

substance which caused it was insoluble in water. This objection to the use of antitoxin, however, still exists to a slight extent to-day.

Dr. Spronck¹¹ of the University of Utrecht claims that it is proved by statistics that heating the serum for a time, at a lower temperature than will destroy its curative power, causes it to lose some injurious property which otherwise produces a rash and the other complications.

Dr. Wright¹² states that in 268 cases of diphtheria treated by him with antitoxin, the only disagreeable effect caused was the production of a localized painful spot in the vicinity of the place of inoculation. He never observed pain in the joints. Urticaria often followed its use in the earlier cases, but since the antitoxin has been produced in a more concentrated form he has never seen it. So we may justly conclude that its benefits far outweigh the temporary distress that may in some cases follow its use.

The next form of therapeutic serum to be discussed is the *antitetanic serum*. Kitasato in 1889, discovered the specific germ of tetanus. Behring and others in 1892, succeeded in immunising horses and used their serum in man. Prof. Roux believes that the action of this particular antitoxin is upon the tissue cells, which it fortifies against tetanin—or the poison of this germ.

“This explanation,” says Dr. Geo. W. Cox of Chicago,¹³ “clearly accounts for the wonderful immunising properties known to exist in the antitetanic serum, and is the strongest possible appeal for the use of this agent as a preventive. Not a single case of tetanus has ever developed after an adequate prophylactic dose of a reliable serum was given.” This fact was proved in hundreds of cases at the Pasteur Institute in 1895. Preventive injections are strongly recommended by numerous writers, in the case of suspicious wounds, such as those soiled with earth, especially in those places where the disease is known to be endemic. For this purpose 10 cc. of the serum given two or three times at intervals of as many weeks, have been suggested.⁸ Treatment of the disease, when once manifested has been unsatisfactory, because tetanus is only recognised when the toxic effect has been produced. The convulsive stage corresponds to the paralytic stage in diphtheria and at this time it is too late to counteract the poison's deadly work.

Antistreptococcic serum is another kind, which was first prepared by Marmorek. Its results are most perplexing, due probably to⁸ the difference in virulence and condition of the germs themselves. Some uphold its benefits in erysipelas and puerperal septicæmia. Where this germ gives rise to complications in scarlet fever or diphtheria, the use of this serum seems to lessen the severity of these diseases.

Sera have been prepared for the treatment and prevention of typhoid, cholera, smallpox, rabies, tuberculosis, pneumonia, and yellow fever.