poison at all comparable in its action with the poison which evidently was formed in the cholera patient and circulated in his blood. The culture media might show the presence of soluble poisons, but these were slight in amount as compared with a culture of the diphtheria bacillus. It remained for Pfeiffer to show that the essential cholera toxine is so intimately bound up with the body of the cholera spirillum that it is only liberated when this spirillum is disintigrating. The fact proved by Pfeiffer for the cholera organism was shown to be true of many others, such as the typhoid bacillus, the bacillus of tuberculosis and others. Pfeiffer's further studies showed that increasing doses of the cholera organism did not give rise to an anti-toxine such as had been found in the case of diphtheria, but to a condition of immunity to the infecting organism, and this leads to the distinction between toxine immunity and bacterial immunity. So far it has been the toxine immunity which it has been possible to push to such a high degree that it may be conferred passively upon another animal by the injection of the blood serum of the immune individual. The toxines which are so intimately associated with the bodies of the micro-organisms are apparently of the nature of nucleoproteids, and their most marked character is their slight solubility, as compared with the toxine of diphtheria; they are many of them equally unstable and are all exceedingly toxic, but the difficulty has been to understand how they acted in the body, since the laboratory experiments necessarily predicated that before the toxine could act the organism must be dead. Experiments on animals have shown that in many cases this was easily demonstrated. Staphylococci when carefully killed so as not to destroy their poison are still pyogenic; tubercle bacilli when killed and injected into animals still give rise to tubercles.

The investigation of all these different poisonous substances has naturally lead to a more precise knowledge in regard to them and we have learned that they are not to be considered simple substances, but that in the case of each organism a number of different toxic compounds are formed. A good example of this is seen in the case of tetanus, where at least two well marked toxines have been discovered, one of which is neurotoxic, the other hæmolytic in its action.

The studies of Pasteur early showed us that the recovery from an experimental infection conferred a certain degree of active immunity and these observations were very soon extended to a large number of specific micro-organisms. For instance repeated increasing doses of the cholera spirillum established in the experiment animal a very high degree of immunity to it. It was natural that theories should be proposed to account for this condition which was so rapidly established.