

thrax or malignant pustule, for typhoid fever, for cholera, for the bubonic plague, and for several other types of infection.

These anti-toxins, if used early in the disease, are "most efficacious," and even when used late are "of service." Here are some examples: In diphtheria.—New York 1893 (before anti-toxin), there were 6468 cases in the hospitals, with a mortality of 1962, or 34 per cent.; in 1906 (after anti-toxin), the cases were 7441, with a mortality of 731, or 9 per cent. In London, 1894, the cases were 3666, with 1035 fatalities; in 1901 the cases were 7622, and 849. "Taking the cases the world over," says Dr. Starr, "it may be stated that the mortality from diphtheria has been reduced from 35 per cent. to 9 per cent." Every year, it will be realised by a simple calculation, many thousands of lives of children are saved which under the old state of things would have perished indubitably. The name most prominently associated with this discovery is Behring, and his name will go down to posterity as famous as Jenner's.

Another famous name is Fleckner's. He made his discovery in the treatment of that dreadful disease cerebro-spinal meningitis. The victim lies plunged in fever, unconscious, paralysed. Till the present century there was no cure, no relief, no hope but in the action of nature, and nature acted only in twenty-one per cent. of the cases, leaving the other seventy-nine to pass out like the dying of a candle in the socket.

How the anti-toxin was found is a fairy tale of scientific determination and perseverance. The microbe did not attack the blood. It had a fancy for the oily fluid supplied to the nervous system for its protection from the bones. In his den in that hidden lair of the human system the tiger

of the microbe world defied capture, even approach. But they got on to his track, followed up the "spoor" patiently, and made a capture at last. Having separated it from the fluid surrounding, the question arose about growing a supply of anti-toxin from his remains. The animal creation had to be explored for the answer to this question, and rapidly science worked to the two which offer favourable breeding ground—the monkey and the horse.

And the anti-toxin was secured. More than that, a factory for its regular manufacture was set up. Then arose another difficulty. Wasserman prepared the anti-toxin in Koch's famous laboratory in Berlin, and it was injected in the usual way, *i.e.*, into the blood. But it failed, the creature would not live in the blood. Where would he consent to live and move and have his being for service against the toxin pest? That question Fleckner answered in a flash of inspiration. He injected the anti-toxin into the cavity of the spine, pitching right upon the country occupied by the enemy, with the result that very soon cures began to be effected where before the assault on the stronghold of the enemy there was not the ghost of a hope. "It is necessary," says Dr. Starr, "to puncture the spine with a hollow needle, to draw away some of the oily fluid, and to throw into the spine the anti-toxin through the needle and leave it there to do its work. The earlier this is done in the disease the better." This cure is not as perfect as is desirable yet, for the difficulties are great, but the fatalities are reduced to twenty-nine per cent., a gain of 50 per cent. on the old style. The discovery of Fleckner is barely a year old, having been hit upon in 1907. In 1906 there were in the City of New York some 1020 seizures, of which 812 were fatal.

Which means that within a year from the discovery and application of the anti-toxin no less than 500 were saved out of every 1000 attacked, who would otherwise have died.

Who has not heard of the awful visitations of cholera in India, of the bubonic plague in the East, of the visitations of typhoid in the cantonments of the Indian armies of Britain? But, owing to these discoveries in the microbe world, typhoid is no longer dreaded by the authorities responsible for the wellbeing of masses of troops in a malarious climate, and "it is thought that both cholera and plague are under control." The last is a large order, and in sight of the terrible array of fatalities chronicled every month from India, with their annual aggregate running well into the millions, the size appears very great indeed. But where such a fine beginning has been made there is good ground for hoping for more and better results. Lockjaw is another triumph on the wonderful list; the lockjaw which but the other day was a decree of inexorable fate in every case. In America the cases ran into hundreds every year. "Now, such deaths are rarely recorded."

This successful war with disease is not confined to man. Forty years ago it was successfully practised in the epidemics of pleuropneumonia, which used to be so virulent in Australia. Inoculation was tried in the sixties in a crude form, simply by taking the virus from the diseased lung of a sick beast, mixing it with water, and passing the mixture into the tails of the sound members of the herd. The tails dropped off, but the beasts were immune from "pleuro." Now the thing is done with more care and certainty. At the same time, other diseases have been brought into

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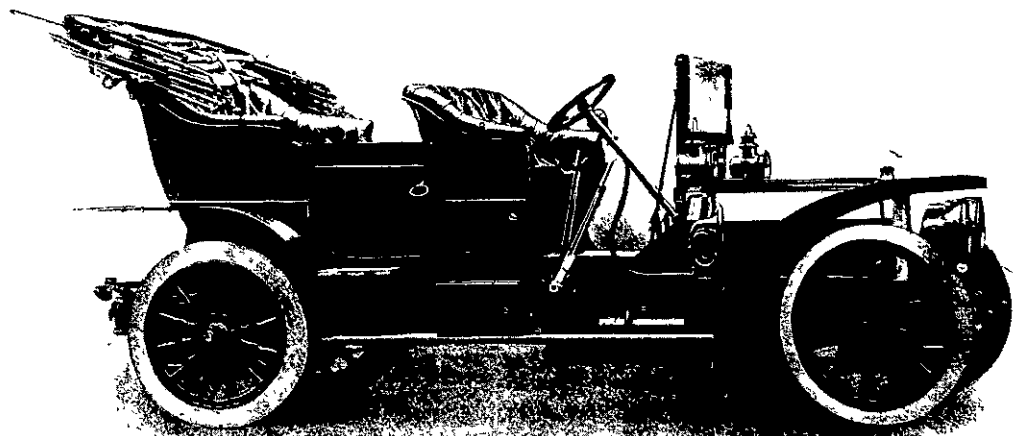
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