

scopic examination of this fluid did not show anything which could be interpreted as a living organism although a minute quantity of it was sufficient to infect another animal. They therefore assumed that it was probably ultra microscopic and endeavored to see if it would pass through the pores of a Pasteur filter. Their results showed that the fluid is equally contagious after passing through the filter and they therefore concluded that it was smaller than any known organism.

The objection might have been raised to their interpretation of these results, that they were dealing with an excessively virulent soluble poison. To meet this objection they proceeded as follows. They found that the minimum infecting dose of the fluid from the vesicle was $\frac{1}{50000}$ c.c. They therefore, after diluting the lymph and passing it through the filter, inoculated animal 1 with $\frac{1}{30}$ c.c.; from the vesicles which developed upon this animal they collected the lymph, (about 3 c.c.) refiltered and inoculated a second animal with the same amount and so on through a series of six animals. Given the same amount of lymph collected in each case and the same dilution, we see that if it were only a poison the last animal would have received less than one two billionth of a c.c. of the original lymph. As it had been demonstrated that at least $\frac{1}{50000}$ was necessary for infection it is evident that reproduction must have taken place.

Another of these interesting organisms has been discovered by Nocard and Roux in the so called contagious pleuro pneumonia of cattle. The cause of this disease has been looked for by a number of investigators, but although numerous bacteria had been isolated, no one of them turned out upon further study to be the essential parasite. Nocard and Roux proceeded to investigate in a somewhat different manner. They demonstrated that the contagium was present in the serous effusion in the pleural cavity and in the lungs, but again could see nothing; they therefore tried this experiment. A sterilized collodion capsule, a little larger than a ten grain quinine capsule, was filled with sterilized bouillon, inoculated with a trace of the serous fluid and placed by operation in the peritoneal cavity of a rabbit. After a time it was removed and was found to have become milky or opalescent. In this opalescent fluid, it was shown by inoculation the organism was present in increased numbers and upon microscopic examination it was possible to see enormous numbers of minute dancing points, so small that no structure could be made out with the highest magnification. This virus would also pass through a Pasteur filter. Here we have a parasite just upon the borders of visibility.

Somewhat later Beyerinck, a Dutch bacteriologist turned his attention to a curious disease of the tobacco plant, the so called mosaic disease.