A Lecture ON MIND AND MATTER.

DELIVERED AT THE MEDICAL GRADUATES' COLLEGE AND
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Of late years much has been written on this subject with the object of elucidating the connexion between mind and matter from the point of view of the most recent facts and deductions of experimental physics, so that it behoves us as practical men to consider modern theories with the object of finding out the possibility of advance in the treatment of psychical disorders, whether there are grounds for the establishment of a *mental pharmacopoeia*, a new order of remedies different in kind from the material foundation of the present prescription.

Do the new ideas of the nature of matter and of mind give us any ground for saying, "It is clearly useless to pursue the condition of the medium of mental and nervous phenomena (the brain and nervous system), the case is clearly one where the psychical order of manifestations is out of joint, we must attack the change in the emotions, we must strive to alter the will or guiding power"? If, with Professor Hæckel, we are monists—that is, upholders of the "law of substance" as the universal cosmic law, including in its essence the two laws of permutable of matter and conservation of energy; that God and the world are one and the same thing, that there is no dualistic combination of God and the world—then it seems unnecessary to trouble ourselves with any other view than that mind is an epiphenomenon, that it disappears when the body dies, and has no existence apart from it, and that, in fact, we need not occupy ourselves with the so-called spiritual manifestations. This doctrine has, at any rate, the advantage of simplicity and conciseness; abnormalities of consciousness (including all the range of mind) must be taken as synonymous with defects of a material structure, and we need look no further than to the latter for our curative basis. Monistic dogmas do not attempt to explain how it is that such a material as, say, brain shall, in its functioning, conserve its energy in the particular form of what we call consciousness, will, etc., but that apparently is of no consequence; all we have to pursue is the "true, the good, and the beautiful." By the majority this is what is followed out; the plan is to try and determine how far, in what way, the nervous system is affected, either directly in itself or indirectly, or influenced by other organs of the body or by conditions of the environment which act unfavourably upon it.

The latest exponent of the other school, the dualists, is Professor Oliver Lodge, and this is his opinion of Professor Hæckel:

If monism signifies a limitation of mind to the potentialities of matter as at present known . . . that without the cerebral hemispheres, consciousness, intelligence, emotion, love, etc., and all the higher attributes towards which humanity is slowly advancing would cease to be, that the term "soul" signifies a sum of plasma and movements in the ganglion cells, and that the term "God" is limited to the operation of a known evolutionary process and is the sum of all atomic forces and all ether vibrations, then such philosophers must be content with an audience of uneducated persons, and must hold themselves liable to be opposed by men of science, who take a wider view of existence, and perceive possibilities to which these narrow philosophers are blind.

One would think after this that Sir Oliver Lodge was sure of his ground, that he had obtained, as a scientific man, sufficient basis for saying that whereas life or mind can neither generate energy nor (directly) force, yet it can cause matter to exert force on matter, and so can exercise guidance and control, can so prepare any sum of activity by arranging the position of existing material as to produce results concordant with an idea or scheme or intention.

Before receiving the conclusions of these physicists upon the subject of mind and matter, it will be well to have a clear idea of what they mean by the terms they use, how they record what is generally called "life," and what are their views as to its origin. We shall see that

they are extremely hypothetical or that they are very dogmatic.

Hæckel's view is that life has risen from inorganic matter without antecedent life. The experimental facts of biogenesis (that is, the doctrine holding that the genesis of living beings from living beings is the only one of which we have any knowledge) he discards in favour of an undiscovered kind of spontaneous generation. He assumes that the chemico-physical properties of carbon confer so peculiar a power on its albuminoid compounds that they develop into living protoplasm. He says that

First simple monera are formed by spontaneous generation, and from these arise unicellular protists forming subsequently tissue-forming plants and animals. The cellular theory has given us the true interpretation of the physical, chemical, and psychological processes of life. Consciousness is a physiological problem, and must be reduced to the phenomena of physics and chemistry. The soul is a natural phenomenon, and we have no different methods of research for psychology than for other sciences.

What does Sir Oliver Lodge say?

Though the brain is truly the organ of mind and consciousness, no one is at liberty to assert, on the strength of that fact, that the realities underlying our use of these terms—namely, mind and consciousness—have no existence apart from terrestrial brains. Nor can we say with any security that brain-stuff (to use Clifford's term) is the only conceivable machinery which they are able to utilize, though it is true that we know of no other. I maintain that life is *not* a form of energy; that it is *not* included in our present physical categories; that its explanation is still to seek. . . . It appears to me to belong to a separate order of existence, which interacts with the material frame of things, exerting guidance and control on the energy which already here exists. I perceive as a fact that life is itself a guiding principle—that is, that a live animal does guide or influence the elements of inorganic nature.

Sir O. Lodge views life as being neither matter nor energy but something belonging to a different category; that, though able to interact with the material world, it can also exist independently, though then it is not apprehensible by our senses. It depends on matter for its manifestations to us now, but it is otherwise independent, and it is subject to a law of evolution, either in its phenomenal or its occult state. The essential property of energy is that it can transform itself into other forms, remaining constant in quantity, whereas life does not add to the stock of any known form of energy, nor does death affect the sum of energy in any known way.

It seems to me that neither side proves its premisses, but merely makes dogmatic statements of what it imagines is the truth. If we allow that mind, consciousness, emotion, will, etc., do exist, but in a form of whose laws and nature we are ignorant, what is the use of denying that these agencies may interact in a way akin to x rays, or the unseen waves of wireless telegraphy—why deny telepathy or the statements of different observers as to "revelations" that have been made known to them?

If we once acknowledge a form of life as to which we recognize only that it has power of guidance over the material around us, we must allow that it may have possibilities and powers beyond anything that we can conceive, at the same time owning that, since we can only speculate about it and have nothing tangible, it is useless to try to harness it, because we cannot generate it; nor do our so-called "laws of thought" teach us much about it. We talk about the laws of similarity and of contiguity, and of the law that every mental impression has its idea (Hume); again, we have the laws of logic, or the process of arguing correctly; and the laws of ethology (Mill), or of character; but after all these are only deductions or abstractions from the mode in which we observe the action of a hypothetical force, or energy, or phenomenon (call it what we will), of the real nature of which we know no more than we do if asked what is an electric charge, what is the difference between positive and negative electricity, what is the internal structure and constitution of an electron?

Before we can understand the most recent speculations as to the nature of mind and matter we must have a clear idea of the meanings of the terms used in the discussion, and of the way in which radio-activity is supposed to occur. I am afraid that we shall find ourselves little better off when we are told that an atom of hydrogen consists of 350 positive and 350 negative electrons, and that these electrons constitute the fundamental substratum of which all matter is composed. The simplest

conception of the material universe is that there is one universal substance—ether—perfectly homogeneous and continuous, and simple in structure, extending to the furthest limits of space, existing equally everywhere, some portions either at rest or in simple irrotational motion, transmitting the undulations which we call light; other portions in rotational motion, that is to say, in vortices or whirls, and differentiated permanently from the rest of the medium by reason of this motion. These whirling motions are called matter; their motion gives them rigidity—like the chain of a bicycle in motion—and of them our bodies and all other material bodies are built up.

The most characteristic property of matter is mass or inertia, and the definition of "inertia" is that property of matter by virtue of which it retains its state of rest or of uniform rectilinear motion as long as no foreign source changes that state. An electric charge has mass or inertia, and the electric theory of matter is nowadays the only way in which matter is viewed. The whole of the atom may be supposed to be built up of interleaved + and - electrons and of nothing else. The oppositely-charged electrons are thought to be flying about inside the atom, occupying the otherwise empty region of space which we call the "atom."

An electron is the most definite and fundamental unit in Nature; it is the smallest known unit of electric charge. Every atom of matter can have associated with it a certain definite quantity of electricity called the ionic charge. Some atoms can have more, but none can have a fraction of this quantity which is an ultimate unit. Now suppose the charge of electricity usually associated with a single monad of matter were concentrated into a spherical nucleus $\frac{1}{100,000}$ of the diameter of the atom its mass (that is, the mass of the charge of electricity) would be the $\frac{1}{100,000}$ of that of the hydrogen atom, the lightest atom known. This hypothetical concentrated atom is an electron, so that if an electron were a sphere 1 in. in diameter, the diameter of an atom of matter would be one and a half miles.

An atom of matter possessing a negative electron in excess is called a negative ion; an atom of matter with one electron in defect is a positive ion. These ions—that is, these atoms of matter possessing electrons in excess or in defect—can travel, and each kind of matter has an intrinsic ionic velocity. The electrons can exist separately, and when released from the atom they fly away; coming from the negative pole, they are termed cathode rays. When stopped suddenly by a massive obstacle they give rise to x-ray radiation. An atom of hydrogen is composed of 350 + 350 electrons; an atom of radium of 160,000 of these electrons. It is confessed that the chief defect in the electrical theory of matter is that the + electron has never been isolated from the rest of a matter-atom.

According to Rutherford radio-activity is the flinging away with great violence of actual atoms of matter, full-sized atoms, which are charged positively, ionizing the air which they bombard and generating heat wherever they strike—they are one hundred times faster than the fastest flying star, and are the fastest moving matter known. This seems to have been actually and experimentally determined.

Rutherford also found that it was *not* the radio-active substance itself which was evaporating. The atomic weight of radium or of thorium is high (200), that of this thrown-off substance is low (1 or 2), and it is most likely hydrogen or helium. The substance left behind in the radio-active substance is volatile—it slowly diffuses away, and behaves like a gas. It can be stored in gas-holders, it condenses, and is itself radio-active. Its radio-activity consists in throwing away particles of itself, leaving yet other residues, one of which ultimately pitches away electrons simply. The physicists hold that this shows that probably the barriers between one species of matter and the next are not infrangible and absolute, but that temporary transitional forms occur. The hypothesis of radio-activity, then, is that an infinitesimal proportion of the atoms is constantly breaking up, throwing themselves very violently at about one-tenth the speed of light; the remainder constitute a slightly different substance very unstable, and therefore radio-active, going through its stages more actively than radium itself, and giving rise to fresh products of its own decay. A

radium atom is not hot, but it has a great store of potential heat, and the collapsing of the electrical constituents of a radium atom by so little as 1 per cent. of their distance apart can supply the whole energy of the observed radiation for 30,000 years. These changes in the more stable elemental atoms required millions of millions of centuries. In such a time as this, at the rate of 100 atoms a second thrown off, a kilogramme—2 lb. of matter—would have drifted away! Existing matter takes its rise thus: Electrons of opposite signs fall together, at first into a manifestly unstable form; these forms then pass from one to another, giving a process of involution of thousands of years.

I have placed before you the modern views of mind and matter, which seem flights of imagination; they are based on some pure facts which appear to be proved, but for the chief part purely speculative and unproved.

In my book, *Ex Cathedra*, I have dwelt upon the possibility of the existence as realities of phenomena which have been up to now scouted as imaginary or hysterical suggestions at the best, if not downright lies of the narrators, and I have given instances of alleged manifestations by trustworthy witnesses, which admitted of no other interpretation than that they had for the time been the recipients of impressions which transcended their receptabilities under ordinary conditions and of the general experience. I do not profess to understand them, and I am not helped by the modern theories which have been stated. As a teacher, I have for many years felt the necessity of emphasizing the explanation of psychical processes by variations in the physical structure, in the absence of any attempt to extend the doctrines of physical science to the realms of psychical or spiritual phenomena—feeling all the time that one's position was precarious, that it was in all probability a temporary expedient, and that in the course of evolution we should be introduced to a chain of processes proving that the spiritual and the corporeal are really subject to the same laws and that there is no longer any more mystery in the incarnation of the Psyche than in any other histological activity. Is there any reason for thinking differently now? Must there still be a doctor for the body and a theologian for the mind? It seems as if the barrier had been seriously attacked and was in process of slow but sure demolition. Have we not been working on different sides of a wall placed on the sand without any solid foundation, and does not the modern tendency to show that with the blasting of the obscuring partition the two sides will be proved to be linked together in one harmonious progression, incomplete perhaps in detail but indicative of a fusion of hitherto contradictory processes—or at least of processes with no common denominator, and therefore impossible of comparison?

The physicist must go forward, the psychist must go back to meet him, and the junction of the two will be effected when the former has made it clear that he can by experiment produce a sensation, an emotion, an idea, or an act of will or guidance, any mental atom that you like to name, out of corporeal elements. There are two bridges to be crossed, one between the inorganic world and the organic, the other between the corporal and the spiritual body.

The recently-discovered phenomena of radio-activity, of x rays and cathode rays, and the fact that all bodies exhibit radio-activity have, however, had the effect of making it apparent that forces are at work of a hitherto unsuspected power, and have set up a belief in the actual reality of phenomena and processes which are, though still inexplicable, yet deemed worthy of acceptance as real.

The brain is different from most of the other organs in that there is no apparent connexion between the organ itself and the result of its working. There is no chemical substance elaborated—nothing to show us, indeed, that it is acting at all except that we can by direct stimulation get some movements in the muscles, or some action on glands and other viscera; and it is almost easier to conceive that the brain is a mere means of the interpretation of the processes which we call mind than it is to understand how mind, as we know it, is the result of action of the brain.

Of what use is the brain and nervous system if not for the production of quick motor reactions and adaptations, some of them reflex and others requiring

guidance? It has not been proved that there is a necessary chemical correlation between the brain and other organs of the body so that the production by the former of a certain chemical product is necessary to the proper functioning of the latter—in the sense of chemical correlation of the functions of the body as illustrated by Professor Starling in his recent Croonian Lectures—but it is certain that brain is necessary for the manifestation of mind, and there is no more difficulty in conceiving that mind is something apart which acts through brain than there is in conceiving electricity as something quite distinct from the substance through which it acts.

We know no more of the actual nature of one than we do of the other, but just as the manifestations in different modes and degrees of the force of electricity have of late been made more apparent to us by using modifications of matter, so it is fairly reasonable to affirm that we have through modern research a right to say that there are grounds for the belief that mind is now demonstrable in forms hitherto denied, and that these forms may be explained to be of the nature of radio-activity. It is, then, reasonable to believe in telepathy, or the influence of one mind upon another at a distance, the influence being determined by the particular nature of what we may term mind-ionization, just as in wireless telegraphy the proper kind of transmitter and receiver are necessary for demonstrating the unseen influence which has been working on the attenuated matter between them.

If radio-activity is a fact for all substances—and the physicists say that it is—there must be conditions in which it can assert itself, which are dependent upon the nature of the material for transmission, and of the receivers and transmitters, and though we may not agree with the possibility of prediction or prophesying, we may yet accept as facts the reported incidents of many so-called mind manifestations, the truths of which have been obscured, and perverted in too many instances by impudent quacks.

But if even so much be allowed we are not practically much further than we were. If mind is simply a modification of electrons in whirling vortices, how are we to treat what are called the diseases of mind? What we call "mind" is an artificial term for the manifestations of some substance of which we confessedly know nothing. To speak of diseased or disordered memory, imagination, will, etc., as perverted material entities can mean nothing in the absence of a definite knowledge of what memory, will, etc., are; we cannot speak of disordered electricity. If we notice anything wrong with the manifestations of the latter, we look for rectification to the medium of these manifestations, the wire or other of the technical accompaniments, and if we notice anything wrong with the manifestations of mind we must look to the body. We have still to deal with the agent and not with the principal. Is there anything in hypnotism, personality, thought-reading, etc., to make us conclude that certain people have peculiar powers denied to others? Nothing at all. People are apt to forget (many of them do not know) that in the condition known as hypnotism it is the subject himself who gives himself away; it is not that the hypnotizer passes over any influence to the subject, but it is the latter who brings himself into a condition of fatigue and of mono-ideism. Again, in what is called the personality or individual force of certain persons, it is the members of the company who give themselves up to what they have elsewhere seen or heard. The individual does not pass on any influence; we know, for instance, that thought-reading is merely an acute interpretation of touch impressions. As practical men we must confess to having seen instances of what is called strong will power in individuals. Over and over again we see strong bodily or even ideal temptations or feelings overcome by persons whose motives enable them to fight and eventually to overcome sensual promptings, though the process may be arduous and painful. But even here the will or guiding power may be shown to be the result of previous perceptions of a pleasant or painful character.

What conclusions can be drawn from these new data as to any influence on our practice in the treatment of mental disease? If we are convinced (as I think we must be) that at present we know nothing of mind except through conditions of the body, that it seems to depend for its proper or improper manifestations on conditions of the body, and that we have no evidence that it is a tractable

substance or even that it exists apart from the body, we must continue to treat those organs of manifestation about which we do know something—the nervous and the other parts of the bodily system—confessing that we are no nearer the true conception of the spiritual than we ever have been, though we may believe that there is a direct continuity between them which may possibly some day be elucidated.

In his article on Attention, Professor Sully alludes to the possibility of the recurrent outward projection of objects which have previously been perceived by the sensory organs; thus he would allow that a person who has once perceived an object—for example, another individual, or a landscape—may by intense concentration so excite the perceptive centres that a representation is made in the absence of the primary representation. Thus a subject under strenuous conditions might resee in all vividness and accuracy some object which, however, he would not be able to confirm by the evidence of other senses. I can imagine the possibility of such a central excitation, and I think that I have seen this intense representation in the apparent reality of some of the hallucinations and delusions of the insane. In dreaming the reality of the images seems overwhelming, though the non-reality is shown directly we are awake, but it must be noted that even here such images as appear are confined to previous actual appearances, no one ever dreamt anything of which he had no previous experience, and therefore the so-called phenomena of spiritualistic *séances* must (if they are true) be merely reproductions of the individual, and of his *past* experiences too—they cannot reveal anything which he did not know already, and if prognostics are made they must be merely guesses or reasoned probabilities on the part of the medium. The future is hidden from us, and this must be so because we seem to have evidence that mind without the body is undemonstrable, and body and mind, as we know, can only make a limited forecast, since we do not possess the materials on which alone true judgements can be based.

Mind is not the same thing as life; we can have the latter where there is no sign of a nervous system, and, as far as we know, there is no manifestation of mind without the presence of a nervous system. If mind is something separate from the body, can it show itself in any other way than through the body? I mean, is there any other material structure than the brain and nervous system which can be made to be the medium of manifestation of a mind or spiritual essence? As far as we know there is not. Can we conceive that the material of the brain and nervous system necessarily implies "mind"? That is, can it act in any other way than by showing what we call mental processes? Is it sufficient for a nervous system to arise to postulate the necessary rise of "mental" phenomena? If so, then mind is a necessary accompaniment of living nerve matter; the two arise together, and are inseparable. Mind becomes, not secondary to, but an essential part of, material, and cannot exist without it, and when the material dies the mind must cease too. A disordered brain is practically a partially dead brain, and therefore cannot show any true mind. What we see in diseases of the brain are manifestations of what is left of the sound tissue; therefore the ravings and incoherences of the lunatic are not diseased manifestations, but are what we may call the unbalanced remnants of runaway tissue, true in themselves but dangerous to the individual and to society, because the harness is broken and the guiding power inert.

In conclusion, I would say that though there is more evidence of things unseen than there was, there is yet the feeling that the transition from the inorganic to the organic, from the corporeal to the spiritual, has still to be proved; in short, the real nature of life is as far from our comprehension as ever, and in our endeavours to keep the life in a man we are still confined to regarding the errors of mechanism.*

* In printing this lecture some passages have been omitted.

DISINFECTIO OF CONFESSIOALS.—On the advice of the Council of Hygiene the Mexican Government has ordered that the confessionals in all the churches of the city of Mexico must be regularly disinfected, with the object of preventing the transmission of infectious or contagious disease. They are used by crowds of persons of both sexes and might easily become contaminated. Priests disobeying this order or showing negligence in carrying it out are liable to imprisonment.