

## CHAPTER VII.

### PHYSIOLOGICAL MATERIALISM.

THE great extension of the department of physiology, especially as combined with the doctrines of comparative anatomy, has occasioned another school of materialism. Its advocates are in full sympathy with the Sensualistic philosophy, and with the recent evolution doctrine; and when they attempt to systematize those functions of the human being which we call mental functions, their method is precisely that of the Sensualist. This movement of opinion is not new or peculiar to our own age; but had, in the last century, an advocate at least as ingenious as any of the recent, in Hartley. The result of physiological materialism is also to recognize no other mind than *nerve-matter*. It begins with these facts asserted by comparative anatomy: that as we proceed with dissections of animal bodies, from the lower to the higher species, wherever we reach a more complete, or better developed nervous system, we see in the living animal abler instincts and fuller powers. Those species which have least nerve and brain, have also the fewest and poorest instinctive powers. Those which approach nearest to man in development of the brain, and completeness of the nervous system, come nearest to him in intelligence. Hence, they attempt to draw the inference, that this nerve-matter is the mind—that thought, feeling, and volition are but refined, perhaps, inexplicable molecular functions, or results of such functions, even as muscular contractions are.

The same conclusion is attempted to be drawn from observations upon the human brain and nerves. Thus : it is claimed that when certain injuries are inflicted on the brain, as long as they continue, all mental functions are wholly suspended. If the nutrition and stimulation of the brain by a circulation of nutritive blood is impaired, the powers of thought are impaired ; if the circulation is enriched, the vigor of mind is increased. Again : it is held that molecular functions of brain attend all the abstract and subjective processes of thought, just as truly as the sensitive. It is supposed that brain-action must accompany the abstract conception of God, of vacant space, of eternity, in the man who meditates with every sense closed, as truly as it attends the hearing of a trumpet, or sight of a landscape. This is inferred from the fact that the passage of such inward thoughts moves the features. This change of countenance would not occur, they argue, unless the muscles were moved by their nerves ; but these nerves radiate from the brain. Again : they profess to have ascertained that the continued activity of the mind in abstract thought increases the amount of certain phosphatic salts excreted from the nerve tissues, and thrown out of the body by its emunctories. The inference from this is, that molecular action must be greater in the brain during, and by reason of, the mental exertions. Does not the correspondence of these facts, asks the materialist, point to the conclusion that mental activities are nothing else than molecular activities of nerve-matter ?

Yet more ingenious surmises are drawn from certain automatic actions of our limbs, and from experiments upon the relations of the different masses or organs of the brain by vivisection. When men walk along the way, occupied by thought or conversation, do their minds emit a distinct volition for every movement of each foot ? Especially when one continues to walk on, after he is wrapped in profound reverie, who can be-

lieve that each motion is prompted by a distinct mental volition emitted by the spirit, when consciousness wholly fails to testify to its emission? It is inferred, therefore, that the nervous matter in the sensorial centre has an automatic power of sending its motive influence down to the muscles, without the perpetual, immediate, and voluntary supervision of the mind. This result materialists suppose to be favorable to their conclusion.

But let us look a little more closely at that complex nerve-organ usually called the brain. It is found, on dissection and experiment, to be not one, but three organs; all, indeed, alike in being composed of nerve-matter; yet distinguishable in place and function, and each of the three complex. First, at the base of the brain, or just over the spot at which the spinal cord enters the bottom of the skull, is a small, but complicated, body of nerve-matter, from which the spinal cord descends as a species of narrowed continuation, and to which *all the different nerves of sensation directly converge*. From this same centre all the efferent nerves of motion also diverge, the most of them through the spinal cord. This cluster of ganglions is evidently, in the immediate sense, the *sensorium*, the centre of sensations. Comparative anatomy shows that it is the rudimental source of brain-structure; for as observation descends from man to less perfect animals, this cluster is still there, at least rudimentally, while the two other clusters of ganglions disappear more and more the lower we go. In man and other higher animals there lies, *behind* the sensorial centre, a mass of nerve-matter called the *cerebellum*, which experiment and comparative anatomy seem to indicate as having no necessary connection with mental processes, but as a nervous store-house for the species of nervous influence which the sensorial centres transmit to the muscles. On the top and in front of these two smaller organs in the human skull

lies the largest organ of all, the *cerebrum*, or brain proper. This consists of several distinct lobes, arranged in two hemispheres, the whole composing the great mass which mainly fills the skull. It is formed of soft nerve-matter, with the vesicular substance bearing a larger ratio to the fibrous than in the spinal cord, and even lavishly supplied with blood. It also has its numerous fibres, which seem to converge towards the neck or joining-place, where it connects with the sensorial cluster beneath, even as the various nerves from the limbs and chest and organs of sensation converge upwards into the same sensorial cluster. To the *cerebrum no nerve of sense or motion runs directly! It has no feeling*, and can be sliced away by the surgeon, without the creature's knowing it, save as one knows when his hair or nail is cut. It has been found *not necessary to the functions of animal life!* for, provided it can be removed without fatal lesion of the other vital organs, and especially of the sensorial cluster just underneath, the creature lives on without any cerebrum—breathes, eats, and digests food, just as before. But, on the other hand, let this great cerebral mass be cut away or disorganized by disease, or even unduly compressed, then *mental functions* are at once interrupted. On the other hand, when the anatomist's knife interferes with the sensorial cluster, the vital functions, seemingly so independent of the *cerebrum*, are at once interfered with, and the slightest wound of the central nucleus of that cluster is instant death.

Such is a brief view of the relations of the three organs. From this the materialists would have us believe that thought is as truly a nerve-function as the molecular affection of the *sensorium*, as brought to it by the afferent or received from it by the efferent nervous fibres. The matter affected, say they, is of the same kind; why not regard the function as the same? Psychologists appeal to "consciousness" to reveal to

them the functions and nature of mind. Why not regard consciousness itself as nerve-function? If mind were a different and independent substance from brain, would not its consciousness reveal to it the interaction of brain as a distinct substance and subordinate instrument, even as consciousness shows to us the fingers by which we execute a conscious volition or derive a tactual sensation?

I have thus stated the main grounds of the materialistic hypothesis, as they are drawn from physiology, and advocated by such writers as Huxley and Flint; and I have allowed them at least as much plausibility as they are entitled to claim. I will only add here, that in the judgment of still more learned physiologists, this conclusion is only plausible, and not true. Thus, *Virchow*, of Berlin, who cannot be suspected of sharing any theological prejudice, is quoted in "Nature" of November, 1874, as saying: "Of all kinds of dogmatism, the materialistic is the most dangerous, because it denies its own dogmatism, and appears in the garb of science; because it professes to rest on fact, when it is but speculation; and because it attempts to annex territories to natural science, before they have been fairly conquered." Dalton says: "The hemispherical ganglia are simply the instruments through which the intellectual powers manifest themselves." Draper not only asserts the immateriality of the mind on grounds of common sense and sound philosophy, but he founds an ingenious physical demonstration on the relation of the *cerebrum* to the sensorial cluster, to prove that mind is a substance distinct from brain. Dr. W. B. Carpenter, the most profound and voluminous English writer on the physiology of man, is a firm believer in the spirituality of the soul and of God. Says Dr. James L. Cabell: "That cerebral action *accompanies* all mental action; this is absolutely all that physiology has rendered probable. It has not demonstrated nor rendered prob-

able the position that cerebral changes *precede* and *produce* mental states. And, even in the case of the perceptive faculties, how can physiology ever bridge over the chasm between the final physical antecedent, the molecular tremors of the organic instrument, and the succeeding incongruous *phenomena* of perception and thought? Whatever discoveries the physiologist as such may make, there must always remain this mystery, which it is an impertinence for him to undertake to solve."