Facts and Arguments

OPPOSED TO

DR. BENNETT'S THEORY OF ORGANISATION.

BY

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THERE are few questions of greater interest to those who are investigating the principles upon which medicine is based, than many now being discussed in the lectures of Professor Bennett of Edinburgh, in course of publication in the *Lancet*. As a fellow labourer in the same field of inquiry, I trust I may be permitted to point out one or two apparent discrepancies or inaccuracies, which seem to me to require further explanation.

Dr. Bennett says that development and growth are owing to the successive formation of *histogenetic* and *histolytic* molecules. He describes how the first may be formed from the union of two simple organic fluids, or from precipitation occurring in formative fluids holding various substances in solution. Histolytic molecules are distinguished from the histogenetic molecules as follows:—"They are often larger in size than histogenetic molecules, are more purely fatty, and from being sometimes associated with the *débris* of broken down texture, may, in such cases, be readily distinguished." Accordingly, the reader may compare fig. 4, showing "histolytic molecules mingled with *débris* of tissue," with fig. 1, "minute histogenetic molecules." But this very same fig. 1 has been described in other works by Dr. Bennett as "minute molecules frequently seen in disintegrated tubercle." Dr. Bennett describes differences between molecules of formation and molecules of disintegration, and yet makes the very same figure represent both. It is true that Dr. Bennett holds that histolytic molecules may become histogenetic molecules; but surely he will not maintain that lifeless particles become aggregated together, and form a living mass, although he has said, "The physical relations I have pointed out are only necessary preliminary steps for the addition of that unknown force we call vitality, which directs the ultimate form these structures assume." (*On Cancerous and Cancroid Growths*, p. 141.)

Dr. Bennett seems to ignore the use of the high powers which are now employed for studying minute points of this kind, and reproduces figures more than ten years old magnified by powers (250 diameters) far lower than those used by observers in the present day for investigating the structure even of fully formed solid tissues.

The molecules "vary in size from the four-thousandth of an inch (a little less than a blood-corpuscle) down to a scarcely visible point, which may be calculated at less than the twenty-thousandth of an inch." Objects of the first diameter appear only as molecules under an inch power, while the mole-

cules, one twenty-thousandth of an inch in diameter, are perfectly measurable when examined under high powers. Surely the term molecule can scarcely be properly applied to a body nearly as large as a blood-corpuscle.

There are many independent living organisms less than the twenty-thousandth of an inch in diameter, consisting of an external envelope, with matter within of a different character. These molecules live and grow and multiply; but their growth does not depend upon the union, coalescence, or aggregation of the molecules or particles precipitated from fluids, as can be proved by anyone who will examine, with a power of 700 diameters or more, the organisms developed in a little water in which some dead animal or vegetable matter has been placed for some hours. Dr. Bennett, however, describes the formation of vibriones in putrid fluids, thus:—"A scum composed of molecules collects on the surface; gradually several of them unite in minute filaments more or less long, which assume vibratile or serpentine movements."

Although I have often watched such minute organisms with powers magnifying from 700 to 3000 diameters, I have never been so fortunate as to see even two particles unite. The particles are all separate from the very first, and remain so. They grow, not by coalescence, but each absorbs nutriment from the fluid which surrounds it, reaches a certain size, and divides. Thus in a few hours millions result. The pabulum passes into each living particle. The new matter is not added upon its external surface.

As an illustration in favour of his view, Dr. Bennett compares the concentric rings of bone in the Haversian system with the concentric layers of a calculus. "When we compare the concentric rings and laminae surrounding the Haversian canals with the like arrangement existing in calculi and all concretions, there can be little doubt that the mineral deposits in bone are intimately connected with the molecular law of aggregation"; but the laminae of the Haversian system are formed layer *within* layer, while the layers of calculous matter are deposited layer *upon*, or *outside*, layer. The outermost lamina, or that *furthest from* the centre, was *first formed* in the one case; the innermost particle, that which becomes the *centre*, was *first precipitated* in the calculus.

There appears to me some confusion in the definition of a molecule; and Dr. Bennett uses the word in many different senses:—

1. The most minute particles of any substance which exhibit no definite form to the highest powers are molecules.
2. Angular or square particles are *molecules*—"angular, square, and of various forms".
3. Spherical particles of the same composition in every part are *molecules*.
4. Particles, the outer part of which possesses properties and composition different to that which is within, are *molecules*.
5. Vibriones, the minute sporules of fungi, etc., are *molecules*.

So that we have large and small molecules, living and dead molecules, simple and compound molecules; molecules of simple, and molecules of complex composition; molecules springing from pre-existing molecules; molecules precipitated from

fluids; molecules which are visible to the histologist, and as large as the 1-4000th of an inch in diameter; and the ultimate molecule, which has "never been reached, even with the highest magnifying powers."

Most of these molecules have totally different properties. Dr. Bennett should therefore state if molecules of the same kind, or molecules of different kinds, become aggregated together.

But, to limit the discussion to one point—the formation of vibriones—Dr. Bennett maintains that several of the molecules forming the seum unite to form minute filaments. I do not think that any one has ever seen even two such living molecules together.

Addresses and Papers

READ AT

THE THIRTIETH ANNUAL MEETING OF THE BRITISH MEDICAL ASSOCIATION.

[Held in LONDON, AUGUST 5th, 6th, 7th, and 8th, 1862.]

OBSERVATIONS ON THE OCCURRENCE OF MALIGNANT PUSTULE IN ENGLAND: ILLUSTRATED BY NUMEROUS FATAL CASES.

By WILLIAM BUDD, M.D., Clifton; Honorary and Consulting Physician to the Bristol Royal Infirmary.

"Le médecin doit, dans ses premières études, jeter un coup d'œil sur les animaux qui se rapprochent le plus de l'homme."—*Chausier*. (Adopted from *Régnier*.)

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As the malady is generally readily curable by decisive measures in its early stage, but is almost as generally incurable if this stage be allowed to pass without them—as the alternatives of death or recovery, therefore, depend on its early recognition—I have thought it a duty to bring the particulars of these cases (so far as I possess them) before the profession, in order that the attention of medical men may be directed to the subject.*

CASE I. On Oct. 21st, 1856, I was summoned by Dr.

* In the Twenty-first Annual Report of the Registrar-General, in a table of the causes of death registered in England in each of the nine years from 1850 to 1858 inclusive, the following are the numbers set down to carbuncle: 131, 161, 233, 252, 300, 255, 353, 252, 216. As there is good reason for believing that these numbers may be taken to represent, approximately at least, the proportion of cases of malignant pustule in each year, they would seem to indicate that the disease is on the increase. It is obvious, however, that these statistics cover too small a period to allow of any general inference being founded upon them. Much greater fluctuations are observed in other zymotic diseases in virtue of the common variations to which the whole group are subject. Unfortunately, no data exist from which the most distant approximation can be made as to the concurrent prevalence of the epizootic from which the malignant pustule is derived. The scientific study of veterinary medicine is too recent in this country to render the necessary records possible. We have already seen that there are good grounds for believing that joint murrain has prevailed in England from a very remote age. If there be some doubt whether in England generally malignant pustule has increased of late years, there seems to be none that in London it has greatly done so. In the Registrar-General's Report of the Health of London in 1858, the following passage occurs:—"The deaths from carbuncle were 61; fewer than in 1856, but ten times as many as the deaths from the disease in the earlier years. This troublesome plague of boils has been prevalent for some time." I shall hereafter give some reasons which render it probable that the flesh of diseased beasts is sent to great towns more largely now than formerly. (See the Report referred to, pages xl and 206.)

Robertson, of Terrell Street, in this city, to see a patient whom he had visited for the first time the day before, and whose case had put on a strange and formidable aspect.

The subject was a married man, rather more than thirty years old, who had for some years been employed as compositor in the office of the *Bristol Times*, and who, at the time of his seizure, was in good health. The disease under which he was now labouring had begun six days before, in the form of a pimple surmounted by a small vesicle, and seated on the upper lip. His attention was first called to this pimple by the severe itching it occasioned, and which annoyed him very much by interfering with his work. In his attempts to relieve this sensation by scratching the part, the vesicle was soon broken; a circumstance which led the patient himself to form a very definite theory of his case. The printing office had lately been supplied with a font of new type, and the notion was that the hand, soiled with the new metal, had, in its frequent contact with the broken surface, poisoned the lip.

The same notion, under some other form, occurred in most of the other cases. The fact is worth noting, as showing that the nature and succession of the morbid changes involuntarily suggest the idea of a poisonous inoculation, even to non-professional persons.

In the course of the day, the swelling and hardness gradually extended; and on the day following, they were so considerable as to cause much disfigurement. It is important to remark, however, that apart from the local discomfort, the patient did not at that time feel ill, but continued to work as before. The malady was still in what the continental writers call the local stage.

On the third day, it had begun to spread widely over the face, and the patient was unable to leave the house. From this stage, it passed rapidly to that in which I first saw it, three days afterwards. The aspect of the disease was then very striking, and was unlike anything I had ever seen before. The lips were, at least, four times their natural thickness; of a deep violet, approaching to black; and as hard as brawn. This state of things extended to the whole circumference of the mouth, from the nose to the chin. The closure of the mouth being imperfect, saliva was constantly drivelling from it. On the space between the upper lip and the nose there were three or four small vesicles, containing a little reddish yellow serum. The temperature of the part was considerably below the normal standard. The rest of the face, the forehead, and throat, were also much swelled, and presented very exactly the appearance which these parts have in bad cases of erysipelas. Passing from the mouth to the cheeks, the deep violet of the former gradually shaded away into a dusky red, and the scirrhus hardness gave place to a puffy swelling. The nose participated but little in the morbid change. The enormous prominence of the mouth, its hard and rigid state, and its almost black colour, caused a peculiar and hideous disfigurement, which was in the highest degree characteristic. The general symptoms bespoke rapidly failing powers. The pulse was more than 140 in the minute, and so feeble that it could scarcely be counted. The breathing was rapid; the belly tympanitic; and the body was bathed in a colliquative sweat. The breath exhaled a peculiar and disgusting fœtor, which, to my own sense of smell at least, was entirely new. The mind remained perfectly clear. A deep incision was made through the upper lip and carried into the cheek. The incised tissues were so hard that they creaked under the knife. But little blood flowed from the wound, the local circulation having, apparently, very nearly ceased. There was no trace of pus, but a serous exudation oozed freely from the part. Stimulants were ordered in liberal doses.

On leaving the patient at eleven o'clock at night, I appointed to see him again early in the morning; but he