The Manufacture of Soda-Water From Polluted Well-Water.

By Frank R. Fry, A. M., M. D.,
St. Louis.

Several physicians who have their offices in the immediate vicinity of the largest manufactory of soda-water in this city, have for some time known that a large quantity of well-water found its way into the products of this establishment. It was also suspected that the same was true of other establishments in the city.

Knowing the difficulties our local board of health has to contend with in such cases, and thinking to create a wholesome sensation, some data were furnished one of our daily papers, to which they industriously added other facts, and from them printed an article that attracted considerable attention, especially as it appeared during the time last summer when there was most talk and some concern felt about the approach of cholera. The article was valuable, as it developed the fact that all the manufacturers of soda-water in this city excepting one, on their own admission, used well-water in making their products,—in all instances the water being taken from wells in populous portions of the city.

Here I wish to digress long enough to state a few facts about the wells of St. Louis that will help to show the importance of the subject at hand. The number of wells here is not known, but Mr. W. Kennett, of the city sanitary office, states that several years ago, when the police force was ordered to report all the wells throughout the city, over seven thousand were enumerated, and the returns were still not complete. But, with this report as a basis, it is estimated that there are between nine and twelve thousand wells in the city.

Between the dates of July 9th and September 30th, 1884, Dr. John A. Heckelmann, the chemist employed by the city board of health, examined the water of forty of these wells, they being wells that were reported as suspicious, with the following results: "Nine of them contained good water, three usable water, two dangerous, twenty-six unfit for drinking purposes." These results were obtained with a rather variable criterion of good and bad. In determining to which class a well belongs, all of the following points are considered: Color, odor, taste, and transparency of the water, the microscopical examination, the chemical examination, including an estimate of its hardness, the total solids, metals, chlorine, organic matter, sewage, free ammonia,
nitrates and nitrites. Also the location of the well, its proximity to vaults, sewers, etc., the amount of water constantly taken from it, and its depth. But so far as I can discover there is not a fixed limit or definite figure determined in regard to any one of these points, a conclusion being reached from the general showing of the water from each well that is examined.

The gentleman above referred to has expressed an opinion that all the wells in an area extending from Cass avenue on the north to Chouteau avenue on the south, and from the river back to 14th street, are more or less contaminated by sewage. This statement is not meant to imply that some other districts are not just as bad, but it covers the ground in which we are now most interested.

It is not necessary to give details to reveal the importance of this matter, but its enormity (from a sanitary standpoint) will appear by reciting the circumstances of one instance. The establishment where the largest amount of fountain soda is manufactured (probably two thirds or three fourths of all used) in the city is located on 8th and St. Charles streets, in the heart of the city, in a thickly settled block covered with old buildings, destitute of many modern improvements. There are sewers on three sides of the block, and a private one in the alley immediately alongside the establishment. During a large portion of the year this alley is in a filthy condition. The water used is drawn from a well, under the building, thirty-five feet deep. The proprietor freely admitted that he used this water in the manufacture of soda-water, and only regretted that he had not more of it, as the supply was not sufficient, and he was compelled to mix with it more or less of other water. It is a peculiarly significant fact that this very block was described as a cholera centre thirty years ago, and the fact was accounted for by the probable condition of the water in the vicinity.

It is interesting to read in this connection a portion of the report made in 1855 to the American Medical Association by Thomas Reyburn, M. D., "Chairman of the Committee on the Epidemics of Missouri, Iowa, etc." On page 152 of this report he says,—"Among the localities within the city that may be noted as cholera districts, are the first and second wards in the southern section, the 'graveyard' lying between Chouteau's lake and Market street and 9th and 11th streets; Hell's half acre, which was formerly the basin of the lake, located between 5th and 7th streets, Spruce and Chouteau avenue; the block bounded by St. Charles, 8th and 9th streets, and Washington avenue; and a cluster of eight or ten blocks or squares, the centre of which is the intersection of 11th and Morgan streets. In these last two localities the neighborhood is to some extent supplied with wells, excavated in part in the limestone strata underlyi the soil, which is here not very deep. The surface drainage has a fair opportunity to percolate the soil and mingle (very imperfectly purified, it may be supposed, by the filtration) with the well-water."

A good look at the block in question would convince one that there has not been much improvement in the surface of it since the above
date. At least a sanitarian could not be convinced that it is safer to drink water from a well on that block now than it was then.

The temptation to use well-water in the manufacture of soda-water is great because of the saving;—first, it saves the expense of filtering and distilling; and secondly, it saves the greater expense of ice for refrigerating purposes, it being necessary to have the water at a low temperature to absorb the requisite amount of carbonic acid gas, to make good soda-water.

My object in presenting this matter to the association is two-fold: first, the custom of using well-water for these purposes may not be confined to St. Louis, and some of the members from other large cities may be led to investigate matters at home; secondly, there seems to be considerable difficulty in handling these cases. While analysis of the water shows impurities, it has not so far shown enough to furnish our board of health a sufficient and safe legal reason to condemn and destroy the wells.

To a body of sanitarians it is not necessary to state that the only safe plan, in instances like these, is to destroy the wells and thereby prevent the possibility of the water being used; but this is not apparent to the manufacturers, or even always to the health authorities. Therefore I have thought that an expression from this association, while it would not be official or mandatory, would be authoritative, and make valuable reference for possible future use in attempting to abate this practice.