CONSTRUCTION OF GOOD ROADS IS GREAT SAVING TO FARMERS

Excellent Methods of Building Highways of Earth, Clay, Sand and Gravel as Recommended by Government Experts Are Given in Detail—Elimination of Hills Assists Horses.

The cost of hauling over country roads is largely determined by the size of the load that can be hauled, the number of trips that can be made in a day and the wear and tear on teams and equipment. Steep grades as well as ruts and mud holes serve to decrease both the speed and the load.

On the principle that "a chain is no stronger than its weakest link," the maximum load that a team can draw is the load that it can draw up the steepest hill or through the deepest mud hole on that road.

Wherever possible, roads should be located on straight lines. In a hilly or mountainous country, however, straightness often causes heavy grades. Straightness and grade must, therefore, be handled together. The best location is one which is straight in general directions, is free from steep grades, is over solid ground, and serves the largest possible number of people.

In studying the relations of grade to distance, the following principle should be borne in mind: To life a ton one foot high requires 2,000 foot-pounds of energy; on a road, the surface of which offers 100 pounds of tractive resistance per ton, the same energy would roll the ton a horizontal distance of 20 feet. To save one foot of grade the road may therefore be lengthened 20 feet.

The elimination of one or two steep hills on a line of road will frequently enable horses to draw three or four times as much as they could draw on the old road. It takes approximately four times as much power to draw loads up ten per cent. grades as on a level, but on a four per cent. or five per cent. grade a horse can usually draw (for a short time) as much as he can draw on a level.

A four per cent. or five per cent. grade is therefore considered the maximum on roads subjected to heavy hauling. Steep grades may often be

Poorly Located and Badly Drained.

avoided by locating the road around instead of over the hill, without materially increasing the distance.

The earth road should have at least six hours of sunshine each day. Such brush and trees as impede the drying action of the sun and wind should be removed. With gravel and stone roads this is not necessary, as a certain amount of moisture is needed on such roads, especially during the summer.

Relocating roads is not an engineering problem alone. One must also consider the effect of the road on those who now live upon it. Many dislike to have the road placed back of their houses, or out of sight of it. It requires tact and good judgment to secure a suitable location without arousing harsh antagonism.

The earth road can best be crowned and ditched with a reversible road grader. Picks, shovels, scoops and plows should not be used for this purpose. One road machine, with suitable power and operator, will do the work of many men with picks and shovels, and do it better.

In order to dispose of storm water quickly before it has time to penetrate deeply into the surface, the road should be properly crowned. For an earth road which is 24 feet wide, the center should be not less than six

Well Drained Earth Road.

inches nor more than twelve inches higher than the other edge of the shoulders. The total fall of grade from center to side ditch should be about an inch to the foot. Ordinarily, the only ditches needed are those made with the road grader, which are wide and shallow. Deep ditches should be provided if the road is about level, but such ditches wash rapidly on steep slopes and are dangerous beside.

Wood or terra cotta tile do not make satisfactory culverts; the first will soon rot and the latter is liable to break. Stone or concrete culverts are the best and cheapest in the long run.

Because of its simplicity, its efficiency and cheapness, the split-log drag is an excellent device for maintaining earth and gravel roads.

The best results have been obtained by dragging once each way after each heavy rain. In some cases, however, one dragging every three or four weeks had been found sufficient to keep a road in good condition. The ... at does its best work when the soil ... moist but not sticky."

... sand-clay road is made by mix... sand and clay together. Coarse, ... and sticky clays are pre-

ferred. A proper mixture will produce a hard surface, which in mild climates and for light traffic will not become loose when dry nor sticky when wet.

Ordinarily from 10 to 15 per cent. of clay and from 85 to 90 per cent. of sand constitute the proper mixture.

If the road to be treated is sandy, the surface is first leveled off and crowned with the road grader. The

A Country Road in March.

clay is then dumped on the surface and spread to a depth of from six to eight inches at the center, and gradually decreasing in depth toward the sides. A layer of clean sand is then added, which is thoroughly mixed with the clay, either by traffic or preferably by means of plows and disk or tooth harrows.

The sand-clay road, after completion, should be carefully maintained until the surface becomes firm and smooth. The construction of this type of road is by no means a quick operation.

There are so many kinds of gravel that it is almost impossible to lay down principles of construction which will hold good in all cases.

The following are the principal causes of failure in gravel roads:

First, poor material; round water worn gravel; too little binder or too much sand, earth or clay.

Second, unstable foundations; placing gravel on surfaces filled with ruts and holes.

Third, poor drainage; too flat, or too high in the middle, side ditches

Poorly Built Gravel Road.

too deep or not deep enough, culverts which are too small, or which are laid so flat that they are soon filled with silt or trash.

Fourth, spreading gravel in dry weather, dumping it in piles and leaving it for the traffic to spread.

Fifth, making the road too narrow to accommodate the traffic, or so narrow that wagons will track and soon cut the surface into ruts. Sixth, failure to keep ruts and holes filled with gravel.

With good binding or cementing gravel, satisfactory roads may be made by surfacing the prepared subgrade with one or two layers of this material. The earth foundation is first shaped with a road grader, and if possible, rolled with an eight or ten ton roller.

The earth foundation should be crowned but slightly. The material is spread in one, two or three layers to a total depth of from eight to twelve inches in the center, and from four to six inches at the sides, gradually diminishing in depth to a feather edge toward the side ditches.

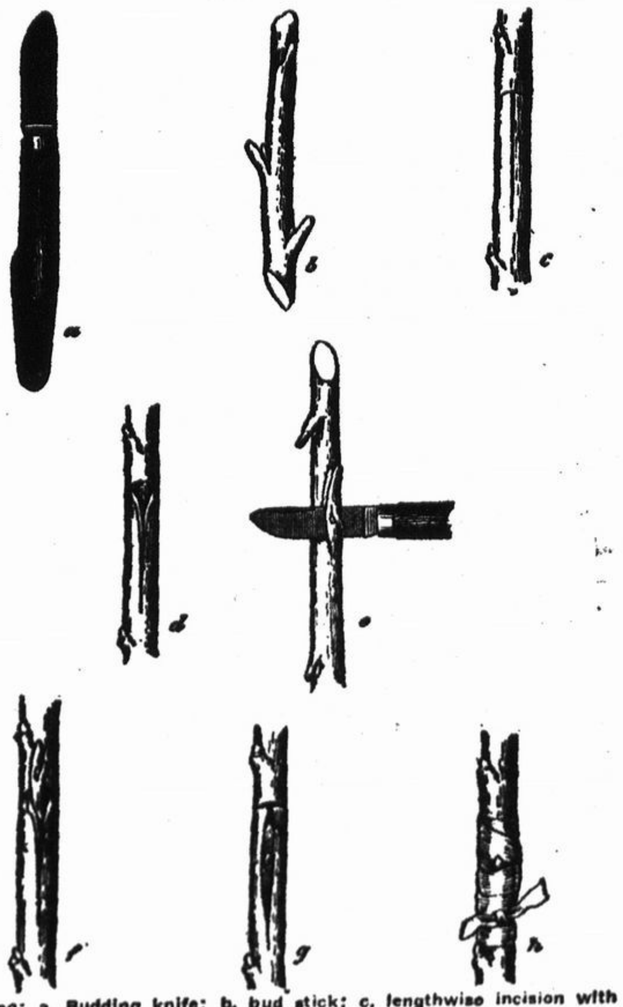
The gravel road ought to have a little attention throughout the year

Two Common Mistakes in Road Making.

instead of a great deal of attention at one time. Mud-holes should never be filled with large rocks or boulders; sods or trash. After the mud has been removed, the holes should be filled with the same kind of gravel with which the road is surfaced.

PEAR ONE OF MOST LUSCIOUS FRUITS UNDER CULTIVATION

Trees, However, Are More Difficult to Maintain in Healthy Productive Condition Than Apple — Neglect in Many Instances Becomes Prime Cause of Ultimate Failure.



Budding: a, Budding knife; b, bud stick; c, lengthwise incision with cross cut at top; d, opening of bark for insertion of bud; e, removing the bud; f, inserting the bud; g, bud inserted; h, bud properly wrapped.

(By G. B. BRACKETT, United States Department of Agriculture.)

The pear has long been regarded as one of the most luscious of the many kinds of fruit brought under cultivation. The choice varieties excel most apples in rich, juicy texture and delicacy of flavor, and for both desert and culinary purposes, either canned or in the fresh state, the pear is considered a great acquisition. With a proper selection of varieties and with careful handling and storing of the fruit its season of use may be extended from midsummer to late winter without resorting to artificial means of preservation.

Pear trees are more difficult to maintain in a healthy, productive condition than apple trees and can not be grown with the same degree of success over so wide an area of country. Such has been the uncertainty of success in growing pears in many parts of the United States that few farmers have the needed confidence to plant even the few trees necessary to provide fruit for home use. This lack of confidence too often leads to neglect, which in many instances becomes the prime cause of ultimate failure.

The operation of budding, which must be performed during the growing season, consists in removing a bud from a twig of the desired variety and inserting it beneath the bark of the stock or young seedling which is to be changed. The inserted bud is held in place by wrapping it fast with soft cotton twine, bark, or raffia. In about ten days the bud will have united with the stock and the wrapping may be removed. Then by cutting back the stock or limb to near the inserted bud, the sap is forced into the newly transplanted bud and the growth of a new tree of the desired variety is promoted.

A budding knife and the successive stages of budding are shown in the illustration.

The main requisites for success in budding are (1) a healthy growing condition of the stock on which the work is to be done and (2) a certain state of maturity of the buds. The bark of the stock must separate freely, so that the bud may be forced under it without injury to the cambium layer of either bud or stock. The bud sticks or scions for budding should be of the current year's growth and should have well-developed buds. When the scions are taken from the tree the leaves must be cut off immediately, leaving only a short stub of the leaf stem for convenience in handling during the operation of budding. The bud sticks should be kept in fresh condition by means of damp moss or a wet cloth, and not more than one or two scions should be withdrawn from the package at a time.

Although budding may be done as early as well-developed buds can be obtained, the common practice of nurserymen is to insert the buds as late in the season as the bark of the stock will separate freely. By this method of late budding the bud is allowed to remain dormant through the following winter. In the spring the wrapping is removed and where the bud appears to be sound the top is cut back as already indicated. All buds on the stock below the one inserted should be rubbed off as they start to grow, so as to throw all the sap into the growth of the bud inserted.

It is as important with the pear as with any other kind of fruit tree that the land, whether for standards or dwarfs, be well and thoroughly prepared by plowing and stirring the soil and subsoil deeply before planting.

An excellent plan is to plow the ground in lands in the direction that will afford the best drainage, backfurrowing with a heavy plow and leaving the dead furrows where the rows of trees are to be set. It is well to break up the bottom of this dead furrow by running a subsoil plow through it two or three times, giving it a good stirring. This method affords a deeper tilth under the trees and allows a partial underdrainage in heavy clay subsoil, if the rows are laid out with reference to this object, and is preferable to digging holes which would form basins that would hold water during rainy seasons, to the injury of the trees.

A good distance for planting standard pear trees is 15 by 30 feet; that is, the rows are 30 feet apart and the trees 15 feet apart in the rows. The object of this method is to obtain larger crops of fruit from the same ground until the trees become large enough to interfere with each other; then each alternate tree in the row is cut out, leaving the trees in the entire orchard at a distance of 30 feet each way. This system has the advantage of more fully utilizing the land for fruit production until the thinning out becomes necessary. Another plan is to plant the trees 20 feet apart each way. This distance will afford free circulation of air and abundance of sunlight, both of which are essential to well-developed and highly colored fruit.

USEFUL FENCE MENDING DEVICE

Illustration Shows Contrivance That Will Be Found Satisfactory — Made of Tough Wood.

For mending a wire fence the device illustrated herewith will be found very satisfactory. It consists of two sticks of tough wood, say 4 feet long, and bolted together at a point about two-thirds the length from the upper end, says the Orange Judd Farmer. A steel clamp at the upper end of each stick is fastened for holding the wire. In each of these a loose end of the wire to be mended is fastened

Wire Fence Mender.

and the legs of the device are brought toward each other until the ratchet on one leg engages with a pin on the other. Then the wire is spliced and the device released by loosening the ratchet and the clamps.