

are healthy young shoots of one year's growth, from good kinds of fruit trees. They must be cut before the buds start, but may be cut any time previously, and kept with the ends stuck in moist earth, in a shady place or cool cellar. (3) A sharp knife, some bast matting, or strips of cotton or linen cloth, and grafting wax, which may be made of 2 parts tallow, 3 parts bees wax, 3 parts rosin; or, 1 pint linseed oil, 6 lbs. rosin, 1 lb bees wax.

The simplest kind of grafting is *cleft grafting*, which suits best when the stock is larger than the graft. Cut the stock off, split it down the centre an inch or two, open the split with a wooden wedge. Cut the lower end of the graft to a wedge form, and cut off the top, leaving only 3 or 4 buds. Insert the lower end of the graft in the slit of the stock, so that the bark of one side at least corresponds exactly with that of the stock. Withdraw the wedge, and apply some grafting wax over the place of junction, so as to exclude air and wet, and tie around strips of cloth or matting smeared with the composition. If you have not composition, tie matting around the stock and scion, and make up a plaster of tough clay and cow dung, and surround the top of the stock with a ball of this "grafting clay." On large stocks a graft may be put in each end of the slit.

Whip grafting is well suited to small stocks. The stock is scarfed or sloped off at top, and the scion similarly sloped at bottom, and a tongue is raised on each by making a little split downward in the stock and upward in the scion; the two are then fitted together, the tongue in the scion fitting into the cut in the stock, and *vice-versa*, the barks are made to correspond at least on one side, and the whole is tied round with matting and smeared with composition, or with strips of cloth covered with composition.

Much of the success of grafting depends on the neatness of the cutting and joining, without leaving gaping spaces or tearing the bark, or separating it from the wood. The best time is when the buds are swelling in spring.

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Liquid Manure.

The importance of liquid manure cannot be over-rated. The farmer who permits the liquid manure of his stable to run to waste, loses about one half of his available material for the production of crops, and must ultimately reduce his farm to poverty,

unless he expends large sums annually in the purchase of guano or other rich animal manure; one thousand gallons of the urine of the cow being equal to a hundred weight of guano. Nearly all good farmers are now aware of the great losses which have been sustained by negligence on this point, and large quantities of these valuable manures are now economised, more especially by providing for their absorption by swamp mud, soil, &c. There are, however, many advantages in applying them in the liquid form, especially in this dry climate; but considerable practical difficulties attend this mode of application, and we give the following remarks by a correspondent of the *New England Farmer*, in the hope that they may tend to remove some of these:—

"To farmers on a small scale who have not the means to provide themselves with that inestimable convenience of a watertight cellar under their barns, a simple and cheap substitute is easily provided. That substitute is nothing more than a tank or cesspool, built under ground, of suitable capacity in proportion to the extent of the farm, placed in the most convenient situation for receiving the whole liquid refuse of the dwelling-house, the urine of every description from the barn, also water from the house pump to dilute the liquor and prevent smell when required. The tank may be constructed of stone, or brick, or even wood, as being the cheapest in the outset. Spruce plank is good enough for the purpose, and comes cheaper than any other material; and, if bedded in clay to prevent it from decay on the outside, the liquor will preserve it in the inside for generations to come. A tank 12 by 6 feet, and 4 feet deep, could be built of this wood, for about \$20, and will hold over 1728 gallons; which is sufficient during the season to supply liquid in abundance to top-dress from 12 to 20 acres of grass-land, and increase the quantity of hay in a most astonishing manner. It should have a close cover for the top, part of which, however, should be movable at pleasure, with a view to cleaning out the bottom when required; and in the permanent part a hole should be left to admit a wooden pump, which is essential for discharging the liquid into the distribution cart. Also an aperture for the discharge of the back-house of the family which should be invariably placed right above the cesspool.

"A cart for the distribution of liquid can be made in different ways. Those used in many parts of Europe for that purpose, are on the same principle, and similar in construction, to those used in this country for watering the streets in cities, during dry weather in summer; but one of much easier and simpler construction may answer all useful purposes, to those of small means. A

large barrel fixed on a pair of old wheels, with a spire for oxen or shafts for a horse attached to the axle, is all that is wanted; or the barrel may be placed in an ox or horse cast, as convenience may dictate, with a spout or box behind pierced with many holes in the bottom for the even distribution of the liquid on the grass. With such a cart one man can manure from 4 to 6 acres in a day, which is a great saving in the expense of labor compared with the common practice of top-dressing with composted manure, a topic worthy of some consideration in this frugal land.

"In order to derive all the advantages from this mode of manuring grass land, special attention must be paid to the proper fermentation of the liquid before application, as properly fermented, and unfermented liquid, may be compared to strong manure, and no manure at all. Every one at all conversant with the making of wine, beer and cider knows that these liquors require to undergo a certain degree of fermentation before they impart that invigorating, and stimulating effect on those that drink them, for which alone their value in proportion to their relative strength is estimated. In like manner does liquid manure operate in all its stages of fermentation; as it has to undergo several chemical changes during that process before it becomes fit food for plants. The next important consideration connected with this undertaking after the fermentation has subsided, is how to fix the ammonia and other volatile matter that the liquid may contain; and how to ascertain when they are fixed. Many substances may be used with good effect for fixing these volatile principles in liquid manure. Any ingredient of an acid nature, if added in sufficient quantity to decomposing urine, fixes and neutralizes the ammonia as it is evolved from the urea and the other nitrogenous bodies of urine; and in consequence very much enriches the ultimate liquid manure. Water, as Professor Nash says, is an excellent absorbent of ammonia, and is in all cases a sufficient deodorizer, provided enough of it is used. This I have invariably found to be correct; and would, therefore, advise a certain quantity to be pumped in the tank every other day in proportion to the amount of other matter it may contain. This will completely subdue any offensive odor that may arise from the fermentation of the liquid, and add considerably to the bulk of the article. Should this course be objected to on account of such quantities of water making the preparation too weak, I would say add guano, night-soil, cow dung, or even green succulent vegetables and many kinds of weeds from the garden and field, to thicken the mass, and bring it up to the proper strength. Before application I invariably use a small quantity of diluted sulphuric acid as a deodorizer and neutralizer of ammonia; and the surest and safest criterion to judge by, when the liquid is fit for using, is its being destitute of any disagreeable odor when