

springy soils. If the drain cannot be laid in the centre of the road without seriously interfering with the passage of wagons, the ditch can be dug on one side of the roadway and between the roadway and the ditch. It should not be less than four feet deep, and this depth will, in most cases, be about right. If we decide to use field stones, we should select flat ones to form the opening or channel at the bottom of the drain, and they should be laid with care, so as to leave a good sized opening, as shown in Figure 7. The method of building this drain is described briefly in the text under the figure.

### HOW A DRAIN WORKS.

If we put a dry sponge in an open dish and place it outdoors in a heavy shower, the sponge becomes filled with water and we say it is "soaked" or saturated. If we then make a hole in the bottom of the



FIGURE 14.

Showing how the soil under the road is drained by an under drain. This figure shows the ordinary form of roadway made by a road machine, with no side ditches except the angle ditches formed by the blade of the machine. The drainage water is drawn out of the soil by the tile drain at the left, and the top line of saturated earth is lowered to about the level of the tile. The drain may be put either at the side or the centre of the road. It works about the same in either position. It should be on that side of the road on which the natural surface of the ground is the higher.

dish, the water at once finds an outlet and a large portion of it runs out; the sponge soon becomes lighter in color and lighter in weight and, if exposed to the sun, will quickly dry. Nearly every soil is made up of a large number of particles filled with pores and separated by very small channels, and these pores and channels absorb water just as the sponge does, and will hold it for a long time, unless there is an outlet at the bottom through which the water may run out. This