THE GERM-THEORY.

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PHYSIOLOGISTS and controversialists of justly distinguished eminence, both at home and abroad, have recently been engaged in the most abstruse research relative to the solution of that difficult problem, the "germ-theory," and as an inevitable sequence, "spontaneous generation." The press also, medical and general, has taken the matter up vigorously, and fully discussed the merits of both sides of the question with undoubted zeal, ability, and impartiality; obviously, however, without arriving at any definite conclusion. The subject at issue remains much in the same obscurity as from the remotest periods, although I believe I am justified in asserting that, at various epochs in the last two successive centuries, it has attracted the attention of *savants* of all civilised nations.

It is true that Professor Huxley, whose name is a tower of strength in natural science, has negatived the sweeping doctrines, or more properly hypotheses, advanced by Lister, Tyndall, Pasteur, and others, by sound logical deduction rather than by positive demonstrative proof. I am not in a position, even were it expedient, to analyse minutely the various methods pursued by individual experimenters and explorers, in arriving by complicated scientific processes at their own conclusions and views on this head. These, I doubt not, are known to most of the readers of the JOURNAL. Suffice it to say, that the advocates of the "germ-theory of disease" are those who also obviously support the theory relative to spontaneous generation. I hope, however, by a very simple process, to show the fallacy of these theories.

The source whence I advance my refutation is simply in an egg-shell. It is well known that an egg, when exposed to the atmosphere for some time, absorbs air, becoming, what is familiarly termed, addled; all its contents undergoing putrefaction, and becoming a homogeneous mass, which, under favourable circumstances will, if the shell keep intact, remain in this condition for an indefinite period. From the density of the shell, and all but impervious texture of its lining membrane, which is firmly attached to it throughout, excepting at the larger end, where there exists a small space containing air *ab initio*, the air must be in a very rarefied, and if I may so term it, *filtered* state. Eggs may be preserved for any length of time—a fact well known in commerce—if rendered impervious to air by smearing over with lard, or any other unctuous varnish.

I have, since this idea suggested itself to me, placed an egg, which from reliable information I believe to have been addled at least six months, for more than a fortnight in water, where it floated buoyantly from the presence of air, and have marked the water-line, and also accurately weighed the egg before and after immersion. I have found from the exact correspondence of both tests, that no endosmotic or exosmotic action whatever had taken place; thus proving beyond question that, if impervious to the least particle of water, it must *à priori* present the same impediment to any germinal matter brought into contact with it. The offensive fœtor of a broken addled egg is familiar to most of us; yet the egg alluded to, of course with its shell intact, does not emit the slightest possible odour—a further proof of its impermeability.

It is clear that in the egg there can originally exist no germs, the alleged cause of putrefaction; excepting, of course, its germ proper, which in all probability loses vitality from the moment when air penetrates and putrefaction has set in. I think it will be conceded on every side, from the physical conformation of this hermetically sealed little chamber, that no germs can enter from without, even assuming that germs of a non-spontaneous origin were essential to the process adverted to; granted, also, that this homogeneous fluid were transformed into some degenerate protoplasm. How is it that, although composed of the very primary elements originally intended for the generation of organic life, and *à priori* a pabulum eminently fitted for that process, with other favourable conditions, it does not produce some higher developed visible organism? Failing this, the maxim, "*Omne vivum ex vivo*," must, I think, be conclusively established.

Putrefaction, briefly, I conceive to be due to the destructive chemical action of air on disorganised animal and vegetable tissue, resolving it into its predestined primitive element, "the dust of the earth." In the course of this process, favoured by local surrounding circumstances, in which doubtless chemical and electrical conditions play an important part, poisonous gases are evolved, becoming diffused through the atmosphere in a more or less concentrated form, and, assisted by predisposing influences, in their turn cause disease and death. That life re-

sists the influence is an accepted and incontrovertible fact; *ergo*, the very lowest grade of germ-life ought to resist putrefaction. It is obvious, therefore, that the received axiom of the germ-theorists carries with it its own contradiction, and at once confutes Professor Lister's theory respecting the action of carbolic acid on wounds. I believe it is to the exclusion of air, from its admixture with oil and other adventitious aids, that the beneficial effect of this much vaunted treatment is chiefly due, not to its alleged germ-killing properties. I do not, however, wish by any means to undervalue its deodorising and antiseptic qualities, which it undoubtedly possesses in common with many other drugs. It acts on the devitalised secretions of wounds and other putrefactive processes, much in the same manner as common salt does in preserving disorganised animal tissue. It acts also on the same principle as "Friar's balsam," which was extensively used of old in surgery, and is even to this day much used in veterinary surgery, but which gave way to the more improved principle of healing wounds by "first intention," by which is meant bringing together solution of continuity, and excluding air by the use of impervious textures, adhesive plaster, cerates, etc. Hence it will be observed, that Mr. Lister's system is simply a revival of a very ancient practice; but he ascribes to it a novel and extraordinary action, ignoring altogether, in my opinion, the action of other important elements in the treatment, viz., air-proof textures, etc., on the accurate application and adjustment of which he lays much stress. The proper application of these, to the exclusion of the irritating germ-killer, would, I believe, in most cases of incised wounds, lead to more favourable results. I would not, however, consign carbolic acid to the same superstitious use allotted to Sir Kenelm Digby's "sympathetic powder," for I must confess that, when used judiciously, in appropriate cases, it possesses valuable properties.

Traditional superstition has handed down to us many excellent hints, remedies, and forms of practice, evidently having for their origin sound scientific principles, at a period when medical science flourished, anterior to the dark ages. Amongst these may be mentioned, the old method, not to be despised, of applying a cap of lint covered with ointment, over a well strapped stump after amputation. Ointments of every description, judiciously selected for different classes of ulcers, etc., have all for their therapeutic action, principally, the exclusion of air, and in my humble opinion are, in appropriate cases, preferable even to the much vaunted water-dressing.

The most remarkable superstition of all, however, bearing in a very singular manner on the question at issue, I cannot do better than introduce here. Sir Kenelm Digby, Knight, possessed a "sympathetic powder." Its nature, which he disclosed in 1608 to James the First, had been taught him by a Carmelite friar, who learnt it in Persia. It was composed of "calced green vitriol." Whenever any wound had been inflicted, the powder was applied to the weapon that had inflicted it, which was, moreover, covered with ointment, and dressed three times a day. The wound itself in the meantime was directed to be brought together, and carefully bound up with clean linen rags, but above all to be left alone for seven days, at the end of which period the bandages were removed, when the wound was generally found perfectly united. The triumph of the cure was ascribed to the mysterious agency of the "sympathetic powder," which had been so cunningly applied to the weapon; whereas, it is scarcely necessary to observe, that the rapid cure depended upon the total exclusion of air from the wound, and upon the healthy operations of nature not having received any disturbance from the officious interference of art. The result beyond doubt furnished the first hint, which led surgeons to the important practice of healing wounds by "first intention."

Poets of the period frequently alluded to this superstitious practice. Thus—

"Anoint the sword which pierced him,
With the weapon salve, and wrap it close from air,
Till I have time to visit it again."—DRYDEN.

PROFESSOR FLOWER'S HUNTERIAN LECTURES ON THE TEETH AND ALLIED ORGANS IN THE MAMMALIA.

Delivered at the Royal College of Surgeons of England.

LECTURE VII.—Friday, March 3rd, 1871.

Carnivora.—The animals of this order are not all exclusively flesh-eaters; some feed almost entirely on vegetables. The name, however, is retained as expressing a certain type of structure. The Carnivora are divided into two sections—terrestrial and aquatic. Regarding their teeth, it is almost impossible to lay down any general statement, except that they have large pointed conical canines.