

ing as the flow is expected to be equable or variable; and as the latter is most generally the case, the ovate form is the most generally preferable. If the flow be equable the circular is preferred, because it gives the greatest capacity with the least expense of wall. If it be variable the ovate gives the advantage of the deep narrow stream when the quantity of fluid is small.

3. The FOUNDATION or bed of a drain should be firm and solid, so as not to permit of any breaking or disjoining. If pipes be used, small excavations should be made to receive the shoulders, and not have the whole weight of pipe, contents and superincumbent earth rest on the shoulders with no support to the rest of the pipe, which is then liable to break or crack. Provision should be made for carrying away subsoil water, which is liable to make for the new earth formed in digging the bed of the drain. If the drain lie *in* a porous stratum and *over* an impenetrable one the chances of the water running along the course of the drain will be especially great. Some tiles are made with a subsoil space, porous or perforated so as to carry off this water.

4. JOINTS. I have already alluded to the necessity of having the joints true-fitting, so as to prevent gaps out of which the cement or clay may fall or be forced. This same may occur if proper care be not taken to prevent the apposed ends from losing their concentricity when laid. If the joints be fitted with puddling clay or other soft material, this will give way before the downward pressure of the small end of the pipe, until this latter rests directly on the receiving collar of the next pipe, leaving no space between them on the under wall, but a large gap on the upper. This will be especially the case if no spaces have been cut to receive the shoulders. To prevent this the joints should be stuffed with oakum, or better still, with lead. This will also prevent the intrusion of rootlets of trees which are apt to insinuate themselves and cause accumulation and choking. Some have tried to kill rootlets by mixing bichloride of mercury in the cement. This is, however, but a poor, temporary expedient at best.