

ship our fertilizers across the line, and, in reality, cutting our own throats by helping others to undersell us in our foreign markets. It is time for the Canadian people to wake up and stop such suicidal policy.

Grey Co., Ont.

G. F. MARSH.

Alfalfa in Ontario.

Alfalfa culture, though comparatively common in some localities, is yet only in its infancy in Ontario, and is surely bound to advance with leaps and bounds during the next decade. Although my experience with it has been limited, it may be of interest to some of your readers, and I give it for what it is worth.

The seed-bed is of the utmost importance. The ground should be clean and free from weeds, well fertilized and well underdrained, unless the drainage is naturally good. The character of the soil, whether it be clay or bottom land, matters little if these requisites be observed. If possible the ground should be fall plowed, and the spring cultivation must be most thorough; the finer the seed-bed the better.

Sow in May, when danger of frost is over, using twenty pounds of first-class seed per acre. As the seed usually costs about nine dollars a bushel, this means a considerable outlay, but thin seeding invariably causes disappointment. If one can afford the loss of one year's crop the seed may be sown broadcast, and lightly covered with a brush harrow, no nurse crop being sown. When the clover reaches the height of seven or eight inches, the mower should be run over it, the finger-bar set well up from the ground, and the clippings left to act as a mulch for the growing plants. This method is considered to be the best.

If one does not care to lose a year's crop, oats may be sown at the rate of three pecks to the acre, using an ordinary seed-drill with a clover-seeder attached, turning the spouts from the seeder in front of the drill hoes, which should be set just deep enough to cover the oats. This will cover the clover seed nicely, and if the land is rolled after the drilling is completed, an ideal seed-bed will be obtained.

The oats should be cut for hay when they are nicely in bloom. Most people cannot withstand the temptation to let them ripen, with the result that the tender young clover plants are often smothered by the vigorous oats, or if they survive they will be weak and spindling.

If one must have the nurse crop ripen, barley is, I think, more satisfactory, as it can be cut earlier, which gives the clover a better chance. It should be sown thinner than is usually done.

Do not pasture the alfalfa the first year, and never allow it to be pastured close. The crown sets well above the ground, and close pasturing will surely injure if not kill it.

After the alfalfa is well established it should yield at least three cuttings a year. It should be cut when it is about one-eighth in bloom; delay in cutting means woody stems and inferior hay. In good haying weather I would cut in the forenoon, and start the tedder immediately after dinner, then rake and cock, leaving the hay two or three days in cock to cure. This saves most of the leaves, which contain a large percentage of nitrogen. The hay is ready to draw when a wisp can be wrung with no appearance of water oozing out.

A field of seven acres, three years seeded, yielded me five and one-half tons to the acre the past summer, and I am looking for a still better return this season.

I believe it holds first place as a roughage feed for dairy cows; in fact, so rich is it in nitrogen that three tons of alfalfa hay are considered to be equal to two tons of wheat bran, which almost entitles it to a place in the list of "concentrates."

The second and third crops are the most satisfactory for sheep feed, as they are less apt to be woody in the stems. Experiments prove it to be ahead of red clover as a sheep feed, and this has been my experience.

As a pasture for hogs, alfalfa is unexcelled, and I have fed it to horses very successfully, especially when they were doing light work or running idle.

As inquiries are sometimes made about growing alfalfa seed, I may say that Joseph E. Wing, probably the best authority on alfalfa in America, states that the seed cannot be successfully grown, even as far north as Ohio, so there is little hope of a successful crop in Ontario.

Brant Co., Ont.

G. W. CLEMONS.

Frostproof Pipes.

To the Editor "Farmer's Advocate":

In your March 3rd number, H. M. asks for information re making the outlet or intake pipes frostproof. Having had some experience in that line, I give it to whom it may concern. Go down into the earth about 4 ft. 6 ins. or 5 ft., and mason up to the top of the earth with brick or stone about four feet square, and the warmth of the earth will keep the frost out of the pipes; the pipes being boxed above ground as stated. The check-valve is dangerous, as it is difficult to have it properly adjusted at all times.

Norfolk Co., Ont.

J. H. W.

Sow Thistle.

A reader says: "I would like you to publish an article on how to kill sow thistle, or as some call it, 'hawk weed.' I have seen at different times in your paper how to smother it with manure when it is in small patches, but when it is distributed all over a field it is impossible to cover it with manure. This is one of the worst weeds that grows, and if something cannot be done to get rid of it it will ruin the country, as nothing will grow where it is established. I would like to know if any of your subscribers have found any way to kill this weed when it is all over the fields? If you can publish an article on this it will do me and the rest of the farmers in this part a great favor. I have seen it grow after having the same field in hoe crop for two years in succession and the more the field is cultivated the more it spreads, as the cultivator drags the roots from one part of the field to the other."

Any one at all acquainted with perennial sow thistle will acquiesce in what our correspondent says. It is a weed that flourishes in loose alluvial soils. On stiff loams, heavy clays, and even on sands it does not prosper as luxuriantly. Its chief means of propagation is by rootstalks, like bindweed, Canada thistle, etc. When once established it soon occupies every available inch of room, and when cultivated the roots are spread to different parts of the field to further propagate. When this weed exists in small patches, it should either be dug out to the tiniest rootlet, or smothered out with a pile of straw or manure. In large areas an effort must be made to prevent the growth of leaves and secure the decay of the roots. To this end we would take extreme measures. Summer-fallowing for a season would check it a little, but would also make an excellent seed-bed for the root nodules. This would have to be endured for a time. After the summer-fallow we would grow a crop of corn, and follow that with roots or more corn. Having summer-fallowed one season and grown two root crops, we would consider it safe to grow a grain crop, but would seed it thickly with red clover, and leave it in sod for two years, then break up and plant to corn again. Such cropping would insure the least possible amount of green leaf being produced, and should hasten the decay of the roots. Throughout all the cultivation the roots that cling to harrows or cultivators should be destroyed. We once saw a field infested with this weed left in sod for eleven years, but on being broken up the thistles again appeared. With sod there is not the same amount of decay of vegetable matter in the soil as in the case when the ground is kept open and stirred, hence the roots were preserved during those years. Doubtless if the field had remained in sod fifteen years the roots would have been decayed.

Training a Hedge.

To the Editor "Farmer's Advocate":

In your January 14th number, W. N. N., Grey Co., asks what to do with his honey-locust hedge. February 25th number, W. N., Bruce Co., replies, to cut it close to the ground, which is all right, if not too large. As one of the oldest growers of honey-locust hedge in Ontario, I wish to make a few statements. The honey-locust plant is one of the best plants for hedges in Canada, for the reason it is a native plant, very hardy, grows on most any soil, and is a taproot plant, consequently will stand drouth. The slashing is a fake; I would not have it done gratis. The sprouts rob the main stock of sap, after which they decay and die, and in a few years you have a perpendicular hedge, with a lot of dead wood, making an open hedge. But to grow the honey-locust plant and trim as W. N., Bruce Co., advises, is a success, and makes a fine hedge.

Norfolk Co., Ont.

J. H. W.

Lifting Posts.

I was much interested in Mr. Deo's article in the "Advocate" of the 31st March, about lifting posts. Although I never used the plan he mentions, I think there is too much manual labor about it.

My method is this: Take a plank about a foot wide and five feet long; if the ground is soft at the time, spike or bolt a two-by-four inch piece two feet long across one end; set this end on the ground, about two and a half feet from the post, let the other end rest against the post; then take a logging chain, and hitch one end around the post at the ground—run it over the top of the plank, to the whiffletrees—hitch the team and go ahead. The plank will cause the draft to come straight up on the post till it is nearly out. Another way is to take the reach and hind wheels of a wagon, back it up to the post, turn the reach straight up, then take a chain and hitch it around the post, bring it over the top of the bolster and fasten; take a hold of the reach and pull it down; this gives you a powerful windlass. The first way is the better, as horse-power is ahead of elbow grease.

Oxford Co., Ont.

J. C.

Problems of the Soil—IV.: Drainage.

In the previous articles we have shown the way in which water is held by the soil, the form in which plants require water, and how soil-moisture may be controlled by the operations of tillage. We have now to discuss another very important means of controlling soil-moisture—drainage.

While drainage is necessary in all soils, if the best results are to be obtained, many soils do not require artificial drainage, being already naturally drained. Where soils are open and mellow, with an open subsoil, and the permanent level of soil-water a good distance below the surface, no artificial drainage is required, the best conditions already existing. Artificial drainage is needed in three cases: (1) Where the level of the soil-water is too close to the surface to give plants a chance for good root development, as is the case in many swamps. (2) Where the land is springy and cold, as we find is the case on many hillsides, and on flat lands at the foot of hills. (3) Where the texture of the land is too close to allow the free escape of surface-water, even though the subsoil may be dry and good, as we find is the case on many good clay lands.

There is no need at the present time of discussing the various methods of draining. Experience has plainly shown that underdraining is the best method of draining, and tile make the best of all underdrains. It is sometimes necessary to use an open ditch to carry off the large volume of water coming from a system of underdrains, but in all other cases it is best to use the underdrains. The number of these drains and the manner of laying them depends on the condition of the land to be drained.

In the case of land having the level of the soil-water too close to the surface, our object is to lower the level of the water to such a depth that it will not interfere with the proper growth of our plants. Hence, our drains must be made of a good depth—three feet at least, while four feet, or even more, is better still. The land here is only of use to plants to the depth of the drains, since below this it is filled with poisonous, stagnant water, and the deeper we can put our drains the better for our plants, particularly for such plants as the red clover, which requires a good depth of soil to succeed. Besides, the distance from which drains will "draw" is proportionate to the depth of the drains, and the deeper the drains are, the fewer of them will be required. The number of drains will also be governed by the texture of the soil, open soil requiring a less number than fine, close soils. In draining these soils, it is a good plan to run a main drain through the land, following, as far as possible, the natural watercourse, and from this, on each side, to run parallel lateral drains, the distance apart of these being governed by the nature of the soil, and the depth of the drains. Four rods is generally a great enough distance in even open soils of this nature, while, if the land is close and heavy, a less distance should be used.

Where land on the slope of a hill, or at the bottom, is "springy" and cold, as the result of the slow seepage of water out of the side of the hill, the object of draining should be to cut off the flow of this water, and instead of allowing it to come to the surface, to the detriment of the soil, to carry it harmlessly off in the drain. We should aim, then, to cut off the flow of this water. To this end, "cut-off" drains should be run diagonally up the side of the hill. In the case of a small hillside, one such drain put in the right place, not running straight up the hill, but angling across it, will often do the work. In case of a larger hillside, a system of such drains, connecting with a main at the bottom, will be necessary.

In the case of clay land, where the subsoil is dry, but where the close texture of the soil prevents the free escape of water, a system of drains laid along the natural watercourses of the land will be all that is necessary. Here it is a question of aiding the escape of surface water, and the drains are intended to take the place of the slower and less satisfactory surface drainage. In such soils, it is a good plan to run the drains wherever water lies after a heavy rain.

In the space at our disposal, it is impossible to fully discuss the broad subject of drainage. We have pointed out the different conditions of the soil requiring artificial drainage, with the needs in each case. We will not attempt to discuss the methods of digging and laying drains, except to say that care should be taken in all cases to have the bed of the drain of uniform fall, and free from sharp dips in which sediment can collect, and that the laterals should join the main drains at a gradual angle, so that the current of the lateral shall not check the flow of the main. Where the land requires it, there is no improvement that gives better returns on investment than underdraining, but we should understand the needs of our land in this regard, and suit our system of drainage to these needs, if the best results are to be had. D.

Wholesale Farmer.

David Rankin, of Tarkio, Mo., owns 22,000 acres of land, and leases more. In his busy season he employs 220 men and 1,000 teams. In 1902 he sold 7,539 head of cattle for \$172,520, and 8,249 hogs for \$111,846.14. Each of his fourteen ranches is in charge of a foreman, who makes a detailed report to Mr. Rankin every month. Mr. Rankin made \$100,000 in 1902.