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THE THEORY OF GERMS, AND ITS APPLICATION TO MEDICINE AND SURGERY, BY PASTEUR, JOUBERT, AND CHAMBERLAND.

(*Continued from page* 113.)

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I have many times stated before this Academy that there exist microscopic ferment creatures, possessing various physiological properties, from the *mycoderma aceti*, essentially an air-living organism, to the ferment of beer, which is at once an air and an airless living one, and I have often insisted upon this circumstance, that life which is manifested for even a very short time without any participation whatever of free oxygen, carries with it the phenomena of fermentation.

We have seen in the vibrio of septicæmia a *microbio* exclusively *anérobious*, (living without air), which therefore could not be developed unless *in vacuo*, or in the presence of inert gases. It must therefore be a ferment. This is the fact. Whilst the multiplication of the vibrio by scissure continues, its life is accompanied by an evolution of hydrogen, a little nitrogen, and minute quantities of putrid gases. These gases do not cease to be produced until the moment in which transformation of the vibrio into corpusculous germs is about to take place. This evolution of gases during the life of the vibrio explains the very rapid tympanites of animals dead from septicæmia, and the emphysematous state of the connective tissue, particularly in certain parts of the body, as the groins, and axillæ, where the inflammation is sometimes excessive. I ought to add that all vibriones are not anërobious; that one of the most common, frequently found on the surface of infusions of vegetable organic matters exposed to contact of air, a vibrio very flexuous and very rapid in its movements, is exclusively aërobious (living in air), absorbing oxygen and exhaling carbonic acid almost in equal volume, exhibiting thus the physiology of the *bacteria carbunculosa*. Want of time prevents me doing more than allude, in passing, to this vibrio, which should give occasion for observations of much interest. This vibrio is inoffensive—being introduced beneath the skin, it produces merely local disorders of little importance. Comparing this innocuousness to the virulence of the septic vibrio, one might believe that the mode of life so different in these two vibriones, the one living *in* air, the other *out* of it —may explain the oppositeness of their action on the economy. The effects, however of the *bacteria carbunculosa*, do not permit us to remain in this belief. If this aërobious vibrio is inoffensive, it is because it cannot live in the temperature of the bodies of animals. At 38° C. (100.4°F.) its movements and its multiplication are suspended, and if then inoculated, it disappears under the skin, as though digested, if we may so speak. Scientific novelties often clash with our preconceited ideas. What is all this rumpus, exclaim certain persons, about your bacteria, and your vibriones? Do we not see these infinitesimals budding in all parts? Are they not seen to abound in the dressings of the convalescent, and to abound even in the wounds in progress of cure? Has the least danger therefore resulted? I answer,—What infinitely small things are you talking about? We have demonstrated that by the side of these very dangerous vibriones, there exist others very harmless, and certainly these last are far from being the only microbios devoid of all virulence. Having been led by the verification of the cause of the innocuousness of the *vibrio aërobious*, of which I have spoken, to institute numerous experiments as to the limits of resistance of microscopic beings in diverse temperatures, and having known that the *bacteria carbunculosa* is not developed, or only with much difficulty, in a temperature of 44°C. (111.2° F.), in certain liquids of culture, we thought this was an explanation of a well known, though very mysterious fact.—to wit: that certain animals are refractory to the carbunculous poison. It was impossible for us during the last year to produce carbuncle in hens. The temperature of about 42° C. (107.6° F.). in the gallinaceæ, united to their vital resistance, opposed the development of the *bacteria carbunculosa* in the bodies of these animals.