

We, therefore, very properly may conclude that as the bacillus of diphtheria grown outside the body produces its toxine, which, introduced into horses, produces the anti-toxine, whose quality and antidoting strength can be measured, so the variolous or vaccinal germ produces its toxine, which stimulates the tissue-cells to produce their anti-toxine.

That such is actually the case has been experimentally proved, especially by Beclere and Chambon, of Paris, who have shown that active vaccine lymph may be neutralized by adding to it in test-tubes the serum from vaccinated heifers, or from men, or monkeys recently having had variola. We have every reason, therefore, to conclude that variola is a bacterial disease, and that Copeman's, Klein's, and others' claims that they have isolated the micro-organism of smallpox or vaccinia are founded upon fact.

The progress of vaccinal immunity in calves has further been admirably illustrated by the experiments of Beclere and Chambon, in which subcutaneous injections of active glycerinized lymph were made, and subsequently epidermal inoculations were made on succeeding days from the 3rd to the 7th. The effect on the vaccine vesicles when the scarifications were made after the fourth day, were (*a*) vesicles appearing sooner than in normal vaccination; (*b*) vesicles modified in external appearance, rapidly arrested or aborted in development; (*c*) lymph having little or no virulence when taken from vesicles after the fourth day. Such, in brief, is the basis upon which the immunity caused by vaccination rests; and it must be satisfactory to all who have followed the marvellous results of the biological studies of infectious diseases carried on during the past quarter of a century. It is, however, a remarkable fact that while the practice of protective and curative inoculations in the instance of diphtheria have been generally accepted both by the profession and the public, there has yet grown up during the very period in which the experiments which form the groundwork of all our theories of immunity have been carried out, an opposition both to the theory and practice of vaccination against smallpox, which even in conservative England, which claims the honor of the great discovery of Dr. Jenner, resulted in 1898 in the introduction of the conscience clause in the Compulsory Vaccination Act.

Wherein, then, lies the origin of this opposition? Primarily, I believe it lies in the simple fact that vaccination laws are compulsory. We have, in fact, no other law compelling persons to subject themselves to inoculation with a disease at a time when