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OUR ENGRAVINGS.

DRAINING.

In my last article on this subject I went over the theoretical points necessary to be understood by every one before the practice is attacked. We saw that the water entered at the bottom of the conduit; that gravity acted more efficiently in proportion to the height of the column of water already existing in the land; and that to get rid of the superfluous water by evaporation produced cold instead of heat: in other words, that, in undrained land, the first efforts of the sun in early spring were injurious instead of beneficial.

The practical questions that first meet us are the following: what depth shall we make the drains? what direction shall we give them? and how shall we cut them?

As a general rule, increased depth will allow of an increased distance between the drains. But the question really sums itself up in this: I have so much money to spend in draining: how many cubic yards of soil can I dry for one dollar? For, if the water-level in the land be not lowered to a depth beyond the reach of capillary attraction, the full benefit of drainage will not be gained, evaporation will still exercise its malefic influence. This level we may assume to be reached at 4½ feet; and, in England, the government Inspectors had strict orders not to sign certificates for the payment of drainage loans unless they found this depth rigidly adhered to. I knew there is not much hope of such a depth being arrived at here, but I cannot help saying that at a less depth than 33 inches the work and materials will be as good as thrown away Still, it is a matter for the farmer's own consideration whether he will put down a few deep drains or a great many shallow ones, the first will, in the majority of soils in this province, draw well at intervals of 50 feet; but the latter will be probably next to useless at more than 20 feet apart. At any rate, when we have to deal with such expensive materials as pipe-tiles, I should think no sensible man would leave them within reach of the frost.

Depth of drains.	Distance apart.	Mass of soil drained in cubic yards.
2 feet.	24 feet.	3226½
3 "	32½ "	4840
4 "	50 "	6153

Generally, double the depth of drain has effect on about twice the cubical contents of earth, and about half more in extent of surface; but as regards price, at the usual cost of digging drains, &c., three times as many cubic yard are dried for one cent by deep drains as are dried for the same amount by shall owones. The exact figures are 2 cu. yds. at 2 feet deep and 24 feet apart; 4 cu. yds. at 3 feet and 33½ feet; and 12 cu. yds. at 4 feet and 50 feet, excluding fractions. I have taken the prices I have myself paid in England, about half what it would cost here.

The direction in which the drains should run. There is nothing so certaln as the answer to this: up and down the greatest fall. And I think the following considerations will make this pretty plain. One law of hydraulics known to every one is that water always seeks the lowest level in all directions. In fig. 1, let *a b c d* be a field sloping from *a b* to *c d;* and let *e f* be a main drain into which the side drains *g h*, *i k*, *l m*, *n o*, *p q* and *r s* fall:

Now there is nothing more clear, in the case where drains cross the fall, than that the water that falls at *v* must have the whole distance to travel from *v*, just below the drain *i k*, in a diagonal line until it arrives at the drain *g h* (for it cannot run up hill into *j k*) that is, actually farther than the distance between the two drains: the same with the water that falls at *w*, below the drain *l m*. But take a glance at the other side of the plan, and look at the drains *n o*, *p q*, *r s*, and it will be evident that the water between each pair of drains has only a little farther to run than half the distance between the two drains, in fact where the fall is slight there is a mere trifle of extra journey for it.

Again, if we look at the plan No. 2, where *a* and *b* are vertical sections of drains, and the dark line above *c* a foot of mould. (the plough furrow, in fact) the rain that falls on *c* will be quickly absorbed, and, seeking the lowest level by gravity, will hasten at first perpendicularly towards the line *d e;* and, in doing so, the portions nearest the drains will find it easier to move towards the open conduits *d* and *e* than towards the firm ground at *h*: moving thus there will always a higher level of water at *h*, and the accumulation there will cause a strong lateral pressure on each side towards *d* and *e*; and the greater the accumulation the stronger will the pressure. Some people imagine that water finds its way into the drains as it does from the ridge of a house into the *rones* or shoots; but they are those who have never given themselves the trouble to think about the matter. Another reason why drains should run in the line of the greatest fall is, that almost invariably the substrata lie *horizontally*. Now look-