against the diphtheritic poison, but will antagonize the effects of the diphtheritic poison after this has been already introduced into the system, in other words, it may be employed as a curative agent in cases of diphtheria. The immunity which it produces is a temporary one only, lasting from ten days to three weeks. Its curative effect in cases of the disease depends, to a considerable extent, upon its use in the early stages before the system has been saturated with the poison.

We have not yet sufficient data to speak positively of the value of this anti-diphtheritic serum as a means of treatment of the disease as compared with certain other methods of treatment, especially in the early stages, but the evidence thus far collected seems to indicate that such serum obtained in the proper manner, and used with proper precautions in the hands of experts, is a valuable addition to our means of combatting this terrible malady. The serum can only be properly prepared and tested by a skilled bacteriologist. It must be sufficiently strong in its immunizing power, and at the same time must contain no living pathogenetic germs of any kind. It must also have been comparatively recently obtained from the living animal, for it gradually loses its specific anti-diphtheritic powers. Special antiseptic precautions are also necessary in injecting the serum under the skin in the human subject to prevent the entrance of noxious germs.

One of the most useful points in applying the anti-diphtheritic serum to practical use is to have the cases diagnosed at the earliest possible date, and this can only be done by a skilled bacteriologist. In New York, Boston, and some other cities, means are now provided by which practicing physicians can have such diagnoses promptly made; and if the case of diphtheria can be seen by a physician in its earlier stages, it is possible to treat it with great hope of success by means of local applications to the throat of certain substances which will quickly destroy the bacillus, and prevent the further production of its peculiar toxine; for example, a solution of tri-cresol of the strength of one per cent. will usually effect this without producing undue irritation or causing any injury to the patient. Those who advocate the use of the immunizing serum say little about the local treatment, but this last is if anything the more important of the two, for the serum does not kill the bacilli which are on the surface of the mucous membrane of the throat, and therefore does not prevent a person rendered immune by it from being the means of spreading contagion.

OYSTERS AS A MEANS OF TRANSMITTING TYPHOID FEVER.

THE *Medical Record* of December 15, 1894, contains a paper by Professor H. W. Conn upon an outbreak of typhoid at Wesleyan University in October and November last, which included about twenty-six cases. When the serious character of the outbreak was recognized, an investigation as to causes was begun. The water supply was tested, and the house plumbing was examined without result. It was found that the disease was almost entirely limited to the members of three fraternities. The period of incubation of typhoid—that is, the time which elapses between the taking of typhoid bacillus into the body and the definite manifestation of the disease—is usually from ten to fourteen days, but may range from seven to twenty-eight days. The first cases of the fever among the students appeared October 20th, and suspicion soon fell upon the fraternity suppers of October 12th. Careful examination of the food supplied at these suppers showed that raw oysters, obtained by each of the three fraternities from the same oyster dealer, were the only things

which were peculiar to their suppers, and inquiry was at once directed to these oysters. It was found that they had been obtained from the deep water of Long Island Sound and had been deposited in the mouth of a fresh water creek to freshen, or to 'fatten,' as it is termed, since under such circumstances the oyster absorbs the fresh water by osmosis and therefore swells and becomes plump. Further inquiry showed that, within about three hundred feet of the place where the oysters had been deposited, was the outlet of a private sewer coming from a house in which were two cases of typhoid fever at the time when the oysters were taken up and sent to the University.

The typhoid bacillus will live for a time in salt or brackish water, and it was proved by trial that if such bacilli are forced in between the two valves of the shell they remained alive long enough to enable the oysters to be carried and used at the fraternity suppers. Whether the bacillus will grow and multiply in living or dead oysters has not yet been determined, but experiments on this point are in progress.

It will be seen that the evidence that the outbreak of typhoid was produced by these oysters is purely circumstantial, but the links in the chain are well connected and strong.

It is by no means certain that there were any typhoid germs within the oysters or the oyster shells when they were sent to Middletown. If the shells were smeared on the outside with typhoid excreta some particles of this might easily have gotten among the oysters during the process of opening them. But it is evident that oysters grown or fattened in positions where sewage may come in contact with them are dangerous if eaten raw.

THE EVOLUTION OF INVENTION.

In a recent study that I have made on the evolution of invention I have divided the changings which underlie all examples of the process into those—

1. Of the thing or process, commonly called inventions.
2. Of the apparatus and methods used.
3. Of the rewards to the inventor.
4. Of the intellectual activities involved.
5. Of society.

Each one of these has undergone an evolution or elaboration, from monorganism to polyorganism, from simplicity to complexity, from individualism to coöperation, from use to comfort, and so on. This statement needs no extended proof; the roller mill is the descendant of the metals, machinery springs from tools, the device beneficial only to its originator becomes the world-embracing and world-blessing invention; the happy thought of one person at last comes to be the beneficent result of an endowed and perennial coöperation, a perpetual repository of invention renewed constantly by the removal of the senescent and the introduction of new and trained minds as in a university.

Now it requires great patience to get together the material evidence of this unfolding or evolution. The mental processes are no longer in sight. The nearest approach to them are the makeshifts of savages, and their minds are almost a sealed book. It has therefore occurred to the writer that among the questions proposed to those who are collating information relating to the psychic growth of children there should be a short series respecting the unfolding of the inventive faculty or process, the finding out originally how to overcome new difficulties or surmounting old ones in new ways.

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