

ing) has the power of converting many times its weight of starch into dextrine and dextrose in the presence of water at a temperature of 66° C. These ferments—the acids excepted—lose their efficacy at temperatures near 100° C. in presence of water; in the dry state they may survive boiling heat. Now here are substances which at certain temperatures induce chemical changes without entering into the composition of the resulting products; and with these facts in view is there not strong ground for believing that the fluids of the body may also be changed by ferments introduced into them, without those ferments being other than decayed or changed albuminous compounds?

“A very great difficulty presents itself when an attempt is made to separate from a pyrogenous liquid that element which produces fever. Dr. Burdon Sanderson, by precipitating with alcohol and then extracting with water, obtained an extract which proved pyrogenous. He shows that this extract is not really in solution, that though it has passed through filtering paper, it still contains particles which carry with them the power of causing fever. He has ascertained that no animal poison is really soluble and adopts a plan of filtering through porcelain, thus obtaining a filtrate which will not produce fever. This filtrate differs from that which has passed through paper in this important particular—it is barren. The first filtrate when under the microscope contained no bacteria, but particles were to be seen; after an hour bacteria were present in considerable numbers. The filtrate through porcelain showed no bacteria, and examined twenty-four hours afterward continued barren. Now here the natural inference is that the fever producing agent is to be found in the particles, and yet may it not be possible that an animal fluid in passing through the fine cells of porcelain may be chemically changed, and that the absence of fever producing energy is due to this change.

“It is well understood that all bacteria found in diseased tissues cannot be regarded as causes of disease. When an animal fluid begins to decompose bacteria are seen, and the forms of vegetable life which appear depend upon the composition of the fluid. One specimen of urine will show the bacterium termo. If sugar is present the torula cerevisiæ also appears; in other specimens small round cells are seen, sometimes isolated, sometimes in chains. So also is it probable that according to the tissue decomposing, different forms of bacteria are present, each form, as it were, choosing that tissue most suitable for its growth. Hence even if after death bacteria are found in any tissue, they cannot at once be regarded as causes of disease. It may be that in the dying body the bacteria which seems to infest the surface of the body and the mucous lining of the intestines in countless numbers, may pass inward to lay hold of the elements that are dead before the life of the whole body has ceased.

“In this way perhaps may be explained that in diseases quite different from one another the same bacterium appears or the same apparent form. It has been suggested that after all the diversity which is seen in fevers, several may depend upon the same bacterium, which in the course of time has been modified by the circumstances under which it has gone, so that while it retains its primitive form it has acquired varied properties producing one form of fever in one case and another form under different circumstances. In like manner it has been found that the harmless hay bacillus may be modified and endowed with the energy of the bacillus anthracis, and that the latter by a process of cultivation may be so changed that instead of causing disease it becomes a vaccinal antidote. The discoveries which have been made regarding bacteria certainly are marvellous and call forth our highest admiration; and yet there are some that as certainly call for a large degree of faith. When it is shown, however,