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ARTICLE III.

SOUL AND BODY.

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LEST the reader trained in a school which holds that there is nothing to be said of the relations of soul and body, except that there is soul and there is body and that is the end of it, should turn away at the outset in disgust from what must seem to him an attempt to solve the insoluble — let me say a word or two to avoid misapprehension. Lotze has somewhere called attention to the fact that the natural tendency of an historical age, priding itself on its historical sense, and working by an historical method, is to surrender the understanding to the imagination, and to demand pictures instead of principles. We are not contented until we can *see* the object matter as a series of definite images. Instead of explanation we want a drama before our eyes. It is because of this tendency, I believe, that it is assumed that there is some difficulty special in kind surrounding the question of the relations of soul and body which makes all attempts to consider the subject necessarily futile. It seems to be assumed on the one hand that nothing can be said about it unless we can see into the bowels of the molecules constituting the brain, and behold from their mutual attractions and repulsions, a sensation and a thought engendered. Or on the other hand, it is assumed that to know any thing about the relations of soul and body, we must be able to contemplate the soul, seated as on a throne in the body, thence sending forth her messengers to lay hold of the nerves and cause them to bring her reports of what is going on in the outlying regions of her domain, or to execute her orders among refractory subjects. And if the only way of knowing any thing about their relations were some such imaginative exploit, the question were

well called insoluble. But questions, as science and philosophy can well testify, are more often insoluble by reason of some unnecessary and absurd assumption, than from the inherent nature of the case. And so the failure of all attempts on this line is rather, I conceive, testimony to the absurdity of the mode of search, than to the absurdity of the question itself. We have an understanding as well as an imagination; principles may be thought as well as pictures seen; laws exist as well as panoramas. We may well give up the attempt to imagine the neural and psychical processes so as to see a transition from one to another, and confine ourselves to the less picturesque, but more hopeful, task of inquiring what principles shall be employed in order to render intelligible the relations of the physical and psychical, so far as these relations have been actually made known. We have certain facts declared by physiology and psychology. The sole question is: what principles, conceptions, shall we use in order to explain these facts, i. e., in order to render a consistent, intelligible account of them? To say that this cannot be done is simply to say that there are facts in the universe which are utterly irrational, which have no meaning. And the one who has the capacity of discovering by his reason that certain facts are non-rational to his reason, is not the one whom I address.

Therefore, if it is again stated that the object of this paper is to consider the relations of soul and body, I hope it will be understood that the object is not to get into the inside of nature and behold with mortal eyes what is going on there, but the less ambitious one of inquiring what principles must be used in order to give meaning to the facts of the case. How shall the facts of physiological psychology be interpreted?

What are these facts?

First. The nervous system, complex as it is, consists ultimately of fibres and cells. The fibres serve normally to conduct or transfer nervous stimuli either from the

organ of sense to some collection of cells, or ganglion, or from this centre back to the muscles and glands, or from one such centre to another. The cells, on the other hand, receive the stimuli brought to them from the surface, and react upon them in such a way as either to neutralize them from their own supply of force, or so as to set free their own nervous energy. In short, the fibres conduct the nervous energy; the cells produce it and regulate its distribution. This distinction in the mode of work of the two elements exists. But it has been usual to regard this distinction in such a way as to make of it an actual separation of functions. This introduces a dualism into the action of the nervous system at the start. It has been held that the fibres are purely passive and receptive, while cells are active. This leads to this result: the cells alone are regarded as having psychical bearings, so that the brain is held to be the sole organ of the mind. The nerves and the peripheral organs are eliminated. Some even go so far as to hold that in the brain there must be some particular set of cells to which all stimuli must be conducted, and that this alone is the organ of the soul. We must avoid, at the outset, any such error. The truth is that the distinction between fibre and cell is a relative one. Fibres possess an activity of their own as well as the cells, and cells conduct. The fibre is not a string which, pulled at one end, rings a bell at the other, itself remaining the meantime indifferent to the process; it is a series of nervous elements each reacting upon the stimulus of the one before it, as the cell reacts to the whole, and each passing it on to the one after it, as the cell distributes its energy. It is, in effect, a connected series of cells. What makes it behave differently from the cell proper is the fact that its power of resistance is so small, and its stored up energy relatively so slight. The cell, on the other hand, is something more than an explosive; it is a conductor. As there is no difference, chemically, between the firing of a gunpowder train and the resulting explosion of the

magazine, so there is none, physiologically, between the processes of the nerve and cell. The difference of the result in both cases is due partly to the amount of energy at hand to be set free, and still more to the resistance offered. In the cell there are no tracks laid down for the carrying off of the energy introduced. It meets resistance, friction, and accumulates till either the cell energy inhibits that introduced, or reacts upon it so as to increase it, and send it forth through the nerve.[1]

I may seem to have dwelt needlessly upon so simple a point, but it is the foundation of any further approach to a correct theory of psycho-physiological relations. The conclusion which it warrants in this respect is all important. In brief it is this: The psychical is *homogeneously* related to the physiological. Whatever is the relation of the psychical to the neural, it is related in the same manner to all parts of the neural. The brain is no more the organ of mind than the spinal cord, the spinal cord no more than the peripheral endings of the nerve fibres. The brain is undoubtedly most closely and most influentially connected with the life of the soul, but its connection is of the same *kind* as that of every other part of the nervous system. Now this gives us but one alternative: either there is absolutely no connection between the body and soul at any point whatever, or else the soul is, through the nerves, present to all the body. This means that the psychical is immanent in the physical. To deny this is to go back to the Cartesian position, and make a miracle of the whole matter — to call in some utterly foreign power to make the transition which is actually found. This may cater to our love of pictures, but it is out of the line which we have laid down for ourselves. The nineteenth century substitute of a double-faced substance is only another ex-

[1] This is not theory, but physiological fact. The experimental data with the conclusions warranted will be found set forth in Wundt, Mechanik der Nerven, und Grundzüge der physiologischen Psychologie, vol. I. pages 240–64.

cursion into the land of fancy sketches. It makes the imagination the source of an ontology. But it fares even worse than the Cartesian scheme. A double-faced substance not only refuses to be thought, but, if one is in earnest, refuses to be imagined. It is the result of the decrepitude of the imagination as well as of the laziness of thought. Not colors for the imagination to see, but principles for the understanding to think, is the desideratum. That compromise which seemed to think that the problem of the relations of soul and body was simplified if the connection of the two could be reduced to as small a space as possible, and excluded it first from the fibre, then from the spinal cord, then from the basal ganglia, the cerebellum, all of the cerebrum except the cortex, then possibly one point of the cortex,— that, too, must be abandoned. The fact is, that the action of the nervous tissue is the same in kind in the cortex and in the peripheral fibre, and hence if any part of the nervous system has any connection with the soul which is not supernatural in character, every part must have, in kind, the same. All, or none, is the disjunction forced upon us. The immanence of the psychical in the physical is, therefore, the foundation of our future inquiry. The nature of the immanence must now be inquired into. That there is unity of function in the cell and fibre is established. What this function is and what conclusion it warrants are the questions now to be asked.

Second. The fundamental nervous activity is a process of adjustment, consisting in a twofold contemporaneous process of stimulation and reaction or inhibition. If we turn to the same physiological authorities whence we learned of the homogeneous nature of the action of fibre and cell, we shall learn what this action is. Nervous tissue, in the first place, wherever found is a highly unstable chemical compound. Any excitation tends to set up such chemical change as will reduce it to relatively simpler and more stable compounds. There is thus set free an

amount of energy equivalent to the amount which would be required to lift this lower compound up to its higher state again. The potential energy of the unstable compound has, in short, become kinetic. The first element in nervous action is, therefore, the excitatory or stimulating, which has the setting free of nervous energy for its result. But if this were all, the energy of the nervous system would be soon used up. Every stimulus would set free nervous force, and the result would be that the body would respond to every stimulus, however slight, and the process would end only with the complete exhaustion of the power. We would be physically in the condition of those having the Saint Vitus's dance; mentally, in the state of some of the insane, who, having no reserve power, react violently upon every impression, intellectual or emotional, until they sink into a stupor, out of which they come only to repeat the process. In short, there must be something which gives control, which regulates the reaction, and which also ensures a reserve power. There must be opposed to the exciting activity one which resists, and thereby prevents the whole force at hand, the whole unstable compound, from being used, and which also restores it as it is expended. And so it is found that there is a complementary process. Not only is energy being constantly put forth, but energy is being constantly stored up or rendered latent. Not all the force which comes to a nervous element is employed in breaking down the unstable compounds and thereby losing energy; part — in some cases much the greater part — is used in building up these unstable compounds, thereby forming a reservoir of energy for future use, while the process itself acts as a restraint upon, a control over, the excitatory factor. Every nervous action is, therefore, a reciprocal function of stimulation, excitation, and inhibition; control through repression. Every nervous activity is essentially an adjustment. It is called forth through the stimulus, but the stimulus is not the sole factor; it does not wander at its own sweet will, but

is checked and directed by the reacting activity, the inhibiting. This is true, of course, of every process, whether occurring in fibre or in cell; but because of the structural differences between the two, previously spoken of, the former mode of action greatly *predominates* over the other in the fibre; while in the cell the inhibitory activity exceeds at the expense of the stimulating. Since the fibres correspond, in a general way, to the peripheral nerve system and the cells to the central, it may truly enough be said that the stimulating or exciting is the peripheral, and the reacting and controlling is the central or ganglionic.

Looked at from this point of view, *the unitary nervous activity is evidently that known as reflex action.* In that, we have precisely these relations of excitement on the one hand, and adjusting activity on the other, of which we have just been speaking. Our conclusions are as follows: there is a fundamental mode of nervous activity; in this the psychical is immanent. This mode of activity is an adjusting activity; therefore the psychical is immanent in the physical as directing it toward a given end. It is not only immanent, but it is teleologically immanent. This teleological character is seen in the nature of the function itself as just described. The loss of the proper proportion of the stimulating and the inhibiting activity is a token of morbid disorder. It is pathological. If the centres react on feeble stimuli, they squander their force upon the little stimuli, which are constant, by playing upon them; if they react only upon very strong stimuli, the force they contain is never put forth when needed to perform the proper adjustment of the organism. But in normal life we find that exact proportion between the two activities which ensures that the force shall be used when its expenditure is for the good of the organism, and then alone. If we take the simplest case of nervous action, such a one as occurs in a cold-blooded animal deprived of all its nervous apparatus except the spinal cord, it will only render still more distinct the teleological character as objec-

tively manifested. Read the following account of Wundt:

"A decapitated frog moves its legs against the pincers with which it is irritated, or it wipes away with its foot the drop of acid applied to the skin. It sometimes tries to get away from a mechanical or electrical stimulation by a jump. If put into an unusual position (e. g., on its back) it often returns to its normal position. The stimulus does not introduce merely a motion in general, which spreads from the irritated part with increasing intensity of the stimulus and growing irritability, but the movement is adapted *to the external impression.* It may be a movement of defence, or one to get rid of the stimulus, or a movement to remove the body from the sphere of irritation, or finally it may aim at restoration of the previous posture. *This purposive adaptation to the stimulus* stands out even more clearly in experiments by Pflüger and Auerbach in which the ordinary conditions of movement are somewhat changed. A frog, for example, whose leg has been cut off on the side on which it is irritated by acid, first makes some fruitless attempts with the amputated stump, and then, pretty regularly, chooses the other leg, which is wont to remain at rest when the animal is unmutilated. If the decapitated frog be fastened by its back, and the inner side of one of its thighs be sprinkled with acid, it tries to get rid of the latter by rubbing the two thighs against each other; but if the moved thigh be separated far from the other, after a few vain attempts it suddenly stretches this one out, and pretty accurately reaches the point which was irritated. Lastly, if one breaks the upper thighs of decapitated frogs and cauterizes, whilst they are stretched on their bellies the lower part of their backs, they correctly touch the cauterized spot with the feet of the broken limb, in spite of the disturbing nature of the treatment. These observations, which may be varied in diverse ways, show that the animal can adapt its movements to its changed conditions." (Wundt, op. cit. vol. ii. p. 404.)

Of course what is true of this simplest form of nerve action is still more true of the higher forms, until we have a large number of nerve centres acting co-ordinately with each other, and all subordinated to the execution of a given act recognized as necessary for the preservation or development of the organism. But it is enough for our purpose to take our stand upon this elementary form of reflex action, and thus cut the very standing ground from under the feet of the materialist.

This, then, is our conclusion: the psychical is immanent in the physical; immanent as directing it toward an end, and for the sake of this end selecting some activities, inhibiting others, responding to some, controlling others, and adjusting and co-ordinating the complex whole, so as, in the simplest and least wasteful way, to reach the chosen end. We find, therefore, that in the simplest form of nervous action there are involved categories transcending the material; principles to which matter, as such, is an entire stranger. Matter *per se* knows no higher category than that of physical causality. Its highest law is that of the necessities of antecedent and consequent. In nervous action we find the category of teleology. The act is not determined by its immediate antecedents, but by the necessary end. We have gone from the sphere of physical to that of final causation, and thereby we recognize that we have gone from the purely physical to the immanence of the psychical in the physical, directing the latter for its own end and purpose.

The materialist, with his reversed logic, which attempts to get the higher from the lower, instead of accounting for the lower on the ground of the higher, utterly misses the nature of the case. To him, the fact of reflex action, the fact of purposive adjustment (if he be far enough advanced in the elements to recognize the fact at all) is evidence of the self-sufficiency of matter. He forthwith makes teleological action an attribute of matter, and intelligent purposiveness a function of the material. He does not recog-

nize that in doing this he is giving up all that characterizes matter as matter, and is, in effect, recognizing the primacy of spirit. If teleology belong to the essence of matter, and purposive regulated action be the nature of the material, then matter and material cease to be what they are commonly regarded as being (viz., matter and material), and become but the hiding places (which are the dwelling places) of spirit and the psychical. The dispute is not, I suppose, about what words we shall use, but what principles. Nor is the question, again, about pictures, but about laws of explanation. If we cease to form a verbal or pictorial conception of matter we shall find that for scientific purposes it means the principle of physical causation; the constant and invariable relations of antecedent and consequent. To attempt to get more into the conception of matter is unscientific in that it is unwarranted; and unscientific in that, if it were accomplished, it would destroy the basis of all physical science and leave it the field for the play of imaginative fancies by whose side the highest flight of the science of the Greek, or of the Middle Ages, will sink into insignificance. The recognition of this one principle of physical causation, the invariableness of succession, is the theoretic basis of all physical science. To attempt to include more is to destroy the principle without reason, and to introduce unbounded confusion. Some foregleams of the depths of absurdity to which we may reach, once started on this course of surrendering principles to words or images, may be seen in the efforts of some German materialists, who, in their laudable efforts to be consistent, have found it necessary to supply the primordial atoms with sensations, and who hold that the laws of the universe are to be deduced from their primitive loves and hates, their desires and strivings. Such is the only consistent position for a materialist. But it is a consistency which looks marvellously like a *reductio ad absurdum*. And it is suicide as well, for it is to give up the very essence of the materialistic position, and to

admit that the nature and laws of the material are constituted by the psychical, which is the determining and prior element in the case. To attempt to swallow up the psychical in the material is not only absurd, but it is useless, for the psychical always revenges itself by encroaching upon the material, and when we finally look for some independent speck of matter, there is none there. It has all been spiritualized. Or, if there be one speck there, it must be defined in terms of the conception of matter just laid down. It will be found to be matter because it acts according to the principles of physical causation and not of final causation; because it is determined by its antecedent, not by an end working itself out in it. So that after all there is no choice for the materialist. If he will but once open his eyes to the fact of purposive action he has no alternative. He may attempt to claim this function as an attribute of matter; if he does, as just seen, he dematerializes his matter. He may admit that there is matter whose principle and law is that of psychical causation. He will then recognize that whatever transcends this principle is essentially non-material, and that with the appearance of teleological action upon the scene, we have passed from the realm of the material into that of the psychical immanent in the material. This is rational, and this saves science from becoming the sport of every inflated and ill-balanced imagination.

There is another method of escaping the significance of purposive action, equally futile, but equally attractive to the mind that prefers panoramas to principles. It is, at present, the more fashionable method. In brief, it is to admit that the actions are at present teleological, but that they became such through a long series of accidental experiments (experiments which were not experiments, as they were not trying to reach any end) of which some happened to be advantageous to the organism, and, surviving, give us now the appearance of purpose. This theory attempts to make the teleological an accidental prod-

uct of the mechanical. It generally hides itself behind imposing scientific terms connected with the theory of biological evolution. It uses its "variations" and "selection," and "survival of the fittest" and "heredity," and thinks that in the end it has got something out of nothing — purpose out of accident. But the argument is suicidal. It only changes the special case into a general law. It gets rid of the primitive purposiveness of, say, a given reflex act, only by importing purposiveness, and thus intelligence, into the very structure of nature. It simply says that nature is such that, by the observance of its own laws as ascertained by science, it gives rise to action for and by ends. Variation, selection, heredity, as *names*, do not, I suppose, accomplish the result. It is that there are embedded in the very constitution of things, forces and principles which as they work themselves out, by their action and reaction, give rise to activity for an end, to purposive action. In short, not only is the structure of the nervous system such that it gives rise to teleological action, but the structure of nature itself is such that it gives rise to this special kind of purposive action. He who has thought to get rid of teleology, and thereby intelligence, in this special case, has done it only by the recognition of teleology, and thereby intelligence, as a universal principle and acting force. Darwinism, far from overthrowing this principle, merely establishes it as a general law of the universe, of the structure of things. Nature is made teleological all the way through.

From this digression, which has, I hope, developed the argument, as well as secured it from possible misconception, I return to the conclusion. The psychical is teleologically immanent in the physical. The simplest nerve action is not so simple as to exclude the adaptive, purposive factor. It is always an adjustment. It is never a mere mechanical result of a stimulus, but always involves selection, inhibition, and response. The stimulus favorable to the well-being of the organism is selected from the immense

number playing upon the organism; others, especially those unserviceable, are inhibited, and then the action results according to the needs, that is, the purpose, of the organism itself. If we broaden our view and take in the consentaneous action of the whole organism, the conclusion appears only the more clearly. The various sensory and muscular stimuli, almost infinite in number, are always co-ordinated and harmoniously combined. The nerves of the cord, the cord itself, the special sense nerves, the cerebellum, the basal ganglia, the cerebral hemispheres, with their infinitude of fibres and cells, act as an adjusted unity for one purpose, and one alone—the welfare of the organism. At times it may seem as if one part were functioning alone, but it is always found (unless the action be pathological) that it is a relative independence. The end of the organism is best gained by allowing a certain amount of originative and self-executed action by the particular part. The apparent independence is but the evidence of the thoroughly teleological character of the whole. It signifies the division of labor in order that the whole task, the development of the organism, may be the more speedily and economically effected. There is no communistic level, but the due gradation and subordination of the various factors in the unity of the whole, as in a well-organized society. There is, in short, the co-ordination of all the nerve organs, and the further subordination of all to the end of the whole, self-realization.

Such is the conclusion we arrive at, without leaving the purely physiological sphere. But such a conclusion is one-sided and narrow, until expanded to take in all the phenomena. The body, through the nervous system, is not only a *physiological*, but a *psycho*-physiological organism. Expressed in its lowest terms, there is *sensation*, as well as adjustment of all the activities to one end. Those who have asserted the spirituality of the soul have often begun to build too high. They have taken as their fortress abstract thought, or the free-will. Now these offer,

indeed, an impregnable refuge, but, in opening the campaign from there, ground is abandoned which, by all territorial rights, is the eminent domain of the spiritual soul. To return to the former metaphor, we can finally build higher and more firmly, because on a broader foundation, on the basis of sensation. Too often is the claim of the materialist that sensation, at least, can be accounted for by material processes, admitted explicitly or tacitly. It seems to be thought that because the immediate and close connection of sensations with the nerve organs and the brain can be made out, that thereby their material character is established. At bottom, this is the survival of a metaphor, out of date at its very birth. The mischief that the term "impression" has played with psychology can never be measured. One of the greatest claims which physiological psychology has upon us is that it has forever outlawed the term and the conception. The only word which has any place in psychology as expressing the material antecedent of the psychical state, sensation, is *stimulus*. Our semi-materialists, like Mr. Huxley and Mr. Tyndall, always conclude their baldest assertions of the dependence of the mind upon the brain with some such statement as this: The passage from the physics of the brain, from a nervous irritation, from a change of motion and matter, to a fact of consciousness, to a psychical state, to a sensation, is unthinkable, is an inexplicable mystery, a gulf which imagination cannot span; and so on, *ad libitum*. One would think that if they would cease attempting to picture the transition and endeavor to *think* it, the explanation would be so patent as to stare them fairly out of countenance. The "mystery" would explode in its own fatuous vacuity. The unthinkable arises from the use of wrong categories, wrong principles. No better evidence that the physical and the psychical are not related as cause and effect, as producer and product, could be adduced than the utter "mysteriousness" hanging with "inexplicable" persistence over all at-

tempts to get one out of the other. When it is recognized that "inexplicability" is not an ultimate fact to be supremely contented with, but a positive condemnation of the method and principles which have led to it, our scientific men will reflect twice before they thrust their uncomprehended physical categories into the psychical realm, thereby begging the whole question, and, themselves being witnesses, landing the whole affair in a mystery which cannot be discriminated from an absurdity. It was recognized some hundreds of years ago that in geometry a *reductio ad absurdum* is a perfect and beautiful demonstration of the untruth of the original hypothesis. Let us hope that the idea of the unity of all thought will finally dawn upon the scientific men who have taken the contract of philosophizing for the English-speaking portion of the nineteenth century, and that they will recognize that what holds in the basis of all scientific reasoning holds also in the rudiments of philosophical.

We will abandon, then, all attempts to picture the confessedly unimaginable, and those endeavors to explain which lead us into the confessedly inexplicable. We will begin with the facts, and inquire what principle they force upon us to explain them; we will not begin with a principle, and, after having in nine-tenths of the paper victoriously "explained" all facts by it, wind up with confessing that it is all inexplicable, and accordingly go on to revel in the unutterable bathos of the "mysterious." If we take the facts, they are simply these: (1) the constant sequence upon a certain nervous process of a psychical state known as a sensation; (2) the entire lack of any connection between the two by way of physical causation, i. e., by way of identity of matter and motion involved. The principle which this leads us to is that the physical antecedent is a stimulus necessary for the production of a sensation; and that it is only a stimulus. The sensation does not come *from* it, although it would never come *without* it. The sensation has its *occasion* from the nervous process; it has

its *cause* from within. The physical process awakens the mind, it incites it to action; the mind, thereupon, spontaneously and by its own laws develops from itself a sensation. The specific names given to the various factors involved is of no importance, as long as it is recognized that the principle concerned is that of stimulus and response; response, which, for its existence, depends upon the physical antecedent, but for its content and nature, upon something else. We must recognize that we have got to go beyond the principle of physical causation to the principle of self-developing activity, though an activity which is not infinite or self-produced, but dependent upon an occasioning impulse beyond it. In short, not only is the soul immanent in the body, as teleological, as subordinating and adjusting its various activities to an end, but the body is the stimulus to the soul. It is the condition of the calling forth of its activities. It is the spark which fires the mind to light its own inextinguishable flame. Sensation, and, *a fortiori*, all higher physical activities, testify to the creative, self-determining power of the mind, with the proviso attached that this power has been called upon to act. There is just the same mystery about it that there is about every fact in the universe, the mystery that there should be such a fact at all. As to principles involved, there is no more mystery than in the explanation of any physical or chemical fact. In ultimate analysis, the spiritual principle is less mysterious, is lucidly transparent in comparison with the mechanical; for it is only from the former that the latter gets its explanation and the guarantee of its validity.

If we include within our survey the psycho-physiological facts as well as the purely physiological phenomena of nerve action, we come to the conclusion that the soul not only directs and focuses the activities of the organism, but that it transforms them into something which they are not. It realizes itself upon the hints, as it were, given by the body. The soul is not only

immanent in the body, as constituting its unity and end; it is transcendent to it, as transforming its activities for its own psychical ends. It uses it as material out of which to build its own structure, as food by which to nourish its own life. These two principles, of the immanence and the transcendence of the soul, to which we have been led by the study of the facts, cannot be left in this isolated way. They must be shown in their unity as necessarily involving each other. And again we turn to the facts of psycho-physiological life with the assurance that the principle will be involved in them, and that we are not left to the logical manipulation of our conceptions.

They are the facts connected with the execution of definite psycho-physiological functions. They may all be included under the phrase "localization of functions," if the phrase be understood in a broad sense to mean the performance of any definite act of psychical bearings by any specific, organized portion of the body. It would include, therefore, the performance of reflex acts by the spinal cord, as well as the supposed location of the "speech centre" in the third frontal convolution of the central hemisphere. The ground for this extension of the term is the unity of all nervous action, as well as particular facts to be presently mentioned. The only difference between the regular and constant "localization" of reflex action in the spinal cord, and of speech in one part of the brain, is a difference of degree, not of kind. The difference is between a localization perfectly formed, and a localization in process of forming. Organization of function might be the better term.

If we turn again to our authorities we shall find the facts substantially as follows:

1. In some form or other localization or, to use the better term, organization of psychical function, is all but universal. The body is not a homogeneous mass which is indifferent, equally as a whole and in all its parts, to the soul. On the contrary, neither as a whole, nor in any of

its parts, is it neutral to the soul. That it is not as a whole, we have seen when considering the immanence of the soul in the body; that it is not in any of its parts, is simply a detailed application of the same principle. The soul is not only in the body, but it is in it in definite, particular ways. The body as a whole is not only the organ of the soul, but the various structures of the body are differentiated organs, of various capacities and tendencies, of the soul. That is the meaning of the localization of function, or of the fact that certain activities have certain, more or less defined, nervous centres in various portions of the spinal cord and brain.

To give the specific evidence of this localization would be but to repeat the whole of the morphology and physiology of the nervous system. The nervous system itself is but a differentiation of the ectoderm; the special sense organs are only so many continuations of the brain and spinal cord. If we take the various movements, we find that, in going from the simplest to the most complex, from the mere reflex action to the most consciously purposive movement, nowhere does the will act without a structure already formed for it. Learning the higher movements, like walking, talking, etc., is but the formation of the organized structures of the body. If these be wanting, no matter how completely the end and the proper means of reaching it are present to consciousness, the volition cannot be performed. If we leave the motor and sensory spheres and come to the higher ideal operations, the evidence for the localization of functions is much less complete and forcible. But we need only to recognize the dependence of thought upon sense for its materials, and largely upon language for its form, to be aware that the same principles must, in some degree at least, hold here also. The fact that in thinking we never deal with the ultimate psychical elements, but with symbolic wholes, with processes already integrated, is still more striking psychological evidence of the same fact. Just as it would take

hours to perform a simple act like dressing, if the motor functions did not become organized in the bodily structure, if the will were obliged to go into detail of the act, instead of simply setting the whole mechanism into operation to work itself out, so in the intellectual sphere. If the various sensations and ideas remained isolated, if they were not organized into wholes, if they were not changed from material into structure, the mind would require hours to take in the meaning of a single sentence, or to reason out a simple inference. But the fact is that the mind does not deal with ultimate elements; it always has integral wholes which it may grasp and use without endeavoring or needing to resolve them. And that there is some similar physiological grouping and integration, some corresponding organization of function in the brain, all artificial experiments upon animals, and all natural experiments, performed by disease upon man, go to show.

2. But there must be explicitly stated, what has already been suggested; viz., that the degree of this localization, both as to definiteness and completeness, varies very greatly. The lower the function, the more perfectly and narrowly is it localized. The wider its scope, and the greater its consequent necessity, the more complete and spatial, so to speak, its localization. Thus the functions of breathing, digesting, swallowing, etc., which are necessary to life, and which have only indirect psychical bearings, have very definite and thoroughly localized centres; while the higher activities, like walking, talking, reading, and writing, involving more and more activities and of a more complex kind, have less and less definite local centres. In the higher activities there is no perfect mapping out at all, but all sorts of shadings-off and variations. So if we consider the sensory sphere, we find that, while the sense-centres may for some of the lower animals be made out pretty certainly, there is no such certainty and agreement in the case of man. And the reason is evident;

in the animals, the sensations remain mostly what they are—pure sense-feelings, while in man these sensations have been so related and interpreted that they have become for the most part perceptions, and even higher ideal relations. Consequently we find that *ideas* as such have no localization whatever. *There is not the slightest evidence whatever that any special idea, whether a percept, an image, or a concept, has any definite specific centre. There are all kinds of evidence that it has not.* The elaborate calculations of Mr. Bain in his work upon Mind and Body going to show that there are as many fibres and cells in the brain as the mind has separate ideas and associations, is based upon an utterly unfounded *a priori* assumption; viz., that cells in the brain correspond to ideas, and fibres to associations. It cannot be stated too strongly, or insisted upon too often, that there is not the slightest fragment of experimental evidence for the theory. There is much experimental evidence to show that the case cannot possibly stand thus. This evidence may be summed up in the statement that all lines of inquiry, morphological, anatomical, and physiological, converge to one result: the psychical function or bearing of the cell is dependent, not on its own structure, but upon its connections by means of the fibres. An "idea," however simple it may seem, has not its physical basis in a cell, but in a group of cells, connected and interconnected by multitudinous fibres. If the idea be very complex it may possibly have relations to all the cells in the brain. This may be an extreme statement, but, beside the statement that any idea may be localized in a given cell, it is truth itself. Hence we see the entire failure of all attempts definitely to localize the higher intellectual functions. The evidence does not warrant the statement that, upon the whole, they have no physical connection; it does warrant the statement that the relations involved are so many, so far reaching, and so complex, that any attempt to find a sharply marked out centre must be forever in vain.

3. The two statements already made that localization is practically universal, and yet that the higher intellectual powers cannot be definitely localized at all, do not contradict each other, They find their reconciliation in the statement that *localization is not original, but acquired.* It has already been stated that the localization is no quality originally inherent in the cell; but that it depends upon the cell's connections through its fibres. As Wundt says (op. cit. vol. i. p. 225), "No element executes specific functions, but the form of the latter depends upon the connections and relations of the cell." And this dependence of localized function upon connection, is the same as to say that given elements of the brain act in a certain way only because they have been associated in the performance of the act. The localization is dependent upon use and exercise. Thus it is that Wundt goes on to state the two following principles: "Every definite function has, under given conditions of connection, a definite place in the central organ from which it proceeds: that is to say, whose elements stand in relations fitted for the execution of the function," and "Every element is the more fitted to the performance of a definite function, the more often it has been occasioned by external conditions to its performance." Localization of function is, in short, only the physiological way of saying habit. The organization of function is not indwelling in the brain as so much matter: it has been *learned* by the brain and learned through the tuition and care of the soul. By no twisting can the phenomena of localization of function be twisted into the support of materialism. The very fibres and cells cry out against such treatment. They all assert that the powers they have, they possess, not of their own original and indefeasible right, but by means of the activity, and under the authority of the soul. This accounts for the various degrees of localization found. The acts most necessary for the soul's ends, and therefore oftenest performed, have, through heredity, become definitely and completely organized,

and, like reflex actions, go on without consciousness, or, like instinctive actions, involve others, which in complexity and far reaching influence are beyond the immediate consciousness of the moment. But the soul, for its own ends, requires again that its higher activities be not thus mechanized. There must be a constant growth, adjustment to new relations, intellectual and moral, and this requires plasticity, variability. In the higher activities complete organization would mean stagnation, death. Thus it is that the higher we come, both in the range of animal life, and in the range of intellectual function, the less the localization. But in each case the evidence all goes to show that the localization is not original, but is acquired because the soul has repeatedly employed the given elements for the performance of a given act. The soul does not write in water, but in the plastic brain and spinal cord. *Litera scripta manet.* By the performance of its acts the soul gains a mechanism by which to perform them again the more readily, economically, and perfectly.

Thus we see how the phenomena of localization of function give us a stand-point whence to view the nature of the immanence and transcendence of the soul. The soul is immanent in the body just so far as it has made the body its organic instrument. The common saying that the "body is the organ of the soul" is literally much truer and more significant than is usually thought or meant. The term "organ" expresses a much more intimate and internal relation than is commonly understood. Organ presupposes function, and soul and body are related indeed as function and organ, activity and instrument. As Aristotle said so long ago, the body is the organ of the soul, as the eye is the organ of seeing. The body is not an external instrument which the soul has happened upon, and consequently uses, as a musician might happen upon a piano. The body is the organ of the soul because by the body the soul expresses and realizes its own nature. It is the outward form and living manifestation of the

soul. To quote from one of the most original and deeply spiritual thinkers whom America has yet produced: "It is the outward man, in and through which the inward powers of the soul express their form and character. It is the necessary mode of our existence in the world of sense, without the intervention of which we have no knowledge, either objective or subjective, no existence in nature, either in space or in time. It is not merely an organ to be conceived as distinct from our personal self, but *it is our proper self as existent in space*, in the order and under the laws of nature."[1]

But this is only one-half the tale. The soul is immanent in the body only because, and in so far as, it has realized itself in the body. The body is its organ only because the soul has *made* the body its organ. The immanence is shown by the localization; the transcendence, by the fact that this localization has come about through the soul's own activities. The body as an organ of the soul is the result of the informing, creating activity of the soul itself. In short, the soul is immanent in the body, not by virtue of the body as mere body, but because, being transcendent, it has expressed and manifested its nature in the body.

The soul, accordingly, is not a powerless, impotent something, so transcendent that it cannot be brought into relation with matter. It is a living and acting force which has formed, and is constantly forming the body, as its own mechanism. This assures, on the one hand that no act or deed of the mind is ever lost, that it finds its registration and record; and that not alone in some supralunary sphere, but down here in the world of matter: and, on the other hand, it forms a mechanism by which the soul can immediately know, can grasp the fragments of its knowledge into one symbolic whole without laboriously gathering them and piecing them together, and by which it can immediately act. It is, as it were, the mind's automaton, ceaselessly and tirelessly executing the demands respond-

[1] President James Marsh, Remains, p. 257.

ing to the needs of the soul. All the phenomena which the materialist parades forth as "proofs"—the unconscious cerebration, the automatic, yet apparently intelligent, action in many states of unconsciousness; the dependence of perception and memory upon the proper condition and integrity of the brain; the accompaniment of brain disease with unconsciousness and insanity; the ratio between mental power and weight and complexity of the brain, etc., are the farthest removed from evidence of materialism. They are but the conclusive evidence of the thoroughness with which the soul has done its work, has formed its mechanism. They are all evidence that the soul is not hanging helpless in the air, but has made the body its home, and has realized itself so effectually in this body as its mechanism, that this mechanism can now act all but automatically, while disturbance of the mechanism of the organ excludes the execution of the corresponding activity, until the soul by its power form the organ again. The materialist but looks at the body after the soul has done its work in making the body what it is, and cries, "Lo, see what the body can do." Every one of the phenomena mentioned, as well as all which the materialist can mention, concern the formed body, the body in which the soul has already organized its functions. The true cry is, "Lo, see what the soul *has* done. It has tabernacled in the flesh and transformed that flesh into its own manifestation. The body is the bodying forth of the soul."

It was the "master of those who know" that said that the soul was the perfect realization or expression of a natural body, and at the same time, not the product of body, but its very life, its essence, its truth and reality—at once its final and efficient cause. (Aristotle, De Anima, ii. 1.) And it was the Teacher of all who know, the Light which lighteth every man that cometh into the world, who said: "Except a corn of wheat fall into the ground and die it abideth alone: but if it die it bringeth forth much fruit." And it was the great disciple of the great

Teacher who wrote "That which thou sowest is not quickened except it die; and that which thou sowest, thou sowest not the body that shall be, but bare grain, it may chance of wheat or of some other grain; but God giveth it a body as it has pleased Him, and to every seed his own body. . . . . It is sown a natural body, it is raised a spiritual body. There is a natural body and there is a spiritual body."

Christianity has no sympathy with those who have such a superfine fear of materialism that they aetherialize the soul past all contact with the body. It knows that in the body the soul is incarnate; that through the soul the natural body comes to be a spiritual body, as the soul works itself out, and realizes itself in it. The soul does apparently die in the body; it hides itself so effectually that the materialist says there is no soul; but it has died as dies the seed, to quicken and transform the body. It is by no accident or meaningless chance that we read in the Apostles' Creed those sublime words: "I believe in the Resurrection of the Body. Catholic historic Christianity, having such a confession on its lips, has no alliance with the metaphysical dualism of spirit and matter, and no fear of the exactest demonstrations of physiology regarding the closest connections of body and soul. It takes its stand upon the words of St. Paul, to which these demonstrations can only add more weight: "There is a natural body and there is a spiritual body. . . . . Howbeit that was not first which is spiritual, but that which is natural; and afterwards that which is spiritual." There is the body, the natural body, first. Spirit indwells within the body, and manifesting itself, realizing its own nature, it makes that body its own organ and servant. It thus makes it the spiritual body. Let it be no surprise that physiological psychology has revealed no new truth concerning the relations of soul and body. It can only confirm and deepen our insight into the truth divined by Aristotle and declared by St. Paul, and with good reason.

"*Das Wahre war schon längst gefunden.*"