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THE PHYSICAL BASIS OF MIND

The Physical Basis of Mind, with Illustrations, being the Second Series of Problems of Life and Mind. By George Henry Lewes. (Trübner and Co., 1877.)

WHEN the first volume of "Problems of Life and Mind" appeared, I ventured to say that perhaps Mr. Lewes promised too much in undertaking to exhibit "how the sentient phenomena may be explained by neural phenomena." I also directed a criticism, as pointed as I could make it, against a proposition placed by Mr. Lewes at the foundation of his psychology; namely, that "actions are prompted and really guided by feeling." The present volume is, in addition to much else, Mr. Lewes fulfilment of his promise and his reply to the criticism.

Considering the limited amount of space at my disposal, I shall, I believe, put it to most advantage by confining myself to these two points. As regards the first—the possibility of finding a physical basis of mind—a sentence in the preface rouses misgivings: "Materialism, in attempting to deduce the mental from the physical, puts into the conclusion what the very terms have excluded from the premisses;" "the attempt to interpret the one by the other" is a legitimate undertaking only "on the hypothesis of a physical process being only the objective aspect of a mental process." This is of ill omen; that which can be done as science does not seek its justification in metaphysics. But let the interpretation be taken on its merits. What is it? Though prepared for disappointment, readers will doubtless be surprised to hear that when looked for, it is nowhere to be found. "The sensation, or state of consciousness," says Mr. Lewes, "is the ultimate fact; we can only explain it by describing its objective conditions." In place of the second proposition, "we can only explain," &c., most thinkers prefer to say we cannot explain it, we can only describe its objective conditions. The difference, then, between Mr. Lewes and others, is not that he has any new light to offer, but that he insists on calling that an explanation which others cannot see to have that character. The sense in which Mr. Lewes thinks he can correctly call a description of neural processes an interpretation of mental facts rests on his statement of the metaphysical hypothesis that these are but "different aspects," "the two faces of one and the same reality." "It is thus indifferent," he continues, "whether we say a sensation is a neural process or a mental process; a molecular change in the nervous system, or a change in feeling." Suppose all this to be understood and granted, where is the explanation or interpretation of the one by the other? Is a description of one aspect of a thing an explanation of a very different aspect of the same reality? Not even metaphysical legerdemain can give the illusion of a physical basis of mind. Mr. Lewes sees that it is impossible to conceive a neural process as causing the mental process. He does not say that molecular movement becomes, or is transformed—in any sense, conceivable or inconceivable—into sensation. Mind is not the

outcome of physical conditions or combinations; it is an aspect, "the spiritual aspect of the material organism." Readers may now judge whether Mr. Lewes can claim to have explained sentient phenomena by neural phenomena, to have shown the manner in which the Self and Not-self "are combined in feeling and thought."

Against Mr. Lewes' proposition that the movements of living beings are prompted and guided by feeling, I urged that science has carried us to a point at which we have but to pause and reflect to see that all movements must be the consequents of purely physical antecedents; that the amount and direction of every nervous discharge must depend solely on physical conditions. And I contended that to see this clearly is to see that when we speak of movement being guided by feeling, we use the language of a less advanced stage of enlightenment. This view has since occupied a good deal of public attention. Under the name of Automatism it has been advocated by Prof. Huxley, and with a firmer logic by Prof. Clifford. It has been argued about in the *Spectator*, zealously combated by Dr. Carpenter, and now Mr. Lewes makes it the subject of one of his Problems, devoting seven chapters to its discussion.

Mr. Lewes cannot think that Prof. Huxley really holds the repulsive doctrine in question, though "supposed to hold (it) by those whom his expressions mislead." Yet, curiously enough, it is against Prof. Huxley's statement that Mr. Lewes' polemic is specially addressed. It is not my affair to reply for Prof. Huxley. Mr. Lewes has, however, mentioned me as having insisted "with iterated emphasis" on the view he now "most earnestly desires to refute." I must give my own statement. Here it is as given in my review of "Problems of Life and Mind" (*The Examiner*, March 14, 1874):—"Using the word feeling in its ordinary acceptation, as a name for subjective phenomena alone, we assert not only that no evidence can be given that feeling ever does prompt or guide action, but that the process of its doing so is inconceivable. How can we picture to ourselves a state of consciousness putting in motion any particle of matter, large or small? for this is really what it comes to. . . . Puss, while dozing before the fire, hears a slight rustle in the corner, and darts towards the spot. What has happened? Certain sound-waves have reached the ear, a series of physical changes have taken place within the organism, special groups of muscles have been brought into play, and the body of the cat has changed its position on the floor. Is it asserted that this chain of physical changes is not, at all points, complete and sufficient within itself? Mr. Lewes, we believe, will not assert this; he will admit that the material succession is unbroken. Once more, then, in what sense can we take the proposition that actions are prompted and really guided by feeling?" Putting in the place of my cat hunting for a mouse, the analogous case of a wolf springing on a sheep, Mr. Lewes replies: "Unless the term physical is here used to designate the objective sequence, as contemplated by an onlooker, who likens the process to the sequence observable in a machine, I should say that from first to last the process has been not physical, but vital." The word "unless," with which the reply opens, might be objected to, as implying that the term "physical" might be here employed to designate something else than the objective sequence—that succes-

sion of external events which can be seen or imagined in terms of vision. Quite irrelevantly, as it seems to me, Mr. Lewes specifies a particular kind of on-looker—one who likens the process to the sequence observable in a machine. I will only say that for myself I decline the honour of a place among those physiologists and philosophers who, according to Mr. Lewes, have failed to perceive the “radical difference between organic and inorganic mechanisms.” However, Mr. Lewes has put it on record that *if* when I spoke of a series of physical changes taking place within the organism I meant series of *inorganic* changes—that the movements of the cat resulted from something of the nature of a combination of levers, springs, and pulleys, then, he “should say that from first to last the process has been *not* physical but *vital*.” And who will question that Mr. Lewes would be quite right in so saying? But why suppose anything so unlikely? Yet this is the meaning Mr. Lewes gives to the word “physical” when it occurs in the mouths of those against whom he directs his arguments. For instance: physiologists are in the habit of describing unconscious reflex movements as physical processes. Of this description Mr. Lewes says: “Restate the conclusion in different terms and its fallacy emerges; ‘organic processes suddenly cease to be organic, and become purely physical by a slight change in their relative position in the consensus.’” But to proceed. Not having used the word “physical” in any peculiar sense, but in accordance with ordinary usage, my question remains—“Is it asserted that the chain of physical changes is not, at all points, complete and sufficient within itself?” So far is Mr. Lewes from denying the physical succession to be unbroken, that he states this, or something very like it, over and over again, as a truth almost too self-evident to require expression. Thus we read: “So long as we are dealing with the objective aspect we have nothing but material processes in a material mechanism before us. A change within the organism is caused by a neural stimulation, and the resulting action is a reflex on the muscles. Here there is simply a transference of motion by a material mechanism. There is in this no evidence of a subjective agency; there could be none.” But we also find statements that seem to have a contrary implication. Here is one: “The physiologist is compelled to complete his objective observations by subjective suggestions; compelled to add feeling to the terms of matter and motion, in spite of the radical diversity of their aspects.” How is he *compelled* to infer that of which Mr. Lewes has just told us there could be “no evidence”? Again, while the volume abounds with detailed descriptions of the behaviour of dogs, frogs, and men, given as instances in which it is “evident enough,” to Mr. Lewes, that their actions were “determined by sensations, emotions, and ideas,” yet Mr. Lewes is equally positive that we are “passing out of the region of physiology when we speak of feeling determining action. Motion may determine Motion, but Feeling can only determine Feeling.” Where, then, are we, when we talk of feeling determining action? In, I maintain, the gray morning of that intellectual light which is still far from having reached its noon-day splendour.

In the minds of our savage ancestors *feeling* was the source of all movement. Every one of them had what Mr.

Lewes, after all he has written about scientific method, can call “the irresistible evidence each man carries in his own consciousness, that his actions are frequently—even if not always—determined by feelings;” and they spoke according to their light. But while we shall continue to speak of feeling determining action, it will only be as we speak of the rising and the setting of the sun. Mr. Lewes is of a different opinion. He says: “We do so speak and are justified. For thereby we implicitly declare, what psychology explicitly teaches, namely, that these two widely different aspects, objective and subjective, are but the two faces of one and the same reality.” If Mr. Lewes did not go farther than this I should not care to quarrel with his endeavour to put a new metaphysical meaning into the language of old error. But he thinks that on the strength of this hypothesis the material succession may be regarded as unbroken, and yet a rational interpretation found for the proposition—actions are prompted and really guided by feeling. Because the molecular changes in the brain which form part of the series of material changes involved in the production of motion may be held to be, in a metaphysical sense, the other side of what we know as feeling, Mr. Lewes somehow concludes that “we must declare consciousness to be an agent (in the production of motion), *in the same sense that we declare one change in the organism to be an agent in some other change*” (the italics are by the author). Let us see. The word “consciousness” here denotes two things assumed by Mr. Lewes to be two faces of one thing. If we substitute for this word one of these denotations and say “we must declare the molecular changes involved in the production of motion to be an agent, &c.,” the statement becomes the most empty tautology. If we give to the word “consciousness” its other meaning—*feeling*—the proposition becomes what Prof. Clifford calls “nonsense;” and is, as Mr. Lewes says, placing feeling where “there is obviously no place for it—among material agencies.” If by “consciousness” Mr. Lewes means neither the molecular changes nor the feeling, but the something of which both are but aspects, then he is altogether beyond science, and for the moment it is enough to say that this metaphysical entity is *not* an agent “*in the same sense,*” &c.

Corresponding to those feelings, which Mr. Lewes will have it inspire and guide movement, there are conditions of the organism which can be conceived as the causal antecedents of the movements—the feelings, as admitted, cannot. Our instinctive faith in the unity and constancy of things leaves us no room to doubt that identical organic conditions will ever be accompanied by identical feelings and followed by identical movements; but this does not bring into view any scientific sense in which the feelings can be said to inspire and guide the movements. These for ever remain parts of an infinite series of physical consequents following on physical antecedents. This is the thesis at present so repulsive to many minds. Against this Mr. Lewes has nothing to advance. If any look to him for comfort they will find that, promising them bread, he gives them a stone—the same stone that has already set their teeth on edge.

One word to correct a false impression that the foregoing critical remarks would leave on minds unacquainted with Mr. Lewes’ writings. Let no one suppose that I have

not read the book with admiration. Like all Mr. Lewes' works, it is a repertory of suggestive fact and of equally valuable and suggestive thought; and if any reader derive from its perusal a tithe of the intellectual stimulation it has afforded me, he may regard his time as well spent. Reflective minds are diligently working towards clearer conceptions in a region that has hitherto been all obscurity. There is reason to believe that ere long philosophic thinkers of the highest rank will for the first time agree as to one or two fundamental conceptions. Few living men have done as much as Mr. Lewes to usher in this new era. Knowing my criticisms to be inspired solely by the same impersonal motives by which he has himself been sustained throughout his extensive labours, I am sure Mr. Lewes would be the last person to suggest that I could have made better use of the space at my disposal. Others, better qualified than myself, will draw attention to the importance of those parts of the work that I have not mentioned, as, for instance, the splendid essay on the Nervous Mechanism.

DOUGLAS A. SPALDING

GORE'S "ELECTRO-METALLURGY"

The Art of Electro-Metallurgy; including all known Processes of Electro-deposition. By G. Gore, LL.D., F.R.S. Text-books of Science Series. (London: Longmans, Green, and Co., 1877.)

DR. GORE has evidently spared no pains to make this text-book a complete manual of the art of electro-metallurgy. Beginning with the history of the subject, he gives an interesting account of the rise and development of the art, full of names and dates and references, and makes the early inventors tell, as far as may be, their own story by quoting freely from their published papers. Then comes a "theoretical division," about which we have something to say presently, and this is followed by what forms the greater part of the work—a detailed account of practical methods of depositing the various metals. This portion of the book, at once thoroughly circumstantial and comprehensive, cannot fail to prove most useful to the practical electroplater as well as to the scientific student. The metals most commonly employed in the arts receive, of course, most attention; but almost none, even of the rarest metals, pass without notice, and the experiments are described with the precision that comes only of experience. An admirable feature of Dr. Gore's book is the habit he has of giving specific references to the authorities he makes use of, so that any one with a library at his command may, if he choose, turn up the passages cited. The remainder of the book is filled by a "special technical section" containing various practical directions and details, and, in conclusion, we have a list of the books previously published on the subject and of the English patents referring to electro-metallurgy. The author is to be congratulated on the accumulation and systematic arrangement of an immense mass of information of a kind that will be welcomed alike in the workshop and in the laboratory.

If Dr. Gore had given us only the practical parts of his book we should have had little to say beyond praise and thanks. Unluckily, however, for himself as well as for

his readers, he has introduced a chapter on the theoretical principles which underlie the art of electro-deposition. Such theoretical *réchauffés* are often to be found in practical text-books, but their existence is surely a thing to be protested against even when they are tolerably well written. No one can hope to give a satisfactory account of chemical and electrical theory in fifty pages, and when his work is to form one of a series in which chemistry and electricity have already been treated of in separate books, the attempt is not only useless but unnecessary. These short abstracts are certainly not to be recommended to the novice; and to the student who has already studied the subjects at greater length they are little short of an impertinence. In a book which stands by itself they might be tolerated if they were at once concise and accurate, giving what is needed and no more. In the case before us these extenuating circumstances are all absent. That Dr. Gore's "theoretical division" is not concise the following quotation will suffice to show:—

"The strength of the current is equal to the electromotive force divided by the resistance; this is known as Ohm's law; it is directly proportional to the electromotive force, and inversely proportional to the resistance; if the resistance remains the same, and the electromotive force varies, the strength is directly proportional to the electromotive force; and if the electromotive force remains the same, and the resistance varies, it is inversely proportional to the whole of the resistance in the circuit" (p. 71).

As an instance of matter which might very well have been left out, take the following. After giving a table of conductivities, Dr. Gore proceeds:—

"If the conduction-resistance of distilled water is so great in relation to that of copper, we can easily understand, by referring to the previous table, that the resistance of gases must be enormous. The electric conduction-resistance of air heated to redness (*sic*) is 30,000 greater than that of water, containing a 20,000th part of its weight of sulphate of copper in solution" (p. 31).

Why this long-buried result of E. Becquerel's (here, by the way, the authority is not cited) should be unearthed for the benefit of students of electro-metallurgy is almost as puzzling as is the strange piece of *à priori* reasoning in the first sentence, which, it is distressing to find, we are expected to understand easily.

The vagueness and inaccuracy of some parts beggar criticism, and leave the reviewer but one weapon—a severe one indeed, but he has no other—he can only quote. Here are a few specimens chosen almost at random.

"The fundamental act or principle of magneto-electric action is, wherever there is varying magnetism, there is an electric current induced in an adjacent closed circuit at right angles to it" (p. 57); the italics are the author's.

"The electromotive force, or strength of the current to overcome resistance, depends upon the degree of difference of strength of chemical affinity of the two metals for the electro-negative constituents of the liquid" (p. 70).

"The electromotive force (commonly called 'the intensity') of the current . . ." (p. 337).

"As the electromotive force is diminished by resistance, a diminution of resistance in any part of the circuit will increase it" (p. 337); this extract we have ventured to italicise.

"Motion of the articles is very advantageous . . . it