

closet with the lead portion of the soil pipe should be made perfectly secure, and as this is the only junction that should exist in the house, it can be made certain. This pipe should pass as directly as possible out of the house, and join the iron soil pipe outside, not in the wall.

"The soil pipe should discharge into a ventilated trap, and should be carried full bore above the house so as to be perfectly ventilated by a constant current of fresh air. The kitchen sink should discharge under an open grating or into the rain water pipe, which should be ventilated well at top and bottom. The principles, then, which ought to govern the regulation of house drainage are mainly as follows:—

"All filth and all organic waste matter which are liable to putrefy should be immediately and completely removed from the inside of the house.

"All pipes (water closet, bath, sink, or other) discharging such matters should, as far as at all possible, pass directly from the house apparatus to the outside of the house. Drains should not, if it can be avoided, pass under a house.

"A water tap to close the house end of every such pipe should be so arranged as to be thoroughly open to view to its deepest part, that it may insist on being kept clean.

"There should intervene between the trap and the house no cavity or surface, in or on which foul air or filth can accumulate.

"All discharge pipes, inside or out of the house, should be well ventilated by openings at top and bottom. In the case of pipes passing through the house for any great distance this is imperatively called for.

In reference to traps on main drains, between the house and sewer, Dr. Parkes, the eminent en-

gineers, Mr. Baldwin Latham, Mr. Rogers Field, and Mr. Henry Robinson, and also the late medical officer of the privy council (Great Britain), are all decidedly in favor of them.

The "Plumber and Sanitary Engineer," a valuable semi-monthly, published in New York, and edited by Chas. F. Wingate, has obtained the opinion of many eminent engineers in the United States on this point. Among others, Mr. Azel Ames, Jur. of Boston, writes to that paper as follows:—"While I think well of a trap, *provided always* it is well ventilated *below* the seal, I would not give much for it as compared with *good ventilation of the cesspool or sewer* into hot flues (preferably), or double channel conductors leading to safe heights; they certainly arrest gas, so that the trap ventilator has its chance. . . . In short, I always use a trap if available." . . .

Mr. A. L. Anderson, C.E., of Cincinnati, writes:—"Our firm considers the following features to be essential in a perfect system of house drainage, viz:—

*First*—A suitable trap between the main sewer and the house. *Second*—An inlet for fresh air on the house side of the trap and at the level of the ground, and usually adjoining the trap, so as to afford a means of inspecting it. *Third*—Soil pipes carried full size above the roof. *Fourth*—Local traps to all water closets, baths, etc., with ventilating pipes on the outlet side, close to said traps. There are, thus, no *dead ends*, but a current of air passing through all the pipes at all times.

"In our practice we endeavor to embody all of these features; but ignorance or parsimony, or both, often step in to prevent the execution of the plan in all its devices; *but the first requisite (that of an ex-*