The almost continuous presence of B. coli entirely demolishes any other conclusion but that the Lindsay people, in spite of their great faith, are drinking a form of dilute sewage; and one cannot conclude but that, if they had only adopted simple oxidizing or nitrifying filters, followed by a small slow sand filter or disinfection by calcium hypochlorite, they would have had a water both organically and bacteriologically pure.

"FOOLS RUSH IN WHERE ANGELS FEAR TO TREAD."

The average engineer prefers to remember his chemistry as something of the past belonging to his school days.

Chemical formulæ, chemical actions and chemical reactions become, as a rule, hidden in mystery by the lack of constant familiarity.

Although the average engineer may feel somewhat shy of chemical deductions, not so with the average daily newspaper.

Give the newspaper man, the maker of press stories, the chance of putting on the armor of science and handling the deadly weapon of cause and effect. Send him on a "Holy Grail" mission to procure and unravel chemical data, and the result, while it may startle and alarm the groundlings, will at any rate provide recreative interest to a few.

The sand filtration plant of Toledo is visited. The knight-errant of modern science is loaded with data relating to "turbidity," "oxygen consumed," "ammonias," free and albuminoid, **and "chlorine."**

The knight returns to his castle, speaks of his adventures, and tells of the foolishness of a people who spend their gold to filter out chlorine from water which won't filter. Here is this large and costly plant laid down, and behold the same amount of chlorine in the water before and after filtration.

Are not the waters of our city charged with this deadly chlorine, which carries disease on its wings?

Will our city spend gold to lay down a similar plant to remove the chlorine from our waters when this plant at Toledo absolutely ignores chlorine?

Truly, those who dreamt of filtration forgot chlorine.

Recreative Note on above.—Chlorine is in solution in water. There are 28,000 parts of chlorine in 1,000,000 in sea water. Why not pass sea water through a sand filter in order to make it fresh water?

Engineers who remember their chemistry please answer.

A further recreative note may be added.

Yet a second daily paper must needs plunge into the chemical chaos. With an instinctive perception that there may be some reason for the Toledo filters ignoring chlorine, they at once commence a wholesale mixture of chlorine, chlorides, chlorites, hypochlorites and all the other combinations of Cl; and, having rammed them into one jar, labelling the mixture "Chlorine," they say, behold the thing which kills the germs!

STERILIZATION OF WATER.*

By Walden and Powell, Baltimore County Water and Electric Co., Baltimore, Md.

The sterilization of public water supplies has been the subject of careful investigation by many municipal and private corporations for the last two or three years, and more so in the past year, owing to the shortage of water and the fact that many supplies, including wells, reservoirs and small streams became badly polluted due to wash when there were rains and at other times when there was not sufficient water to properly flush the streams or surface to prevent pollution from such wells through the sand strata. These investigations have invariably met with the obstacle which has been the stumbling block in all such enterprises, that is, first cost and operating cost of the purification system.

The Baltimore County Water and Electric Company have been operating a filter plant for a number of years and being desirous of obtaining a cheaper method of sterilization, have from time to time been investigating the various methods of filtration, namely, slow sand, American or rapid sand, and the up-draught system of sand filtration here, as well as the European. This company has also experimented for several years with the application of alum and hypochlorite of lime applied directly in the reservoirs or storage basins themselves, with considerable success, as will be shown in this paper.

In addition to the above-mentioned careful investigations, the sterilization of water by ozone was considered about two years ago. The United Water Improvement Company controlling the James H. Bridge patents, submitted a sample 3,000-gallon ozone sterilization plant for test, which was placed alongside the American or rapid, and slow sand filters, handling raw water directly without sedimentation. Some of the results obtained from this sample plant have already been reported in a paper on the use of hypochlorite of lime, which has also been in use both in the American and English filters for some two years. In addition to these tests, a rough determination of the amount of nascent oxygen in a grain of chloride of lime has been made, and the approximate calculation of the volume of gas on a basis of .1 grain per gallon, to get an approximation for the volume of ozone, which was roughly .00096 cubic inch per gallon, but this depends upon the concentration and will vary with the condition of operation and temperance. The specific gravity of ozone throughout the test has been taken at 1.65, as compared with air as 1.

With the data at hand, the ozone plant at Lindsay, which had just been started, was investigated, and it was decided to install a sterilization plant at the Herring Run Station of the Baltimore County Water and Electric Company, to have an ultimate capacity of 10,000,000 gallons in twenty-four hours with roughing filters to remove the suspended matter, to handle the raw water at double or triple the usual rates per unit area in rapid or American sand filters. Plans were gotten out and work started, but considerable difficulty was met with owing to quick-sands. The sterilization pit was thirty feet deep and within twenty-five feet of the river bank. The walls were not completed until it was late in the fall. Work had to be abandoned during the winter other than to test the many different kinds of mixing head or aspirators, including various nozzles, converging tubes, orifices, etc.

As it was important to get information as to the amount of air that could be mixed with a given volume of water under our low head, it was found that under low heads some aspirators would not give a continuous draught of ozone or air, and when the draught was heavy the specific gravity of the mixture would become so light that there would be a blow-back, which would momentarily blow the ozone input back. and while it was possible with low heads to get about one-third ozone to water in volume, the lowest point or head

*Read at Thirtieth Annual Meeting of the American Water-works Association, New Orleans, La., April 25-30, 1910.