The Farm.

Spring Tillage Operations.

Those who paid attention to the directions given by us last fall will have their heavy soils plowed, and as much of their remaining land as possible. The disintegration and pulverization of clayey soils take place both in winter and in summer; in winter by the action of frost and in summer by ferment of the vegetable matter in the soil. This action is promoted by tillage; in the fall by exposing the soil to the more effective action of frost, and in spring by making the soil porous, thereby admitting the air, which acts on the organic matter. Vegetable or organic matter is only acted on by warm air, aided by moisture, which causes its decomposition, the escape of the gases promoting the decomposition of the small particles of rock found in the soil.

If heavy soils are plowed in spring, it will now be seen that the plant food on the surface, manufactured by the winter frosts, will be buried too deep for the use of the young plants, and the vegetable matter plowed down in the fall will be brought to the surface when it is least wanted. It is important that the vegetable matter (either from stubble or manure) should be thoroughly mixed with the soil, and this object is best accomplished by the cultivator and the harrow. The fact that coarse unfermented manure has the effect of loosening stiff soils has led to the impression that this kind of manure is best for such soils, and although it often produces beneficial results, the results would be more beneficial if the soil were loosened by other means—such as drainage, thorough tillage, the application of ashes or other fine manures, thoroughly incorporated with the soil. Coarse manures cannot be thus incorporated, and they act disadvantageously by obstructing the movements of soil moisture. The greatest amount of tillage should be directed against the uncleanest fields; by doing so, a minimum quantity of manure will be required. On clean land, if the soil is in the right mechanical condition, very little tillage is required.

If there is not time in the fall to do all the plowing, the soils left for the spring should be more of a lighter character. Vegetable soils, which are least benefited by the action of frosts, are much benefited by spring tillage, the soil being made porous for the admission of air, which has a decomposing action on the vegetable matter. These soils can usually be worked earlier in the spring than undrained clay. However, sod land, when plowed in the fall, can be made mellower in spring, and more plant food is made available for the growing crop. Sandy soils may be plowed at almost any time, and the amount of tillage may be mainly regulated by the quantity of weeds in the field. Such soils require heavy manuring, and the manure should be kept near the surface, else it will wash down too deeply, beyond the roots of the plants. The main effects of tillage on the various classes of soils are different. It makes heavy soils mellower, poor soils richer, and dirty soils cleaner. A fine texture or a proper mechanical condition is often quite as necessary as the supply of plant food.

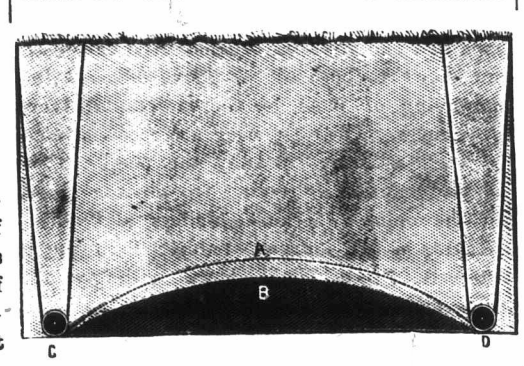
The roller, when not used in the proper time and place, may produce more injury than benefit. Its chief uses are to make a fine seed bed by pulverizing the surface of heavy soils, to compress light soils, and to prevent the too rapid evaporation while the soil is loose by closing many of the surface pores. It is possible, however, to keep out too much air by rolling. Clays should therefore not be rolled when wet, especially when they are not harrowed afterwards. The roller may be advantageously used in rolling winter wheat that has been heaved by the frost.

Farm Drainage.

No. VIII.

How the water enters the drain.—Before you can comprehend how the tiles should be laid and the trenches filled, it is necessary to understand how the water enters the drain.

The dark portion of the accompanying illustration, B, represents the undrained soil, the portion above being drained, the still lighter parts directly above the tiles C and D, representing cross sections of two drains and the shape which they have been cut. It will thus be seen that the pressure of the water is under the drain, not from the top. This curve is called the water-table or line of saturation.



CROSS SECTION OF DRAIN.

Let us now suppose that a shower of rain falls; when the particles of the drained portion of soil become saturated, the surplus water falls to the water-table, which rises, say to A. It will now be seen that a larger portion of the joints between the tiles receives the water, and that a smaller fraction of the soil is drained. Moreover, it illustrates the benefit of deep drains (providing the objections which we have already mentioned do not apply), for in shallow drainage the portion of line of saturation which lies between the drains may be so near the surface as to materially damage the roots of the crop. It also illustrates the advantages of placing the drains sufficiently close together; for the farther the drains are apart the higher will be the curve of saturation, and a smaller portion of the soil will be drained. We are now also placed in a position to understand why smaller tiles are required in a deep drain; for there is less water to be carried off on account of there being more soil to be saturated, and as the water is acted upon by a greater pressure, more will be carried off in the same length of time than in a shallow drain. In the long run, deep drains are preferable in the stiffest clay; for, although they may not give satisfactory results for several years, yet they become more and more porous as time advances, and eventually produce excellent results.

It must not be supposed that the water-table in all classes of soils presents the same curve. In a porous soil the line of saturation sinks, in dry weather, near the level of the drain floor; while in a stiff soil it presents a higher curve, extending nearer the surface of the soil, and leaving more soil undrained between the drains. Take the accompanying illustration, for instance; if the soil is heavy the curve A would represent the water-table, while in a more porous soil it would sink to B, the other conditions being the same. The water-table is constantly descending towards the floor when there is no rain, but the descent becomes slower as time progresses, until the water-table is raised again by a fresh supply of water.

Laying the tile and filling the trenches.—The best form of a trench is that represented in the accompanying illustration, viz., gradually narrowing until the bottom is no wider than the diameter of the tile. But special drainage tools are required for digging this kind of trench. The special advantage is that the tile is not so apt to move laterally out of its place as in wide-bottomed trenches, where the packing of the earth around the tiles is likely to be done unevenly by careless or inefficient workmen. Another important consideration is, never thrust the spade into the ground below the bottom of the trench, for the loosening of the soil may cause the tile to sink in these places. An efficient drainer should therefore be employed for scooping out the bottom of the drain. In digging the trench, throw the fine compact soil on one side, and the coarser soil on the other. In this way suitable soil will always be convenient for placing over the tiles. The digging is usually commenced at the outlet.

In laying the tile, commence at the higher end, and, unless the soil is a stiff clay, a brick is usually placed on edge against the bank closing the opening of the first tile. The tiles should be placed as closely together as possible, for there will always be opening enough at the joints to receive the water. The water does not soak through the tiles, as some suppose, for so long as there is ample space at the joints to fill the drain, no calculation should be made for water entering the body of the tile. If the soil is fine and silty, special care should be taken to procure tiles with smooth, evenly-cut ends, so that the joints will not be too open for the admission of silt. In such soils it is a common practice to cover the portion of the joints which lies upwards, thereby preventing the ingress of silt from above. However, if the fall is considerable, and the tiles small enough to allow the drain to run at times to its full capacity, this practice need not be followed, for the sediment will be washed out, and when the soil becomes settled around the drain, the loss of silt is reduced to a minimum. Where it is necessary to cover the upper portion of the joints, sods should never be used, as is the practice amongst some farmers, for decaying vegetable matter should never be placed near the tile; it keeps the soil too open where it should be most compact, and furnishes a supply of silt to choke the drain. Tarred paper, tea-chest lead, scraps of leather, and clay moistened to a doughy consistency, have all been used with success.

In filling the trenches great care should be taken that the earth is packed evenly on both sides of the tile when the trench is dug with