

## WATER ON FARMS—CEMENT PIPES.

(From the Albany Cultivator.)

Those only who are deprived of the advantages of good watering places on their farms, can fully appreciate the privilege they confer, or the amount of suffering they prevent, when the farm stock have no drink except such as is dealt out to them once or twice a day from a well, or are obliged to be driven a distance to a pond or a stream. It is surprising how little attention is paid to this subject of water, when so much is depending upon it, and when so little expense would, in most cases, provide a remedy for the evil. Wells, artificial ponds, &c. may be resorted to, when nothing better can be provided; but experience proves that running water, such as is furnished by springs, or streams, and which can be conducted to the points where it is most wanted, is not only the best for stock, but far the most economical in the end. There are few, very few farms, on which water works of this kind may not be constructed, and the water conveyed in pipes wherever desired; still we have known men bring their water for domestic use, year after year, in barrels or in hogsheads, when nothing but a little energy or skill was required to bring an abundant supply of pure spring water to their doors.

For the purpose of conveying water from a distance, pipes of various kinds have been resorted to, of which the most common are lead, wood and cement. Of these we give a decided preference to cement, unless used in circumstances where a great pressure is unavoidable, when perhaps wood or lead might be substituted. That a cement pipe properly constructed will not resist any ordinary pressure, is effectually disproved by one we have in use for conveying water to our buildings and on which a perpendicular pressure of forty-five has not the slightest effect. We dislike lead as a conductor of water for domestic purposes, because there are few springs that do not contain salts, of some kind sufficient to have a decided corrosive action on the lead, as such pipes on examination almost invariably show, and lead is too active and dangerous poison to be trusted in the human system in any form. Wood is free from the objection attached to lead, but its want of durability is a serious obstacle to its use. In passing through orchards, or meadows, roots will insinuate themselves through the minutest crevices, and once entered will spread and ramify, so as to speedily fill the pipe and obstruct the passage of the water. Clover is, if possible, more injurious to wood pipes than the roots of trees, and we have known an aqueduct ruined, and taken up, from the obstruction caused by the roots of this plant. Observation and experience both concur in inducing us to prefer a pipe made of cement or water lime and sand, to any other material for conveying water. There are several reasons for this preference. The first is the purity and sweetness of the water so conveyed. If the water is good at the source, it is good at its delivery; no poisonous metal, or disagreeable wood taste have been added. A well-made cement pipe, is in fact, a calcareous sand stone, and preserves water as pure as would a pipe of that stone. In the second place a cement pipe is durable. Lead usually soon fails from corrosion, and wood from decay; a cement pipe does neither. If well bedded, and at such a depth as not to be disturbed from the surface, there seems no reason why they should not last forever. Indeed, the cement aqueducts of Rome and Jerusalem, after the lapse of some two or three thousand years, furnish pretty good evidence on this point. In the third place, cement pipe is the cheapest. It is the cheapest, because the first outlay in most cases is less than that of any other pipe, and because when once done well, it is done for all the time, accidents excepted.

We have had some inquiries as to the best materials, and the best methods of making cement, both for cisterns and for water pipes, and all such we propose to answer here. The best material for cement is the water lime of Ulster or Onondaga; but it should be of undoubted quality, fresh, or packed in air tight barrels, or it will be little better than ordinary good quick lime. As few are aware of the extent to which the manufacture of water lime is carried in this state, we will remark here, that the researches connected with the geological survey of New York, showed, that in 1839, six hundred thousand bushels were manufactured in

Ulster county, and an immense quantity is annually manufactured in Onondaga and Madison counties. To prepare the cement, two bushels of very coarse sand or even fine gravel, sharp and clean from all dirt or loam, is mixed with one bushel of lime. The cleaner and sharper the sand, the firmer and better the cement; great attention should therefore be paid to this part of the operation, as well as to the quality of the lime. For cisterns, or other purposes where water lime is used, the same precautions will be found essential, and if observed failures can scarcely occur.

There are several methods of laying down cement pipe, but all so simple and easy, that any one may perform the operation; although practice enables one to work water lime pipe so much more perfectly and readily, that an experienced hand should be obtained when practicable. The first thing is to provide the water to be conducted. If a single spring, or a stream, it may be considered ready for use; if from several springs, they must be conducted to a common reservoir; and if the water is to be derived from wet grounds, deep covered drains centreing at some convenient point will be required. From this point, or reservoir, the water is to be conducted in cement pipes to the places where it is wanted. The ditch for a water pipe should be not less than two feet deep, and if intended to convey water for the use of a family, should be still deeper; for, if laid shallow, the heat of the earth when the water flows any distance from the spring, renders it disagreeably warm in summer. The width of the ditch may be eighteen inches or two feet, a deep trench requiring more width than a shallow one. Where intended for the use of stock only, pipes so low as to be beyond the reach of frost, the plough, or pressure from passing bodies, are sufficient for every purpose. The bottom of the trench should be level, free from holes or soft places, as such would permit unequal pressure on the pipe, and endanger its breaking.

We have known two kinds of implements used for laying the pipe. In one of these cases, firm but flexible harness leather was sewed into a tube four or five feet in length, of the diameter it was intended to give the pipe, and then rammed full of bran. A covering of cement an inch thick was placed on the bottom of the trench, this cylinder placed on the middle of that, and a covering of cement well worked over it with a trowel, or by hand, for twenty to twenty-four inches. The cylinder was then drawn forward, while the cement was held back by the other hand, and thus the pipe was rapidly and perfectly formed. Two narrow boards served to confine the cement placed on the ground for the bed to the proper width of four or six inches, according to the bore of the pipe, and thus left the completed aqueduct of a square form on its exterior surface. In the other instance the implement for forming the pipe was a round rod turned perfectly true, some two feet in length, and perforated from end to end to allow the passage of a strong cord. To this cord is attached a piece of wood ten inches long, of the same size as the rod, turned perfectly smooth, and tapering to each end. The cement is laid over the long rod, well worked down by a trowel, and when sufficiently covered is drawn forward, leaving the short rod attached to the cord a short distance in the rear. As the work advances, and the cement sets, which, if good, is very quickly done, the short rod is drawn forward with the effect of rendering the bore of the pipe uniform in its size, perfectly smooth, and free from every thing to interrupt the flow of the water. Either of these methods, with good materials, will produce an aqueduct sound, free, and which, in a few weeks, will become almost as hard as sandstone. Much, however, is depending on the thoroughness with which the mortar, or cement, is worked round the rods that form the bore. Care must be taken not to allow the rods to remain too long before they are drawn forward, as the cement, when partially set, may in that way be cracked and injured. Should such cracks occur, the work may be made safe by immediately covering the place with fresh cement.

The cement should be used as fast as prepared, or a firm pipe need not be expected. If kept dry during the construction, the work will be the better, for though such cement will in time harden under water, dryness greatly facilitates that process. If

necessary, water may be allowed to flow through the pipe as fast as constructed; but it is best to avoid it if possible, and in no event must any pressure be allowed, as that would certainly destroy the work. The pipe should remain from six weeks to two months before it is filled with water, or pressure permitted to take place. A piece of led pipe, of suitable bore, should be used to connect the cement pipe with the hydrant or poststick, as without such precaution frost or accidental concussion might fracture the cement. If it be necessary for any part of the pipe to sustain a greater pressure than another, that part should receive a second layer of cement, well worked upon the first.

When the pipe is laid, it should be uncovered a few days to set, and then fine earth should be thrown upon it, with water to dampen it, so as to have it pack close about the pipe. At first the filling of the trench should proceed carefully; but the whole should be packed close, so as to prevent all danger of breaking. As to the expense of cement pipe, we have the authority of a man well acquainted with the business, for saying that of one inch bore aqueduct he can lay 10 rods per day, and 13 of three-fourths inch per day. Lime of good quality can be procured for 16 cents per bushel at the mill, and allowing 6 cents per bushel for the sand, if the work was charged at \$1.50 per day, it would be about 12 cents per rod, and the expense of the material and laying the pipe some 37 cents per rod. The cost of the trench would depend on the size and depth, and of that each can judge for himself. One dollar a rod for the whole expense would be a liberal estimate. Lead pipe would cost from \$1.50 to \$1.75, according to size, and wood could not be afforded as low as cement. We think no farmer who wishes to construct an aqueduct, will regret that he has made choice of water lime instead of lead or wood; and every man who has not water convenient on his farm will do well to see whether he cannot obtain it in this way, at an expense bearing no comparison with the benefits that would accrue.

## GRAFTING.

The principle fault to be discovered in the various descriptions we have of grafting, is, their not sufficiently describing the parts of the business. A first rate hand will set from three to four hundred per day, and not lose more than ten out of a hundred.

**Cutting Scions.**—Scions may be cut from the fall of the leaf in autumn, till the buds begin to open in the spring. Cut your scions from trees you are acquainted with, or obtain them from persons who can be depended upon. Much time and money is expended in cultivating fruit of an inferior quality, which discourages the owner from continuing the business of grafting. The whole fault consists in an improper selection of scions. It should always be remembered, that it costs no more to raise the best fruits than the worst. For example, it costs no more to raise apples that will fetch seventy-five cents per bushel and get them to market, than it does those that will fetch but twelve cents. The latter would not pay even for transportation any distance.

In cutting scions, select thrifty shoots of the last growth, cut them off about three-fourths of an inch below the circle where the last year's growth commenced. Do not take scions that have been much shaded, or from the interior of a tree-top, however thrifty they may look; neither the wood nor the buds are sufficiently matured to render them safe for use. Tie each sort in a bunch by itself, and mark them. Make the same mark in a book and annex the name of the fruit. If you graft in an orchard mark in the bark of the tree, if in a nursery, put a stake with the name at the end of the row, or by the tree grafted. By this means you can always obtain the name of the fruit.

**To keep Scions.**—Select a dry piece of ground and dig a square pit about two feet deep, of sufficient size to contain your scions; line it with boards at the bottom and the sides to prevent them from coming in contact with the earth; lay a board over the top and cover the whole with earth about a foot deep; lay boards over the mound to turn off the rain, for should the wet penetrate, the scions will be spoiled. Remember that these scions cut