

through properly constructed fixture outlets, followed by an equally thorough pure-air flushing from the room through the fixture and trap, is infinitely more effective than ventilation with foul air alone from the soil-pipe through the back-vent pipe, and is, indeed, altogether sufficient.

Hence the law should require every fixture to be constructed on the principle of the "flush-tank" by having outlet and outlet-valves large enough to fill their waste-pipes and traps "full bore" at every discharge. . . .

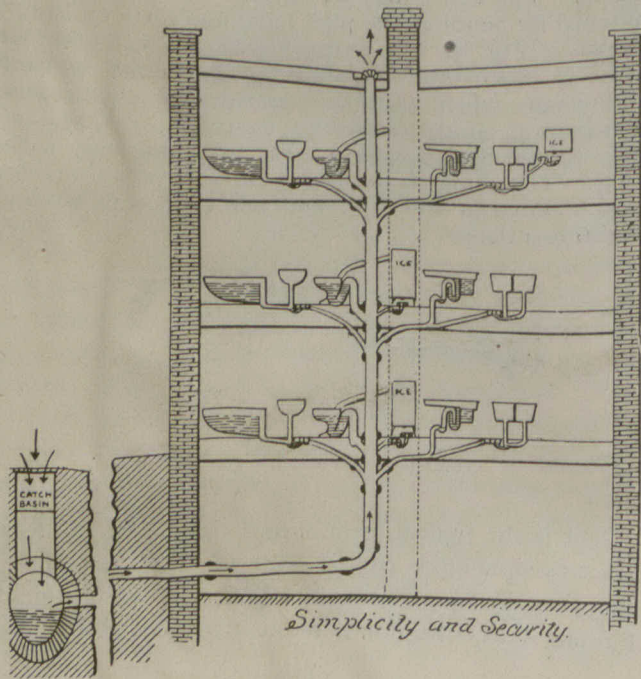


FIG. 7.

Figs. 7 and 8 show the same fixtures in a house plumbed in two different ways—Fig. 7 being in accordance with my recommendations and 8 being in accordance with the manner now sometimes seen in the finest houses. On the extreme left of the latter is the outside sewer vent, and on the inside, next to this, is the house-trap and circulation-vent. We have also

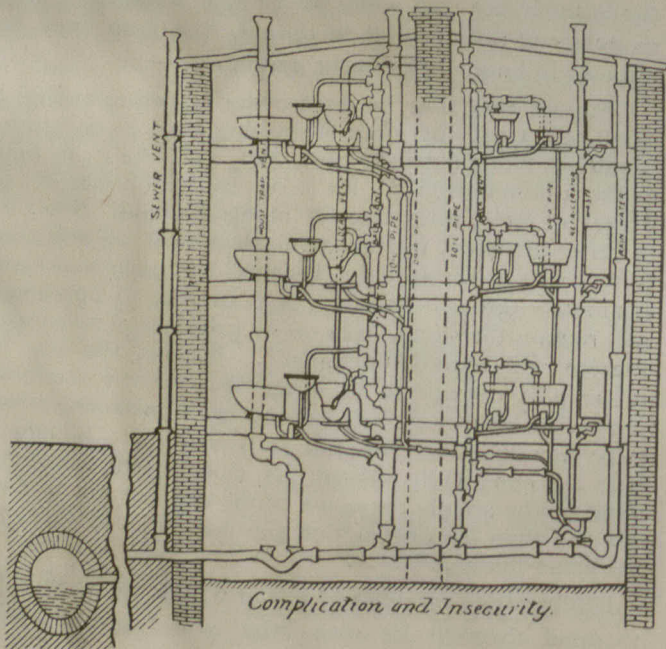


FIG. 8.

back-vents, drip-vents and rain-water pipe, and all of these unnecessary stacks are very common in the modern house.

Fig. 9 shows a part of this work enlarged. It is taken from a well known house in New York.

My reasons for urging legislation prohibiting the use of the main house trap, or "intercepting" trap

are, first, because its use prevents the best and only efficient and practical method of adequately ventilating the sewers, and, second, because it adds an altogether useless expense and complication to the plumbing.

Recent investigations by eminent scientists have shown us the fallacy of the popular idea that the air of sewers abounds in disease germs, and so sight-seers may now visit the famous sewers of some of the great cities of the world with the same feeling of safety they enjoy while seeing other regular "sights."

Germs are "particulate," as Dr. Carmichael, of Scotland, expressed it, and have no more power to raise themselves from the water or moist surfaces of sewers than have any other particles of vegetable matter, like leaves or small sticks. If, by any chance, parts of the sewage above the normal level of the flow become dried, as in periods of drought, and are then lifted and wafted along by some unusually strong air-current, it is found that they very soon fall again into the water by gravity or are carried against a wet surface in a bend or branch of a sewer by the same air-current that lifted them. Furthermore, it has lately been discovered, and the discovery satisfactorily corroborated, especially by the noteworthy and most interesting researches of the Englishmen, Laws and An-

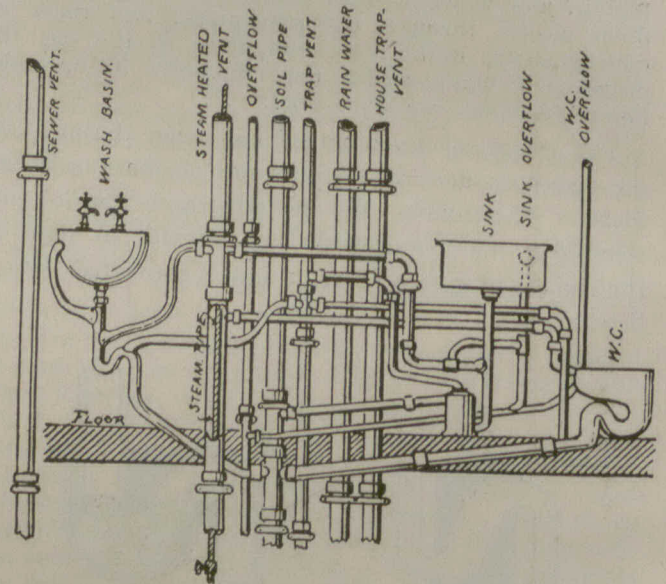


FIG. 9.

drewes, that the specific germs of disease do not thrive even in the water itself of sewers. They appear to be destroyed by other species of germs, harmless to man, which abound there.

In short, it has been determined that the dreaded germs of specific diseases are, of all places, least to be sought for in the air of sewers. They may abound in the air of the streets above the sewers, but not in that of the sewers themselves. Hence, if they are borne into our dwellings by air-currents at all, they must enter by way of doors and windows and not by way of the drains.

Note that we are speaking of germs and not of odors and gases. These latter do abound in the air of badly ventilated sewers and are unwholesome to breathe continuously. But they are immediately dangerous only when in an exceedingly concentrated form, and are easily excluded from houses by simple precautions and by proper plumbing regulations. One of the most effective and rational of these precautions is thorough sewer and drain-pipe ventilation.

Simple openings into the sewers at intervals along the streets are common; but they provide no motive-power to effect proper ventilation. The foul sewer may thus remain foul, and an opening here and there at the street level only concentrates the nuisance in the worst manner at special places for the annoyance of the public.

It is much better to carry the foul gases to the tops of the houses than to emit them at the street level under the very noses of the passers-by. Soil-pipes can now be constructed and jointed so as to be absolutely