In order to adjust the strength of a pipe to the strain, we may conceive it as consisting of two half cylinders of insuperable strength, joined along the two seams, where the strength is the same with the ordinary strength of the materials of which it is made. The inside pressure tends to burst the pipe by tearing open these seams, and each of them sustains half of the strain. The strain on an inch of these two seams is equal to the weight of a column of water whose height is the depth of the seam below the surface of the reservoir, and whose base is an inch broad and a diameter of the pipe in length. This follows from the common principles of hydrostatics.

Suppose the pipe to be of lead, one foot in diameter and 100 feet under the surface of the reservoir. Water weighs $62\frac{1}{2}$ pounds *per* foot. The base of our column is therefore $\frac{1}{12}$th of a foot, and the tendency to burst the pipe is $100 \times 62\frac{1}{2} \times \frac{1}{12} = \frac{6250}{12}$, $= 521$ pounds nearly. Therefore an inch of one seam is strained by $260\frac{1}{2}$ pounds. A rod of lead one inch square is pulled asunder by 860 pounds (STRENGTH OF MATERIALS, vol. I.). Therefore, if the thickness of the seam is $= \frac{261}{860}$ inches, or $\frac{1}{3}$d of an inch, it will just withstand this strain. But we must make it much stronger than this, especially if the pipe leads from an engine which sends the water along it by starts. Belidor and Desaguiliers have given tables of the thickness and weights of pipes which experience has found sufficient for the different materials and depths. Desaguiliers says, that a leaden pipe of $\frac{3}{4}$ths of an inch in thickness is strong enough for a height of 140 feet and diameter of 7 inches. From this we may calculate others. Belidor says, that a leaden pipe 12 inches diameter and 60 feet deep should be half an inch thick: but these things will be more properly computed by means of the list given in the article STRENGTH OF MATERIALS, vol. I.

The application which we are most anxious to make of the knowledge of the pressure of moving waters is the derivation from a main conduit by lateral branches. This