ties, plainly saw that a serious mistake had been made, and, that after the aerating advantages of the old draining system were discontinued, that all the public sewers and private drains were simply turned into putrefaction chambers or receptacles for breeding diseases, and that the foul gases generated in the sewers invaded the houses and streets, and that they, the engineers and surveyors, were meeting together to find out a plan to crawl out of the difficulty without tarnishing their former reputation.

The model by-laws, as they call them in Great Britain, or town laws compelling property owners to place the interception trap on their drains and to have useless vent or back air pipes attached to all the house traps, has only been enforced for a very short time, and in a few towns of Great Britain, but the injurious effect of such dangerous innovations was soon felt, because the people are more crowded together there than out here, and the highest sanitarians and engineers have begun to speak out boldly against such cruel and expensive model by-laws, and considerable valuable information has been published in the engineering and sanitary journals of Great Britain proving the injurious effects on the public health.

The lectures and debates of the 17th annual Congress of the members of the Society of Sanitary Science, held lately at Birmingham, England, dwelt largely on the evils of the interception trap and the excesses that have crept into plumbing and draining work. W. Henman, Esq., F.R.I., B.A. Sc., etc., chairman of the Sanitary Section of the Congress, in his opening speech stated that the day would come when all interceptors and traps would be abolished, and with them the sewer gases which the interceptors had retained about our dwellings. He proved, during the delivery of his address, that public engineers and surveyors had deeply sinned against the public in the construction of public sewers, because, instead of aiding a rapid removal of sewage and refuse by water carriage, nearly all the sewers they constructed acted as filters or separators, invariably leaving the solids in the sewer pipes to fester and become offensive and dangerous to the public health.

Dr. Bostock Hill at the same meeting showed the falsity of using drain pipes too large for the flow and placing interception traps on the private drains. He stated that the smallest waste or drain pipes which will convey the necessary quantity of liquid intended to pass through are certainly the best for reasons of cleanliness and flushing. From a single house a 4 inch drain is ample, yet Mr. Bostock says he has known public surveyors insist on having a 6-inch pipe and interception trap installed instead of a 4 inch, stating that they compelled the larger pipe because there was less likelihood of the drain becoming choked, which cannot be true, and there are many other disadvantages that tell against using too large a drain pipe, viz., from small houses solids and sewage are chiefly sent down in gushes, the pipe itself, if it is 6 inches, can never be nearly full, and the crown and upper half of the sides only get splashed, so that dirt and filth accumulate and set up putrefaction and generate dangerous gases. Continuing his address on the interception trap he states that when the trap is put in the main line of the private drain a ventilation pipe has to be installed somewhere near the surface of the ground, near the house, to ventilate the private drain and house waste pipes, and in that case the following evils must of necessity occur, viz., each syphon or dip on the trap holds a quantity of foul water, and where water closets are used fœcal matter lodges in them, which generates poisonous gases that take the easiest way out to the open air, which is through this breather or private ventilation pipe. This same breather delivers the accumulated contents of putrid gases each time the house sewage is rushed down the waste pipes and private drain. By these two methods alone a large amount of putrid and poisonous gases are discharged into atmosphere near the windows and doors of private dwellings, causing constant smells, and if some of the dwellings have fever in the place, and the stool of the patient is sent down the sewer, then the foul gases discharged from the breather pipe or air inlet at this time is dangerous and will spread the epidemic. It is certainly undesirable to store sewage even in such small quantities as the amount that lodges in the dip of a trap near inhabitable premises, and I am strongly of opinion that the system of placing interception traps and other impediments in waste and sewer pipes induces a state of things that, from a sanitary point of view, is very much worse than the system which the modern model by-laws have superseded. These are the opinions of a public health officer in England, and many of his associates are fully in accord with him, but I will not weary the readers with repeating their speeches, but proceed to give the results of the tests made by Dr. Porter, M.D., showing the resistance of traps to the freedom of the flow of water and solids when flushing water closets, because it is further extending the experiments begun at Cologne and proving another reason why their adoption is injurious to the public health. Dr. Porter shows by his experiments, what amount of water it takes to flush a water closet properly and prevent the private drain from becoming little better than an elongated cesspool, and states that to gain a thorough knowledge of the requirements of house drains he made 120 test experiments by flushing on the lines laid down for such purposes by the Sanitary Institute in 1893. The class of water closet he used was Duckett's washdown closet having an S trap and a Unitas washout closet, flushed by a water waste preventing cistern graduated for a flush of 6, 4, 3½, 3, 2½ and 1½ gallons of water at one flushing, and connected to the basin by 5 feet of 1¼-inch lead pipe. The water closet in each case discharging through 47 feet of glazed earthenware 6-inch pipe and again through the same length of 4-inch tile piping to an interception trap, the usual quantity of fœcal matter and paper used being supplied from a factory privy. The weight of the quantities at one flushing being 4 ounces, 6 ounces, and in a few trials 8 and 12 ounces used at each flushing. The first series of trials (fifty in number) were made with a 4-inch drain (fall 1 in 40) and 4-inch disconnecting trap. This trap was filled by 4 pints of water and at the lowest part measured 3½ inches transversely and 4 inches vertically. Flushes of 3, 2½, 2 and 1½ gallons were employed, the result being that 3 gallons invariably sufficed to thoroughly flush closet, drain and 4-inch trap; a 2½ gallon flush generally failed to clear the 4-inch trap; with 2 gallons the interceptor was not once cleared, and most of the solids were left in the trap. By repeated 2-gallon flushes in rapid succession, causing a head of water in the drain, the trap was eventually cleared with a rush, but this did not happen if one flush were allowed to trickle away before the next followed it. A 1½ gallon flush was found to be of little use. The drain was never cleared and became rapidly blocked.

The second series included twenty-one experiments, and was made with a 6-inch drain (fall 1 in 60) and 6-inch disconnecting trap, which, it is noteworthy, required 12 pints of water to fill it, and at its lowest part measured 5⅛ inches transversely and 5⅜ inches vertically. Flushes of 6, 4, 3½, 3 and 2½ gallons were used, and it is a remarkable fact that, though 3 gallons and upwards sufficed to clear