

THE FARM.

Soil Drainage: Where and How to Drain.

Editor "The Farmer's Advocate":

All lands that produce crops satisfactorily must be drained. Some of the best-drained soils are drained by nature. When the subsoil is open, allowing the excess of water to pass through without the soil being saturated for several days after each considerable rainfall, there is no need of artificial drainage. We may ascertain whether a soil requires artificial drainage by a little observation of its physical condition in spring, the growth of the crop, and the amount of matured crop. We should determine whether or not the water-table is above the root-zone at any time of the year. Where the water-table is above the root-zone during a considerable part of the spring, the soil requires drainage. A soil which, when turned, presents a furrow with a very wet, shiny surface, is in need of drainage; it is waterlogged. A soil of this condition is impervious to the air, is of low temperature, is not in a condition to make use of manure or any fertilizer applied, and is in very poor physical condition.

Any soil in which the seeds sown are slow in germinating, and on which the growing crop is patchy as a result, is in need of drainage. The crop on an undrained soil will present a sickly and yellowish appearance, clearly showing a need of drainage. We often observe that the snow is long in melting on a particular field, or on a part of a field; this indicates a lack of proper drainage. A growth distinctive of wet, undrained soils is such weeds as lady's thumb, horse tails, mosses and sorrels. We may be safe in saying that heavy clay soils require to be drained under any circumstances.

Artificial drainage may be effected in two ways, viz., surface drainage and underdrainage. Both systems may be made effective, and may be made so as to ensure so much of the good that will accrue from a drainage system. Let us now consider briefly the two systems, that we may be able to ascertain satisfactorily which system it would be expedient for a farmer to adopt in any soil he may be thinking of draining. A greater area of the cultivated land of our Province today is served by open drains, but I do not think this is in any sense a point in favor of open drains. This system was the first used by the early farmers, and is being rapidly supplanted by underdrainage. For a farmer having an area of land on his farm requiring drainage, and not so situated that he can install a system of underdrainage, surface drainage may be made to answer very well, and will certainly pay for the labor expended. However, open drains are seldom advised, as they have many disadvantages. They take up considerable space, and, moreover, often divide land into tracts of inconvenient shape, and interfere with the moving of wagons and other machinery, etc. They often become the location of undesirable wild herbage. They usually cost more to dig at first, besides costing considerable every year to clean out, and keep clear of sediment. In any case, open drains are not so effective as a system of underdrainage.

Experience has shown that the best method of underdrainage is tile drains. By this method trenches are dug at about an average depth of three feet, and circular tile one foot in length are laid in the trench, thus forming a continuous channel through which the water passes. The bottom of the trench is graded so the water in the drain is all carried to another underdrain, which carries it to an open drain, or may be carried at first to the open drain, and away. The water, as it passes downward through, also moves laterally towards the drain, and as a volume of water is removed, other water of the soil takes the place of that removed. By this method of drainage there is a continuous movement of the water in the soil, the upper water taking the place of the lower as it is removed. This process does not leave the soil without moisture, nor do the drains remove water from below their level, but the soil retains all the moisture held by surface tension.

To secure an effective system, the drains should be laid near enough to each other that the effect of one drain will reach that of the next. In laying drains, proficiency can best be acquired through experience. On planning and carrying to completion a system, much has to be taken into consideration to gain best results. The contour of the land must first be studied, to ascertain a plan of the system, and to gain best outlets, and obviate the occurrence of unnecessary short bends and the use of unnecessary silt basins. The character of the soil must be understood before one can intelligently determine the depth the tiles should be placed from the surface, and at what distance the laterals should be placed from each other. These distances vary in different

soils, while one system will be as effective as the other. There is no improvement that will give better returns for the labor expended and financial outlay than the drainage of rich soils, and to obtain best results, we should carefully consider and so clearly understand the needs of our soils, and so adapt the system of drainage to these needs.

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Why we Advocate Lucerne.

Readers of "The Farmer's Advocate" may have been wondering at the enthusiastic manner in which we have been talking up lucerne or alfalfa for some time back. They may desire to know the reason for our faith. Two members of our staff have had experience with it. The present writer, in particular, has been advocating lucerne for hillsides for the last seven or eight years. Our reasons are these: We had noticed that it did best, held the ground longest, was less liable to be winter-killed, less liable to be crowded out by weeds or grass, and made altogether the best growth on the clay hillsides. We had noticed, also, that those who had lucerne spoke highly of it as a feed. We knew it was a legume, and therefore a nitrogen-gatherer. We knew that most farm rations were rather deficient in the elements in which lucerne was particularly rich. We saw that there was little profit, often loss, in working

othy, and on which they do decidedly better. Well-cured lucerne hay makes milk of almost June color. Not a particle of manure or fertilizer has been put on this field, but at the time of our visit, May 28th, every square foot of ground was covered knee-deep with a dense growth, as good as or better than it was the second and third seasons. It comes on first thing in spring, and thrives in the driest time of summer, its roots going down into the very bowels of the earth for moisture and plant food, while the bacteria in the little nodules in the roots are continually abstracting nitrogen from the air, to enrich other parts of the farm by adding to the value of the manure pile. Other land has been seeded on the same farm, and wherever there is a clay hillside it does well; on the loamy soil it is subject to winter-killing. It may be asked why lucerne prefers the clay hills? Because there it finds abundance of the mineral elements of plant food, particularly potash. Nitrogen it takes from the air. The hillside location also ensures that no water will stand about the crown of the plant. Water thus standing for any length of time is death to it. We have been observing lucerne elsewhere with the greatest interest, and all the conclusions stated above have been corroborated time and again. Lucerne for clay hills is a regular bonanza. Is it any wonder we are enthusiastic?

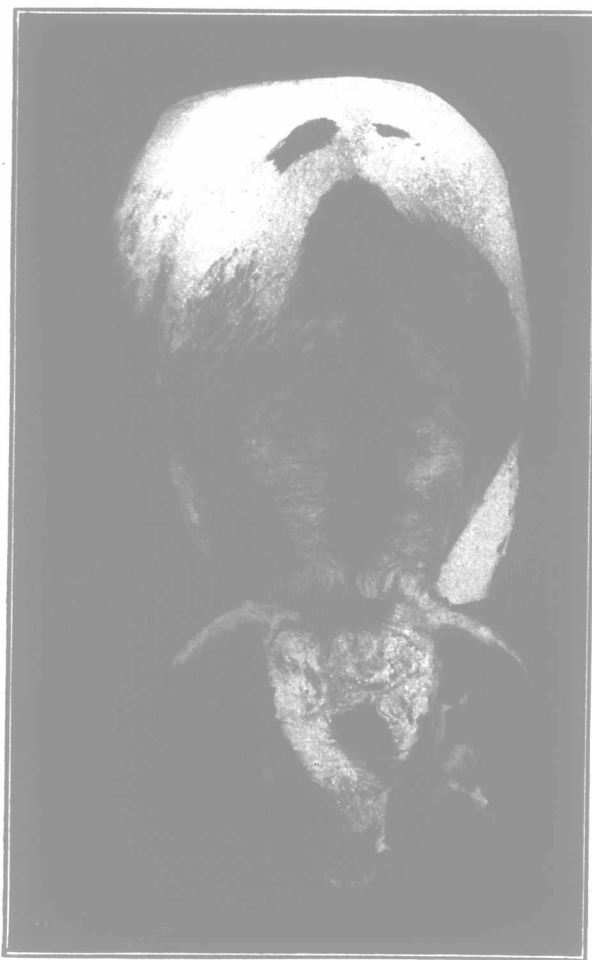
Let us add a caution. Sow the seed alone on clean, well-prepared soil, preferably after a hoe crop. Use twenty pounds of good seed per acre. Clip the growth once or twice during the season with the mower bar set high. This will keep weeds from seeding. Don't pasture the first season. Never pasture down close, and never pasture late in the fall. If you fail with the first seeding, try again. Many who are unsuccessful at first, get a good stand at their second or third trial. Prepare to try lucerne next year. It is worth repeated effort to establish. It is the best of all crops for a farm, where labor is scarce, requiring no labor but that of harvesting. It is hard to plow up, but one doesn't require to plow it often. The first crop is difficult to cure for hay, but it can nearly always be done, and if one had no cows or other stock to which it could be fed, and had to draw the first crop to the manure pile, the second and third would still pay good rent. These latter two cuttings would yield three to four tons per acre. Four tons of hay per acre, at \$3 a ton, would amount to \$12 per year—pretty good rent for rough land. Lucerne solves the winter-feed problem, it solves the dairy and soiling problems. Let a man get thoroughly seized with the advantages of lucerne as a crop and as a feed, so that he is anxious to get some sown, and any little difficulties he may meet he'll find a way to overcome. We do not know of any crop which combines more strong advantages with so few disadvantages. Every farmer who can grow it should have from five to twenty acres. Sow it on the steepest clay hillsides on the farm. If you have no hillsides, try it on the level, but try lucerne.

Cultivating Two Rows of Corn at Once.

A very good wrinkle we noticed lately, in Brant Co., Ont., was an old-fashioned spring-tooth cultivator, arranged to cultivate corn. It was straddling two rows at a time, and doing better work than some of the regular corn cultivators. It lacked guards to protect the hills, and therefore it was impossible to run quite so close to the rows as might otherwise have been done; but as the corn was rowed both ways, and could be cross-cultivated alternately, this was not such a serious objection. The rows were long—over fifty rods, if our eye did not deceive us—and two horses were snaking this cultivator through at a great rate. What a contrast from the old manner of trudging twice through each space with a one-horse scuffer. In economies such as these, permitting one man to do the work that two, three or four did previously, lies the solution of the labor problem.

Advantages of the Split-log Drag.

A reader of "The Farmer's Advocate" whom we had urged to make a split-log drag, asked us what advantages it has over the ordinary leveller. One great advantage is that the drag is used when it is wet—too wet to work on the land. The leveller cannot be used to advantage till the road is crumbling dry, which is about the time when the fields are getting fit to work, when corn and roots should be cultivated, and other duties are liable to be pressing. This results in one of two unfortunate contingencies. The road or the farm is neglected; usually the road suffers. The drag is more likely to be used than the leveller; it can be used with less inconvenience and when the land on the farm is too wet for working, and it puts the road into condition for traffic a little sooner after a wet season. Try the split-log drag.



Top View of Shorthorn Bull.

hillsides in regular rotation. They took the biggest share of the manure, required the most labor, frequently upset the rotation, by reason of failure to secure a catch of clover, and, withal, were annually washing more or less, so that the patch of clay became larger in area. The great desirability of seeding these hills with a crop that would keep them from washing, do away with the necessity for manuring and cultivation, and yield even a fair return per acre, appealed to us more forcibly the longer we thought about it. Lucerne was the crop par excellence. We tried it. It more than fulfilled expectations in every direction, and we have been growing more enthusiastic over it every year since. The last of May this year we visited the old homestead. There was one piece in particular, of about an acre in extent, a stiff-clay hill along the east side of a field. It was sown five years ago on a corn stubble. The ground was worked up well in the spring, and about twenty pounds of seed harrowed in. It grew pretty well, but some spots were a little yellow and sickly. It often is so the first season. Over these spots we scattered a load of mixed coal and wood ashes from the kitchen range. The growth was clipped with the mower once or twice the first summer, but nothing was harvested, and no stock was allowed on it. Since then three crops a year have been cut from it, until last season, when the third growth was pastured. It yields from five to seven tons of hay each season—hay which cattle and horses eat in preference to clover or tim-