

closure one more possible centre of typhoid infection is removed ; but the decreasing influence exercised by this on the annual rate of prevalence is small indeed if the public supply continue to disseminate the disease. The dollars and cents represented by the existing water-works may be regarded as a barricade to sanitary progress, or an altar on which typhoid-fever sacrifices its victims.

The efforts that have been made from time to time to quiet the public mind by demonstrating the destruction of sewage and the self-purification of the water which contained it, are in part attributable to these financial interests : but only in part, for many sanitary inquiries have been deceived by partial or imperfect observations. Unfortunately, however, those analysts who have had much practical experience in following the track of sewage in its passage down-stream recognize in this so-called self-purification only the results of sedimentation and dilution. Undoubtedly the natural processes of purification—the transformation of organic matter into ammonia, and the nitrification of the latter—operate in the current of a running stream ; but these account for but a small proportion of the seeming purification, and there is no ground for supposing that the infectious principle of typhoid-fever is given up to the action of these purifying agencies. We acknowledge that typhoid-fever is propagated by an infected sewage in a well-water when all organic matter in the dangerous sewage—matter which, by the absence of life, is given up to decomposition and reduction to harmless inorganic forms, and matter which by its vitality is preserved from these influences, and we acknowledge that in the well-water the former may be reduced, while the latter retains the full measure of its virulence. Analogy shows conditions of a similar character affecting our river-supplies, and the seeming apathy with which they are regarded can only be accounted for by assuming that individually we have fought against the barricade erected by the dollars and cents, and been defeated by its solidity and strength.

In this country the relation between the distribution of a water which contains sewage and the prevalence of typhoid-fever can be readily observed by any one who

studies the mortality returns of our cities in connection with the *character* of their water-supply. The records in many instances are complete and trustworthy for the past twenty years. Brooklyn, New York City, Boston, Cincinnati, Philadelphia, etc., have a death-rate from typhoid fever proportioned to the quantity of sewage which enters their water-supplies. Where the water supply, as in the first-mentioned city, is free from sewage, the death-rate is low, about 15 in every 100,000 of the population, these cases being due to indirect infection and other local causes. When care is exercised in excluding sewage from the water-shed which furnishes the public supply, there is a corresponding freedom from typhoid-fever, as in New York, which has a rate of 25, and Boston, which loses about 40 annually for every 100,000 of her people. In Philadelphia and other cities, in which less attention is given to the purity of the public supply, the typhoid death-rates are correspondingly increased. Moreover, the records of some of these cities give interesting information when viewed in connection with the *history* of the water-supply. The city of Baltimore has had a steadily diminishing rate since its water-supply was first introduced, and this decrease has been more notable since 1880, when the supply was largely extended. And this same city of Baltimore shows that its improved condition is not due to the introduction of a system of sewerage, but to the use of a purer water than was formerly furnished by its infected wells. Ordinarily a sewerage system and public water-supply are contemporaneous improvements, and heretofore any benefit to the health of the community has been credited to the sewerage, although it seems as if the inflow of a wholesome water had had really more to do with the lessened death-rate, for the small typhoid rate of New Orleans, La., cannot be attributed to the sewers of that city, since it has none, but it *may* be attributed to the water-supply, for that consists of rain-water, which is free from sewage, inasmuch as the cisterns in which it is stored are not sunk in the soil, but raised considerably above the surface.

Testimony of a similar character has recently been developed by the experience