Depth of Drains and Distance Apart.

The depth of the drains and the distance apart are other points that must be decided before the map can be completed. These are related questions, and one cannot be intelligently discussed without the consideration of the other. We have already seen (Bulletin 174) that the roots of ordinary crops penetrate three or four feet into the ground, and that if not given an opportunity to do so before droughts come they are unable to make the depth afterward, as they soon begin to feel the scarcity of water. We may, then, lay down as a fundamental law that the drains should be deep enough to permit the fullest root development of which the plants are capable, and which they demand for best results. Now the water table in a drained field is in a zigzag form like a rail fence, low at the drains and high between. If in a field that is underdrained three feet deep one were to dig a series of holes as deep as the

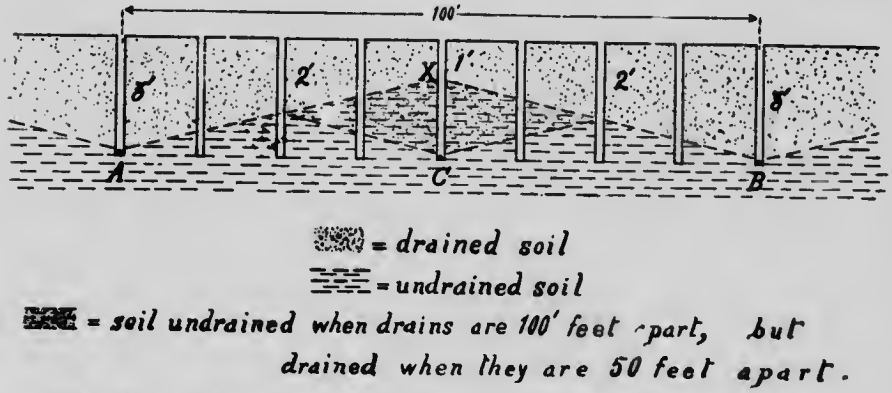

Fig. 15. Showing the relation of depth of drains to distance apart.

drains every few feet between them, and if after a heavy rain he were to observe the water in the holes for a day or two he would find that in a very short time no water would remain in the hole at either drain, but that the one situated half way between would hold considerable water for a long time, and the others would have less and less in them as he approached either drain, thus showing that the water table stands highest half way between the drains and slopes toward them on either side. In a clay in fairly good condition it will be found this slope is about 1 foot in 25, in loam 1 foot in about 33. Applying these gradients, let us see what they mean. Fig. 15 represents a clay soil with drains A and B 100 feet apart. Wells are dug 12.5 feet apart. At the end of 48 hours after a heavy rain the water will stand about as indicated by zig-zag lines, in a gradient of about 1 in 25, and hence will be two feet deeper in the centre well than at either drain. Hence if the drains are three feet deep there will be three feet of drained soil over A and B, but