

Or, take again cholera? Every one, I suppose, is acquainted with Cunningham's remarkable declaration that out of sixteen cases of cholera at Calcutta, the home of the disease, he was able to isolate no less than ten different spirilla resembling each other on the whole, but nevertheless in his belief presenting such clear and constant distinctions that he classed them not as varieties but as species.* Thanks to Professor Welch, of the Johns Hopkins University, I had last year a series of more than half a dozen growths taken from patients suffering from undoubted cholera, who had come from Europe in different ships to the port of New York during the last cholera epidemic. These cultures had been isolated by that able bacteriologist, Dr. Dunham, and certainly each separate case presented some little difference either in rapidity of growth, in amount of pigmentation, in morphological characters of the spirilla separating them off from Koch's type. Case after case might be recorded of these divergences on the part of growths of the cholera spirilla from different quarters, the most noticeable being those recorded by Sanarelli and by Metchnikoff in connection with spirilla taken from various cases in the neighbourhood of Paris. The difference between these various growths are as great as are those between Koch's typical spirilla and the spirilla obtained from water in regions where no true cholera has occurred. Only quite recently, for instance, an epidemic not of cholera but of diarrhoea has been described as occurring at Lisbon, in which spirilla closely resembling the true spirillum of cholera has been isolated. Here again, what is the conclusion that has to be drawn? How is the health officer at any point of landing to give an absolutely certain bacteriological diagnosis? Again, take diphtheria. Here we are introduced to a slight modification of the problem before us. In the case of diphtheria, as in that of

* It is true that at Berlin they have proved with success that a considerable number of these so-called species of Cunningham are only races of the cholera-spirillum—nevertheless case after case is being published in which spirilla isolated from cases of this disease do not accord in their characteristics with Koch's narrow limitations of the peculiarities of the cholera-spirillum.