

of Vienna. In that city, from 1851 to 1874, well water of an impure character was used to a large extent in addition to a systematized supply from the Danube. During this period the deaths from typhoid-fever ranged from 100 to 340 annually in every 100,000 of the population. In the last mentioned year a spring water was introduced, and the death-rate from typhoid-fever fell immediately to 50. Since then, by the disuse of impure wells and the extension of the new supply, the rate for the past three years has fallen to 11; and, inasmuch as the sewerage system was in existence during the period of high rates, the fall since 1874 is necessarily referred to the use of a water which is free from sewage. The fall in the typhoid rate experienced an interruption in 1877, when, owing to the freezing of some of the sources of the spring-supply, the water of the Danube had to be pumped into certain of the mains; and it is of importance to observe that the sections of the city which were chiefly affected by this epidemic were those in which the Danube water was distributed. According to Professor Nothnagel, typhoid-fever has become such a rarity since the introduction of the spring supply that when a case occasionally comes to hospital from outside the city he shows it to the students as one of unusual interest.

In the face of such testimony to the influence of a pure water on the typhoid rate, we cannot shut our eyes to the relation that exists between sewage in our streams and typhoid-fever in the cities that are supplied by them, no matter how great may be the financial interests that are involved or sunk in the contaminated supplies. Now comes the inquiry. What are the measures that have been or should be adopted to lessen the evil?

As a rule, the only effort made by our municipal authorities and water companies to purify our public supplies is by sedimentation. They select a pond which forms a natural sedimenting reservoir, or they throw a dam across a stream to form an artificial one, or, in the case of large water-courses, they pump directly from the stream into specially prepared basins. Primarily these basins or reservoirs were

intended to facilitate distribution and guard against a temporarily inadequate flow in the stream which furnishes the supply; but they were found to answer the purpose of clearing, and to that extent of purifying, a turbid water, provided they were large enough to permit the water to remain undisturbed for the needful length of time. When it is proposed to have additions made to the water-supply of a city, the construction of new basins is usually implied. As an instance, there are now at the city of St. Louis, Mo., four settling basins, holding eighteen million gallons each. The floors are paved with brick on edge, and slope toward the centre and the river side. The sediment is floated off from the floor of each basin once in about four months, the quantity removed annually amounting nearly to 200,000 cubic yards. The wants of the city permit the water to settle only from eight to eighteen hours, while a period of thirty hours is required for a satisfactory subsidence. On this account an extension of the work is at present in contemplation. Surveys have been made, and land purchased, for larger settling-basins and conduits to carry the water to the present high-service or clear-water pumping-plant. The estimated cost of these improvements is three and a half million dollars.

The storage of a turbid water in such basins undoubtedly tends to improve its quality. No argument is required to show that the St. Louis water is better with its suspended matters at the bottom of the reservoirs than choking the distributing pipes, collecting in every containing vessel in the city, or settling in the alimentary tract of the water consumers. The subsidence of the inorganic matters which constitute the mass of the turbidity carries down a considerable proportion of the associated organic materials, and the clear water gives markedly better results as well on chemical analysis as on bacteriological examination.

Chemically considered, the tendency of the cleared water is to further purification. Organic matter steadily diminishes in quantity, and is replaced by ammonia and nitrates; but as this is effected by bacterial agencies, biologically the stored