

them than where the soil is porous. The texture of the subsoils must be consulted, and the depths of the drains, if below the frost line, proportioned accordingly. To form an approximation of how deep to dig trenches for drains, begin by putting down one drain five feet deep, then dig a hole at a point 40 feet on one side, and if the water stands in it 12 hours after a rain-storm at less than one foot from the surface, then 80 feet will be too wide apart for the drains. Try again in another place by digging a hole 20 feet from one side, and if the water is there at 2 feet below the surface, its inclination on flowing into the drain, is about 1 in 7, and the drains must be about 50 feet apart to leave over a foot of dry land between drains. Stiff clay-soil may require to be drained, where the frost admits of it, at shorter distances between the drains—say at 40 feet apart and four feet deep; thus admitting the soil to become aerated and pulverized by the weather. The use of an auger, in some cases, will facilitate the operation of determining how deep it may be necessary to lay drains in order that they may do their work effectively. But there can be no doubt that deep under-draining promotes the aeration and disintegration of the soil to a greater extent, generally, than shallower drains. Any depth less than three feet will generally prove unsatisfactory. It is to be expected that the general drainage of the land will lead to floods, as the water will be brought off the soil much more rapidly than before. The rivers and streams will be swollen proportionately, so that a good outlet is almost a *sine qua non* in every system of drainage.

#### EXPLANATION OF THE TABLES.

Table No. 1 shows the velocity per second of water flowing through ordinary underdrains open at each joint for the admission of water percolating through the soil, and is calculated from a formula  $\sqrt{F \times D \times 2}$ , where  $F$  is the fall per thousand,  $D$  is the diameter of the drain, and 2 is a constant, all in feet. Repeated experiments, conducted under different conditions, show that this formula is as nearly correct as it is possible to be for drains about