applying the stethoscope ; always warm the stethoscope before using it. I have known it of inestimable value as a toy, occupying the little patient in front, while I have been stealing a march on him in the rear and employing immediate auscultation without his knowledge.

Remarks
ON
THE MOLECULAR THEORY OF ORGANISATION:
IN REPLY TO DR. BEALE.

BY

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I AGREE with Professor Beale that there are few questions of greater interest to those who are investigating the principles upon which medicine is based, than a consideration of the laws governing the ultimate molecules of which every living organism is composed. I have great pleasure, therefore, in replying to his remarks ; because, probably from want of clearness on my part, he has misapprehended the nature of the theory which, after long and mature consideration, I have ventured to place before the profession in the pages of the *Lancet*.

Dr. Beale thinks that, because I have described histolytic molecules as being *often* larger in size than histogenetic molecules, and as being *sometimes* associated with the *débris* of broken down textures, there is a discrepancy in my figuring the latter in disintegrated tubercle unconnected with such *débris*. But I have never stated that the one class of molecules may not exactly resemble the other; and a glance at the figures representing the development of *ascaris mystax* must prove the contrary. Moreover, as it is an essential part of my theory that the histolytic molecules of one period may become the histogenetic molecules of another, there is nothing contradictory in making one figure represent both. Dr. Beale says that I "surely will not maintain that lifeless particles become aggregated together and form a living mass." But tubercle is not lifeless, and is subject to the general law of organisation. As to when, how, and where life is communicated to matter, these are questions I need not now discuss.

Dr. Beale says I ignore the use of high powers and reproduce figures ten years old, drawn under a magnifying powers of 250 diameters linear, an enlargement far less than he and others employ in the present day. I have frequently used powers varying from 700 to 1200 diameters linear ; but in rare cases have gained any advantage thereby. If a thing can be seen distinctly under a low power, we seldom see anything new by making it four times as big. Inexperienced persons, also, by the use of such high powers, are peculiarly liable to be led into error. For the purposes of illustration, therefore, I consider that in most cases (not all), a power of 250 times

linear is amply sufficient, and it has the great merit of saving space and expense in wood cutting.

Dr. Beale says that the term molecule can scarcely be properly applied to a body nearly as large as a blood-corpuscle. But I can see, say in milk, no difference in structure between the larger and smaller molecules. I have always maintained that, whatever powers are employed, you cannot reach the ultimate molecule; I am far, therefore, from disputing that many of them may be less than the twenty-thousandth of an inch, and still possess all their vital and physical properties.

In the formation of vibriones, I have certainly never seen two particles in the very act of uniting, any more than I presume Dr. Beale has seen them divide under his eye. Either view is a matter of inference. But if Dr. Beale has been fortunate enough to see them actually divide, this is no objection to my theory, as there is no reason why they may not form in one way and multiply in another. In the same way, having been produced by precipitation, they may increase by absorption or imbibition of nutritive fluids.

Dr. Beale thinks it an objection to my statement, that the formation of bone is connected with the molecular law of aggregation, because " the laminæ of the Haversian system are formed layer *within* layer, while the layers of calculous matter are deposited layer *upon* or *outside* layer". But molecular aggregation may take place equally from within or from without; and, as in bone the nourishing fluid is derived from vessels lining the Haversian canals, it is only from within that one could expect such aggregation to be produced.

Dr. Beale thinks there is some confusion in the definition of molecules, because they may be living and dead, simple and compound ; may originate from others, and be precipitated from fluids ; may be so large as the 1-4000th of an inch, and so small as not to have been reached by the highest magnifying power ; and because they have different properties. I can see no inconsistency in all this. Other elementary parts—for example, fibres—possess equal differences. Cells also vary in size, origin, chemical composition, complexity, and properties ; yet they are still cells. As to whether molecules of the same kind or molecules of different kinds become aggregated together, there can be no question that coalescence may occur in compound organisms, both between the same and between different molecules, although the former is the most common. When a minute particle of oil is precipitated in an albuminous fluid, there is aggregated round the former a layer of albumen ; and so a simple is at once converted into a compound molecule.

I have thus endeavoured to answer all the topics contained in Professor Beale's communication, in which I have been unable to see either facts or arguments in any way opposed to the molecular theory of organisation. On the other hand, were it necessary, I could easily prove from the valuable facts Dr. Beale has placed on record, and from the laborious investigations which he has made into the structure and growth of the tissues, that he has himself furnished most powerful arguments in its support.

I would deprecate further discussion on this matter until the whole of my lectures are published, when I shall be most happy to argue the subject, in all courtesy, with any opponents who, like Dr. Beale, possess an earnest desire to elucidate the truth.