

problem has turned out to be by no means as simple as in the case of the diseases just mentioned. Practical experience has shown that the efficacy of the antitoxic sera hitherto prepared is in direct ratio to the virulence of the diseases in which they are employed. Unlike diphtheria, tuberculosis is not a self-limited disease, nor does it kill by septicæmia. It belongs to that group of diseases to which leprosy, syphilis, and actinomycosis also belong, that have a characteristically slow progression, presenting it is true effects referable to a mild intoxication, but also causing gross organic lesions in various parts. Here it is obvious that a purely antitoxic serum, that is to say, one that merely neutralizes the poisons elaborated by the tubercle bacillus in the course of its growth, is hardly likely to prove effective. Should it be possible to prepare such a serum, and as we shall see it undoubtedly is, the disease would still progress. To be of real value a serum would need to possess germicidal as well as antitoxic properties. Even in the days of the discovery of the diphtheria antitoxin and before (1884), attempts were made to solve the problem and the names of Héricourt and Richet stand out as pioneers in this line of research. Since then the number of workers has increased marvellously, and the work of Koch, Maragliano, Babès, Maffucci and Di Vestea, Behring, Niemann, and on this continent, Trudeau, and DeSchweinitz, is a monument of painstaking research, scientific accuracy, and devotion to truth. No one who has not investigated the subject would credit the enormous amount of labour expended on this one problem.

The subject has been attacked in various ways. One class of investigators has attempted the cure of tuberculosis by means of drugs, a mode which seems of late again to be coming into prominence. A second school, of which Koch has for some years been the leading spirit, has sought to produce immunity and cure the disease by the injections of various toxins derived from the tubercle bacillus or chemical modifications thereof. In this category of remedies belong the various tuberculins, oxytuberculin, tuberculocidin, and antiphrthisin. By the injection of these substances it is sought to stimulate the cells of the body to the elaboration of an antitoxic substance in such amount as to neutralize the poisons eliminated by the bacilli. The third series of experimenters has endeavoured by the injection of various extracts of tubercle bacilli, or in some cases the living attenuated germs, to produce immunity in certain of the lower animals, and use the blood serum of animals thus fortified to combat the disease in other individuals. It is with work of this last class alone that this paper will deal.

The first observation, and one that has led to all the rest, was that of Héricourt and Richet. In 1888 they noted that if a rabbit, which