

at which the elaboratory of nature commences its process of preparing the manure, or fertilizing qualities of the soil, to produce vegetation, and after all it must be noted, that the water receding more slowly as it disappears from the surface, and the more active means of evaporation, probably remains but a short distance below the surface at seed time, and continues its influence upon it. But be this as it may, the soil is wet, and at a low temperature, a number of days later than on a dry soil, other things being equal. On these few days, in a climate like ours, frequently depends the crop, or at least a good share of its value. It must be borne in mind, that the water which has only ebbed during the dry season, rises again as this season terminates, chilling the surface, and reducing its temperature, some days before the eye detects its presence, thus preparing it for an early frost, which the dry and warmer soil escapes. Here we find a solution to the inquiry, why some pieces of land are more subject to frost, in spring and fall, than others. We frequently find a valley or low piece of ground covered with a deep rich mould, but no crop can be raised on it, because it is so inert, or it is so frosty. Is not the above solution of the difficulty satisfactory? Can any other be given? The inquiry may be made, why these frosty pieces have such a depth of vegetable mould, while warmer ones equally low are equally destitute of it? The late and early cold water has always affected it; and the leaves and grass falling on it, or which have been blown on to it, have been retained there by its moisture. This moisture and low temperature consequent thereon, has retained them in an inert and imperfectly decomposed condition, until the present quality has accumulated. But the man who waits for the water to dry off from his land, to put in his late crop, may object to my view of the subject, that after all, his crops are as good, or nearly so, as those grown on dry and earlier ground. This may be, and frequently is the case; but it will be seen that it fortifies one of my points, and does not militate against my theory. These moist lands, from the cause above assigned, have frequently a much greater amount of unexpended vegetable matter than any others; indeed, a fertility sufficient to overcome, to a considerable extent, the difficulties which I have enumerated, and if properly drained, would be ranked with our most fertile and certain lands. Look at this subject in connection with the application of manure. If the soil is wet and leachy, it is certain to carry off a portion of its strength with the superabundant water, and what is left, the coarser part from its low temperature is comparatively inert and useless, at least in the early part of spring.

As I intend to confine myself rather to the theory of this subject, with barely sufficient illustration to be understood, I will restrict my remaining remarks to the mode of draining. This depends on so many local circumstances; for instance, under which of the above heads is the water to be classed? What is the character of the soil? What is the slope of the land? What is its elevation above the lowest point at which it can be discharged? that I shall content myself with a few rules applicable to most cases. My first general rule is, *do all you can by a single ditch*. One properly located, and of sufficient width and depth, will generally supersede the necessity of many smaller ones, will be more economical, and will generally be decidedly more efficient and durable. My second general rule is, *make an open ditch*. So far as my experience has extended, it costs more to cover a ditch, so that it shall be permanent, than it does to dig it. Here is a saving of one-half of the expense, supposing them both to be dug by hand, which should be done, where they are to be covered. The ditch which I recommend, can be done almost entirely with the plough and scraper, and at an expense not exceeding one-half of what it would cost to dig it with a shovel; and if the earth

is soft and wet, it will make more difference. If the plough and scraper are used, the common farm help can generally do it; these men are seldom willing to do much with a shovel and pick-axe, in a ditch. The ditch will not look quite as smooth when first finished with the scraper, but in the end it will look better, as you will have a better slope, the earth will be removed to a more secure distance from the edge, and if there are any holes or inequalities near, they can be filled up or smoothed down. Where these ditches can be so located as to form the boundaries of fields it should be done, even at the expense of a small crook in the fence. This commonly furnishes the best of water on both sides. Its banks furnish a dry and advantageous location for a fence; cattle are not apt to press on it as when approachable on both sides, and it is usually located where different soils divide, fit for the different purposes of tillage or grass. There are other considerations of greater weight in my mind in favor of this course. All subterraneous water, except what falls under my definition of a leach, has a well defined strata of porous earth, such as sand or gravel, through which it percolates, resting on a hard strata, impervious to water. This porous strata is at different depths, and is covered with every variety of earth. In swamps, its immediate covering is usually clay, or a hard cement of clay and sand, or gravel, and sometimes both. This is generally covered with a vegetable deposit, and sometimes to the depth of a number of feet. The porous strata never extends beyond the lower edge of the swamp, if it did it would drain it. The head or source of this strata is more elevated than the highest water in the swamp; the clay, or hard pan which covers this strata under the swamp is full of holes, the result of the action of water, roots of trees, or other causes, through which the water is forced up by its more elevated head, and presents itself upon the surface in the numerous springs with which such lands abound; to maintain an obstinate and successful defence against all the efforts of the farmer, with his innumerable small drains and ditches covered with turf, straw, or something else, which, in four cases out of five, in the end, go over to the enemy, and render his last state worse than the first; while the courage of the farmer lies buried with his outlay, until he is again reminded of his defeat by a proposition to underdrain his swamp. I grant that cases may occur where this mode of doing business is the only resort. The situation of the land may be such, possibly, that this is the only remedy; but I would remark that, except in the case of small pieces, to improve the looks of otherwise valuable tracts, if land cannot be otherwise reclaimed, I doubt much whether the advantage to be gained will justify the expense in this country, although it may be different in England.

If a piece of ground is to be drained by a single ditch, the location and depth of the porous strata must be ascertained; the ditch should then be commenced, at a point low enough to cut through this strata, as it progresses. If the porous strata is thoroughly perforated, the result must be both effectual and permanent. After this is done, the water can be no more forced up to the higher outlet, the old spring holes, upon the surface, than it could be to the discharge, in a vent, after the pump log, or other aqueduct was broken off, and for the same reasons. It is not necessary that the ditch should be dug as low as the bottom of the porous strata, but I would usually prefer it, if not too deep, as a precautionary measure. The fine earth which, in the process of time, has washed down these subterraneous streams, is frequently deposited more in one place than another, and as this is continued, a point is shot up to the stream and widens, and has frequently a small stream under it. This may have projected itself above where the ditch crosses, and must be so, if any spring continues to discharge. The remedy is plain,

They must be tapped, and this would be easier, and perhaps the necessity for it would have been obviated, if the ditch had been dug to the bottom of the strata. If the porous strata should be found at such a depth that no outlet can be adopted, low enough to drain it, or if the depth should be such that the expense would prevent setting the ditch to its level, the water may be reached by sinking wells to the bottom of the ditch, to the region of it. The uncertainty, however, of opening all of the veins by this process, is such, that it should not be adopted, except in extreme cases. The ditch should usually be carried along the upper side of the land to be drained, or the side on which the water approaches it. One main reason is, that the porous strata will be found easier, and better defined here; but there may be cases where, from the want of fall, the depth of the porous strata, or the depth of intermediate excavation, the width of the swamp, or other causes, an intermediate course may be adopted. If the porous strata is effectually perforated, the water will discharge itself through the lower artificial orifice, before it would force itself to the higher level, to supply the old discharge. I have known a ditch thus situated, to draw off water that stood upon the surface some distance above it.—There is danger, however, in adopting these lower locations, that a branch of the porous strata may not extend as low as the ditch, and thus not be perforated.

Where what I have termed a leach occurs, a resort to a number of parallel under drains may be proper, if the situation of the land will justify the outlay. If, however, the slope is moderate, I would still adhere to the other system. It is true, that it might not be convenient to cut a ditch to the bottom of the leach, yet it would probably cut off the water from all the land above a level extending out from the bottom of the ditch to the surface, where if necessary, a second may be cut. If the quantity that could in this way be reclaimed would not justify the expense, I doubt whether any other course could be adopted, with hope of better success.

I would make the additional remark, that unless the earth above the porous strata is cut through the ditch of whatever depth, will only operate as a surface drain. I have seen frequent instances, where an individual having determined to make thorough work, has cut a deep and expensive ditch across a field of clay, or other impervious under strata, which only operated as a surface drain, and when one of a few inches in depth, would have been equally beneficial. Had he dug through to the porous strata, perhaps but a few inches lower, or what is more than probable, had his ditch been properly located, with much less depth and expense of excavation, his field would have been drained.—*Cultivator*.

SOILING MILCH COWS.

The Zoarites, a religious sect of Germans, on the Muskingum river in Ohio, keep their *milk cows constantly in the stall, and feed them with the offal of the milk, hay, roots, &c.* and they are said to yield an extraordinary quantity of milk—some twenty quarts a day throughout the year. They also pay particular attention to their cleanliness. Their stalls are thoroughly washed daily, and the water used for this purpose is carefully collected in reservoirs, and applied, in the form of liquid manure, to their hot houses and gardens.

In a late communication to the British Board of Agriculture, it stated that thirty cows, one bull, four calves, and five horses, were fed through the summer from fifteen acres of clover, sown the preceding year. The labor of two men and two women were sufficient to tend them, and the nett produce of the season, in butter, from June to October, was £19-10s. from each cow.