

the expense of engaging an engineer. There are many simple contrivances, which, with the assistance of a common spirit level, will serve the purposes. Among these, perhaps, the best is a straight-edged board, set on legs, sharpened at the points so that they can be driven into the ground till the board is level. Then look along its top, noting where its continued line strikes the ground or a marked pole held by an assistant. The difference between the point at which the continued line strikes the pole, and the ground, and between the top of the straight edge and the ground, indicates the rise or fall between the two points. If there are turns in the drain it will be necessary to move the leveling apparatus at each turn. It will be necessary before going further to decide upon the size of the tile required. To arrive at the proper size of a tile required to be laid in any particular drain, practical engineers have prepared tables showing the size of a tile, which, with a given fall, will remove from a fixed area a certain amount of water or rainfall in a given time, but which it would take up too much room to insert here, feeling confident as I do that the ADVOCATE will furnish this information to any anxious enquirer. The depth of the drain will be the next point, and upon this we do not presume to lay down any cast-iron rules, circumstances often beyond the control of man, such as a shallow outlet, a rocky or a quicksand bottom, rendering it impossible to go to the depth one might desire. A great deal depends on the nature of the soil and the lie of the land in fixing what may be regarded as a proper depth. If the soil is a deep porous clay which works easily, and through which the water percolates freely, it is only natural to think that deep drains would draw further, and thus would not require to be laid so closely as in harder soils. But when it is necessary, in order to reach a desired depth of say three feet, to pick every inch of a hard-pan subsoil, for a foot or more at the bottom of the drain, it is labor in vain, as the water can never be brought to draw through this pan. A shallow drain would have the same effect, and cost less. I have seen many cases of such a hard-pan subsoil, which was just as hard in the spring, as soon as the water was off, or after the soaking rains in the fall, as in August or September. It is desirable, in order to secure as even a flow of water as possible, that the fall of the drain should be carried through at an even grade, as the tile will last better and is less liable to fill up with sediment than when one part is steep and another is level. To new beginners, and even old drainers, a spirit level will be found to be a very useful article in keeping the proper grade, as it is a very easy matter to try the bottom as we go along, thus making sure that the desired level is being maintained, which is much easier done with the proper spades, and a scoop with a long handle, which the drainer draws towards himself, standing on the unfinished part of the drain, looking back over the work, and lifting the bottom clay up on the bank with the scoop, than the old-fashioned method of standing on the finished bottom, shovelling it out, and working the bottom, if there is water, into mud and mire. Where many drains join into one, a silt basin formed of a plank, or brick box, with cover, into which all the tile enter and from which the discharge pipe is fed, is a very good plan, easily constructed, and very useful in gather-

ing up any sediment that comes down, which should be regularly removed. Have the tile laying along the edge of the ditch, so that they can be reached by the drainer standing on the tile in the bottom of it, and the laying in of them is a very small matter. Some would reach the tile and place them from the top, with a pole having a hook on its end. This system answers well, particularly where the bottom is soft and muddy. After they are laid dig a little of the mould from the top, on to the tile, trample it, and then finish the filling in with a plow. The question of laying mains and their laterals is one that admits of argument. After locating and laying the main up through the lowest part of the field, some would lay their laterals at right angles to it, through the field. At the junctions, in all cases, all right angles should be changed to an acute angle, as the water passes from the lateral into the main much more freely in this position. A plan much in vogue, and much in favor in this section, is to lay a sub main at right angles with the main, and lay the laterals from it, parallel or nearly so with the main. The idea is this: that you catch the water as it comes down; it sinks into the tile, and is carried off, but with the laterals running at right angles with the main, the water in springy or from a spongy hole would run down between the two, as every farmer is not in a position to drain so closely as to catch every inch of ground. Where an open ditch runs across a field, and the volume of water to be carried off is so great that to lay a tile of sufficient capacity for it would be too costly for the average farmer, but where the land adjoining this ditch is almost worthless until drained, it is better, instead of emptying each tile into the ditch by a separate mouth, to lay a larger tile closer to the edge of it, and run the laterals into it, as by this means you have all the fall and only one mouth to protect. If the lay of the land is such that the same main can run up through two or three or more fields by starting with a large tile, you can lessen it, as each sub-main branches off. To the average farmer under ordinary conditions, who does not wish to sink too much at first, it is an easy matter to place the laterals at such distances that, should he feel inclined at some future time, he can lay one or more between each of them. The increased yield from draining land is great, many holding that the expenditure will be recouped in two or three crops; and, added to this, the pleasure of working land rendered friable and loose by the removal of the water, we have a very satisfactory showing.

Harrowing and Rolling in Spring.

Gerald Howatt in an exchange says:—When the snow is off the wheat and rye intended for grain, and land is dryish, it should be harrowed and rolled thoroughly. This has been my practice for years with all winter grain. Whether sown by drill or broadcast, the soil from snow and frost becomes hard, and this harrowing is as essential as the hoeing of any garden crop when it becomes baked, and which starts the plants into fresh vigor. Should it have been sown in the fall with grass seed, it is equally necessary. In some localities they cannot sow grass seed in sowing their grain. Those sowing in the spring, following the harrow, will find it a nice bed when thoroughly done. It is no use showing it the harrow; it must be a heavy one, run both ways. Those roots that may be torn up, the roller will

press into the ground; this will make your grain tiller better, and give better straw and heads. The young grass that may be rooted up, the roller will also settle into its proper place. If you are skeptical about this, try one field so, and let another go untouched; mark the growth of both all through the season, particularly so in harvesting and threshing, and then report to these columns for the benefit of your neighbors. It is not only on grain that the harrow and roller will pay to use after the winter frosts; grass land, particularly timothy and orchard, will more or less heave. If timothy and orchard grass are in clumps, occasioned by too thin sowing, you can only roll them thoroughly, if heavy, and if the aftermath of orchard grass has not been cut or fed off (as it should have been), put a very heavy harrow over it; this tears out all the dead grass from the bottom, giving all your grasses a good, clean start; and bear in mind that one inch at the bottom is worth two at the top. This will also facilitate your mowing machine, the guards not clogging up with rotten and dead grass.

Sheaves from our Gleaner.

Sprigs of cedar distributed throughout the nests of fowls will effectually clear them of vermin.

A quickly-ripened cheese will decay soon, just as a summer apple, that ripens quickly, decays before the slowly-ripened winter apple.

Silver-plating swindlers are abroad in some parts of the country. "The articles look right at first, but all effect of the treatment disappears within twenty-four hours."

The Western Rural says there is nothing about the Dorset sheep to recommend them above the breeds already in the United States. In fact this paper prefers our old famed-kinds.

A recent trial proved that a ferret kept in a cage in a barn or other building will drive rats away. The scent from the ferret is what does it. It is claimed that rats are so fearful of it that they will even abandon their nests of young.

The Russian Agricultural Department announces that the time has arrived when Russia can come forward with considerable chance of success, to compete with America and other countries in supplying the western European markets with live stock.

The commodity known in the United States as "white grease," which the N. Y. Tribune says is rendered from dead animals, and from the heads and entrails of hogs, is used, after being bleached, as a lard adulteration. All such lard should be forbidden access to our markets.

It occasionally happens in the best managed flock that there will be a motherless lamb and a lambless mother. There is just one way to make these fit. Strip the skin from the dead lamb at once (it comes off very easily while warm, and you need not skin the head or legs), and sew it on the lamb you wish to take its place. Fit the skin neatly around the neck, legs and belly, especially on the rump and tail. Put the foster mother alone with the lamb, and though she may demur at first, stamp her feet, etc., she will presently own the lamb as her own. It may be necessary to gently hold her a few times for the lamb to suck. Do not take off the skin too soon or she may go back on you. This plan is almost always successful.