a perfunctory manner. Where there is no water carriage system of sewerage these infected discharges are emptied in the privy or some other convenient place, sometimes being covered with earth, but more often not, and from these deposits, where favorable geological and topographical conditions obtain, the typhoid germ easily finds its way through or over the ground into nearby wells, which serve as sources of drinking water for one or more families.

The attendants on a typhoid sufferer not infrequently regard the urine of such a patient as innocuous, and since



it is less trouble it is emptied into a nearby sink or out of a back window. It has been positively demonstrated that the urine of a typhoid patient may contain as high as I to 500,000,000 typhoid germs per cubic centimeter, or from 5 to 25,000,000 in a single drop, and this is sufficient to show its very dangerous character, particularly in the contamination of dug wells.

A summary of the results of a large number of examinations made of wells located on farms in eastern and western United States showed that at least 60 per cent. of the wells examined were contaminated with bacteria which are always identified with sewage. There is no doubt that a fair share of the annual typhoid grist comes from the consumption of polluted well waters, either through direct consumption, or through the contamination of milk and other foods which are brought in contact with them.

Wholesale Pollution of Public Water Supplies.— Where the house of the typhoid sufferer is provided with a convenient water closet, the temptation is great for the attendant to eschew the disagreeable task

of effective disinfection, and the excreta, without such treatment, are summarily dumped therein to find unimpeded transit facilities to the nearest waterway, from which others draw their water supplies. It may be that the sewage of such communities is subjected to some form of purification before it is allowed to flow into the nearest waterway, but no form of treatment used in any part of the world at all times actually destroys all of the disease germs in such sewages. It remains for those communities whose water supplies are thus polluted to purify them before consumption. If this is carefully done, all is well; if not, then there is always a heavy endemic toll of typhoid fever in those communities, the sodden monotony of which frequently is broken by a spectacular epidemic.

Death Rate.—Dr. Allen W. Freeman, Assistant Commissioner of Health of Virginia, recently said:—\*

We have learned by sad experience that the measure of typhoid fever in any community 15 the measure of the distribution of human filth in that community, and that the dissemination in of human excrement will inevitably result The the spread of typhoid fever. problem is no longer an investigative or scientific problem, but a problem of administration. When the people of the United States wish to pay for absolute protection against typhoid fever it can be bought with the full assurance that the goods can be delivered. As physicians and sanitarians, we are most interested in the practical question, can typhoid fever be prevented? We know that it can. We know that our methods are certain, that they will yield the desired result in every case where they are properly applied. The problem remaining for solution is how to convince the American people that protection from typhoid fever is something worth spending money for.

Dr. Freeman estimates that in the northern part of the United States the purification of all water supplies would result in the reduction of the annual typhoid rate to a figure usually less than twenty per hundred thousand population, while in the south the purification of the water supply

alone would seldom reduce the rate to less than fifty per hundred thousand, other measures, such as perfect sewering or rigid screening and supervision of dry closets, being required to bring down the rate to the point which could be reached in the north by water purification alone. Below this point, in the north and south alike, reduction must be attained by the thorough super-

<sup>\*</sup>The Present Status of our Knowledge Regarding the Transmission of Typhoid Fever, Public Health Reports, issued by the United States Public Health Service, January 10, 1913.