel is filled, horses like it as well as they do clover hay.

PIPES VS. TILES FOR UNDERDRAINING.

STEPHENS, in his "Book of the Farm," gives the following reasons why pipes are better than horseshoe tiles to drain with:

"There can be no doubt that in the case of derangement taking place in a drain with tiles of any kind, from whatever cause, the pipe-tile is a safer means of continuing the flow of the water than a tile without a sole; for an arched tile is not a duct, but only a cover to a duct, whether a tile sole or the surface of the ground, when no soles are used — and whenever the ground or sole is deranged, so must the duct be. But a pipe-tile, however deranged, remains still a duct for the water; and although one pipe may be completely choked up with mud and rendered useless, the one before and behind will still operate as well as ever; no stoppage of water can take place beyond the undisturbed pipe on each side of the derangement. A figure will best illustrate this argument. It is obvious that no known species of force can act upon the tiles from below, to push them upwards; nor is it probable that any force can act upon them from above. The only way that we can imagine a derangement to take place is by the subsidence of the ground below them, or by an inordinate quantity of water. Now suppose that the pipe-tiles *b*, *c*, *d*, *e*, in the accompanying figure are displaced by sinking of the ground below them, and that the earth above them, *g*, has fallen down. The water will continue to run from the pipe *f* as usual, and will occupy the interior of the pipes *c* and *d*, and partially that of *b* and *e*; and although the earth may have fallen in between their ends, the water will still find its way through *e* and *b*. The water will saturate the earth in *g* as high as until it reaches the level of the pipes *a* and *f*, which, remaining in their proper position, *a* will take it away, and it can rise no higher. It matters not whether pipes are upset or not as *c* is seen to be — it continues a duct as good as ever. Instead of pipes, had there been tiles without soles, they would instantly have



DISPLACEMENT OF PIPE-TILES IN A DRAIN.

been embedded in the soft earth, and rendered useless as covers to ducts; and even had soles been furnished, the displacement of them would have rendered them equally useless as ducts."

JOHN JOHNSTON, the great "Drain King" of America, has always used horse shoe tiles, and we believe has never had but one case where the drains became displaced and choked up.

It is not an uncommon impression that pipes, being closed along their sides, cannot take in the water from the drain so quickly as a tile and sole. Whether they can do so as fast is of no consequence if it can be proved that ordinary pipe-tiles are sufficient to take away all the water. STEPHENS shows this in a simple manner. Suppose that egg-shaped tiles of two inches wide and two and three-quarters inches in the bore are used, their circumference is ten inches. These tiles cannot be placed *closer* to each other by the ends than an eighth of an inch apart, so that the area comprised between two tiles is one and one-quarter square inch. Suppose that the drain is two hundred yards in length, to furnish which four hundred and eighty pipes of fifteen inches in length are required. Now the joints between this number of pipe-tiles afford openings for water to enter them of exactly six hundred square inches, equal to four square feet and twenty-four square inches. Does any one doubt that an opening of four square feet and upwards would easily contain all the water that could possibly come out of one drain of two hundred yards long in the greatest rain that was ever remembered to have fallen in this country! It may be very true from this, that inch-bore pipe-tile are sufficiently large for drainage, as the practice of some English drainers demonstrates; but we do not see the utility and safety of using the smallest bore when a much larger bore can be afforded for a comparatively less sum of monev.

MIXTURE FOR MARKING SHEEP.—To thirty spoonfuls of linseed oil add two ounces of litharge and one ounce of lampblack; unite them by boiling, and mark the sheep therewith, using a common paint brush. It will not injure the wool.

THICKNESS OF A MANURE HEAP.—"Experience," says BOUSSINGAULT, "has shown that the thickness of a dung heap ought not to exceed from about four feet and a half to about six feet and a half; it ought certainly never to exceed the latter amount."

THE CULTURE OF FLAX.

WRITTEN FOR THE RURAL ANNUAL BY D. W. RAY, ESQ.

Among the various agricultural productions of the loyal States no article during the past two years has attracted so much attention and interest from practical men as the culture of flax. Cotton had so long been king — its production had increased to such an extent, and it was grown so cheaply in the genial climate and rich soil of the South, that cotton fabrics at the North had almost entirely usurped the place of linen goods. Indeed, the culture of flax was hardly thought of. There was, previous to this time, no factories in the country for the manufacture of textile fabrics from the flax fibre, and most of the linen goods used were imported from Europe, where even cheap labor and capital could scarcely compete with the cotton of the New World. Less than three years since, the Southern slave drivers having become crazed with a delusive dream of Southern Independence, inaugurated one of the most gigantic rebellions of ancient or modern times. The organization of this movement has sadly interfered with the production of cotton, and the most fertile districts, best adapted to its growth, have either been wrested from the hands of the rebels, or been overrun by hostile armies, so that the production of this staple commodity is scarcely one-tenth of its former amount. As a consequence cotton fabrics, as well as linen goods, have increased in value to an enormous extent, deranging in a measure the commerce and exchanges of the world. The attention of the public mind has, therefore, been largely turned to the production of flax as a means of keeping King Cotton [illegible] to supply the great vacuum caused by the decrease in

[illegible] directed to the pro-

and the day is is not far distant when the machinery now in use will be so far improved that flax cotton will be spun and woven upon cotton machinery. When this is accomplished the great social problem of the age will have been solved, and the production of flax and the manufacture of textile fabrics from this material, will rank side by side with cotton, increasing the wealth and prosperity of our people to untold millions. The hills and valleys of the North, and the vast prairies of the West, teem with an agricultural population numbered by millions, which will henceforth find flax culture profitable, and will engage in it to an extent unparalleled in the history of the world. The spindle and the loom which have remained inactive for want of the raw material will again be set in motion and the merchant, the mechanic, and every class of society will be alike benefitted.

Whatever difficulties may present themselves in the way of producing this desired result, we feel assured that American genius is abundantly able to surmount them, and by the adoption of improved machinery convert cheaply this fibre into all the different fabrics that enter into the commerce of the world.

FLAX MILLS AND MACHINERY.

It is less than a century since American genius, by the invention of the cotton gin, gave this important staple its prominence in commerce and manufactures.

Already flax culture in Western New York is an important branch of agriculture, and it is becoming quite extensively grown. Flax mills are springing up on every hand, and our farmers find a ready market for the raw material as well as for the seed.

A flax manufactory has been in operation at Lockport for over two years. The company has, we understand, over $50,000 invested. They are about to make the coarser kinds of fabrics, and with good success will in time make better and finer qualities of goods. They have paid the producers on an average of $10 per tun for the dry straw.

They take the dry plant, break and clean it, after which it goes through a scutching process, and is combed. The combing detaches the remainder of the shive and lays the fibres parallel with each other. It is next steeped twenty-four hours, boiled, washed, bleached and dipped in a solution of alum, borax and salt, which is a strong solvent and mellows the fibre. The flax is then dried by the use of steam pipes, and carded. There are eight carding machines in use which turn out about one thousand pounds of lint and flax-cotton per day. The expense of manufacturing a tun of flax-straw in Lockport is about

$17.20. The produce from one ton of straw is about three hundred pounds of flax-cotton and three hundred pounds of lint suitable for mixing with wool.

At Medina, Orleans county, N. Y., a similar establishment is also in active operation, at which the farmers in the vicinity find a ready sale for the straw at remunerative prices.

A machine has been invented by Mr. CHARLES BEACH, of Penn Yan, for cottonizing flax which operates upon a different plan from most of the other machines in the country used for separating the fibre from the woody portion of the stalk. The crude straw in a dry state is cut to correspond with the length of the fibre desired. It is then ground beneath large rollers and passed through two beating cylinders armed with teeth three inches long, which revolve twelve hundred times a minnte. The portions of the shive are thrown out through a wire screen. The lint secured by this operation is next removed to another machine and placed upon an endless apron and carried between cylinders where the lint is further divided and subjected to a strong current of air, which separates the remainder of the straw from the lint. This process makes a fair article of flax-cotton of short fibre, which can be produced with great rapidity and cheapness.

MOST FAVORABLE CLIMATE.

The flax plant may be grown on almost any soil, and in almost any climate on the face of the globe, although the fineness of the fibre depends upon and is varied by changes in either soil or climate. It will not impoverish the soil more than any other crop if the woody part of the stalks are retained for consumption on the farm.

Flax will thrive best in districts where the temperature is the most equable and where excessive droughts do not prevail. It will bear a good deal of moisture and thrives best in moist climates.

SOIL.

The best soil for flax is a dry, deep loam over clay subsoil. Light clays and alluvial soils will also do well with proper management; but light, sandy, or gravelly soils, well underdrained clay, will not produce flax well. It should not be sown upon lands that have been highly manured, as when this has been done the fibre grows thin upon the stock. New grounds produce a strong crop of flax.

The land selected for flax should be well drained and free from weeds. The soil should be left in a fine, deep, clean state, and should be plowed and cross-plowed until it is well pulverized. The roots can then easily penetrate into the ground, which they will often do equal to

half the length of the stem. The ground should be plowed in autumn and then left until early spring. It should then be cross-plowed and thoroughly harrowed and rolled. All stones and sods should be removed, leaving the surface smooth as possible.

SEED, AND TIME OF SOWING.

The seed sown should be plump, heavy, and clear of seeds of weeds. From a bushel to a bushel and a half per acre is enough seed to sow. It is better to have too much seed than too little. After sowing, it should be well harrowed, going over it in opposite directions, as the seed will thus be more evenly distributed. The ground should then be rolled, which will cover the seed about an inch, insuring an even germination.

There is a difference of opinion about the time of sowing. The seed should, however, be sown as early in the season as possible, as a more slow and steady growth is the result of early seeding, and produces a finer fibre.

All weeds should be carefully pulled when the plant is about three inches high.

TIME OF HARVESTING.

The best time to cut flax is before the seed is quite ripe, as the fibre is then in its best state. The longer it remains after this period the coarser the fibre. It should not be cut too early, as it will make the fibre too flimsy. When the seeds begin to change from a green to a pale brown, and the leaves begin to fall, then flax should be cut, especially if the weather is dry.

It may be cut with a scythe, cradle, or mowing machine, and should be cured the same as hay. As soon as dry it should be stacked or housed, and not exposed to dews or rains. It may be threshed with an ordinary flail, or with a machine.

The usual crop of flax is from one to two tuns of unrotted straw, and from fifteen to twenty bushels of seed per acre. Sometimes twenty-five bushels of seed are raised on an acre.

PREPARATION FOR MARKET, ETC.

The National Fibralia Company, located at Boston, are purchasing large amounts of fibrilia from the producer, and are furnishing improved machines to farmers for breaking and cleaning flax. One of these machines will do the whole work, and can be run by horse power on the farm the same as a threshing machine. It will turn out the fibre ready for steeping from one to two tuns of straw per day, and

will cost from $250 to $500, according to size. One good machine will answer the purpose of a whole neighborhood or town.

Where there are no factories for taking the flax straw in bulk, it should be carefully prepared for market. The straw should be thoroughly dry when broken, and as soon as the fibre is separated from the shives it should be baled without being wet, then sent to market, where it is steeped, fibrilized, and bleached or colored, as required for spinning on short stapled machinery, prepared for this purpose. The latter processes belong properly to the manufacturer.

The shives or woody portion of the flax, if used before fermenting, make the best of food for cattle and stock, which is an important item for the flax grower to consider.

The rotting process, so much in vogue heretofore among flax growers, is now sought to be abandoned, and with the aid of steam and improved machinery it can be entirely dispensed with. The farmer can afford his unrotted straw at half the price of rotted. One tun of unrotted straw will produce about five hundred pounds of unsteeped fibre, or four hundred pounds of pure fibrilia, and will leave about twelve hundred pouuds of valuable food for stock.

Flax seed for the past year or two has commanded very high prices in Western New York, and was sold just previous to seeding time at $5 per bushel. The large amount of flax grown in this section during the past season will have a tendency to cheapen the price of seed so as to bring it within the reach of every farmer, which fact alone will largely increase the production of this staple.

The cultivation of flax during the year 1864 promises to be far in excess of anything in the past, and its culture will increase year by year until it rivals even that of cotton itself. Speed the day.

Care of Hens in Winter.—Farmers as a general rule neglect their hens in winter. They are left to pick up what they can find about the barn yard; if they get sufficient food, well; if not, no matter. This is cruel, and decidedly unprofitable. If it will not pay to keep them in good condition, it will not pay to keep them at all. They should have a warm and clean place to roost in, and the farmer should see that they never suffer from lack of food. A little light grain or buckwheat, with a few boiled potatoes, turnips, mangel wurzel, or other succulent food will generally be paid for by the eggs laid during winter and in the spring fourfold. Hens starved during winter will not furnish many eggs the coming spring.

CULTIVATION OF PEARS.

WRITTEN FOR THE RURAL ANNUAL BY F. W. LAY, OF GREECE, N. Y.

THE pear is justly considered at the present day the Prince of Fruits. The varieties are so numerous that almost any month in the year some are found with a flavor to please all tastes, and it is no marvel that so much attention should be given at the present time to its cultivation; but in looking at the large and extensive orchards that are being set with the pear, it seems impossible to believe that the product will find a market.

Who does not remember that less than twenty-five years ago scarcely one farmer in twenty had a pear tree of any sort growing on his premises, and an orchard of hardly a dozen varieties was a curiosity! Indeed, I think I could safely say that not one-quarter of the rural population of Western New York, twenty-five years ago, had ever eaten a pear of good quality. Now, orchards of thousands of trees and scores of varieties are not rare, and there is still no apparent diminution of the interest in the fruit, or in the wish to plant out trees. Can this continue with profit to the cultivator, or without glutting the market?

In Western New York, where the soil and climate are as well suited to pear cultivation as any in the world, I think there need be for many years no fear of the business being overdone, or the market glutted with good pears.

The facilities for shipping and marketing are unsurpassed, and when the taste has once been acquired for good fruit, an immense quantity will be consumed. The rapidly increasing demand in Upper and Lower Canada, and in the larger eastern cities, easily accessible by rail, give good security that the orchardist will receive fair and remunerative prices for all the fruit that he can send to market in *good* condition.

Without being egotistical, some description of my own pear orchard and of my own successes and failures may be instructive and useful to the readers of the RURAL ANNUAL. I commenced six years last spring to

set my main orchard of eleven acres. The first business was to obtain the trees. I inquired in various places at what prices first quality trees could be obtained. I found they would cost me about forty cents each for Standards, and twenty to twenty-five cents for Dwarfs; but I finally succeeded in getting about fifteen hundred trees — about equal quantities of Standards and Dwarfs — some of them large, first quality trees, and others smaller, which I purchased at a fair price. I selected eleven hundred for permanent setting, and put the balance in nursery rows in my garden. At the end of two years I took the best of them to replace any in the orchard that looked unthrifty or not desirable to retain. I set my trees in rows twenty-four feet apart, and twelve feet apart in the rows, standards and dwarfs alternately. The next year I purchased dwarfs and filled in two rows between each, making the trees finally eight feet by twelve. This setting them farther one way than the other gives room for cultivation and working among them much better than if they were in squares. With the exception of about fifty that I have dug up and thrown away they have all grown finely, and I have now an orchard of over four thousand splendid pear trees.

Now as to my failures. My principal mistake was in setting more Virgalieus or White Doyenne, than I should have done. At that time the White Doyenne was popular. It had not shown that tendency to crack and spot that has since ruined this fine pear, and I set about one-half of my first lot of this variety. Here was a mistake, but one not past remedy. I cut off their tops and at small expense grafted them with Bartletts, Beurre Bosc and other sorts that my experience had shown were desirable, and the grafted trees are now nearly as large as those not grafted. I consider the alteration of the variety of a small tree of but little consequence, provided the stock is healthy and the tree thrifty, and all that is necessary if the variety does not suit you is to change it by grafting, and in a few years you will have an orchard of first quality.

A false impression prevails among a large class of the community that standard pears are long in coming into bearing. A friend said to me when I set my trees, "You must have great confidence in your constitution to expect to live long enough to eat fruit from those trees," but this idea is entirely wrong. I have frequently had them bear fruit the next year after setting and increasing regularly in production every year afterwards. Perhaps there are no fruit trees that will bear sooner and more regularly than some varieties of standard pears.

The question is often asked, would you advise setting dwarfs exten-

sively? There are some varieties of pears that are so much improved on the quince that they should be cultivated in no other way. The Louise Bonne de Jersey, Duchesse d'Angouleme, Belle Lucrative, Easter Beurre, Vicar of Winkfield and Glout Morceau are greatly improved in being grown upon the quince, and as on the pear root they are frequently astringent and worthless, they should be cultivated only as dwarfs. Bartlett, Lawrence, Buerre Bosc, Flemish Beauty and Sheldon succeed much better as standards.

BEST VARIETIES FOR MARKET.

Almost all beginners procure more kinds than is profitable. The temptation is great to have a large variety of fruits in cultivation. To the gentleman of leisure, to whom profit is only a secondary consideration, this may be pleasant and desirable, but to those who desire to make money out of their products, a few leading kinds that are generally and favorably known, will be found to pay the best. Of standards I would set much the largest number of Bartletts, and about equally of Beurre Bosc, Seckel, Lawrence and Flemish Beauty, together with a few Madelaines, Sheldons, and such other varieties in small quantities as the particular market or fancy might dictate. On the quince, Louise Bonne de Jersey occupies the same place as the Bartlett among standards, and the other varieties which I have mentioned before may be planted in such quantities as seems desirable, always bearing in mind that the fewer the varieties the greater will be the profit of the orchard.

PRUNING.

Pears are pruned for various reasons; to promote fruitfulness, to regulate growth, to add to the beauty of the tree, etc. It is obvious that pruning for so many and such various objects requires different treatment, together with long experience and study of the habits and wants of the pear. But let not the new beginner be discouraged in the outset, practice will soon teach him when to cut and perseverance will soon make him an adept, and his trees models. Very many in my opinion prune pears more severely than is necessary. I have frequently seen the outside branches of dwarfs shortened-in month after month and year after year, till the outside presents the appearance of a closely shaven hedge; no attempt whatever to thin out the inside, and the treee, as it must grow somewhere, gives up trying to spread itself, and grows all inside. This is pruning with a vengeance. Far better leave the tree to take its own course than give it such treatment. We should never cut any tree without an object, and that object should

be well marked in the mind before proceeding. Almost all pears have a tendency to shoot upwards. This, though seemingly the natural growth of the pear, should be regulated by the orchardist, and in the dwarf, checked. The roots of the quince stock, extending as they do but a short distance, cannot hold up or sustain a high or large tree. By shortening down or summer pinching the upright leading shoots, encouraging the lateral branches and thinning out the inside so as to let in light and air we have the grand general principles of pruning the dwarf pear. Standards require nearly the same treatment, but should be allowed to extend upward to a much greater extent than dwarfs, but a severe inside pruning is absolutely necessary in order to have fine fruit. This should be commenced when the tree is quite small, and the branches encouraged to extend sideways instead of upright, even spreading them by means of cords extending to stakes set in the ground will frequently be found of service. Different varieties of pears will require very different treatment. The wide spreading branches of the Flemish Beauty and Onondaga, the irregular and straggling growth of the Beurre Bosc and Winter Nelis, the short and thick twiggs of the Seckel, the strong and upright Bartlett and Madelaine, the slender, succulent and close growing branches of the White Doyenne, all require such different treatment that no general rules will always be applicable. Still if the orchardist bears this general principle in mind, to keep the head as low and as open as possible, his own judgment will seldom be at fault in pruning the pear.

TREATMENT OF THE SOIL IN A PEAR ORCHARD.

There is one thing I wish to impress on the mind of the orchardist, and impress it with *emphasis*, that whatever else he does no grass or grain of any kind must be allowed to grow in his pear orchard. Hoed crops and roots may be allowed while the trees are small; and even after they have attained considerable size. Potatoes, beans and other low growing crops that require considerable hand labor may be grown without essential injury to the trees, but usually the less the land is occupied with other crops the better growth you will have on the trees.

If the soil is naturally rich, or such a soil as will produce good crops, no great quantities of manure need be used, but sufficient should be applied to keep up a regular healthy growth of the trees. Should more be supplied it might produce that succulent tender growth that so strongly predisposes to blight and unhealthiness. Mulching the roots of the tree will be found very beneficial while the trees are small. Almost any material will be found good, but none in my

experience is equal to leaves from the woods. This is an excellent manure after it becomes decayed, and is generally easily obtained.

Could the RURAL ANNUAL reach every person in Western New York owning a square rod of land, I would say to each and every one, set out in connection with other fruit trees a few pears, not only for the profit that you may some day derive from them, but for the gratification of your own family. Children will have fruit if it is in the neighborhood, and if they cannot get it legitimately will take it where they can find it. Public opinion, very unwisely in my view, winks at these practises. The boy that would be vigorously prosecuted for taking a few potatoes, would be let alone for taking an equal amount of pears ten times as valuable, and perhaps a hundred times more cherished by the owner. Ten dollars well expended in getting trees will soon supply a family with all the fruit necessary, and add greatly not only to the comfort and health of the inmates, but to the intrinsic value of the property. Farmers also, who have small tenant houses occupied generally by laborers, will find it to their interest to surround them with fruit trees for the use of the inmates, thus enabling each family to enjoy their own fruits and saving others the annoyance of having their grounds ransacked by prowling children.

TO DESTROY WEEDS IN PAVED WALKS.—The following method of destroying weeds on pavements is said to be employed at the Mint in Paris:

"One hundred pounds of water, twenty pounds of quick-lime, and two pounds of flour of sulphur, are to be boiled in an iron vessel; the liquor is to be allowed to settle, the clear part drawn off, and being more or less diluted, according to circumstances, is to be used for watering the alleys and pavements. The weeds will not reappear for several years."

This is nothing more nor less than *hyposulphite of lime.* Whether it will destroy the weeds or not we cannot tell; but of one thing there can be no doubt, that this liquid diluted with three or four times its weight of water is an excellent article for syringing grape vines to prevent mildew. It should be used the moment the mildew makes its appearance, or before.

IF the leaves of cabbage are turned up over the head, and a stone laid upon them, the heads will be larger.

FRUIT CULTURE IN THE WEST.

WRITTEN FOR THE RURAL ANNUAL BY D. C. SCOFIELD, ELGIN, ILLINOIS.

FRUIT culture in the West does not differ very materially from fruit culture in the East, except in the former it is yet in its infancy, and in both it is least understood of all the interests pertaining to the farm and garden.

Much as has been done in the West to promote its interests by conventions, by horticultural associations and discussions, by individual enterprise and capital, yet we realize that we have but just entered the suburbs of the great field before us; still we have done much and learned much, having arrived at some important conclusions, from which the future efforts of fruit growers may be conducted with more certain success

Till about the year 1856 there existed scarcely a question in the minds of the people that fruit growing would be anything but a success in the prairie country; but the weather of that year, it will be recollected, proved destructive to fruit trees over an exceedingly wide territory, from the Atlantic westward, as far as fruit trees were found, and from Texas to the far North; and the people of the West felt that their case was peculiar, and that fruit raising was a failure. Since that time the seasons have been favorable, the injured trees have died out, the uninjured and newly planted trees have flourished and produced abundant crops, and the affright of the people has subsided, and the planting of trees and the raising of fruit is now the order of the day. There was at the time the calamity was first discovered an impression on the public mind, and is now prevailing to a certain extent, that many varieties of apples that are hardy in the same latitude East are tender in the West, and those varieties that suffered most are to this day regarded by many as unfit for our climate. This is no doubt a mistake. That some varieties of fruit trees are more liable to be injured than others, by the changeableness of the weather in the winter, is no doubt true, such, particularly, as have a tendency to push their buds at the first approach of warm weather; but that this should be a good reason

for excluding them from western orchards more than from eastern we believe to be an error, which, if followed, will strike from our list of apples many of the most valuable varieties, such as Rhode Island Greening, Baldwin, Sweet Bough, Rambo, and others, till our orchards are shorn of much of their excellence.

A considerable part of the trees of the varieties denominated "tender" have survived all the vicissitudes of the climate in the West, are healthy, and yielding as abundant crops of fruit as in the Eastern States, and should be retained, as well here as there.

In a young orchard thirty miles north of Troy, N. Y., of nearly four thousand (4,000) trees planted a little before the winter alluded to, there were seventeen hundred trees perished, yet the owner never thought of rejecting the varieties destroyed, but immediately replaced them, and probably will never meet such a winter again.

Such visitations of the destruction of trees are seldom known, and should not deter the planter from replacing them immediately, although fruit trees grow more vigorously on the rich prairie than on the "barrens" or "timbered land," yet the latter come into bearing earlier. The reason is obvious. The surface of the prairie, for several inches, and sometimes several feet in depth, is composed of a rich, black mould, which cases a very strong growth of wood, and less tendency, therefore, to form fruit buds; underlying which is a soil very similar to the surface soil of the timber land, which produces a less vigorous growth of wood and contains, in larger proportions, those properties which tend to the more immediate production of fruit. Remove the surface of the prairie till you arrive at the loam or *timber soil*, and plant the tree, and you have the same result as in the timber land. An admixture of the surface and subsoil of the prairie by means of deep subsoiling or trenching, gives us a soil of the most valuable compost for fruit trees. The peninsula of Michigan is peculiarly adapted to fruit culture, as the lakes which surround it on three sides tend to regulate the atmosphere so that the sudden changes of weather are checked, and trees do not suffer. Along the eastern shore of Lake Michigan is the best peach growing region of the North, from whence large quantities are annually shipped to the Chicago market.

The cultivation of pears is receiving more attention, and we believe will be attended with equal success, as in the most favored locations of the East. The exhibitions of fruit at the State and County Fairs of the West are in most instances magnificent, and would do honor to an Eastern Fair.

Plums have only succeeded in some localities, and quinces are

nearly an entire failure. The grape, and all the varieties of smaller fruits find a home here. The future history of this country is to be emphatically one of grapes and vineyards, especially in the vicinity of the rivers. The Isabella scarcely fails to ripen as far north as the north line of the State of Illiuois, and the great depth and richness of the soil favor grape growing in a high degree.

SOOT AS A LIQUID MANURE.

GEORGE GORDON, of England, recommends the use of soot as a liquid manure for the garden. He says:

"While the materials for liquid manures are often difficult to procure by the amateur gardener, and frequently tedious in their preparation, injurious in their application, or offensive in their smell, soot sufficient for the purpose is almost everywhere at hand, and in a few hours can be prepared for use; and if amateur gardeners were more generally aware that no manures can be taken up in a state of solidity by plants as food, and that they can only absorb them in a gaseous or liquid state, and to which state all solid manures applied to plants must be previously reduced before any benefit can be derived from them by the plant, they would in many cases facilitate the process by using them in a liquid state. Sir HUMPHREY DAVY characterizes soot as a powerful manure, possessing ammoniacal salt, empyreumatic oil, and charcoal, which is capable of being rendered soluble by the action of oxygen; consequently, when soot is dissolved in water there is no waste, while if sown by hand in a dry state a great portion of its ammonia, which is one of its active ingredients, is volatilized, and is dissipated in the atmosphere. Soot when used as a liquid manure gives vigor to the plant without grossness, and imparts a healthy green to the foliage without the least chance of injury to the plant. In fact, watering a sickly plant with a weak solution of soot water is the surest and safest means of restoring it to health.

"In preparing soot water it only necessary to throw a few handfuls of fresh soot into a pail of water, and after stirring it up to leave the mixture for a few hours to settle, and when the liquid has become clear, it is fit for use, and can be given once a week in summer without the least risk of injury to the plants, whether in pots or in the open ground."

PLOWING IN CLOVER ON CLAY SOILS.

A GENTLEMAN in this vicinity informs us that a few years ago he broke up a heavy clay soil in mid-summer, turning under a fair crop of clover. The surface was afterwards harrowed and cultivated at intervals of a few weeks, in order to keep it free from weeds, and to ameliorate the soil and form a good seed-bed. It was sown to wheat in the fall, without another plowing. The crop was not an average, probably less than it would have been had the field been summer-fallowed; that is, broke up in the spring and plowed twice afterwards, with several harrowings, etc., during the summer. On plowing the field in the fall, after the wheat was harvested, he found to his surprise that the clover was nearly or quite as perfect as when plowed in. The stalks and leaves were not decomposed in the least.

What was the cause of this?

Heat, moisture, and oxygen, or atmospheric air, are the essentials of fermentation or decomposition. The compact nature of clay prevents, to some extent, the admission of air, and hence decomposition is retarded. It may be that, in the instance alluded to, the soil perfectly excluded the air, and that this hypothesis alone is sufficient to account for the phenomenon — a phenomenon which many farmers have witnessed.

The exclusion of air, however, is not the only reason why clay soils retard the decomposition of clover, manure, and other organic substances, when turned under. The experiments of Prof. WAY indicate that clay has a remarkable action in reference to the fermentation of organic matters.

In one experiment, Prof. WAY took three quantities of fresh urine, of 2000 grains each, and placed them in similar glasses. With one portion, its own weight of white *sand* was mixed; with another, its own weight of white *clay;* the third being left without admixture of any kind.

When smelled immediately after mixture, the sand appeared to have had no effect, while the clay mixture had entirely lost the smell of urine; they were all decidedly acid to test paper. The three glasses were covered lightly with paper, and placed in a warm place, being examined

from time to time. In a few hours it was found that the urine containing the sand had become slightly putrid; then followed the natural urine; but the quantity with which clay had been mixed did not become putrid at all, and at the end of seven or eight weeks it had only the peculiar smell of fresh urine, without the smallest putridity. The surface of the clay, however, afterwards became covered with a luxuriant growth of *Confervæ*, which did not happen in either of the other glasses.

This is a remarkable experiment, and one capable of throwing light on many subjects hitherto enveloped in thick darkness. The reason that the sand accelerates the fermentation of urine, is no doubt this: All bodies possess a surface attraction for gasses, and of course, therefore, for common air. This attraction, which enables them to condense a certain quantity of air on their surfaces, is in direct relation to the extent of those surfaces. In mixing sand with the urine, we are, in fact, exposing the latter to a largely increased surface air, the oxygen of which is necessary to commence the putrefaction, and thus hastening the changes which sooner or later would occur in the urine naturally.

The quick vinegar process, or *Schnellessigfabrikation* of the Germans, whereby fermented cider, or any liquid containing alcohol, is converted into vinegar in a few hours by filtering it through beech-wood chips, is a case in point.

But what shall we say ot the actien of the clay? That it retards or changes the nature of putrefaction is evident. But the question is, does it prevent the conversion of the animal matters into the ordinary products of decay; or does it allow of that conversion, and absorb those products as they are formed?

Other experiments made by Prof. WAY show that urine filtered through clay will not afterwards ferment.

As plants can take their food only in the organic state, [one plant can not live on another plant, as such; its organism must first be destroyed, and the elements of which it is composed be reduced to their inorganic state,] if clays have the power of arresting decomposition, it follows that the chief value of plowing in clover, etc., on heavy clay soils, consists, the first year, in ameliorating the soil, rendering it lighter, more porous, etc., rather than in supplying food for the plants; and it is a question worthy the consideration of farmers, whether clay soils can not be ameliorated by mechanical means, such as plowing, etc., cheaper than by plowing under long, unfermented manures.

It follows, too, from these experiments, that if we want manures to

furnish food for plants on clay soils, they must be thoroughly decomposed before being plowed under. Perhaps it would be better, under some circumstances, to spread them on the surface of the soil. We have seen, on heavy land, barnyard manure so applied late in the fall, on wheat, with good results — better, the first crop, than when plowed under.

Sand accelerates decomposition. When clover is plowed in on sandy soils, it probably decomposes with greater rapidity, as with the urine in the experiment, than though kept moist in a heap unmixed with sand.

To MAKE HARD WATER SOFT.— Water is frequently hard by holding in solution a quantity of carbonate of lime. It may be rendered soft by the addition of a little quick lime. The *rationale* of the process is this: Carbonate of lime is insoluble in pure water, but soluble in water containing carbonic acid. Any water, therefore, that contains carbonate of lime in solution contains free carbonic acid. When quick lime is added, this free carbonic acid unites with it, forming the insoluble carbonate of lime; which, together with the carbonate of lime originally in the water, falls to the bottom of the vessel, and the supernatant water is soft.

SOOT AS A MANURE.— Soot is used in England to considerable extent as a manure for wheat. It contains much ammonia, and BOUSSINGAULT attributes its high fertilizing effect to this ingredient. The experiments of the late Prof. ANDERSON showed soot to be a valuable manure for wheat, for timothy, and for other grasses, *while it had no good effect on clover.*

COST OF UNDERDRAINING.— ROBERT J. SWAN, of Geneva, N. Y., has laid *sixty-one miles* of underdrains on his farm of three hundred and forty-four acres. The drains are from two and one-half to three feet deep. The wettest portion of the farm is on the highest ground, and here the drains are about twenty-seven feet apart. On the low land they are fifty-four feet apart. Taking the whole farm, there are sixty-three rods of drains on an average to the acre. The cost of digging the drains was 12½ cents per rod; laying the tiles and filling the drains with the plow, etc., 3 cents per rod. The tiles and cartage cost 13 cents per rod, making the whole cost 38½ cents per rod. This is much cheaper than such work is usually done on a small scale and by experienced hands.

PICKING AND MARKETING FRUIT.

WRITTEN FOR THE RURAL ANNUAL BY E. W. HERENDEEN.

In order to obtain the greatest amount of profit from fruit culture, knowledge and skill in picking and marketing the fruit in the best manner are of absolute importance. For, however well fruit may be grown, however carefully the tree may be cultivated and pruned, if through ignorance or carelessness it is sent to market in bad condition, or at the wrong time, or sold to parties who either can not or will not pay the best price for it, the producer fails to obtain the just reward for his labors. The same quality of fruit put up and sent to market by two different persons, will often vary from 25 to 50 per cent. in the amount obtained for it.

There are hundreds of young orchards and vineyards which have been planted within a few years, the owners of which have had as yet little or no experience in the management of their products, who will perhaps be glad to receive a few practical hints in regard to them. For the experienced grower there will probably be little, if any thing, new or instructive. We will consider first the most valuable of all fruits,

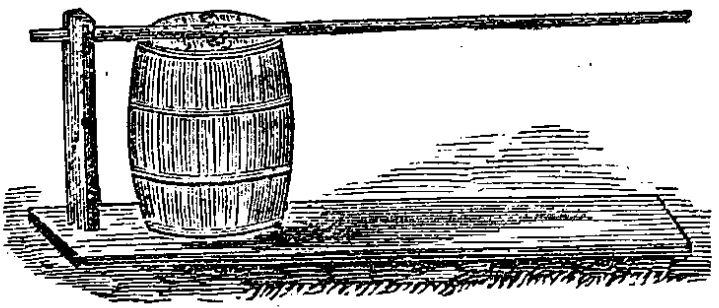
THE APPLE.

When apples are picked and sold in the fall, immediately from the orchard, buyers will not always be willing to pay for the care and attention which should be bestowed upon them. But apples properly sorted, packed without leaves or sticks, and pressed just enough to go without shaking, will generally bring from 10 to 25 cents more per barrel than the mass which are gathered without this care.

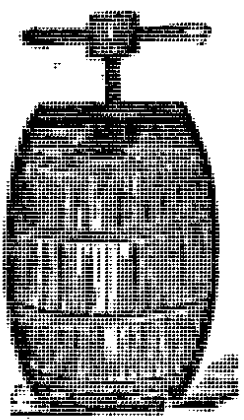
Picking off the imperfect fruit in July or August will be found of great service. There will be as many bushels of good fruit in the fall as there would have been good, bad and indifferent, if all are left to grow, and it takes scarcely any longer to pick them in summer than in the fall, when they have to be sorted out and thrown away. Generally speaking one day's work to fifty barrels of apples will take out nearly or quite all the imperfect fruit.

In filling the barrels the apples should be placed with their stems upon the bottom end, or "faced." As this is the end generally examined they have a neat and careful appearance when opened. They should be gently shaken, occasionally, when filling the barrel, so that they will not work loose when on their journey to market.

There are different plans to press the head into the filled barrel. The old fashioned one, which we have used in many hundred barrels, was to stand upon the head, and pound and press with the feet. This is very objectionable, as it mars the barrel head by unnecssary pounding, and bruises the apples. Another plan often recommended is to use a lever running through a post which stands upright at the end of a plank, thus:



By pressing down upon the end of the lever, a stick placed across the barrel head will press them firmly and gently into the barrel. This arrangement has two objections: it is heavy to move from place to place in the orchard, and it requires two persons to properly work it. The best plan is that of a screw as seen in the annexed cut. It consists of a screw working through a block, from each end of which iron hooks extend to the bottom of the barrel. Of course as the screw is turned down the head of the barrel is infallibly pressed into the proper position in the barrel. It is light and requires only one person to manage it, and cheap, costing not more than $1.25.



Ladders, if properly made, and of the best material, may be very light indeed, and if kept painted and housed, will last almost an indefinite length of time. Self-supporting ladders, with the exception of stepping ladders, six or seven feet high, are not generally of any particular value.

Persons who have orchards of late keeping varieties, such as Russets, Northern Spy, Baldwin, Newtown Pippin, and some others, can

generally obtain double the price for their fruit if kept until spring, and if kept properly there will be but little loss from decay.

Cellars to dwelling houses are seldom good for storing apples. They are generally too warm, and being used for keeping miscellaneous articles the fruit acquires an unpleasant flavor, and looses that freshness which it has if kept in the cellar of a grain barn, or what would be still better a cellar built expressly for keeping fruit.

A friend of mine had last fall about one hundred barrels of Roxbury Russets. As he was only able to obtain an offer of 75 cents per barrel for them by the dealers, he concluded to keep them until spring. In March a buyer from Chicago heard of the lot and came a distance of ninety miles, expressly to buy them, offering him $2 per barrel. My friend in putting them up, selected ten barrels which were the most imperfect, and sent them to Philadelphia, and obtained for them $3.90 per barrel — 90 cents paying the transportation. Had he sent the selected fruit he would have realized at least $3.50 for them. Fruit was never more abundant than it was last fall.

No matter how large a crop of apples there may be, the great bulk of them will be gone by April, so that long keeping apples will always be in demand after that time.

How to obtain the greatest price for apples in the spring is a question of great importance. Generally speaking if good fruit is sent directly to some reliable commission house in one of our large cities, better prices will be obtained for it than can be obtained of the dealers, from the fact that western apples do not generally keep as well as those grown in Western New York.

Chicago has been, and will probably continue to be a first rate market for fruit, and as transportation is very low on the lakes — costing only 25 cents per barrel from Buffalo to Chicago — producers in Western New York are comparatively near a fine fruit market.

Care should be taken in selecting a commission merchant, as they are not all alike, and when a good one is found employ him as long as he treats you well.

Apples should never be placed in piles in the orchard, as is frequently the case, as they get bruised, wet and dirty. They should at once be barreled, and left for a week or ten days with the barrel heads left out, to allow them to cure somewhat, and then removed to some barn or shed, and remain there as long as possible without freezing. Then place them as before remarked into as cool a cellar as will keep them. It will be a great advantage to the producer if he will put his

name on the barrels, as in that way he will soon get a reputation among dealers, and sell his fruit more readily

PEARS.

Upon the proper time and manner of managing pears, still more than apples, depend the profit derived from their cultivation. It is impossible to give any precise directions to ascertain the proper time to pick pears, but it may generally be known by the fruit parting readily from the stem, and by the seeds having turned dark brown or black. If the fruit is left to ripen on the tree it will loose much of the fine aroma and brilliant color which it would have if ripened in the house. The peculiar rich fragrance and taste of a good pear seems valuable. Many pears which are decidedly second quality when picked from the tree and eaten, become much improved when properly ripened. Perhaps we might add, however, that poorly grown pears can by no process of ripening be made to equal well grown ones. They differ in this respect very much from apples, where difference in size does not indicate a corresponding difference in flavor. It usually takes from one to three weeks to ripen summer and fall pears, and consequently there is ample time generally to send them to market before they become soft. And they do just as well kept in a tight barrel as in any other way.

In order to obtain the highest prices it is generally the best plan to *grade* the fruit, putting those of the same quality into the same package. A quantity of pears put up in this manner will bring considerably more than they will when large and small are mixed together.

The prices obtained in some instances, by judicious selection, have been enormous. A barrel of Duchesse d'Angouleme pears, containing one hundred and twenty-five, brought $35.62, and ten barrels brought $300. This fruit mixed with more inferior would have added but little more to the price obtained for that, and the whole would have fallen far below the price realized. In some instances the fruit has been wound in paper, similar to oranges, but experience does not prove it to be of sufficient value to justify the practice. Paper is sometimes put on the ends of the barrel, but it is not considered essential. The fruit should, however, be placed on the blossom end in the bottom of the barrel, like apples.

When to pick and how to ripen winter pears has long been a very interesting and difficult question with fruit growers. It has been thought by many that they should be brought into a warm room to ripen; that the maturing process will not go on properly if left in the

cellar like apples. Experience has proved this to be a mistake. The proper way is to leave the fruit on the tree as long as the season will permit; at least until the middle or end of October, then to pack it on a dry day, put into tight barrels or boxes, and store in a shed or other open building until freezing weather comes on, then place in a cool cellar, precisely as winter apples. They will ripen up slowly, and if of the proper sorts, will be found far superior to those taken from a warm room, where their rich aroma has long since evaporated.

If the weather is mild they may be sent to market so as to ripen up shortly after getting there. And by express they may generally be sent at any time in the winter, as the cars have stoves in them which prevent them from freezing. The price which good winter pears always bring will amply justify this additional expense.

We think the price of good winter pears will hardly ever fall below $12 per barrel, and will probably reach a much higher sum.

Fruit houses are almost essential, or at least very profitable, as they enable the producer to keep the fruit unchanged till he can find a good market. There are already several inventions, with the same leading idea, which seem to accomplish the proposed object very successfully. The fruit is kept in an ice house, the air of which is made dry by the use of chloride of lime. Quick lime would answer the same purpose, we suppose.

A late number of the *Gardeners' Monthly* contains a report of the experiments of FLETCHER, WILLIAMS and VAN CAMP, of Indianapolis, with NICE'S patent method of preserving fruit in air kept by ice within a few degrees of freezing and rendered dry by chloride of calcium. About a thousand bushels of apples were experimented upon the first winter. They kept till the following June in perfect condition. The following summer small fruits were tried. Raspberries and blackberries kept eight weeks, and then lost their flavor without decaying. Peaches, after ten weeks, showed evidences of decay. Gooseberries, currants, and cherries kept much longer. Of pears two hundred and fifty bushels were tried, of such sorts as Bartlett, Seckel and Flemish Beauty, which it is thought may keep the winter through. Grapes, as might be expected, kept a year, but they should, of course, be well grown and thoroughly ripened.

As ice houses are not very expensive there is every reason to believe that they will in future play an important part in the preservation of fruit. Bartlett pears, for instance, are sometimes quite low at the time of their greatest abundance, but as the season draws to a close they rapidly advance in price, frequently bringing $25 per barrel. The

profit thereby obtained as can easily be seen, is enormous. No doubt but that if fruit is kept in a temperature really down to the freezing point it may be kept a long time unchanged.

This is a new field for experiment, and we shall watch with interest the results obtained from it.

STRAWBERRY CULTURE NEAR BOSTON.

N. C. STRONG, of Brighton, Massachusetts, furnishes the *Gardeners' Monthly* the following article on the cultivation of strawberries for the Boston market:

The most successful cultivators do not attempt but about one acre per annum. There is a limit to the amount of help to be profitably employed; the land is to be prepared by yearly rotation, and the bed changed every year, so that a bed of one acre, changed year after year, will require a lot of from three to five acres, according to frequency of rotation.

Heavy clay loam is the soil preferred. Bottom lands, inclining to be wet, but underdrained, and then thrown into beds by dead furrows, about twenty-one feet apart, so that surface water shall pass off at once in the winter; these give the most luxuriant beds. Having been in good tilth the previous season, about ten to fifteen loads of horse manure are applied to each acre during the winter or early spring. This is ploughed in and the plants are set in April. As stated, the beds are twenty-one feet wide. At each edge and close to the dead furrow, is a row of Brighton Pine. The remainder of the bed is filled with the Hovey, in rows three feet apart and one foot apart in the row. These are cultivated by horse until they make runners. By September the ground is completely covered, and the plants so stout that they seem to have all the elements of fruit hid within themselves, and able to carry them through the pinching cold of winter.

Salt hay, sedge, and leaves are used as a winter cover, the latter being considered best. Care must be taken that the covering be not too heavy, so as to smother the plants in case of heavy snows. Early in spring the covering is removed. The large beds, say two hundred feet [illegible]-one feet wide, are a tick mass of plants, the Brighton [illegible] rows to act as fertilizers, and the inside [illegible] dividing the Hovey

into sub-beds, three feet wide and running the length of the large bed. The winter covering is then put back, as a mulch, upon the paths and worked into the beds whenever any vacancy occurs. The ground is now so thoroughly possessed by strong plants that weeds will give but little trouble; the planter may await with complacency his reward.

Four thousand quarts are considered a fair crop for an acre. The fruit is of such size that the cost of picking and arranging is greatly diminished. Superior fruit is always saleable, and at advanced prices. In our market, fruit of third quality will average to the grower about 15 cents per quart. The best growers say they average about 25 cents per quart.

From these data the profit of strawberry culture may be easily calculated. One crop is all. As soon as this is taken, the field is plowed and is ready for any late crop. The testimony is pretty uniform, that this is the wisest course. In case a second crop is grown, the sub-beds are cut to single rows, three feet apart, immediately after fruiting; manure is again applied, and the following spring the old plants are cut out for paths, reliance for fruit being placed entirely upon the runners of the previous season.

In regard to varieties, none of the new comers yet equal those above named. Jenny Lind is a fine early fruit and productive. It deserves culture and might be substituted for the Brighton as a fertilizer, though it is too early to fructify the later blossoms of Hovey. Triomphe de Gand proves quite hardy, large and prolific. Its shape and color are objectionable, and separates from the calix with some difficulty. Still, its perfect flower, its size and fruitfulness, we think will make it valuable. La Constantine went up like a rocket, but the reverse curve is less brilliant. If, in England, the pump is the "best manure for the strawberry," what shall we say in our dry climate? La Constantine will give the amateur a *charry* quantity of *splendid* berries, he first giving large supplies of food and drink; but for general culture it is useless.

Every farmer should have his workshop, and every farmer should be mechanic enough to mend all the small breakages that occur on the farm, instead of losing time and patience in sending to the village to have the work done. Besides this, when a wet day comes, the boys will interest themselves in learning to become practical mechanics, instead of moping round the house.

THE BEST WAY TO USE BONES.

We have been requested to publish in this number of the of the *Rural Annual* the following article from the pen of George Haskell, of Ipswich, Massachusetts, written in reply to an inquiry in the *Country Gentleman*, in regard to "the best possible way to use bones."

"Take one ton of ground bone, (the finer ground the better,) and one-half an ox cart load (one-quarter of a cord) of good friable soil, which will not break or cake by drying, and which is free from sods and stones, no matter how wet it may be when used. Place a layer of the soil and a layer of the bone, of about equal thickness, upon each other, (soil at the bottom,) on the barn floor, or under cover in a shed or outbuilding, leaving a bushel or two of the soil to cover the heap when all the rest is put together. The heap will be three to four feet wide at the bottom, and about twice as long. In forty-eight hours it will be too hot to hold your hand in. Let it remain undisturbed until the heap begins to cool, which will be in a week or ten days. Then "throw over" the heap by "chopping it down" with a shovel and moving it "in end," thoroughly mixing the soil and bone. In a day or two it will heat again. Let it remain until it cools, or for eight or ten days; then throw it over in the same manner again. In a few days it will heat again, unless the previous fermentations have exhausted all the moisture in the soil and bone. Throw over each ten days until all the moisture is thus exhausted and it does not ferment any more; then it will be fit for use, and can be put away in old barrels, and it will be ready for use, without deterioration, for ten years.

"All that is necessary to make bones operate as a manure, is decomposition—*rotting;* and to produce this process the bone only needs to be ground or broken fine, and to be subjected to moisture in warm weather with some substance that will absorb or retain the gases evolved during the process. Soil furnishes the essential requisites, and nothing more is needed to make bones an excellent and durable manure.

"This is not a theoretical rule, merely. I have used many tons prepared in this manner during the last twelve to fifteen years. I have tried it upon the same field, and side by side with the superphosphates

of different manufacturers, and always saw the best and most permanent effects from the same weight of bone prepared in this manner, a ton of which costs, exclusive of the labor and the soil, about half as much as a ton of superphosphate.

"I do not wish to excite a war with the chemists, but I think their theory of the benefit bone derives by treatment with sulphuric acid is erroneous. The acid only aids the manurial qualities of the bone by the mechanical effect of sub-dividing it — making it finer. Its chemical effect is no better upon bone than it would be upon green horse-dung, and I would no sooner treat one than the other with oil of vitriol, with a view of adding to its chemical value as a manure.

"I want to say further, that before treating bones in this manner, I tried several methods recommended by the farming newspapers without much satisfaction. I mixed half a tun of ground bones with twenty bushels of leached ashes, and half a tun with twelve bushels unleached ashes, and the workmen could not open their eyes in the barn next morning until the doors and windows had been open long enough to let the *ammonia* out! As soon as I saw the effect of this process, I sent for a load or two of spent tan to mix with it; and thus saved a part of the ammonia, but the effect of this compost was not very striking.

"I next mixed a tun of bone with wet, yellow sand — a material about half way between sharp sand and loam. This fermented finely but it smelt so bad and was so nasty, that I had to pay an exorbitant price to get it applied to the land. It had a good effect, however.

"I then mixed a tun of bone with a tun of ground plaster. I found the plaster was wholly incapable of keeping down the carrion smell, or of absorbing the manure given out in the form of gases. Water had to be added to this heap to support the fermentation, and the plaster dried hard and in lumps, and did not seem to participate in the fermentive process as the soil does. This did not have so good an effect as the bone and sand; and none of these compounds was equal to that prepared with soil.

"I will also add that the newest bone is the best. The old dry bones which are collected after exposure to the weather for years, have lost much of their virtue, and will not heat so soon nor so much as those which have not lost their gelatine in that manner."

If the heap becomes "too hot to hold your hand in," and is turned over and over till all the moisture is driven off from the soil and the bones by fermentation, we should think that, with the small proportion of soil used, the ammonia arising from the decomposition of the

bones would escape, and that the mixture would be less valuable than the bone dust would have been if used alone.

Dr. VOELCKER, Chemist to the Royal Agricultural Society, gives a method of decomposing bone dust which we think preferable. After remarking that the best manure for growing turnips on light land is a compost of bone dust and rotten dung, he says:

"The best way to make this mixture is to cart into a corner of the field the yard manure, about three months before turnip sowing begins. At the same time, the bone dust — calculating six to eight bushels per acre — is carted next to the place where the manure is to be put up in a heap. In making the heap, first a thick layer of dung is placed upon the ground; a thin sprinkling of bone is placed upon it, then a layer of dung; again a sprinkling of bone dust; and so on, until all the bone dust and dung are placed in alternate layers in a heap. About a month before sowing the turnips, the heap should be turned over. Proceeding in this way, we shall find that the fermented dung disintegrates and partially dissolves the bone dust to such an extent that, by the time the manure is ready to be distributed over the turnip field, nearly the whole of the bone dust will have become decomposed and uniformly amalgamated with the dung. This excellent plan appears to be by far the most economical mode of dissolving and applying bone dust on light land, which, as has been stated, should, if possible, be manured with at least half a dressing of ordinary manure, in order that the deficiency of potash and organic matter in the soil may be supplied."

In the culture of garden vegetables this compost could be used with decided advantage.

It will be noticed that both these methods take it for granted that the bones are ground. And herein lies the difficulty. There is not much trouble in using bone dust. It is not at all necessary to dissolve it in acid, or ferment it, or prepare it in any way. It will gradually decompose in the soil, and yield up all its fertilizing elements — organic and inorganic. The only advantage in the methods recommended by Mr. HASKELL and Dr. VOELCKER is, that the bones have a more immediate effect.

But, so far as the mass of farmers are concerned, the great problem to be solved is, how to use *unground* bones. If these will ferment in a compost of soil or manure, or both, every farmer in the country could collect the materials, with little trouble or expense, for a most valuable manure.

PLANTING TREES.

A CORRESPONDENT in the *Prairie Farmer* recommends thorough preparation of the whole ground before planting, and says:

"Long experience has taught me that it is a fatal mistake to plant any tree or shrub too deep. The hole dug — and if you are planting an orchard, the best way is to furrow it out, and plant in the furrows — the ground where your row comes, having been at least twice plowed and well harrowed; the first time thrown out, the next time thrown together, so as to form a ridge; now you are ready to plant. In planting, put the strongest roots towards the southwest. If there is any injured spot on the tree, put it to the north. Spread the roots as they formerly grew — the end low down, and never allow them to be cocked up or bent round the hole. The bottom of the hole should be filled with a few inches of mellow, black earth, left somewhat crowning, or higher in the centre — the reason for which will soon be obvious to the most inexperienced beginner. Plant your tree no deeper than it stood in the nursery. Fill in with mellow, black earth, if you have to draw it a mile, tread firmly with the foot before the hole is more than two-thirds full. Tread with heels out, toes in, treading, especially in very dry weather, is often half the battle — tread well. Should the ground be wet, do not tread much. Fill in with good earth and have it as loose as possible.

THE BEST TIME TO SET OUT STRAWBERRIES. — Strawberrses can be set out in the spring, or in August, September, October, or November, till the ground is closed with frost. If the weather is rainy in August or September, and the ground is sufficiently moist, strawberries may be transplanted with safety and success, and there is this advantage, you get a fair crop of fruit the next season. But it is not often that we have weather at this season favorable for the work, and then it is better to defer planting till later. The question, then, is, whether it is better to plant in the fall or wait until spring. In this section we prefer spring planting. The strawberry runners will stand the winter better in the old beds, if not too thick, than in the new ones, and you will have strong, healthy plants to set out in the spring.