

M I N D

A QUARTERLY REVIEW

OF

PSYCHOLOGY AND PHILOSOPHY.

I.—THE DOUBLE BRAIN.

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I.

Is the brain, which is notably double in structure, a double organ, "seeming parted, but yet a union in partition"? Or is it a seeming whole made up actually of two organs? Have we, in fact, two brains as we have two eyes, two lungs, two kidneys? Or have we one brain as we have one body, built up of two similar halves?¹

Whatever the fact, we are entitled to declare the action of both halves or of both organs to be necessary to the fullest function of the organism. We see better with two eyes than with one eye, breathe better with two lungs than with one lung, do more with two arms than with one arm, although one eye, one lung, one arm will serve in case of need. This is true where the organs are two, separate and independent,

¹ In his original and suggestive book on *The Duality of the Mind* (1844), a book which has never perhaps obtained the attention which it deserved, Dr. A. L. Wigan enunciated and maintained the doctrine that the two hemispheres of the brain are really two distinct and entire organs, and each respectively as complete (indeed more complete), and as fully perfect in all its parts for the purposes it is intended to perform, as are the two eyes.

much more true, therefore, where the organ is one whole made up of two halves. In the former case the loss of one organ would mean so much subtraction of function only, a loss which might be made good by the increased action of the other that was left; in the latter case the loss of one half would not be a lessening only, but a laming of function, which could not be compensated by any increased action of the remaining half.

When we reflect upon the intimate constitution and structural connexions of the brain, it seems the natural conclusion that it is not formed of two distinct organs any more than the body is formed of two distinct bodies; that, like the body, it is a bilateral structure. Essentially it is a great aggregate of nerve-centres and nerve-tracts, part of, and administering organ in, a circle of communication between the organism and its medium, nowise a separate and paramount centre of authority, a sort of supreme organ apart, as ordinary language might seem sometimes to imply; an aggregate with which all parts of the body are in communion, mediate or immediate, in which they may be said to have direct or indirect representation, through which the whole works in each part and each part in the whole; and it is bound, therefore, by its constitution and relations, however great the separateness of its halves in respect of some functions, to be fundamentally a double organ ministering to one function, the function of one body. It represents at the same time the halves of the body and the unity of the whole whereof itself is part.

That the halves of the double brain, like the halves of the body, have corresponding functions, one perhaps having fuller function than the other, but the work being of the same kind, is a conclusion warranted by (*a*) their similarity of conformation and structure; (*b*) the fact that they are respectively in communion with and representative of similar organs and structures of the body; (*c*) the observation that the one hemisphere may do the work of both hemispheres in thinking and feeling when the other is destroyed; (*d*) the results of artificial experiments on animals and of the natural experiments yielded by disease in man, which agree to locate many corresponding sensory and motor centres of the cortex in the hemispheres.

Are the halves of the brain capable of acting singly as well as conjointly? Of this there can be no doubt. The right half certainly governs the movements of the left limbs and the left half the movements of the right limbs; wherefore, when anyone makes a series of movements with his right

hand while his left hand is at rest, the proper nerve-tracts of his left hemisphere are working while the corresponding tracts of his right hemisphere are at rest. Moreover, so far as he is planning his acts and thinking of what he is doing, that is to say, performing his movements ideally, we must assume that the cortical plexuses of the brain, the thought-substrata of it, are at work on the left side and at rest on the right side.

It is certain, again, that the two sides of the brain are able to act differently when acting together—that they may direct different but harmonious movements in the corresponding limbs of the opposite sides of the body. In various complex feats of bodily skill, in which each limb is differently employed at the same time while co-operating to a common end, the right brain must be occupied in directing a series of movements of the left arm and leg, and the left brain a series of movements of the right arm and leg. Moreover, the movements in either case might be such as the proper hemisphere only could accomplish. There are notably movements which the one hemisphere can, but the other cannot, do: the act of writing, for instance, implies an orderly series of finely specialised movements of the right hand which the left hemisphere has been patiently educated to command and execute, but which the right hemisphere certainly cannot command the left hand to perform; therefore the right brain is at rest when the tracts of the left brain which subserve writing are at work, and cannot even think the special movements when the left tracts are destroyed. It is the same with speech, the cerebral centre of which is proved by pathological observations and experiments on animals to be in the lower part of the third or ascending left frontal convolution. Indeed, the capacities of the most highly specialised movements seem, so far as we know, to be contained only in one—the opposite—hemisphere. The most highly specialised movements of the hand, at any rate, are lost after a complete destruction of the proper cortical centres of the forearm and hand; permanent paralysis ensues, since the other hemisphere does not take up the work. It cannot do so, presumably because it has not been taught the fine special work.¹

¹ It is almost universally admitted now that each cerebral hemisphere contains the centre of voluntary movements and of sensory perceptions for the opposite side of the body; experiments on animals and observations of disease in man having apparently put the conclusion beyond all reasonable question. All the more surprising is it, therefore, to find Prof. Brown-Séquard continuing to express an unqualified dissent and

From what has been said it appears plainly that the functions of the hemispheres, and of the respective tracts in them, may be—

(1) *Single*—when one may replace the other, directing the same kind of act with a different instrument, as when either right or left hand is used, or when the one hemisphere does work which the other cannot do.

(2) *Conjoint and correspondent*—when they combine the same series of movements to a common end. When they do that, as they do for the most part automatically, having been patiently trained to the work, it is probable, almost certain, that the impulse from one hemisphere suffices to excite the proper movements, either because it acts upon associated subcortical motor centres which are the more direct agents of them, or because it instantly draws in its train of action the associated cortical centres in the other hemisphere. In the former case the subordinate centres form a bilateral nucleus or centre; in the latter case the supreme cortical centres have that character. For we may note here that it does not matter whether the associated centres in such case lie close together so as apparently to form one organ or not; if they are closely united in structure by fibres of association, and habitually associated in function, they are practically one notwithstanding that they lie some distance apart. From experiments on animals we learn that, when a cortical centre innervating muscles which are in the habit of acting in concert with corresponding muscles on the opposite side is destroyed, the corresponding centre in the opposite hemisphere takes up the function of the destroyed centre, and so prevents permanent paralysis.

(3) *Conjoint and different*—when the hemispheres combine to dictate different movements of the two sides for a common end, just as the eyes combine their different

believing that he has demonstrated the accepted localisation to be erroneous. In a recent number of an American popular journal (*Forum*, vol. v., No. 2, p. 169) he says: "I have shown by a large number of facts that this localisation is erroneous. In reality we have two full brains, as each hemisphere is endowed with all the powers we believe to exist in the two cerebral halves. It is now recognised that one-half of the cerebrum is enough for all intellectual functions; but facts show that this is the case also for the power of speech (notwithstanding what is so often seen in cases of aphasia), and for all the motor, sensorial and sensitive functions." One would receive this opinion of so practised a vivisectionist with more assurance had any adequate result ever come from [the multitude of his cruel experiments through a long physiological life.

visions of one object. And here it may be noted that the principle holds which was observed in corresponding movements of the two sides—namely, that centres habitually associated in function, although it be not now in correspondent but different movements, become in respect of that function practically one, a bilateral nucleus or organ, only with its halves of different structure, when the excitation of one will be the excitation of both.

Although the most highly specialised movements are thought to proceed from one hemisphere only, the conclusion may not be true of such highly specialised movements as are done habitually by the two hands in concert. In this case the necessary muscles on the two sides which act in concert might probably be put into action from either hemisphere, as happens with the movements of the two eyes, of the two sides of the face, of the two vocal cords. Adequate account must be taken of the effects of education. It would be quite possible to teach a child to write with its left hand instead of with its right hand, in which case the right hemisphere would be taught; or to teach it to write with both hands, if it were worth while, in which case both hemispheres would be taught; or to teach the two hands to act habitually together, if not in writing, at any rate in the performance of movements as fine and highly specialised as those of writing, in which case it is probable that either hemisphere would be able to actuate the necessary movements. Now it is notably much easier to teach the right hemisphere writing than it is to teach it speech, and it is not difficult to understand why. In the first place, the hands are entirely separate and able to act independently, while the tongue is one organ, bilateral, which, from the first, has moved as a whole and been governed by one hemisphere; and, in the second place, the left hand has been through life trained to finely specialised movements which render it the apter to acquire the new specialised movements of writing. But the main reason is, perhaps, that years are required to learn the exceeding nice, exact, numerous and complex movements of speech, which really go along in their acquisition and development *pari passu* with the acquisition and development of reason, whereas the simpler, fewer and less fine movements of writing may be taught in a few months. Words being the symbols of reasoning, the definite fixing of them and of the fine shades of their meaning—the nice and exact organisation of their proper nervous substrata—need long time and work, but once they have been acquired it is not so difficult to

substitute other symbols for them ; if a person, therefore, who has lost the use of his right hand retains his power of speech and reasoning, it ought to be little more difficult, if not easier, to teach him to write with the left hand than it was to teach him in the first instance to write with his right hand. To teach his right hemisphere language when he had lost the function by destruction of its seat in the left hemisphere would entail a far longer and more difficult labour ; it can be done best, therefore, in children, in whom the effects of the destruction of the speech-centre in the third left frontal convolution are usually temporary, can be done also to a large extent, sometimes even entirely, in young adults, but can only be done very imperfectly at the best in old people.

It appears plainly, then, in respect of movements, that the hemispheres have not entirely correspondent and equivalent functions, but that beyond their functions in common either has a certain independence and particular function, directing some special actions of its own, and that the left hemisphere is commonly the most richly endowed, governing entirely some of the most specialised movements. What is true of the outgoing current in action upon the medium as movement is true also of the ingoing currents from the impressions made by the medium in sensation and perception ; for it is impossible to separate the motor from the sensory element in perception, which is essentially reflex action at a higher remove.

It remains now to consider how the hemispheres act towards one another in thinking. If a person who is performing one kind of act with one hand and another kind of act with the other hand will endeavour to think of both acts at the same moment, he will discover that he cannot do so ; although he can execute the respective motions simultaneously, he cannot think them simultaneously ; he must pass in thought from the one to the other, a rapid alternation of consciousness taking place. The alternation, although rapid, is by no means instantaneous ; it is distinctly succession, since there is an appreciable pause in the performance of it. A simultaneous consciousness in such case would necessarily be a distracted or dual consciousness, for it would be the coexistence of two different states of consciousness at the same instant. If it be true that the hemispheres can work together simultaneously at different work, but cannot think together of it simultaneously, it is evident that the conditions of joint motor work by them are different from the conditions of

joint consciousness—that they are more separate as conscious than as motor agents, or at any rate than the motor centres concerned. Is it that they act together like a bilateral nucleus in the motor work, but act independently in the consciousness of it? Or is it that the actual motor agency is in closely associated subordinate centres, and that its thought-representation, the ideal notation or symbolism of it, so to speak, is in the convolutions?

When we try to conceive the physical side of that alternating experience, there are three suppositions which it seems possible to make: (1) that consciousness exists at one moment in the one, and at the next moment in the other, hemisphere; (2) that the hemispheres act together by a sort of immediate sympathy or induction during the alternating instants that we are conscious of their respective doings, the one suspending its own consciousness and repeating instantaneously that of the other the moment we pass in thought from the work of one to that of the other—the suspension of function being limited to consciousness, since the motor work goes on; (3) that one hemisphere or one nervous tract of it can perform function consciously at the same moment that the other hemisphere or a different tract of it is performing a different conscious function.

The last supposition may perhaps be dismissed without more ado, since it would involve the coexistence of two different consciousnesses at the same instant; the second is improbable, since it postulates a repeating action of the second hemisphere which is hardly consistent with the continuance of its different motor work, and which seems unnecessary in face of the observation that one hemisphere suffices for consciousness; there remains, therefore, the third supposition, of an alternating action of the hemispheres corresponding to the alternating consciousness.

It seems so natural and easy for the hemispheres to act together in function that we do not sufficiently consider that it was necessary to teach them to do it in the first instance and how much teaching they required in order to do it. We cannot perform simultaneously different movements dictated by them until we patiently learn the habits by practice: the requisite movements must be made automatic by frequent repetition and laboured attention, if we are to succeed well. Consider how awkwardly incompetent everyone is to perform at the same time two different and strange actions, the one with the one and the other with the other hand: he cannot for the life of him keep them going together at first, but must pass from the one to the other, boggling with both,

until he has gained the skill of habit, when he performs them together with perfect ease. What is the process of learning? He begins by performing the movements on either side slowly and alternately; by and by, as he gets expert by practice, he does them more rapidly and alternately, and finally, as he gains complete skill, is able by practice to combine them and to do them easily together: he puts the hemispheres, in fact, into alternate action until the proper centres in them, or the proper subordinate centres, as the case may be, have been trained to such close and fit association as to act together automatically and as one centre. The conjoint action of the hemispheres is practically in that case the single action of one compound centre. Herein we perceive plain and pregnant proof of a continuous and gradual education for joint action, the extent of which, since it begins and goes on from the first moment of life, we do not commonly realise.

It is tolerably certain that the full function of such compound centre, once it has been thoroughly organised as such, can be instigated by an act of will proceeding from either hemisphere—that the excitation of either half of it in that way will be the immediate excitation of the other half. At any rate this is true when it is acting through instruments so separate as the two arms and legs. A skilful pianist who is able to converse at the same time that he is executing a difficult piece of music must, I take it, require for his performance some co-operation of the cortical tracts of his brain; and, if that be so, it is a reasonable surmise that the one hemisphere is employed in that function while the other is employed in conversation. When he first learnt to play that piece of music he was obliged to attend to each note as he struck it and to laboriously associate in action the proper tracts in the two hemispheres; at that time he could not for the life of him have carried on a conversation at the same time; but afterwards, when he has perfected the necessary mechanism of association by repeated practice, he is able to put it under the direction of one hemisphere and to employ the other differently. Not that there is probably in such case simultaneous consciousness of the different operations; such consciousness as there is being, I make no doubt, in extremely rapid alternations.

That which is true of parts so separate and independent as the two arms seems not to be true of parts so closely bound together structurally as to form one organ—the tongue, for example; its halves cannot act separately, they must act together in relation to one another and in relation to the

very nice and complex movements of the lips and palate. The *one* organ cannot in such case afford equal authority to two governing hemispheres, since its unity demands a unity of authority. And inasmuch as its halves have from the first moment of life been taught to act together, whichever hemisphere got the lead at the beginning—as the left hemisphere commonly would, the right side of the body notably taking the lead and getting the preference in education—was bound to keep it; the education of the other must needs be precluded by the ground being entirely occupied. How is it possible to teach the right hemisphere speech while the left is in full and active possession of the function? There is practically no organ for it to actuate, since the one organ has been appropriated by the left hemisphere, which cannot, or at any rate does not, suspend its function from time to time in order to give the right the opportunities to learn it. It would be easy to teach the latter writing, were it worth while, because it has a separate organ available for the purpose; but as we deliberately do not think it worth while to learn to write with either hand, although perfectly able to learn the double accomplishment, it is not for us to accuse nature of parsimony because she has deemed one hemisphere enough for speech, and so doomed to speechlessness the unfortunate person whose left frontal convolution has been destroyed, notwithstanding that the corresponding convolution of the right side remains safe and sound, and, so far as appears, functionless. Faithful to its central purpose of providing for the continuation of the species against all hazards by a profuse excess of germs, most of which are produced only to die, it has shown more regard to bodily propagation—since it leaves one testicle capable of full function when the other is destroyed—than to intellectual propagation.

Whence comes the unity of authority in the diversity of movements dictated by the hemispheres when they are co-operating in a common act? When the two sides of the body combine different movements to a common end we assign the governing principle to the brain, but from what higher source do the hemispheres of the brain obtain their governing principle of unity? How is it that when dictating different movements they yet have an understanding in common and work together to a common end? The answer is that the unity does not come from above but from below; it is not something imposed authoritatively on them, but something acquired painfully by them; they get their conception of the aim of the act, the unity of it, from the tedious

training of experience in doing it. Like the two hands, the two hemispheres cannot act together until they have been taught, and can only act together in that wherein they have been taught. I may perhaps compare their joint action to that of two lithe and supple acrobats who can writhe their bodies in a conjunction and succession of the most rapid, nice and complicated movements to perform skilful feats of tumbling, which they have thoroughly learnt to do by practice but cannot do until they have learnt them by much travail and pains. In that case we have two separate brains at work in a co-operation of the most thorough and exact adaptations to accomplish an end, the one brain taking the lead or yielding it to the other as required. What is it that unifies their action? The end or aim in view. And what is the end or aim? The conception or foresight of the act, its ideal accomplishment, which is derived from experience—either individual working experience, when it is exact, full and capable, or observation of the built-up experience of others, when it is vague and general only, incapable of unifying successfully the movements of the two bodies, capable only of supplying them with a general purpose to direct the work of gradual adaptation through repeated trials and patient practice. The purpose is complete and definite only when the effect can be completely and definitely accomplished. Now just as either of the acrobats has the conception of the aims or ends of his respective feats, and both must have a common conception in their workings together, so it is probable that either of the hemispheres has the conception of the end of a joint action, and that both have it in common when they begin to perform it.

In this relation it is of the first importance to realise and weigh well the great work of education in building up our perceptions, judgments and powers of action, none of which would exist without the training of experience. Certainly perceptions are not the mere impressions on sense which they seem to be when we have acquired them, but are acts of inference or judgment grounded on experience: so easy and natural to us are they when formed that we fail to remember that we were not born with them, and to realise how slow and tedious their acquisition was actually. The first movements of the infant are notably uncertain, irregular, uncombined; they become definite, regular, and are combined by practice; more and more so day after day by insensible degrees, until they attain an automatic ease and exactitude. The two halves of the brain, which could not in the first instance work together, learn to do so by

practice.¹ It is exactly the same probably with regard to perceptions as it is with regard to movements: they are at first confused, uncertain, perhaps even double, the infant seeing one object as two objects, but become clear, definite and single by practice; more and more so by insensible degrees, until they take place in the end easily and almost unconsciously. How then should the hemispheres think separately, any more than the two eyes see separately, when they have been trained to work together from the first moment of birth? The perception of an object means fundamentally an aggregate of the different sensory effects which it is capable of producing in one being and the different responsive movements which that being is capable of making in relation to these impressions;² wherefore, if his hemispheres acted separately in thought, he would be brought to the contradictory impossibility of thinking as two objects that in relation to which he, one being, had always been obliged to feel and act as one object. The unity of feeling and action must entail unity of thought. To have always seen two objects as equally real where there was only one object would have been to confound or actually destroy uniformity of action in regard to it—in fact, to preclude true apprehension of it in thought; practical life would then have been possible only on condition of some difference in the two impressions, whereby we might learn to regard the one and to disregard the other, as we notably do in some instances of double vision.

As it is evident that consciousness attends the training to act together of the nervous tracts or centres in the divisions of the brain, and lapses when by association of functions they have been so firmly co-organised as to act together as one, it is easy to understand that in ordinary perception and thought, the automatic kind of daily work which involves no great attention, the action of one hemisphere, if it suffice not of itself, may entail the requisite action of the other hemisphere. Presumably it is where the indi-

¹ No doubt there is a certain innate predisposition or inclination of the hemispheres to enter into joint action, a sort of waiting readiness, not otherwise than as in two bodies which, without previous instruction, accomplish a sexual union that is entirely new to them; and at any rate they can do together simultaneously what one might have to do successively, and so save time.

² The eye in perceiving or *apprehending* literally *grasps*, like the hand, only it grasps the image, not the object; and if the object be indistinct and uncertain, as it is when it is a long way off, the eye, like the hand, makes repeated grasps, as it were, until it hits on the fit one—searches and tries, in fact, until it succeeds in the fit motor apprehension.

vidual is labouring to grasp some new thought, to compass a new apprehension, or where he is giving strong attention to a process of reasoning—where, in fact, new adjustments and new combinations of nerve-plexuses to new facts and relations are being made—that the process of associating the hemispheres to act together in one function is going on. The fullest voluntary attention would seem to demand their conjoint action ; perhaps the proportions and relations of things thus obtain representation in more adequate conceptions ; there may be a strength and grasp of thought in the union which there could not be in the single action ; and at any rate there will be a saving of time and wear by their doing together simultaneously what the one would have to do successively. So it is perhaps that we need the joint action of the hemispheres to apprehend best intellectually, just as we need the joint action of the two hands to apprehend or grasp best physically, and the joint action of the two eyes to see best. In looking at an object in front of me there is notably a part which I see with one eye only, a part of it which I see with the other eye only, a much larger, in fact the greatest, part which I see with both eyes, the fields of their visual consciousnesses coinciding there ; instead of seeing two objects, as I probably did in the first instance when I began to see, I combine the two images, blending into one perception that which my eyes see in common in the object, and uniting it to that which either eye sees. So I get one object in relation to which I can act definitely instead of two objects in relation to which, both looking equally real, action would be confounded. If we suppose something of the same kind to take place in single function of the hemispheres, then in the joint action of them for a definite purpose—which we may take to be the equivalent of the joint bodily action itself at a higher remove—there will be that which is special to either hemisphere, however little in some instances, and there will be that large part which is common to them in most instances ; and these elements will have been combined into one idea by the education of experience, as the impressions of the two eyes are combined into one image. Obviously the hemispheres are bound by their structural connexions with corresponding organs of sense and movement to have an immense deal in common. Now just as in vision, once the image has been acquired by experience, the momentary impression of the object on one eye is a sign quite sufficient to awaken it fully—(and a mere sign it is, which without the previous instruction we should no more be able to interpret into the object than we should

be able to understand the words of an entirely unknown language)—so may it be in thought that, once the idea has been acquired by experience, the least suitable stimulus to either hemisphere suffices to excite it fully.

If the hemispheres supplement one another in the acquisition and development of thought, we may well hesitate to conclude absolutely, as is sometimes done, that the complete loss of one occasions no impairment of the powers of mind. One would expect, *a priori*, to observe in a case of such damage less power of thinking new thoughts and more time taken in the process, less power of grasping and holding a thought, less power of sustained thought, less power of the functions which we include under the term attention. What are the facts? Unfortunately they are not yet accurately known; for although no appreciable injury to the mental powers has been discovered in those cases in which one hemisphere is said to have been entirely destroyed by disease, it is by no means quite certain that the observations were sufficiently thorough and exact—first, in verifying the completeness of the destruction of the one hemisphere, and, secondly, in making the careful inquiries necessary to test intimately and thoroughly the mental functions of the damaged individual. Those who have made the experiments on animals certainly hold it to be “a demonstrated fact that the removal or destruction of one hemisphere abolishes motion and sensation unilaterally, but leaves the mental functions unimpaired in respect of completeness; that the brain as ministering to motion and sensation is a single organ formed of two halves, but a dual organ as organ of thought”.¹ But here again there may be excuse for some hesitation to accept the conclusion absolutely—at any rate, in its implied extension to man; for, in the first place, the very difficult business of ascertaining the animal's exact mental state after the severe experiment may well warrant some reserve of judgment, and, in the second place, it is hard to believe, if speech is located in the left hemisphere, that a man's intelligence can remain wholly unaffected by its entire destruction. It is obvious that he might have the ordinary feelings and thoughts of life, and behave like other persons in the ordinary relations of life, while many subtle defects were hidden under the show of complete soundness.²

¹ Dr. Ferrier, *Functions of the Brain*, p. 426, 2nd ed.

² It is the more difficult to accept unreservedly the conclusion of the singleness of the organ as ministering to motion and sensation, and of

It is perhaps easier to conceive that one hemisphere may do well the ordinary work of thinking, feeling and willing when the function of the other is entirely suspended or abolished than it is when its function is not abolished entirely, so leaving the sound one free play, but is deranged or discordant. In this case the sound hemisphere must, if the person is to remain sane in thought, take the lead and correct the disordered function of the unsound hemisphere. So only can unity of thought be preserved; for if there were equal authority in the deliverances of the two hemispheres, the one being as much regarded as the other, there could not fail to be distraction and the reign of disorder. The person would most likely think double, as he sees double when disorder of the action of the eyes, giving visual results contrary to his uniform experience, causes him to see one object as two objects; in which case notably he is sometimes able after a while to learn to disregard the second object—all the more easily when the two objects are wide apart than when they are close together or overlap. Now, if the one hemisphere can take so decided a lead as to control and correct the other when it is deranged, and in that way to maintain order over disorder, it may be taken as additional evidence that it can by itself subserve the ordinary processes of thought, feeling and will: a conclusion which obtains, perhaps, further confirmation from the fact, already commented on, that in complex action for a definite end one hemisphere may be dictating one kind of movement while the other at the same time dictates a different movement.

One loss the person who loses the use of a hemisphere certainly sustains—namely, the loss of nearly one-half his reserve-power; he has nothing to fall back upon should the serviceable hemisphere fail him. Moreover, a continued strain of work on this under all conditions of health, even when some temporary indisposition unfits it for full function, will predispose and may in the end lead to permanent disorder of its structure.

II.

When we exert will, either to think closely or to do resolutely, we draw upon the affective life or life of feeling for

its complete duality as ministering to thought, if we stand by the generally received doctrine of sensory and motor areas in the cortex. Are corresponding sensory and motor centres of the cortex on the two sides a single organ, and the closely adjacent or perhaps actually intermixed cortical centres or tracts of thought on the two sides entirely dual?

the driving force. The intellect deals only with the clearness or dimness, the definiteness or indefiniteness of ideas, it supplies no motive energy; all the ideas in the world might pass through it without there being any feeling or desire in relation to them—without appetite or inappetence; it would never experience the least motive of indulgence towards one rather than another, would never tend to one rather than another. The desire tinged any idea, the affective tone or element of the idea, its motive power, comes from the affective life. Now as it is certain that ideas belong to the cerebral hemispheres, being elaborated and performed there, so it is certain that the sources of the passions or affections of mind are distributed through the whole body; they spring and flow from the organic life, of which the so-called sympathetic system of nerves is the ministering nervous machinery. And here let it be noted that recent inquiries go to prove the sympathetic system not to be the separate and quasi-independent nervous system which it has been customary to regard it; so far from being a different system from the cerebro-spinal, it would appear to be actually neither more nor less than the splanchnic distribution or system of the cerebro-spinal. There are not, in fact, two nervous systems, but there is one nervous system with its different distributions.

Again, it is certain that the life of feeling is fundamental to the life of thought; it goes before it in the order of development and lies deeper in the individual nature—is rooted in the organic life and constitutes really the basic unity of the Ego, all whose passions and emotions are determined in character according as their exciting causes help or hinder its self-expansion. The fundamental note of the organic life, as of all life, is attraction and repulsion—to ensue what is profitable, to eschew what is hurtful, to it; and the organs of animal life inspired by it are really its means and instruments to accomplish this end. Their function is to sustain and maintain the organism by procuring food, by securing what is helpful and repelling what is hurtful to it, by embracing what is agreeable and shunning what is disagreeable—in fact, to protect and defend and further life in all ways. In like manner the function of the hemispheres, which are themselves incorporations of the capitalised experience of the life of the race in doing such work of protection and furtherance through the ages, is to assimilate in thoughts and actions what furthers development and to avoid what is adverse to it—to incorporate experience in structure and to use it serviceably; there being superadded in their nature in

the process of evolution, and they therefore superadding in the display of their function, all the social developments which the fundamental instincts and reflex acts have undergone—that is, the æsthetic developments from the mere animal, the rational from the instinctive, basis. What, in fact, it behoves us to apprehend clearly and to hold well in mind is that the cerebral hemispheres represent at bottom an aggregate of complex evolutions of the fundamental reflex acts of self-conservation and self-propagation ; that they are the from-age-to-age-evolved instruments through which the most complex organism in the world gets into more and more intimate relations with the intricacies of external nature in the course of developing its fundamental self-conservative and propagative instincts. Their combined and separate actions are as the combined and separate actions of the dual organs of animal life, unified as they and these are by the basic organic life.

It appears, then, that the unity of the intellectual life which, so far as the division of the cerebral hemispheres is concerned, might apparently be almost dual, is based upon the unity of feeling, and this again upon the unity of the organic life. For although there is a symmetry of the organs of animal life on the two sides of the body, there is not a like symmetry of those of organic life throughout the body ; most, if not all, of them are, it is true, symmetrically double in the earliest state of its embryonic development, but there is provision made in their subsequent union for the unity of life of the individual. We conclude, then, that it is feeling which gives welding unity to thought and from which power is derived ; that the thoroughly combined action of the two hemispheres which was before judged to be necessary to the exercise of strong attention—necessary, that is, to the fullest accomplishment of the *wish* or *desire to tend to* an object—derives its principle of unity and motive power from the organic life through the sympathetic system of nerves.

It will help to make the apprehension of this matter more simple and easy if we think of all intellectual action as fundamentally a simple reflex act, or as a combination and series of such acts, the aim of which is to effect a profitable adjustment of the individual to his environment and of his environment to him, and in the end as complex machinery or agency for that purpose driven by the organic life. A want of adjustment on his part is ignorance and impotence, a wrong adjustment is error or delusion and false action ; in the former case he does not get the good which he might get, in the latter case he gets positive harm. To make the best

adjustment possible is to secure the fullest intellectual development of his nature as it has been constituted for him by the capitalised or structuralised experiences of his forefathers through unnumbered ages. For it is at bottom the capital invested in structure which makes the endowments and limitations of his faculties. When a creature of the simplest organisation receives an adverse stimulus it notably shrinks or starts away from it instantly; it shows no disposition to endure or to repeat it and to endeavour to get into any relation of adjustment to it—that is to say, it cannot examine and reflect; but when a being of the most complex organisation receives an unwelcome stimulus he does not necessarily shun it instantly, although that may be his first impulse, since he has within him, incorporate in his mental structure, that organisation of experience which enables him to reflect it on to other tracts, or, in other words, to subordinate a present impression to wider considerations of future good; wherefore he endures it and adjusts himself to it, and gets advantage, it may be, from it—that is to say, he examines and reflects and acts in relation to it. In the end he perfects the right reflex acts in relation to it, when he is properly said to understand it; ever afterwards he can think it without performing it actually, performing it ideally in fact, confident what its value will be if proved by the test of actual experience. Knowledge is fit reflex action at higher removes—abstracts, as it were, from the concrete, not in the sense of real abstract existences, but as general signs or notations, each of which stands for or represents all particular ideas of the same class. The idea of an object is, so to speak, the mark and prognostic of the impressions and reactions which that object and all objects of the same class are able to stir in us.

We have now reached the point where appears plainly the full answer to the previously put question—to wit, how comes it to pass that the hemispheres of the brain, when dictating different movements, yet have an understanding in common and work together to a common end. They are organs of *one* body—two like structures moulded on one stem—in the organic life of which their basic unity lies; nowise supereminent and independent organs apart, that govern the body from the platform of a higher life, but organs of the body, living in it and by it and for it; and their functions are not, like those of the limbs, functions of the animal life only or mainly, but functions in which the whole life, animal and organic, is represented. It is from the life of the *whole* body that the constituents of the mental

life are derived, and inasmuch as the cerebral hemispheres are organs ministering to this life, they must necessarily have its fundamental unity. Superpose on this basal unity of being the effects of education of the hemispheres in joint working, begun with the first movements of life and continued throughout it, and we have a sufficient explanation of their communion of function in thoughts, feelings and acts.

III.

I pass on now to a rapid survey of some of the leading phenomena of mental disorder in order to see how they stand in relation to the foregoing conclusions. The two main types of mental disorder, mania and melancholia, notably present very different and almost opposite features : in the former there is great exaltation of self with answering lively display thereof in thought, feeling and conduct—phenomena witnessing to a generally brisk and easy reflex action ; in the latter, great depression of self with answering sluggish expression of thought, feeling and conduct—phenomena witnessing to dull, slow and inert reflex function. The organic functions, moreover, share in the exaltation of the one state, in the depression of the other ; if they do not actually do their work much better or much worse as the case may be, their tone is sensibly different, they doing in the one with ease and sense of satisfaction what they do in the other with labour and sense of oppression only. The contrast is most striking when the alternating phases of excitement and depression occur in immediate succession in the same person, as they do in the form of alternating mental disorder which is known as *circular* or *alternating* insanity. Now if it be true that the source of the exalted or depressed selfhood is in the organic functions, and true that the organic life supplies a basal unity to the action of the cerebral hemispheres, there ought certainly to be more evidence of their unity of action in the maniacal than in the melancholic type of disorder. What are the facts ? Consider the typical features of the two states : on the one hand, exaggerated self-confidence and exultant feeling of well-being, quick and acute perception, extraordinary memory, overflowing rush of ideas, multitudinous projects, extreme susceptibility, voluble talk, unresting activity, an absence of all sense of effort, boastful self-assertion, delusions of greatness and power ; on the other hand, loss of self-confidence and great self-distrust, no relish for or interest in or hold on the affairs of life, incapacity of

attention, sluggish and inefficient memory, deadness of feeling and dulness of thought, inability or aversion to will and act, sense of infinite effort in order to make the least exertion, despairing self-depreciation, delusions of ruin or damnation, or of possession or persecution by devil or other malignant power. The maniac never feels the least doubt that he is himself, when actually he is not himself but alienated from his true self; the melancholic feels and laments that he is not himself, that he and things around him are changed and unreal, that he is another self or in subjection to another self, when his main affliction is a loss of faith in self. The question is then whether it is right to look on this deep sense of the want of unity of being, this mental inability to realise self and its correlative loss of hold on the not-self, as being due to the failure of the organic driving force. That is the present contention: there is in fact the weakness resulting from the incomplete union or actual disunion, a self divided against itself by a commencing or completed disruption, and there are in consequence the dual and confusing suggestions of self coming from the weak and almost independent action of the disunited halves.

In taking account of the strange and gloomy ideas which arise in the mind under those conditions of disorder, it is important to remember that we have to do, not with the negative effects of lessened or lost function only, but also with the positive effects of the disordered function which is not lessened or lost. The supreme centres of the brain are constantly receiving impressions from without and from within the body; these impressions they under conditions of disorder work into all sorts of anomalous forms, just as they do in dreams; and so it comes to pass that when ordinary stimuli affect the individual, he, not realising their true nature because of his perverted sensibility, deems the stimuli themselves extraordinary and fashions them into monstrous shapes. If the hemispheres are not acting in unison, but differently and discordantly, it is manifest that there will be a confused and incongruous mixture of these disordered creations.

The phenomena of dreaming may be cited in further illustration and confirmation of the position here taken up. During sleep the organic life does not cease, like the animal life, but goes on at a lower rate of activity; the consequence being that the hemispheres, lacking the force necessary to full unity of action and yet taking up the organic impressions from the body, as well as any chance-impressions from

without, manufacture from them the most incongruous dream-images and events. Moreover, they are probably under this further prejudice, that they are deprived to some extent of the unifying effects of education, since the senses are closed and movements in abeyance: for education means education in strict relations to external objects; and although it is certainly possible to think without presentation of object to sense, yet there is no doubt that the habitual relations of sense to the external world, which exist when we are awake and hardly or not at all aware of them, do exert and quietly keep up a unifying and steadying effect upon the actions of the cerebral hemispheres. Deprived of this tacit control and weakened in their basal organic union, they deal riotously with the stimuli, seldom wanting, which make dreamless sleep a rare event; for the main conditions of such sleep are: first, a gentle and quiet action of the processes of the whole digestive tract and of all other functions of the organic life, so that no undue stimuli therefrom disturb the repose of the brain; secondly, an absence of all disturbing external impressions which, albeit not strong enough to produce waking, are yet sufficient to affect the not entirely insensible sleeper and to be woven into the ravelled texture of his dreams; thirdly, a quiet brain—a brain, that is to say, which has not been made irritable and susceptible by excitement or exhaustion before going to sleep.

Reflect how painfully incompetent to perform a complicated act of contrivance and skill, even though it be a tolerably familiar act, or to give firm and consecutive attention to a subject of thought, a person is who has been rendered 'nervous,' whether it be by some moral or physical shock, or by some temporary bodily disorder, or by some other cause of nervous exhaustion and agitation, and how immediate may be the restoration of self-confidence and power from the taking of a glass of wine or other like stimulant of the organic energies. The acquired nervous incompetence of one who is temporarily incapacitated from doing well, or doing at all, what he can commonly do with skill and ease is very like the natural nervous incapacity of one who is learning anxiously by practice to do an act of the kind; in both cases there is apparently an ineffective co-operation of the hemispheres, due probably in the former to a loss of driving force, in the latter to an incompleting education.

Very remarkable is the cold collapse of self, the extreme prostration of body and mind, the almost entire extinction

of energy which a serious wound of the abdominal viscera occasions at once; the degree of instant collapse which takes place being out of all proportion to the immediate danger of the injury, fatal as this may prove in a few days by its disorganising consequences. Of a like kind, although less in degree, is the overwhelming prostration which commonly goes along with sea-sickness; a malady of so little serious moment in itself for the most part as to render the contrast of the accompanying abject moral prostration all the more remarkable and even ludicrous. When the deep foundations of self are shattered, as they seemingly are by sudden disorganisation of the sympathetic nervous system, the sufferer goes practically to pieces; as well he may, indeed, if these foundations are laid in the organic life.

It will be understood that the organic life includes not only those functions which serve self-conservation, but those also which serve reproduction, so long as they are active. Without them the self would be quite a different self, since they are necessary constituent elements of it. Now it is an observation which experienced physicians have occasion to make, that the premature loss of sexual power is apt to produce the utmost mental depression and may be a cause of suicide, and that a deep melancholic disorder sometimes follows its natural extinction. It is not simply that the person is bereft of a gratification which he would gladly have and is miserable in consequence, but he is reduced to a lower level of life so far as love of it and pleasure in it are concerned; not so much any measurable gap in his conscious life, an explicit sorrow of which he can give an account, but a deeper and more intimate loss, whereby everything seems to him stale, flat and unprofitable, and instead of having gladness in feeling and doing, it is pain and weariness to him to feel and do. Things and events he apprehends as clearly as ever he did, and judges rightly concerning them, but they pass before him in dream-like distance, as if they were a mechanical show which stirs not his interest nor touches his feeling; he has lost much of that affective intonation of his nature whence come desire and relish of them. All this seems the evident effect of the lowering of the force of organic life by the abstraction of the reproductive function from it: so much special vital energy has by the extinction of its source been subtracted from the stream of organic energy supplied to the brain, whose functions in consequence lack interest and are performed with greater effort. It is not for the most part our brains that wear out in old age; they would go on for a longer period were they properly fed

with energy from below, but it is the organic viscera which decay and fail in function ; it is their failure which makes desire wane and the grasshopper a burden ; they are the source of life's energy and relish, and their integrity and vigour the secret of an eager and active old age.

Having pointed out thus far how exaltation and abasement of the Ego or self answer respectively to *excess* and *defect* of the fund of organic energy in the brain, I go on now to note briefly that great *perversion* of this energy is followed by complete disintegration of the Ego or self. For this purpose I may fitly call in evidence certain cases of the deepest and most distracting nervous distress in which, without any known structural disease, a strange, disquieting, indescribable sensation is felt suddenly at the epigastrium or in its neighbourhood, diffuses itself vaguely through the body or mounts towards the head, and occasions instantly a distracting and overwhelming apprehension of impending dissolution of self : not a definite apprehension of death, nothing which can be grasped definitely in thought and feeling, but a vague, vast, indescribable feeling of impending horror, an unspeakable anguish. The impetuous and overpowering feeling is accompanied, perhaps, by the sense of a vehement rush of something, not blood, to the head, and may issue in scarcely resistible or actually irresistible impulse to an act of desperation, suicidal or homicidal, which is then, so to speak, the psychomotor convulsive outcome of it : in itself it is probably the pathological parallel on the sensory side of what convulsion is on the motor side. The sufferer who, after the attack is over, quietly recognises that his fears were groundless, and during it even remembers that he has had similar seizures before, cannot at the time of agony hold his intellectual ground at all ; his power of thinking is abolished, his intellectual and moral unity dissolved, in face of the rushing mighty sensation of deranged organic unity.

In order to facilitate conception of the discordant action of the hemispheres and of its probable effects in thought, feeling and conduct, let us consider a person's movements when from deranged action of the dual organs of animal life there is no longer that unity of function which belongs to them in a state of health, and thereupon endeavour to imagine what the effect would be of a similar unity-destroying action upon the mental functions. Suppose a person to be afflicted with similar spasmodic or convulsive movements of the limbs of both sides, but not of such intensity as to incapacitate him from walking of a stumbling, rickety sort ; imagine next his motions to be, like his thoughts, self-

conscious ; what would be the revelation of themselves that they would make ? Most likely an exultation and pride in their new activity, of the convulsive nature of which, being equally and similarly affected, they would be unaware. Let the supposition be of such a convulsive action of the limbs of one side only ; what would be the revelation then ? Of a self bound to another self which was hindering and opposing it—of a self divided against itself, a distracted or double self. Both in movements and in mental functions the full unity of function is the unity of a double organisation ; wherefore, if there be duality, instead of unity, of the latter, we cannot fail to have phenomena marking the disintegration of self, cannot have phenomena that consist only with its integrity.

He who would pursue this inquiry into all its important consequences ought to go on to examine and reflect how such duality, instead of singleness, of function would affect particularly each of the different faculties or functions of mind—for example, memory, perception, judgment and will. Not memory, perception, judgment and will as *general* faculties or functions, be it understood, since in that sense they exist not, being no more than general representative signs or terms, but the *particular* memory, perception, judgment and will which is the living mental act. The memory, perception or judgment of one subject or of one part of the brain may be utterly wrong, while the memory, perception or judgment of another part of it is perfectly right ; so that to speak of loss of memory and the like in general, without specifying the exact nature of the loss, is no more instructive than it would be to speak of loss of movement without specifying the particular loss and its exact nature.

As regards perception, it is obvious that a person whose hemispheres were at variance because of disorder of one of them must perceive a real object with the one hemisphere and an unreal object with the other, and perceive them both as equally real when equally vivid ; his life, therefore, must needs be a succession of incoherent relations to the external world according as the one or the other was in the ascendant ; at one time he would attend to and act in relation to his wrong perception, at another time he would attend to and act in relation to the true perception. In like manner his memory will be a memory of two selves, and oftentimes of two incompatible selves : he will speak quite correctly of actual events and his doings in them, so that there seems no fault in him, but immediately afterwards must speak with equal certitude of unreal events and

his supposed doings in them, so that there will seem no health in him. Judgment and will must necessarily be equally lamed and deranged, since the same division runs through them, and they must display the same sort of incoherent function. The individual will not only think double and perhaps act double, but the ideas of his double thinking and doing will be inconsistent and incompatible—he will be literally *distracted*.

Such are the effects which might theoretically be looked for from a dual and discordant action of the hemispheres. A survey of the phenomena of mental derangement discloses many facts that might be adduced in support of the theory. Take for first illustration the mode of coming-on and going-off of the attack in some cases of insanity: there is notable a brief period at the outset when the sound hemisphere appears to hold the lead and to repress or ignore the suggestions of the unsound hemisphere, whereas after a time of struggle and uncertainty the unsound hemisphere may be thought to gain the entire lead and to draw the other with it in such servitude that it does not rebel nor even suggest a doubt; and in like manner when the disease is passing off there are intruding intimations of doubt of the unsound thought which, little regarded at first, return in greater force by degrees and eventually grow to certainties that overcome and suppress its delusions. More striking still is the example of the person who is possessed by alternate voices, the one profane and blasphemous, the other reverent and devout; or of one who is to all intents and purposes two selves at the same time, his real self having his natural feelings and seeing things in their true light, and his morbid self with unnatural feelings and perverted notions, the two engaged perpetually in an inconclusive conflict which drives him to the deepest despair and perhaps even to suicide; or of one who, having extravagantly insane delusions on some subject concerning which he talks such absurd and incoherent nonsense as would seem incompatible with the persistence of any sense in the conduct of life, nevertheless exhibits such sound reason and good judgment on all other subjects as render it marvellous that he cannot correct his false bearings and put himself right with the world. Do not such facts as these suit well with the theory of a dual and inconsistent action of the hemispheres?¹

¹ Many more illustrations of the same sort might be given; they are numerous enough, whatever their right interpretation. "Je me sens couché avec un autre moi-même," said a French patient, "qui me parle sans être interrogé et répond à mes pensées sans me laisser le temps de

It was previously mentioned incidentally that in some cases of double vision we learn to trust one eye and to disregard the deliverances of the other ; and it is notable that it is easier to do that when the two visual images are wide apart than when they are close together or overlap. So in some sort is it with the double thought of mental disorder. In large asylums for the insane there are commonly two or three patients who, believing themselves to be royal or other great personages, accept quietly from day to day positions of service and do submissively mean work quite inconsistent with the claims they ought logically to make and maintain ; their delusions are so far apart from the relations of their ordinary lives that for the most part they are disregarded, now and then only intruding actively and disturbing their conduct. But let a person be possessed with the delusion of his wife's infidelity, or believe that his neighbours or persons of his own household are saying insulting things to him or putting poison into his food, and he cannot so far disregard his delusions as to go on quietly at home, although he may so far distrust them as to conceal and even to deny them when challenged by strangers ; they lie too near, or overlap, as it were, the thoughts and feelings of his daily life.

There are many more facts which deserve and might well repay examination in the light of the theory of a discordant action of the hemispheres, but it must suffice now to indicate in the briefest way two or three of them. One inquiry might be whether the theory is fitted to throw any light on the mental states of those more or less peculiar persons who, springing from families in which there is a decided insane strain, without being actually insane themselves, exhibit such anomalies of thought, feeling and conduct as to be known as odd, queer, eccentric. The best of them may possess remarkable abilities of a special kind, signalling themselves, perhaps, by a singular skill in punning or by wit of a higher order, or excelling in some particular line of art, musical, artistic or poetical ; the worst of them exhibit undoubted marks of physical and mental degeneracy. One of the physical peculiarities noted sometimes in the most degenerate examples is a signal want of symmetry between the two sides of the face, or of the two sides of the skull, or of the two ears ; and if it be true that, as Swedenborg used

les exprimer." A gentleman after five sleepless nights suffered from a form of fatigue in which "the brain seemed divided into two parts, thinking independently, and one side putting questions which the other answered".

to put it, whatever is displayed in the outermost is contained in the innermost, that would mean a corresponding want of symmetry between the two sides of the brain, with corresponding degrees of unsymmetric thought and feeling. May we thereupon suppose that some of the strange quips and cranks of thought and feeling displayed by the better-endowed possessors of an insane temperament betoken a disposition to separate and independent action of the hemispheres, a sort of nonconformity of functions?¹ It is interesting to take note in this connexion that it is precisely in those cases of insanity which own a strong hereditary predisposition that the most extravagant delusions on one class of subjects and the sanest reason on other subjects are found to exist side by side.

Another class of facts demanding curious attention comprises the remarkable disturbances of consciousness which occur in connexion with epilepsy. One well-known variety of the so-called 'aura' or warning which often goes before the epileptic fit is of an intellectual nature; not a simple sensation, nor a hallucination of one or other of the special senses, but what is called a thought or reminiscence, or a certain dreamy vagueness of thought which the sufferer feels it difficult or impossible to describe.² It occurs to him suddenly as something different from what he was thinking of at the time, an abrupt incursion of alien thought and feeling, or a seeming reminiscence of a scene or dream, producing the impression of two selves; it obscures or abolishes consciousness of other things, and is followed quickly by entire unconsciousness. Now, just as the convulsive movements of the epileptic fit may begin on one side and in particular muscles of that side, so may the intruding strange thought which goes before the fit originate probably in one

¹ In the Goulstonian lectures on *Body and Mind* before the Royal College of Physicians (1870), I pointed out that an inveterate inclination to punning was frequently an accompaniment of what I described as "the insane temperament" or, as it is now sometimes called, the neuropsychopathic diathesis. That was stated merely as a fact of observation, without any attempt at explanation. Does the explanation then lie in a certain separateness of action of the hemispheres, the proneness to which is constitutional, whereby the one hemisphere takes in the sense of what is said while the other is on the watch for the fit assonance and alliteration? It is curious to note that excessive punning is sometimes displayed in the stage of exaltation that goes before the actual incoherence of acute mania, when the highest powers of control are abolished, and I have known it to be developed after a severe shock to the brain which had damaged the memory and will and impaired the moral and higher social feelings.

² "On a Particular Variety of Epilepsy (Intellectual Aura)," by J. Hughlings-Jackson, M.D. (*Brain*, July, 1888).

hemisphere of the brain and in the local functional discharge of a particular part of it, and the singular feeling of a double self accompanying its intrusion perhaps be the result of the dissident action of the hemispheres.

The last fact to which I shall refer is the singular feeling, which almost everybody has had more than once in his life, of having been before in exactly the same circumstances and having had exactly the same experience, notwithstanding that the experience was plainly and entirely novel. The feeling is not, I think, merely a flash of recognition, but is instinct with a sort of sure foresight or prophetic certainty of what is going to happen ; not a memory certainly, since we cannot remember what has never happened ; and it is at best a momentary consciousness which vanishes almost as soon as it is felt. Its nature and mode of occurrence seem to prove that it is an almost instantaneous, but not exactly consentaneous, double experience of the same event ; and it is not an unreasonable conjecture, therefore, that the seeming recognition may be due to the instantaneously successive consciousnesses of the separately acting hemispheres. In this instance the hemispheres have exactly the same experience, whence the seeming familiarity ; but in the perhaps not essentially different mental disturbance which precedes the epileptic fit they act differently, whence the strange feeling of alien thought and of a double self. And it is interesting to take notice in reference to this explanation that there is some reason to suppose that the persons who are likely to become epileptic in the end are exactly those who most often have the strange feeling of a previous identical experience.¹

¹ Dr. Hughlings-Jackson says, in the paper just referred to, that he should never diagnose epilepsy from the paroxysmal recurrence of "remniscence" without other symptoms, although he should suspect epilepsy, if the recurrence were frequent.