

One of the liquids used by us for the culture of the septic vibrio, was the extract which is called in commerce the *caldo Liebig*, which, after dilution in ten parts by weight of water, and having been neutralized, or rendered slightly alkaline, was raised during a quarter of an hour to a temperature of 113°C (235.4°F .) so as to turn it absolutely impurescible under contact with pure air. We have said that the septic vibrio is formed of minute threads which move. This is particularly the aspect under which they are met with in the abdominal serosity, or in the muscles of animals dead from septicæmia; but it is often associated in the muscles, especially of the abdomen, with small corpuscles generally immovable, having a lenticular form. These lenticles, which have sometimes a corpuscular germ in one of their extremities, were for a long time, a source of embarrassment, and a mystery to us; our experiments in culture have taught us, however, that they are no other than one of the forms of the septic vibrio.

Sometimes the lenticle is terminated on one side by an elongated appendix, having thus the form of a bell-tongue. We have likewise seen the septic vibrio under the form of minute twigs, extremely short and gross, or very much attenuated; but that which is most surprising is the facility with which the septic vibrio can be reproduced without manifesting the least movement, a facility combined with a great diminution of virulence, though this does not altogether disappear.

For a considerable time we thought we had two, or several forms of vibriones, of divers forms of virulence, and that by our cultures we obtained separations more or less complete between these diverse vibriones. It is not so. We have not met, in septicæmia properly so called, any but one vibrio, in which our means of culture caused change of aspect, or facility of propagation, and virulence.

The best proof that, in our culture, indefinitely repeated, we have had, that it is a specific vibrio is that those cultures may be raised in their commencing virulence by changing their liquid. Let there be reproduced ten, twenty, thirty times, consecutively, the septic vibrio in the *caldo Liebig*, and then let there be substituted for the *caldo* sanguineous serum slightly charged with fibrinous coagula, the new culture will furnish a very virulent septic vibrio, killing, for example, with $\frac{1}{20000}$ of a drop

and the blood and serosity of the animal dead, will immediately acquire a virulence yet infinitely greater, with the habitual forms and movements of the septic vibrio.

We have shown by the preceding facts, how premature, in the actual present state of our knowledge, are the classifications and nomenclatures proposed for beings which, in their aspect and properties, through external conditions, can change to such an extent as we have instanced.

In the study of microscopic beings, every method which can be availed of for separation of the numerous species, whose association is so frequent, is indispensable. The peculiarities of those ferments which live without air, placed us on the track of these methods. I will allude to culture *in vacuo*, opposed to that in presence of atmospheric air. If the germs of an aërobious organism are met with, mixed with those of an anërobious one, they can only be separated by culture *in vacuo*. The same will happen equally in a mixture of germs of a species which is at once aërobious and anërobious. Applying this method, and associating with it others known; sometimes, too, taking advantage of a happy accident, as we always do in a long course of investigation, we have found that the atmosphere and the water, those grand reservoirs whence converge the microscopic destructions of all that has life, contained very numerous species, both of the aërobious and the anërobious. Without entering into premonitions of our observations, we may say, in a general way, that the inoculation of these organisms often induces fatal disorders, which appear even to constitute affections, as novel in the specific character of their action, as in the nature of the organisms inoculated in them. The septicæmia, for example, with which we have already been occupied, is not unique. The air and the water contain germs of a vibrio a little less in diameter than that of the septic vibrio,—more rigid, less flexuous, and slower in its movements. In another communication we shall describe its effects.

The following experiments make known another method of separation of microscopic germs which at some points enter into the subject already treated of. Take a quantity of flesh meat, of any weight whatever; let it be a large quarter of mutton; then after having passed it rapidly over fire, in all parts of its surface, pass through the thickness of its tis