It is sometimes desirable to be able to calculate the velocity of water in a sewer, in view of its bearing both on the self-cleansing action of sewers, and also in computing the amount which a sewer of a given area will discharge in a given time. I, therefore, give the following formula for calculating this velocity :—

$$V. = 55 \sqrt{2 HS.}$$

V. being the velocity in feet per minute,

H. the fall in feet per mile, and

S. the hydraulic mean depth.

This S. (the hydraulic mean depth) is ascertained by dividing the sectional area by the wetted perimeter, the wetted perimeter being the portion of the sewer in horizontal section touched by the fluid. This, in circular sewers, is always one-fourth the diameter.

Various experiments have been tried as to the carrying force of sewer streams. It has been found that small pieces of brick require a velocity of 960 ft. per minute, and iron slugs a velocity of 1,410 ft. per minute to carry them onward.

But what is more to the point for us is, that experience has led to the conclusion that a velocity of 180 ft. per minute, when running half full, is necessary for efficient house drains.

By the formula given above, it will be found that this would necessitate :—In a 4 inch drain, a fall of 1 in 92, and would take 7·85 cubic ft. per minute; in a 6 inch drain, a fall of 1 in 137 and would take 17·66 cubic ft.; and in a 9 inch drain, a fall of 1 in 206, and would take 39·76 cubic ft.

It must be borne in mind that the above calculations as to the necessary slope, are based on the presumption of the drain running half full; but, in many drains, so large a quantity of water is not often poured at once as that indicated above; in some the main house drain is, under ordinary circumstances, never filled half full, for it is merely the common outlet of a number of smaller ones, and unless these are simultaneously filled, it will not be half full.

Hence, the greater necessity of providing means of flushing