

not time to do so here ; suffice it to say that it was finally settled by Pasteur in 1860, by showing that the temperature of boiling water was not sufficient to destroy all life, but that at a few degrees above that point (above 20°) all life was destroyed, and infusions treated in this manner no longer fermented, but remained unchanged indefinitely. It was afterwards shown that this was due to the fact that bacteria existed in two forms, one in which they were less resistant and could be killed by boiling water, and one in which they were more resistant (the so-called spore form) in which a higher temperature was required to kill them.

Throughout the struggle, however, our knowledge of bacteriology was continually widening, and in it the foundation was laid for all the brilliant results of later years.

The other circumstance which lifted bacteriology into a science by itself, was the discovery, in 1849-50, that cattle dying from a disease called anthrax, were found to have in their blood multitudes of little rods which the observers believed to be bacteria, and which they afterwards showed to be the cause of the disease. These first observations were treated with scant courtesy, and all sorts of suggestions were made to explain them, from the mild one that the observers were mistaken, to the more aggressive one that they had used their imaginations better than their microscopes—to put it baldly, that they had simply lied. This work was repeated, however, proof added to proof until the evidence was conclusive. The connection between bacteriology and practical medicine being thus established, its study was taken up eagerly by medical men, and the purely medical side rapidly developed.

In 1881, Robert Koch published first the description of his methods of work which has lightened tremendously the labor of separating bacteria from one another, and there was another impetus given to the science. In 1880, the cause of typhoid fever was discovered ; in 1882, the cause of consumption ; in 1884, the cause of cholera and of diphtheria, and so on from year to year there has been ever-increasing additions to our knowledge, so that to-day it would be hard indeed for the most sanguine to predict what the next two or three years will bring forth. One thing is certain, that in bacteriology practical results follow with wonderful rapidity upon the work of the laboratory. Pasteur's work upon the silk worm disease saved France millions of dollars. Koch's work on cholera since 1884 is the only explanation of the marvellous manner in which cholera has been prevented from spreading during the past summer in Europe.

Although Leeuwenhoek's observations upon the bacteria of the teeth were repeated time and again by subsequent microscopists, it remained for Miller, an American dentist living in Berlin, to first do systematic work upon them, and study their relationship to the etiology of dental caries.