Chlorine. In water collected from chalk or sandstone we need not be suspicious of chlorine till it reaches 3 parts per 100.000. But in excess of this it can only be attributed to organic pollution after all other likely sources have been excluded, e. g. wells near sea coast, tidal waters, alkali effluents, etc.

These are the more important constituents, but of course there are others more or less corroborative What does the presence of these constituents indicate, and where do they come from?

The upper layers of the soil contain great numbers of bacteria (putrefactive) chiefly in the upper 4 or 5 feet.

Suppose sewage from a cesspool or other sources filters into the soil. The organic animal matter it contains is seized upon by these organisms in successive crops and the complex albuminoid and nitrogenous substance are gradually broken down into more simple bodies till ultimately there is little left but NH_3, free or in combination, CO_2 and H_2O. But when this stage is reached another set of bacteria get to work. These are the nitrifying organisms. They have the power of building up from the simple NH_3 a more complex body, viz: oxidized NH_3 in other words HNO_2, which, combining with various metals e. g. K., Na., etc., forms nitrites. A still further stage of oxidation would be the conversion of the nitrous into nitric acid. This is accomplished by another group of bacteria, hence we in the same way as before get the nitrates.

Thus we see that much albuminoid NH_3 indicates very recent pollution, nitrites, not quite so recent, and nitrates still more remote. But when thus remote we are in constant danger, as it shows that the source of contamination is in the neighborhood and may at any time as it were overflow.

So much then for the chemical examination. What about the bacteriological?

As a matter of fact these are nearly corroborative of each other. Suppose we find a water containing a great many putrefactive organisms (not disease producing), and therefore harmless in themselves, we are practically sure to find organic matter undergoing putrefaction, and this of course points to contamination.

I have on several occasions got samples of water to be examined for typhoid bacilli. Now looking for typhoid bacilli in a water sample is like looking for a needle in a hay stack, and is rarely accomplished even by the most experienced bacteriologists. But it is