### How do Drains Operate.

After conversation with various practica farmers, I am satisfied that many of them do not fully understand the correct theory of the action of drains. To those who do not give the matter their careful attention, it will seem a very simple matter to understand how, when it rains, or when from some other cause water accumulates in the soil, it should escape by sinking down into a well-made drain; but just here is where a mistake is made, for the water does not come into the drain from the top, but from the bottom of the drain, or, in other words, the surplus water comes up into the drain, and not down into it.

In all low land there is a point at which the soil remains saturated with water, and the distance of this point from the surface will of course vary with the facility offered for the discharge of the surplus water. Where this point is so near the surface as to affect the roots of the farmer's crops, drains are needed and should be used, in order to keep this line of saturation on a level with their bottoms. In order to simplify the matter, this line of saturation has been styled the water table.

In case of a heavy rain the water will sink down untill it reaches this water table, which, from the accumulation of water, will gradually rise until (in the absence of drains) it finds a natural outlet. The amount of damage done to the farmers will, of course, depend upon the height of this outlet; in some cases it is not so high as to overflow the surface, but still is high enough to do damage to the growing crops.

To explain more clearly my meaning. Suppose a barrel (water tight) to be filled with common soil, and small openings made at different heights along its side; now suppose water to be poured so slowly upon the surface of this soil that it will be absorbed as fast as it is poured in,—the earth will reach a point of saturation at which it will hold no more water, and it will accumulate at the bottom of the barrel. If the addition of water is continued, the artificial water table will raise, and the surplus water will pass off at the lowest opening; if the water is added faster than one opening can carry it off, it will rise to the next above, and in this way will, if the water is added fast enough, overflow the top of the barrel. In all cases the surplus water will raise to the lowest opening, and not fall to and escape by the upper one.

This is exactly what takes place with a drain. As soon as the drain is opened it lowers the water table to its own level, and if the water does not come in faster than the drain can carry it off, will hold it there.

In one case I was told by a practical farmer, who had drains in successful operation, that this idea was not correct, for if it was, one drain would lower the water table on an acre of ground, and should prove sufficient to drain it properly. But in the capillary attraction of the soil, this objection would hold good; they may be, and often are, so far apart that the capillary attraction of the soil entirely counteracts the tendency of the water to seek the level of the drain; and hence we find where the drains are too far apart, that the water table is not level, but raises nearly or quite to the surface—midway between the drains, but over them falls to their level.

This line of saturation is a wonderful provision of nature, whereby moisture is furnished en just as it is needed and in proper quantities, provided it is at the proper distance from the surface. If this point is too far from the surface, the power of capillary attraction will be overcome by the weight of the water—and if too near the surface the crop will be injured by its roots coming in contact with the water.

From what I have already written, we may see why drained land is so much less liable to "wash" than that which is undrained—for the water having a free passage through the soil to the level of the water table, will pass off in the drain, instead of over the surface of the soil.—*Observer, in Practical Farmer.*

### Curing Clover.

Joseph Harris, in his "Walks and Talks" in the Agriculturist, approves of the following plan of managing the clover crop :

"Experienced hay-makers know very well that a heavy rain or dew falling on clover only just cut down, will not injure it. But rain or dew, falling on a field of partially cured clover, does considerable damage. And the more the clover has been bruised in shaking about, the greater will be the damage done by the rain. Bearing these facts in mind, when there is considerable clover to cut, I would start the machine about 5 o'clock in the afternoon, and cut as long as I could see; and unless there was a very heavy dew, I would start the machine a little after daylight in the morning, and keep on cutting until 9 or 10 o'clock. By this time the hay cut the night before will need moving. How best to do this is, with me an open question. Some good farmers do it with a tedding machine. My own plan has been to take a self-acting steel rake, that can be easily raised and lowered rapidly, and pull the clover into small windrows, five or six feet apart. In an hour or so afterwards turn the windrows by hand, and if any of the clover is green and matted together, shake it out.—Treat the morning-cut clover in the same way. And if you have time, turn the night cut clover again before dinner; but if not, turn it immediately after dinner. If it has been spread out much in turning, the steel rake can be used again to considerable advantage. I have a 12-year old boy who does this work with the rake to perfection. The rake is lifted by the wheel, and it is thrown in and out of gear by a lever. He moves this lever back and forth, and keeps the rake going up and down about every second. The object is not to rake the grass together, but to turn it.—The oftener the green hay can be stirred, the more rapidly it cures, and this is the main object of the first day's operations. About three o'clock, pull the hay together in the windrows with a wooden revolving rake, and put it into moderate sized cocks. At the same time let the boy with the steel rake run in between the rows of cocks, and make everything clean and snug. The next morning if necessary, turn over the cocks, and spread out any part of the hay that is still green. And it may be necessary to turn the hay again in an hour or so.—By one o'clock the hay should be fit to draw in. The objections to this method are that it takes more labor, and that opening the cocks, if done carelessly, may shake off the leaves of the clover, which, except the blossoms, are the best part of the hay. The advantage is simply a gain of time, and less risk from bad weather.

A heavy growth of clover, badly knocked down, and twisted together by rain and wind, is a bad crop to handle. Better cut a heavy crop early, rather than run the risk of having it fall down. What you lose in the first crop by early cutting, you will gain in the second or in the seed. Or, if you are short of pasturage, an early cut field of clover soon gives a capital bite for recently weaned lambs. But early cut clover shrinks a good deal, and it requires extra care in curing. The hay is very deceptive. It appears cured when it is not. The sap is quite weak, and the ingredients of the clover are only partially organized, and consequently more inclined to run into injurious fermentation. Early cut clover, therefore, must be thoroughly cured. It then makes capital hay for milch cows."

### Causes of Sap-flow in the Sugar Season.

Is the simple thawing of a tapped tree the only reason for the flow of several gallons of sap each day for two or three weeks of good sap weather? Consider the state of the tree at the beginning of winter. The summer's work is finished. The annual ring of wood is formed, the yearly crop of seeds is matured, the foundation of next year's leafage is laid in the auxiliary and terminal buds that are thickly dotted over the bare branches, and the trees are stored from the ends of the roots to the extreme tips of the shoots with the various products of vegetable organization.—All these processes ended with the fall of the leaf. But the activity of the roots is not yet checked, for it does not depend upon leaf action. The juices within the tree are denser than the water that bathes its roots, and the two are separated by a membraneous partition—the inward flow will therefore continue until the osmotic force is balanced from within, so that in the spring the tree is gorged with water. This is no mere speculation, for careful experiments have proved that wood contains more water in winter than in summer.—We must remember also, that the trunk of a tree contains air in its vessels as well as water, and both are expanded by heat and contracted by cold. Air increases in volume more than one third in passing from 32 degrees to 212 degrees, and water expands nearly one twentieth by the same change of temperature.—What must happen, therefore, in the trunk of a tree on warm, clear days, when the radiant action of the sun upon the dark rough bark raises the temperature a few degrees? The expanded air must press upon the expanded water and force it out of any incision made through the bark into the young wood. A few degrees of rise in the temperature of the tree would cause a large flow from such a wound. But at night when the trunk has been thus exhausted, what takes place? Its cooling stops the flow of sap, while the contraction of its contained air allows an inward rush of air through the spile from external pressure. On the following day, as the trunk warms, the pressure of air again renews the flow of sap. The supply of water in the tree is kept up by the action of the deep-lying roots. They must from the first furnish a small amount, and as the season advances root action increases, and more and more water flows into the tree.

### A Farmers Experience.

Mr. Editor,—Having observed in a January number an invitation to write for your paper, I have concluded to give you a sketch of what I have been doing, and will at some future time tell you what I purpose to do, if you will correct all my mistakes and put up with my bad writing. In 1869 I sent and obtained from Mr. Ramsdell a bushel of his Norway oats. It was a bushel of dirt and oats mixed; and when I had cleaned them, I had about half a bushel left; but they were pure in quality, and I sowed them in the spring, but did not put them on very good ground, for I was not very well pleased at having to pay $10 for what only turned out half a bushel, neither had I much faith in oats that looked as if they had grasshoppers' legs on them. However, when I came to harvest them, I found that I had thirty-one bushels weighing thirty-six pounds to the bushel. Last spring I sold some of them at $5 a bushel. Some persons that had them sowed them on ground that was so weedy that they did not see any thing else, hoping I suppose that the oats would eat the weeds up, like a flock of hungry sheep; and these folks have been disappointed and of course complain of the oats, when the fault was their own. One man got half a bushel, and sowed them, but did not see them until July, and because they did not ripen in August, he turned his cattle into them, and then found fault with the oats because he had no crop. But others have had good crops, because they sowed on good land. Where I sowed the three bushels to the acre I found one-third more oats at harvest time than I ever had before on the same amount of land, and I am satisfied that to get a real good crop off the ground, three bushels of Norway oats to the acre is none too much. Farmers would do well to try the Norway, provided they can get them at a dollar a bushel.

Last spring I sent for some pumpkin and squash seeds, as I wished to raise a few for the Exhibition. I was told sometimes that I was a fool for doing so, but nevertheless I got the seeds, raised the squash, and took the prize; and because the pumpkins were not so large as the squash, I would not take them to the Exhibition, but when I got there I found I had missed a figure.

Last spring I planted potatoes when the ground was as dry as ashes almost, and was not aware at the time that the ground could be so dry as to kill potatoe seed; but I found only about a third of them made their appearance, the consequence was that my hans (?) had to die just like sinners, without being half prepared for it.

I have been trying to fatten some old cows this winter whose ages ranged from thirteen to seventeen years, and I do not find it a money-making business. Why didn't I turn them off sooner? Because they were too good dairy cows to part with as long a I could avoid it. Now I must make the best of it. Let no one be led into the same trap, for it is a hard one to get out of.

Lester Stockton.

Cornhill, King's Co.

*Exchange paper.*

We should be pleased if more of the farmers in the western section of the Dominion would furnish us with more reports on the different cereals and roots that we are disseminating, and any other agricultural information that would be of interest or use to others. You only lack the will, or you could all furnish some knowledge that would be of benefit. Write! write! write! Ed. F.A.

Calves fattening for the butcher should suck the cow, and should be tied up in a warm, dry, well ventilated apartment, that is not too light. Keep them as quiet as possible, and feed the cow liberally. After the third day there is little danger of milk fever.

### Foot Rot in Sheep.

The New England Farmer publishes an article from Henry Boynton, of Woodstock, Vt., on this disease, from which we make the following extract:—

Well, then, let every one be convinced of this fact, that this disease is only an ulcerating sore, and needs for its removal—or cure—just the same rational local treatment that an intelligent physician would prescribe for a similar sore upon your finger, caused by the contact of poisonous matter in some post-mortem examination. A clean poultice, or lint moistened with warm water, would be about all that would be demanded for the finger. But as we cannot carry the same delicacy into the treatment of sheep's feet, let our treatment be regulated on the same principle—that is, cleanliness, as perfect and entire as can possibly be obtained, and as lasting as the case demands. Here lies the whole system of "curing" this annoying disease, which so generally affects the flocks of New England. My conclusion is not drawn from theory alone but from actual practice, no less.

From a number of worse cases I have ever seen in my own flock, I selected seven for experiment—none could be found worse than these seven. After every particle of the shell of the ailing feet, that could be flayed up easily from the ulcerating tissue beneath, had been cut away with a sharp knife, the feet were carefully and thoroughly washed in cold water, and the sheep put into a dry pen, well littered with clean straw. Now for the result. I examined those feet every day. Where manure adhered, so as to prevent needed observation, it was washed off. No knife was used. Not a drop of matter was ever seen upon one of them. The loose, ragged tissues contracted and became dry externally, new shell commenced to form, and as soon as time enough had passed, every foot was claid in as clean and sound a hoof as ever a sheep stood upon.

This experiment taught me how to cure foot-rot; and if a man has but a small flock, or a small number affected, and can give the requisite time to it, nothing more is needed. I have tried this plan in other instances, and always with the same result.

Still some aid may be obtained in treating large numbers, from vitrol. I think this all that ever need be applied, and the action of this agent is purely mechanical. It contracts or puckers up the tissues that have been eaten into shreds by ulceration, and so doubtless, squeezes out the minute particles of poisonous virus from the deep cavities in the diseased part, and bringing the live fibres into closer contact, the healing process is assisted.

As a wet sponge, if thoroughly squeezed, will dry more quickly than if laid in the sun while filled with water, and as, if kept compressed, it will not as readily absorb more moisture, so vitrol, by its astringent property, compresses the spongy tissue of the diseased foot, and holds it in that condition till the parts become glued together by the material supplied from the blood of the animal. The compression aids the healing process, and at the same time renders any fresh matter that may come in contact with the foot much less liable to be absorbed.

### To Destroy Cucumber Bugs.

The Maryland Farmer says :—The following effectually protected my melon, squash, cucumber and other vines from the striped or cucumber bug, the past season, with only one application, viz. : a strong solution of hen-house manure—say one peck of the manure to one and a half gallons of water—let it stand twenty-four hours, and sprinkle the plants freely with it after sunset. The above was suggested to me by a negro woman, who has some practical experience in gardening. She says she has used it for years, and has never known the first application to drive them off, and they never return.

Clean up Around the House.—This pleasant spring weather affords good opportunity to make the surroundings of the dwelling tidy. A little gravel will mend muddy paths, and a little picking up of rubbish and smoothing of rough places will give pleasure all summer long. See that the drains discharge their contents at a distance from the house, so that no sickness may result from them. The cellar should be thoroughly cleaned and aired, and the walls whitewashed.

A Mississippian, in braggfng about his wife, wound up with the declaration, "Why, she'd make a regular high-pressure steamer, she's got such a talent for blowing up."