

This disease produces as its prominent symptoms the destruction of the chlorophyll of the leaves with the result that they become covered with yellow spots. It can be transmitted from leaf to leaf and from plant to plant by inoculation, the slightest trace of juice from the mosaic spot being capable of setting up the trouble in another plant.

Microscopic examination and culture methods were unsuccessful in revealing any bacterial organisms. The juice seemed absolutely clear and transparent, under the highest magnifications, although evidently very contagious. Bayerinck applied the filter test, and found that the filtered juice was equally virulent, and therefore concluded that here also we were dealing with an ultra microscopic virus. He went, however, a step further, and showed what was still more wonderful—that the contagion was diffusible—that it would pass by diffusion through a layer of agar jelly, just as a salt in solution might pass, and he therefore announced that he had discovered a *contagium vivum fluidum* or, really, a soluble toxine, capable of reproduction.

Another animal disease, which for some years baffled investigators, was a type of chicken disease which prevails in northern Italy. It was for a long time confused with the so-called chicken cholera, which is due to a well known bacillus isolated by Pasteur. But further study sufficed to separate it from this disease, and numerous attempts were made, without success, to cultivate from infected birds a specific micro-organism.

Within the past year, the discovery has been made by Centanni and by two Austrian observers, independantly, that in this particular disease, we have to do with a filterable virus. The blood of the animals contain the virus, and it is intensely virulent. A needle dipped in the infected blood, wiped off, and inserted beneath the skin of a healthy fowl, leads to its death in about thirty hours. This infected blood, when filtered through the densest of the Pasteur filters, does not show the slightest diminution in its virulence, and yet microscopic observation fails to reveal anything. Here again we have an example of a parasite of ultra microscopic size.

There are several other diseases of domestic animals which, as a result of the filtration test, combined with the failure to demonstrate organisms by the high magnifications, are to be classed as due to ultra microscopic organisms. One of the most important, recently discovered, is the African Horse Sickness, which McFadyen, in 1900, showed was due to a filterable virus. This virus, not only passes freely through the Pasteur filter, mark F, but even through the most compact form, mark B, which will hold back the virus of foot and mouth disease.