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ternal and also the internal influences that move the masses. It takes advantage of the shifting markets for the domestic products. It notes the rise and decline of the various industries. It applies stimulants when needed and repression when necessary. In short, the state is an all-prevading, energizing, regulating, far-seeing organization of the people; the culminating expression of the modern democracy. It is this machinery, which in our day is very closely connected with the appliances of modern science, which is not free from the church, but which the church assumes still to direct. Instead, we claim that it is the right and duty of the state itself to look after its own interests, and especially its highest interests, and to take measures to qualify citizens not only to read their ballots, but to discharge all the duties of high citizenship. There is no limit to this duty short of the necessity of the state, as has already been admitted. That which constitutes a state—"high-minded men"—is its necessity, and that it is the duty of the state to provide, to the end that its multifarious industry may be under the guide of the highest statesmanship.

SOME IMPURITIES IN DRINKING WATER.

BY PROF. GEO. WEITBRECHT.
Of the St. Paul Medical College.

[ABSTRACT]

The more we know about the causes of disease the more we are convinced that many of the ills that flesh is heir to come to us through germs that are transmitted through the air we breath, the water we drink and the food we eat. You are all familiar with the westward march of cholera among men and epizooty among animals. In surgical operations the danger is not from the operation, but from germs which are in

the air and which get into the body through the wound, producing surgical fever, etc. Since Lester used the carbolic acid spray and bandages saturated with carbolic acid, which kills those germs, the cases of fever having greatly decreased.

Just what the nature of those germs is we do not know. Neither the microscope nor the most delicate tests of the chemist can tell, but it is known that if a homeopathic dose of the discharge of a cholera patient be introduced into the digestive tract of a most healthy man, he will become sick with the cholera. So with typhoid fever and diphtheria.

A great deal of the poison of cholera, diphtheria and typhus comes to us through the agency of drinking water. This fact has been demonstrated in almost every city in this country and Europe. There are hundreds of well-attested cases on record showing that these diseases are sometimes confined to those families that use water from the same well. The case of Pittsburg during the cholera of 1849 was cited, where the wells were infected by sewerage. The wells have since been filled up. The cholera in London in 1848 and 1854 was instanced, where the source of disease was found to come from the use of impure water.

In Medford, Massachusetts, in 1873, typhus fever of a particularly malignant type broke out. The Massachusetts board of health investigated the matter, and found that it was confined to a certain district and to certain families in that district who purchased milk of a certain milkman, whose well, it was found, contained the body of a dead pig. They exonerated the milkman, and said the typhus was communicated from the poison that adhered to the pans from being washed with the water from that well.

An English case was given where the water from a new well was supplied to 330 houses for one day only, resulting in 500 cases of fever and twenty-one deaths. It was found that a sewer ran within ten feet of the well. The number of well established instances might be multiplied, but enough have been cited to establish the fact that zymotic diseases come to us through the water-supply.

I have no hesitation in saying that the great mass of wells are unsafe sources for drinking water. Our yards contain, besides the well, a cess-pool, and unfortunately the well is the deeper of the two. The result is the well becomes poisoned, and ere long the germs of disease will develop there. A look at the geological structure necessary for a well shows that a porous layer on the surface and the joints in the rocks will permit cess-pool matter to work through it just as well as it does the rain water. Water that appears sparkling and pure has been shown to be contaminated; the fact that it does sparkle is often the best of indications of impurity; that shows the presence of carbonic acid, which indicates the process of decay of organic matter. Various local causes of zymotic disease, caused by contaminated water, were given. I have no doubt that the investigation will show that the diphtheria of Cannon Falls this winter is connected with the water supply. The geology of the region is admirable to produce such disease. On the surface there is the same sandstone that underlies Minneapolis and St. Paul, and underneath that is a water bearing strata; the sandstone is porous and not much better than a sieve for holding water, and the result to the wells is obvious.

Passing to the river supply, he stated that it is much superior to the well supply, provided that it is free from sewerage, and even if contaminated with that the chances of purification are infinitely better than in the case of well waters, because the flowing water of a river is exposed to the air, which it incorporates into its substance as it flows along, or is disturbed by the wind, and the oxygen of the air is the great purifier of the world.

For some reason or other, zymotic diseases are twice as numerous in Minneapolis as in St. Paul, I have never examined the waters, but I understand some of the sewerage comes into the river above the pumps in Minneapolis, while in St. Paul the water comes from a lake, upon whose banks

dwell only two or three persons. I would not be surprised to find that the greater amount of zymotics of Minoapolis were due, in part, to the contamination of the river water.

There is a supply of water that is above reproach in 999 towns out of 1,000, and that is the supply we gather from the roofs into our cisterns. If the cistern is properly made and sealed, neither diphtheria, dysentery, typhia or cholera can come to us through the water supply, because the poisonous germs which produce these diseases cannot get into such a receptacle. Care should be taken, however, to let the water that first runs off the roof run to waste, or insects may be conveyed into the cisterns.

The speaker stated, too, that water may be purified by the use of a chain pump, which distributes air through the water; and closed by recommending that we should do all in our power to aid Dr. Hewitt and the board of health to bring about better public sanitary conditions; that cesspools should be sealed cisterns, and the matter not allowed to percolate through the soil and spout.

INDUSTRIAL EDUCATION.

BY PROF. W. A. PIKE, OF THE UNIV. OF MINN.

There can be no question as to the fact, that in these days of special machinery there is a demand for some means by which the young man who wishes to devote himself to mechanical pursuits may receive an education which shall fit him for such work. In the days gone by when there was a regular system of apprenticeship and the number of special tools was very much less than now, it was for the interest of employers to give their men thorough instruction in all the various processes of their business and to make them expert artizans, and therefore no public system of industrial education was needed. Now, however, things are very much changed,