Can Unconscious Cerebration be proved? By WILLIAM W. IRELAND, M.D., Edin., Medical Superintendent of the Scottish National Institution for the Education of Imbecile Children, Larbert, Stirlingshire.

Unconscious cerebration is regarded as so important a discovery that two well-known scientific men have contended for the priority of its publication, and while some people are anxious to give it fresh applications and illustrations, others proclaim it to the public as a new demonstration of science, accepted by physiologists, and stable enough to uphold new theories founded upon it. After having carefully considered the evidence upon which the theory of unconscious cerebration is supposed to rest, I am disposed to think that the facts, or assumed facts, may be explained in a simpler manner, and that the theory itself is superfluous and unproved. For an exposition of what is understood by unconscious cerebration, and on what grounds it is believed to exist, I have used a work called, "The Principles of Mental Physiology," by Dr. Carpenter,* the well known physiologist, who claims to have worked out the theory in his own mind, without knowing that any other had preceded him, and whose recognised reputation is a sufficient guarantee that the argument, in his hands, is sure of being well stated. The term itself seems far from being a happy one. Dr. Carpenter tells us that it has been found readily intelligible; he objects to "unconscious reasoning" as a contradiction in terms, and yet his own description seems either to imply unconscious reasoning, or unfelt feeling; and the difficulty of finding an appropriate term for this class of operations, is really owing to the difficulty of conceiving what these operations really are. In fact, to state them clearly, is to render the theory incredible. To call thought cerebration, may show the desire of a writer to assign thought as the product of brain action; but it is neither warranted by true philosophy, nor by the popular and scientific uses of speech. When the liver secretes bile, one does not say that it hepatates; or when a man breathes, we do not say he pulmonates.

Dr. Carpenter tells us that he was led into the train of thinking which brought him to formulate his theory by what he calls automatic motion; and it was by doubting

* I have also used Dr. Carpenter's "Principles of Human Physiology." Fourth Edition, London, 1853.

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the correctness of Dr. Carpenter's explanation of automatic motion that I was led to disbelieve in unconscious cerebration. This explanation may be given in his own words—as Paley says:—"A child learning to walk is the greatest posture master in the world." Yet, when this co-ordination has been once established, the ordinary movements of locomotion, though involving the combined action of almost every muscle in the body, are performed automatically, the Will being only concerned in starting, directing, or checking them. Of this we have familiar experience in the continuance of the act of *walking* whilst the attention is occupied by some "train of thought" which completely and continuously engrosses it. Though we set out with the intention of proceeding in a certain direction, after a few minutes we may lose all consciousness of where we are, or of whither our legs are carrying us; yet we continue to walk on steadily, and may unexpectedly find ourselves at the end of our journey before we are aware of having done more than commence it. Each individual movement here *suggests* the succeeding one, and the repetition continues, until, the attention having been recalled, the automatic impulse is superseded by the control of the will. Further, the direction of the movement is given by the sense of sight, which so guides the motions of our legs that we do not jostle our fellow passengers, or run up against lamp-posts; and the same sense directs also their general course along the line that *habit* has rendered most familiar, although at the commencement of our walk we may have intended to take some other." It seems to me that a man who walks along a crowded street must always exercise a certain amount of attention; if he is accustomed to do so like a thoroughbred citizen, he can thread his way with much less attention than a man used to walk along quiet country roads, and consequently he is able to divert his thoughts to other subjects as he goes along, to converse with a friend, or to meditate over some difficult problem; but if the attention to the problem be too profound, the minimum of attention necessary to guide the footsteps is withdrawn, so that he will go on in a straight line without turning round the proper corner, or if the distraction be further increased, he will strike against the passers by, or perhaps stand still till his attention is again directed to the necessity of attending to his steps. We can understand how a man might perform some simple motion such as flexing or extending his legs by reflex or automatic action; but that he should walk from one part of a crowded

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city to another without any exertion of conscious intelligence seems altogether unproved and unproveable.

In what we call absence of mind, the attention is so concentrated upon a single subject, or train of thought, that one loses the sense of his present situation which accompanies less intense mental action. Consciousness runs only in one channel, and we wake up as it were from a dream, when the concentration is relaxed. The amount of concentration of mind determines the amount and complexity of the physical actions which can be at the same time carried on. The concentration may be so great that the individual can execute no motion whatever; he is wrapped in a reverie, like Socrates, who stood for a whole day and night in the camp before Potidæa motionless, with his attention completely engrossed with some subject of meditation. In a lesser degree of mental attention the walk becomes slower, or more awkward than usual, or there may be even a double action of the mind; a train of thought is diligently pursued, while the motions are regulated by a loose association of ideas. Thus, there is a story told of a learned clergyman, very much given to absence of mind, who went up stairs to change his dress, previous to going out to dinner. After a while, his wife went up to see what had become of him, and found that he had taken off all his clothes, and gone to bed. In this case there were obviously two trains of thought going on in the mind; one the subject of learned contemplation, and the other the association of ideas which connected the taking off his upper garments with that of going to bed.

Dr. Carpenter talks of a man walking by reflex action "being sustained by the successive contacts of our feet with the ground, each exciting the next action;" but it is clear that, without the picture of the street or road present to the conscious mind, walking to any purpose cannot go on, the mere absence of light being sufficient to put an end to it, save in the case of blind persons, who, however, do not walk by reflex action, but depend upon the increased activity and exercise of their other senses. It is difficult to perceive what Dr. Carpenter means by the sense of light guiding the motion of our legs; for indeed sensation can be no guide. It transmits information to the mind, which makes use of it for our guidance, and if the functions of the hemispheres were suspended, and no information transmitted to the mind as to the state of the external world, the process of walking would soon cease, though all true reflex action might continue.

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Here it may be noticed that the advocates of unconscious cerebration seem to ground a great many of their arguments upon the assumption that the mind can only attend to one subject at once, and if this be doubted, many of their arguments must appear inconclusive. It is generally admitted by metaphysicians, however, that the mind can attend to more than a single object at once. Sir William Hamilton's opinion, which ought to be acceptable to Dr. Carpenter,* is thus given: "You will recollect that I formerly stated that the greater the number of objects among which the attention of the mind is distributed, the feebler and less distinct will be its cognisance of each—*Pluribus intentus, minor est ad singula sensus.*"

"Consciousness will thus be at its maximum of intensity when attention is concentrated on a single object; and the question comes to be, how many several objects can the mind simultaneously survey, not with vivacity, but without absolute confusion. I find this problem stated, and differently answered by different philosophers, and apparently without a knowledge of each other. By Charles Bonnet the mind is allowed to have a distinct notion of six objects at once; by Abraham Tucker the number is limited to four; while Destutt Tracy again amplifies it to six. The opinion of the first and last of these philosophers appears to me correct."

A man can attend to two simultaneous processes all the more easily if they are different in kind; for example, one can direct a bodily action with a purely intellectual operation more readily than he can attend to two intellectual operations. The human mind requires less attention to intellectual or muscular operations to which it is accustomed, than to those which are new, and therefore difficult, and as the effort is much smaller, the amount of attention or directed consciousness is much less; but to attempt to transmute this diminution of attention into a proof that no attention whatever is required, seems to me precisely the fallacy which underlies the whole of Dr. Carpenter's argument. We know that when a thing is once done it is easier done over again; the oftener we do it the easier; and this is true both of purely mental and of voluntary muscular operations. The easier a thing is done the more ready is the mind to forget the efforts it has made to do it; and again, great rapidity of conscious impressions is accompanied with a very faint memory of these impressions; and thoughts and volition resulting in actions

* See Sir William Hamilton's "Lectures on Metaphysics," Lecture XIV., vol. i., p. 254.

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are much less readily remembered than thoughts ending in speech. To such an extent indeed is this true, that some people have actually argued that we cannot think without words. But take for example a man fencing with another. He watches his opponent's point, and his opponent's eye, and executes a series of most complicated and rapid movements of parry and thrust every instant in a different order. He interprets his opponent's thrusts or feints, parries them, and then makes lounges and feints himself. All this requires quick apprehension and thought, yet it is not translated into words. The fencer is conscious, though he is not conscious of being conscious; that is, he has no time for introspection or retrospection, and although he would be conscious of each pass, if he only made one, or stopped, or rested his consciousness on the last one which he made, he is totally unable to recall the series of motions which he has gone through; and nothing remains in his memory but one or two of the most striking incidents in the fencing, such as that he has hit his opponent several times, or has been hit himself.

The large field of wordless thought is a subject well worthy of consideration. Not only are there thoughts which die away without being translated into words, there are also thoughts which we habitually confound with sensations,* and thoughts which pass into motions without ever being expressed by symbols. These are extremely numerous, especially in the fields of technical art and action; but to follow up the subject at present would lead us into a digression. It is one of our besetting mental fallacies not only to imagine that thoughts are inseparable from words, but that where there are no words, there are also no thoughts. One thing is certain, that words add much to the clearness of our conceptions.

* Those who have not already studied the question will find examples of the play of comparison, association, ideal anticipation, judgment and inference in the use of the senses, in the "Westminster Review" for July, 1872, in an article entitled, "Recent Experiments with the Senses," and in the works there quoted, especially "Helmholtz's Handbuch der Physiologischen Optik." It requires a careful study of optics to learn how much of the mental action enters into our vision of the phenomenal world. As the Reviewer remarks, "If a part of an impression, however elementary it may seem, is sometimes overcome and changed into its opposite, by a mere element of inference or effect of experience, it is clear that it is not the pure result of the nervous stimulation, but depends, in part at least, on further and cerebral processes. In this way, for example, we know that a person's recognition of a colour is in part an act of inference. The science of optics is full of the most startling illustrations of the displacement of inferences, so rapid and mechanical that they easily appear intuitions to persons ignorant of these facts."

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> "Thought, too, delivered is the more possessed;
> Teaching, we learn, and giving we retain
> The births of intellect, when dumb forgot."—YOUNG.

Thoughts unclothed in words are much less easily made the subjects of introspection and analysis, and fade very rapidly from the memory. The domain of wordless thought is the dim side of our consciousness. In a man's mind, as well as in the outer world, there are processes and objects which he is in the habit of passing over without any attention or analysis, and this habit becomes strengthened the older he gets. A careful introspection of his own wordless thoughts will convince one how numerous they are, and how little he has studied their nature.

In the Eighteenth Lecture on Metaphysics Sir William distinguishes three degrees of mental latency. The first is defined in the statement that what we know or recollect is not present to our consciousness unless it be recalled at will or start up in a train of association; this every one admits. The second degree exists when the mind contains certain systems of knowledge, or certain habits of action, which it is wholly unconscious of possessing in its ordinary state, but which are revealed to consciousness in certain extraordinary exaltations of its powers. This I have no intention of disputing, though I should like rigidly to examine the evidence of some of the illustrations of it, which are copied from one book to another. His third degree seems more capable of dispute. "You are," he says, "of course, aware, in general, that vision is the result of the rays of light, reflected from the surface of objects to the eye; a greater number of rays is reflected from a larger surface; if the superficial extent of an object, and, consequently, the number of the rays which it reflects, be diminished beyond a certain limit, the object becomes invisible; and the minimum visibile is the smallest expanse which can be seen—which can consciously affect us—which we can be conscious of seeing. This being understood, it is plain that if we divide this minimum visibile into parts, neither half can, by itself, be an object of vision, or visual consciousness. They are, severally and apart, to consciousness as zero. But it is evident that each half must, by itself, have produced in us a certain modification, real though unperceived; for as the perceived whole is nothing but the union of the unperceived halves, so the perception—the perceived affection itself of which we are conscious—is only the sum of two modifications, each of which severally eludes our

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consciousness. When we look at a distant forest we perceive a certain expanse of green. Of this, as an affection of our organism, we are clearly and distinctly conscious. Now, the expanse of which we are conscious is evidently made up of parts of which we are not conscious. No leaf, perhaps no tree, may be separately visible. But the greenness of the forest is made up of the greenness of the leaves, that is, the total impression of which we are conscious is made up of an infinitude of small impressions of which we are not conscious." Hamilton goes on to illustrate his thesis by arguing in a similar manner on hearing and other senses; but this line of reasoning, like many others based on the infinite divisibility of extended objects, is more puzzling than convincing. It does not, in any case, seem to help much the theory of latent ideas. No doubt a thing perceived may be divided into a half, and this half may be too small to be perceived, but there is no such thing as half a perception. Two points singly invisible may by joining together produce a perception; but because the two do so is no proof that one of them modifies insensibly the perceptive faculty, and unless we assume this, the argument stops short of its destined aim, for it is not sufficient to prove that the impression modifies the optical apparatus. An impression which should modify the optic nerve without exciting visual perception is not analogous to latent thought, which, according to Sir William Hamilton, is proved to exist from its effects, but the *minimum visibile* is not perceptible from its effects, and is only discoverable by reasoning on the infinite divisibility of matter. This argument would go to prove that any point, say the million billionth part of a grain of sand, must modify the perceptive faculty because a million billions of such parts collected together can be seen, and our perception is but the sum of these million billion parts. An impression which can never be perceived till combined with others, or, perhaps, with a billion of others, is no perception at all. When an adequate force moves a stone, it does not follow that half the force must have an insensible effect upon it. We know that it has none, at least, in the way of moving it, being counterbalanced by other forces; and it is possible that the changes of our sensory organs whereby we recognise outward objects actually do consist of motions, or modifications of arrangement and position in nerve tissues.

"In like manner," says Sir W. Hamilton, "in the internal perception of a series of mental operations, a certain time,

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a certain duration, is necessary for the smallest section of continuous energy to which consciousness is competent. Some minimum of time must be admitted as the condition of consciousness; and, as time is divisible *ad infinitum*, whatever minimum be taken, there must be admitted to be, beyond the cognisance of consciousness, intervals of time, in which, if mental agencies be performed, these will be latent to consciousness. If we suppose that the minimum of time to which consciousness can descend be an interval called six, and that six different movements be performed in this interval, these, it is evident, will appear to consciousness as a simple indivisible point of modified time, precisely as the *minimum visibile* appears as an indivisible point of modified space. And, as in the extended parts of the *minimum visibile* each must determine a certain modification on the percipient subject, seeing that the effect of the whole is only the conjoined effect of its parts; in like manner, the protended parts of each conscious instant—of each distinguishable minimum of time—though themselves beyond the ken of consciousness, must contribute to give the character to the whole mental state, which that instant, that minimum, comprises. This being understood, it is easy to see how we lose the consciousness of the several acts, in the rapid succession of many of our habits and dexterities. At first, and before the habit is acquired, every act is slow, and we are conscious of the effort of deliberation, choice, and volition; by degrees the mind proceeds with less vacillation and uncertainty; at length the acts become secure and precise: in proportion as this takes place, the velocity of the procedure is increased; and as this acceleration rises, the individual acts become secure and precise: in proportion as this takes place, the velocity of the procedure is increased, and as this acceleration rises, the individual acts drop one by one from consciousness, as we lose the leaves in retiring further and further from the tree; and, at last, we are only aware of the general state which results from these unconscious operations, as we can, at last, only perceive the greenness which results from the unperceived leaves."

The relation of objects of sense to space, and of thoughts to time, so beautifully expressed by Sir William Hamilton, forms a pleasing antithesis till we remember that sensory impressions, as well as thoughts, have a certain relation to time; for example, a coloured object rapidly flashed before the eye does not produce a distinct impression. The fallacy of

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the argument seems to me to be in supposing that the attribute of consciousness is not infinitely divisible, along with the thought which it accompanies. The protended parts of each *conscious* instant must be divided into an infinity of *unconscious* parts. Thus consciousness is not the concomitant of such mental operations as go on very rapidly, but stands to these operations in the same relation as the eye does to minute objects. Surely this is something very like the raising of consciousness into a separate faculty. In any case, this philosopher assumes that consciousness is of slower operation than muscular contractions. The discs of a muscle can contract many times ere consciousness derives a distinct impression from their contractions. This may be fairly disputed. The quickness of thought is as great as that of muscular motion. Music is often given as an instance of work done under the influence of unconscious cerebration, and yet it may be held that the mind perceives the execution of a tune as quickly as the muscles can play it. I have heard it said that the conductor of an orchestra can detect a false note, from a particular instrument, amongst the great variety of sounds in a brass band. Altogether Sir W. Hamilton's argument appears to me of the same character as that of the Eleatic Zeno upon motion, but not so successfully conducted.

What is perhaps the best of Sir William Hamilton's arguments is taken from an assumed violation of what he calls the law of association. One idea suggests another; and the second idea usually suggests a third; but sometimes this series is broken up: usually A suggests B; and B, C, but sometimes A suggests C alone. In that case, observes Sir William, B was unconsciously present to the mind; A in reality did not bring C to consciousness; it was the B of which the mind was not conscious that did so. If you do not assume this, the "laws of association" are violated. An opponent might, however, make a stand on the matter of fact, and reply, "You say that A can only suggest B, and B, C, but I give you an instance where A can suggest C." If this instance be deceptive, why may not every other be so? And to make a finer point. How do you know that A suggests B? Perhaps it suggests something else which suggests B. At any rate here are two laws; in the first case one conscious idea is associated with a second to call into consciousness a third; in the second we have two conscious ideas apparently associated and in precisely the same

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way, and yet you insist in putting in between them something entirely different, unless you hold that not being an object of consciousness makes no difference.

As for the laws of association, as they are called, it would be agreeable to know what they are. It cannot be affirmed that one idea naturally and invariably suggests another; in any case the exceptions are very numerous; indeed the obliteration of links of association is one of the most common of the educational processes through which we pass. For example,we have learned to speak by a slow process of associating our conceptions with certain recognised symbols; between these symbols and the conceptions themselves there were a number of associated ideas taken up in the process of instruction long ago faded from our memory, but which we know must have existed and did exist. At last the word is so closely associated with the thing, and the thing with the word, that it is only by a careful process of thought that we know that the idea actually exists without the word. By using these associated symbols I may learn a set of other ones, that is a new language, and though at first I may be obliged to go over the words of my own language, and translate them into another, in the end I can so familiarise myself with a foreign one as to drop the old words, that is, the old links of association, and think in a new language. Moreover, the laws or train of associations are so variable that we do not hold ourselves compelled to explain its anomalies. Of all mental processes association appears to us the most inexplicable. With this proviso it may be held that the explanation that an intervening link of association is momentarily present to the mind and then forgotten, does not seem to us so unreasonable. Is this kind of forgetfulness not the most common of all things? A thousand ideas and representations rise into the mind, present themselves to consciousness, and unless the mind pay special attention to them, for some special reason or other, they disappear from memory without leaving any trace behind, and sometimes they do so, if not instantly, at least within a very short period of time. Were it not for this forgetfulness, one could recall every occurrence of his past life day by day. It is true, circumstances which we imagine we have forgotten sometimes again rise in the memory, but this does not gainsay the general truth that many things, both mental and bodily, of which we were once conscious, are to all appearance totally forgotten, and it is precisely those operations

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which we are most ready to forget, on which the theory of unconscious cerebration seems to rest. Why then should it appear so incredible that the memory of the consciousness should cease in a very short time, especially when the impression was not vivid, consciousness faint, and the sequence of ideas rapid or distracted?

It may not be out of place here to notice that Sir William Hamilton held the view that consciousness was maintained even during sleep. He believed sleep to be a series of isolated acts of consciousness, which, unless under some unusual circumstances, we forget on awaking. This makes it all the more strange that he should favour a hypothesis by which waking thoughts are stripped of the accompaniments of consciousness, rather than admit that consciousness could be separated from memory.

Sometimes we forget one part of an action or mental process, and sometimes another, and this partial oblivion has been the source of illusions. A man may have learned something, and retaining what he has learned, may forget when and where he has learned it, so that his knowledge, being revived in his mind by some sudden association, he is doubtful whether it is not a new creation of the mind or an effort of the imagination, so easily and rapidly comes the evolution of his stored up knowledge. Dr. Laycock, in his interesting "Chapter on some Organic Laws of Memory" in the "Journal of Mental Science,"* has given some instances where authors had forgotten what they had themselves written, and read their own productions with great pleasure; and no doubt an author is extremely well adapted to admire his own works, for no one else could be expected to occupy so exactly the same standpoint.

It happens to all of us that on finding ourselves in a certain situation, or on viewing a landscape or some other scene for the first time, we have a vivid impression that we have been in the same position or witnessed the same scene before; and it is very likely that we have seen something closely similar, or have read or dreamed of something like what we are going through, and that we recognise the resemblance without remembering when, where, or how we have seen the thing similar, and thus are led into the belief that we have seen something the same. Occasionally by rigid mental scrutiny, we are enabled to recall the circumstances under which the previous occurrence had taken place, and

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thus as it were lay bare the machinery of the illusion which was used by the Pythagoreans as an argument for the transmigration of souls.

The following are instances of ideas presented to consciousness, and very quickly forgotten. Sometimes the will is exerted to apprehend impressions from the senses and secure the result; for example, if a clock were to strike three or four, we might suddenly call our mind to note the number of sounds so as to learn what o'clock it was; and we have the impression on our mind that we must do so quickly, or else all consciousness of the number of strokes will pass away, and we shall remember nothing.

The usual address of one of my friends on meeting me was: "Oh, what was I going to say?" At one time or another we have a remark or train of remarks as it were trembling on our lips, when in an instant it is forgotten, sometimes to be recalled in a minute, sometimes not again to return to memory.

Again I have noticed that when I look up a foreign word in a dictionary with my attention wandering on something else, I return to the text which I was reading without either knowing the meaning of the word or being sure that I have looked it up, but on again looking it up, I at once recognise the different meanings given in the dictionary, and feel sure that they were in my mind a few seconds before. Observations such as these, which are, I suppose, common to us all, ought to make one cautious against being positive that we must remember what we were conscious of the minute before.

Moreover, the condition of somnambulism affords proof that memory can be separated from consciousness, for somnambulism, as Sir William Hamilton has himself stated, has consciousness without memory for its characteristic. This being so, it is very strange that some should have represented the analogous state of mesmerism as an instance of unconscious cerebration. A man acting in a mesmeric state is conscious of what he does, but unconscious of the antecedent and surrounding circumstances in which he is placed.* The will is suspended, and the thoughts of the

* Dr. Laycock in his learned work "Mind and Brain," Edinburgh, 1860, vol. ii., p. 101, gives an explanation of those processes which I am ready to accept, save that the words "thought ceases" might convey an erroneous impression. "The best illustrations," writes Dr. Laycock, "of this kind are afforded by the phenomena of sleep and somnambulism, and by those manifested under the influence of alcohol, opium, chloroform, hachisch, and other nervine irritants and anæsthestics. During the waking conscious state, all the external senses instinctively co-operate in verification without the knowledge of the in-

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mesmerised person follow a train of association which may be guided by another, but he is conscious of this train of association, and his attention is indeed very strongly directed towards certain objects to the exclusion of others; and what is attention but concentrated consciousness?

The mesmeric state is somewhat akin to reverie and still more so to somnambulism. In the "Chicago Journal,* of Nervous and Mental Disease," there is a translation of a paper by Dr. E. Mesnet, on "The Automatism of Memory and Association in Pathological Somnambulism." It contains a remarkable series of observations on a soldier wounded in the head in one of the battles preceding Sedan. After recovering from paralysis of the right half of the body which continued for a year, this man occasionally fell into states of somnambulism. The observations of Dr. Mesnet are of great interest, though his conclusions are sometimes questionable. It is likely that some may regard this case as a living example of unconscious cerebration.

"The transition from health to illness," we are told, "is accomplished with rapidity, in a few minutes insensibility, without convulsions, without cry, *he changes from one to the other without experiencing those fading tints of light and reason which we find at the hour when sleep approaches, and he who is conscious, responsible, and in full control of himself, an instant later is only a blind mechanism, an automaton, obeying the unconscious activity of his brain.* He moves with an appearance of freedom which he does not really possess; he seems to exercise his will, and yet he has only an unconscious volition which is powerless to remove the slightest obstacle opposed to his movements."

Dr. Mesnet found that while, in this condition, the general sensibility was extinguished; hearing, smell, and taste were sealed against any impressions from without, and sight yielded

dividual, and so place him in fitting relation with the external world. When they cease to transmit impressions unitedly, from changes in the co-ordinating sensory ganglia, unconsciousness begins to approach; and when the senses are at last shut up, so that no affinitive impressions reach the ideagenic tissue, sensation, perception, and thought cease, and all verification ends. If, however, the impressions reach the tissue, and are not co-ordinated, then false thoughts will arise; for while there is no correct knowledge of the external world, the impressions themselves excite ideagenic changes. These result either in somnambulistic or delirious acts and thoughts. Chloroform sometimes developes this state of somnambulistic activity, and the world of dreaming becomes a world of reality to the individual."

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only vague ideas; while the sense of touch persisted, and and seemed to acquire delicacy and an exaggerated impressibility. The muscular sensibility, if it be distinguished from touch, seemed also to be preserved. In walking about and acting during these states, the man only used the sense of touch as a connection with the outer world; but then a man who feels touch is conscious. Feeling is merely a phase of consciousness. By means of this sense observers were enabled to suggest trains of association in his mind, to arouse ideas which were the beginning of hallucinations under which he acted; but then these associations, these hallucinations, implied consciousness, though a consciousness limited to one sense, to a train of associations apparently not under the control of the will, and to certain pictures floating before the mind. Any one who reads the very interesting description of this man's state will be forced to admit that there is no proof, and indeed proof to the contrary, that the man was unconscious.

As is usual in such cases, the man entirely forgot, on returning into his normal state, what he had done during his somnambulism. The demonstration of this condition of double consciousness is perhaps the most interesting and valuable addition to our knowledge of mental operations afforded to us by the observations of physicians. Not only is it interesting in itself, by enlarging our conception of the human mind, but it is very serviceable in helping us to refute arguments and hypotheses which ignore observations so unexpected in their results.

One might receive what Leibnitz and Sir W. Hamilton have written about latent thought without admitting the extensions which Dr. Carpenter has given to the theory. It is somewhat difficult to make out what that learned physiologist really holds, for it is possible he may not entirely agree with the quotations which he makes from various authors, who certainly do not agree with each other; but it would seem that Dr. Carpenter's own view amounts to this—That there is a principle or order which sometimes arranges our ideas in a more regular or orderly posture than we could have placed them with all our skill and industry; all the while we are not conscious of this process, but may be thinking of something else. In short two processes of thought may go on, if not within the mind, at least within the cerebrum; and of one of these processes we are conscious, and of the other not conscious, so that when one asserts that he

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is not thinking of a thing, he may be quite mistaken. When a man is composing a poem or story, or classifying objects in zoology, or working out a problem in algebra, he may think it or he may cerebrate it; he may work it out in his waking moments with toil and care, or he may cerebrate it in his sleep, and find the difficulty solved in the morning.

Dr. Carpenter, however, believes that unconscious cerebration is really due to unrecognised changes in the substance of the brain; thus he hesitates to call them mental changes at all. Here, as Sir Henry Holland has remarked, this hypothesis "supposes intellectual operations in which consciousness has no part, but which, nevertheless, evolves true logical results. Here we are called on to recognise an *exclusion* of mind from the highest functions of mind." Dr. Carpenter's view is the same as that which Sir William Hamilton calls the mechanical theory—that the whole process is effected without either volition or even any action of the thinking principle, it being merely automatic or mechanical. "This opinion," he continues, "is unphilosophical, because, in the first place, it assumes an occult and incomprehensible principle, to enable us to comprehend the effect. In the second place, admitting the agency of the mind in accomplishing the series of movements before the habit or dexterity is formed, it afterwards takes it out of the hands of the mind, in order to bestow it upon another agent. This hypothesis thus violates the two great laws of philosophising—to assume no occult principle without necessity—to assume no second principle without necessity."*

Rather than admit Dr. Carpenter's explanation thus repudiated by one whom he claims as an ally, we might be tempted to take up the old theory of inspiration, of new ideas being put into the mind by another spirit in some unknown way. I already admit the existence of other minds besides my own, and I am more disposed to believe that they might communicate their thoughts to me than that my mind could be unconsciously composing poetry while I imagine myself studying science.†

* Sir William Hamilton's Lectures on Metaphysics, Vol. i., page 368.

† Dr. Carpenter gives in another place what might be a third solution of the question: of which, however, I have no intention of availing myself: "Looking at nerve force," he says, "as a special form of physical energy, it may be deemed not altogether incredible that it should exert itself from a distance, so as to bring the brain of one person into direct dynamical communication with that of another, without the intermediation either of verbal language or of movements of expression. A large amount of evidence, sifted with the utmost care, would be needed to establish even a *probability* of such communication, but would any man of science have a right to say that it is *impossible?*"

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It is quite true that after long puzzling ourselves to see the true relations of things, it now and then happens that they suddenly, as it were, present themselves to our mind, and the difficulty is at once solved like a whole landscape seen by a flash of lightning; but this affords no proof that we have been working at it unconsciously, it merely shows that the mind is sometimes more rapid and powerful in its operations than at others. Occasionally, as in recollecting where we put lost objects, it is owing to an idea crossing our mind which lights up a lost train of associations. As well might the wearied marksman, whose shoulder is sore, and whose gun trembles in his hand so that he shoots wide of the mark, but who finds next morning that he can hit the centre—as well might he conclude that he had been unconsciously practising in his sleep. He, too, has his flashes of inspiration; on a certain moment he feels that the muscular adjustment and visual adaptation are complete, and that he has made a correct aim. This he may repeat once or twice, or he may totally fail to do it again for days afterwards, but, like the poet or mathematician, he has times when the results are happier. Our views are confirmed by considering attentively the nature of these sudden flashes of inspiration; they show us the true relation of things by which we can work out problems and gain results; but they do not give us the *results* themselves.

To take an easy example; we do not see how to state a question in arithmetic correctly, and after puzzling our brains for a while we give it up; suddenly our thoughts return and we see at once how to state it. But in the instances usually given we have to work out the question, we never awake with the answer. Even suppose we did so it would not be conclusively proved that we had worked it out unconsciously; we might have done it like the gentleman mentioned by Dr. Carpenter, who worked out an algebraic sum which had long puzzled him, obtained the desired result and wrote it down, but forgot all about it until he found the scrap of paper upon which he had worked it.

These flashes of inspiration do not necessarily occur after a given interval of time during which unconscious cerebration is assumed to have been at work. They may occur in the course of one sustained effort of thought, the whole relation of things becoming suddenly clear; or they may occur in the heat of an improvised debate. In truth the manner of their occurrence determines in a great degree the intellectual character and capacity for various pursuits.

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Thus the orator and the improvisatore seize upon the relations of a subject quicker than the ordinary writer of poetry or leading articles. There are two ways of writing a book as Dr. Johnson remarked: to wait for the inspiration, or to sit down doggedly to it. I always suspected that the first method of working was rather a proof of mental weakness than of mental power, and that the great masters of thought or imagination could work on rapidly, easily, and with fewer checks than those who had to wait for ideas, who easily got tired of a difficult subject, and had to put it away till the mind was refreshed. I have no intention of going through all Dr. Carpenter's instances and anecdotes; but I doubt not all those that are authentic could be explained in an easy manner without leaving room for his principle of unconscious cerebration.

The difference between ourselves and our opponents, however, is not solely a difference in explanation. They are in the habit of stating facts in a way which is only consistent with their theory; for example, Sir William Hamilton says: "Now, all of you must have experienced, if ever under the necessity of reading aloud, that, if the matter be uninteresting, your thoughts, while you are going on in the performance of your task, are wholly abstracted from the book and its subject, and you are perhaps deeply occupied in a train of serious meditation. Here the process of reading is performed without interruption, and with the most punctual accuracy; and, at the same time, the process of meditation is carried on without distraction or fatigue." Now, so far from a person being able to read a book aloud and think on something else without distraction and fatigue, I believe when this is done that it is really accompanied both by distraction and fatigue, that no train of severe and difficult thought can be carried on in this way, and that, though the mind may wander through a series of associations, yet a minimum of attention must always be kept up to the reading. The mind is still conscious of the printed page, and if the words were ill spelt or a word were to be repeated twice or thrice, or any very startling expression used, the diminished attention would at once be increased; and how could this be if no consciousness had remained? The easier the reading the more conscious are we of the ideas; the more difficult the reading the fainter becomes the grasp of the ideas, so that we are occasionally obliged (as in deciphering a difficult MS.) to read a sentence twice over, once for the words, and once for the

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sense. In reading aloud with the mind wandering on something else, we only read for the words; each word is recognised but not their collective meaning. As has been already said, much of the difficulty has been created by the assumption that we cannot attend to more than one mental process at the same time.

There is a great similarity between physical processes which are readily forgotten and mental ones, so that if we affirm unconscious cerebration of the one we are obliged in consistency to do so of the other. In this way Dr. Carpenter, who is much less wary than Sir William Hamilton, carries his views so far as to render the whole theory suspicious.

Perhaps he nowhere exposes the weakness of his position more than in the following statement.* "So an expert calculator, who may have originally had no more than an ordinary facility in apprehending the relations of numbers, casting his eye rapidly from the bottom to the top of a column of figures, will name the total without any conscious appreciation of the value of each individual figure; having acquired by practice somewhat of that *immediate insight*, which is so remarkable a form of intuition in certain rare cases. It is certain that a distinct ideational state must have been *originally* called up by the sight of each individual figure; and yet an impression made by it upon the cerebrum, which does not produce any *conscious* recognition of its numerical value, comes to be adequate for the evolution of the result." It certainly is a bold statement to say that a man can add up a column of figures without the mind being conscious of any of them. Common sense would surely reply, that if the accountant were unconscious of even one of the figures, he would not add it up along with the rest, and his addition would thus be incorrect. It is true an accountant in adding up a long column of figures has his attention so occupied with the sum which is growing in his mind that at the end of the process he has totally forgotten the separate ciphers which make up the addition, but this forgetfulness is no proof that a momentary consciousness did not exist—if he were stopped for a moment and asked what was the last figure, he would probably answer correctly, unless the cohesion of his ideas were scattered by the abruptness of the question. The truth is, if one were to add up a long column of figures and dwell for a short while on each of them so as to ensure that he was fully conscious of their

* Op. Cit., p. 529.

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numerical value, and if after he had completed the addition and written it down, he were asked to repeat the column of figures, the mind of the man, after adding the columns thus slowly, would be in very much the same condition as if he had added them quickly; he would be totally unable to recall the column of figures in both cases. But Dr. Carpenter would say, that in the one case the accountant could not repeat the column of figures because he had forgotten them, and that he did not know the other column of figures because he had been unconscious of their numerical value, and that, though it was a reasonable explanation to say that the column which he had added slowly had faded from his memory, it was incredible that the one he added quickly should have done so. A similar argument has been happily stated by Dugald Stewart.* "Thus, in the case of a performer on the harpsichord, I apprehend that there is an act of the will preceding every motion of every finger, although he may not be able to recollect these volitions afterwards, and although he may, during the time of his performance, be employed in carrying on a separate train of thought. For it must be remarked, that the most rapid performer can, when he pleases, play so slowly as to be able to attend to, and to recollect, every separate act of his will in the various movements of his fingers; and he can gradually accelerate the rate of his execution till he is unable to recollect these acts. Now, in this instance, one of two suppositions must be made. The one is, that the operations in the two cases are carried on precisely in the same manner, and differ only in the degree of rapidity; and that when this rapidity exceeds a certain rate, the acts of the will are too momentary to leave any impression on the memory. The other is, that when the rapidity exceeds a certain rate, the operation is taken entirely out of our hands, and is carried on by some unknown power, of the nature of which we are as ignorant as of the cause of the circulation of the blood, or of the motion of the intestines. The last supposition seems to me to be somewhat similar to that of a man who should maintain that, although a body, projected with a moderate velocity, is seen to pass through all the intermediate spaces in moving from one place to another, yet we are not entitled to conclude that this happens when the body moves so quickly as to become invisible to the eye. The former supposition is supported by the analogy of many other

* Sir William Hamilton's "Lectures on Metaphysics," vol. i., p. 357.

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facts in our constitution. Of some of these I have already taken notice, and it would be easy to add to the number. An expert accountant, for example, can sum up almost with a glance of his eye a long column of figures. He can tell the sum with unerring certainty, while at the same time he is unable to recollect anyone of the figures of which that sum is composed; and yet nobody doubts that each of these figures has passed through his mind, or supposes that, when the rapidity of the process becomes so great that he is unable to recollect the various steps of it, he obtains the result by a sort of inspiration."

Dugald Stewart, evidently, had no foreboding of the existence of Dr. Carpenter; but it is not clear how the consciousness of the accountant could be granted, and the theory of unconscious cerebration be still used to explain operations which are generally assigned to it.

Dr. Carpenter's work has been selected for criticism, as he is the most popularly known advocate of the theory, and, though it would take too much room to go over all his illustrations, those selected are believed to be the strongest supports of his position. Anyone who reads his book will perceive that he is somewhat ready to admit the truth of an anecdote when it favours his own views, and the following may serve as an instance. "It is a remarkable confirmation of this view," he observes, "that ideas which have passed out of the conscious memory sometimes express themselves in *voluntary muscular movements*, to the great surprise of the individuals exercising them." So far from thinking this statement a confirmation of any view, most people will think that it requires itself to be confirmed, and their mistrust will, perhaps, not be lessened when they find that Dr. Carpenter has to appeal to the spirit-rappers for assistance. "True answers," he writes, "are often given to questions as to matters of fact, notwithstanding that there may be either entire ignorance, proceeding from complete forgetfulness of those facts, or absolute disbelief in the statement of them." Thus, a man may unconsciously know what he consciously disbelieves, and record his knowledge by kicking on the table. Dr. Carpenter gives some instances of this from the Rev. Mr. Dibdin's lecture on table turning, in which the number of years the Queen had reigned, and the age of the Prince of Wales, were indicated by taps on the table, though no one present knew the number of years in either case. The number of tailors sewing in a neighbouring room was given by

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three taps and two gentle rises, the taps being for three full-grown tailors, and the rises for two boys. This is a famous way of disposing of the spiritualists. It is in vain that they will insist that they learn from spirits things that they did not know before. Dr. Carpenter will show them that they have a fund of unconscious knowledge which they never dreamt of, and which they display in a manner they never intended. But, seriously, we cannot think that Dr. Carpenter's explanation will be received as sufficient to account for the facts stated by spiritualists, if these facts be admitted at all.

The Rev. W. G. Davies, in a thoughtful paper upon "Consciousness and Unconscious Cerebration,"* has the following passage:—

"When we are at a loss for a name and make every effort to recall it, but unsuccessfully, and that name afterwards spontaneously flashes into consciousness, such an event can be satisfactorily accounted for by the great physiological law of production to which reference has been already made. The disintegrating activity involved in hunting for the name has made an increased demand upon the nutritive process or production, extra force has been generated, this flashes out of latency into consciousness, and lo! the missing name. If 'Unconscious Cerebration,' in the sense of expenditure, is made to account for the fact that the schoolboy who can just manage with great effort to repeat fifty lines of Virgil before retiring to rest, can repeat them fluently in the morning, we are placed in this difficulty, namely, how to make a cask from which the water runs out as fast as it runs in, fuller in the morning than it was the previous night. So intelligent a man and so able a physiologist as Dr. Carpenter must see the reasonableness of what we are here urging if he has not done so already, only he is so hampered by an untenable hypothesis that he does not clearly state whether by 'Unconscious Cerebration' he does not mean both integrating and disintegrating mental processes. Let him, therefore, ponder well over the fact that the integrating process is invariably preparatory to the display of consciousness, that the disintegrating process never takes place without such display."

For my part, I am neither satisfied with this explanation of the reverend gentleman, nor able to suggest another one. There are anomalies in memory and association which

* "Journal of Mental Science," July, 1873.

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will possibly always remain mysterious. The condition which is required to allow for the play of Mr. Davies' explanation is, that there should be an increased amount of brain work in the effort to recall the lost name; but, then, the name may be recalled, or return, to the mind without any such effort being made; at least, the effort may be only momentary. A man may not think it worth his while to take any trouble to recall the lost name, and yet it may appear to consciousness the minute after, five minutes after, a week after; and this without any search demanding or allowing the nutritive processes which generate extra force.

The recovery of lost names can be explained to a certain extent by the mental process of association, but not by "the integrating and disintegrating mental processes." It may be that a schoolboy who can say his lesson more readily in the morning than on the evening before is aided by the fresher state of his brain; but we do not see that "the fact" upon which Dr. Carpenter is asked to ponder well, has been established on scientific evidence. How do we know, for example, that "the disintegrating process" never takes place without a display of consciousness? Is there never any disintegration of the tissues of the brain without consciousness? Or may not consciousness accompany the integration of the tissues? We can infer, from certain changes and reactions in the blood, that mental exertion is followed by waste of the tissues of the brain, and that this waste is proportioned to the amount of work, but what are the order and succession of changes which go on in the nerve cells, or nerve fibres, during thought is, as yet, unknown to us. When we can detect a desire with a chemical re-agent, and when we can see an abstract idea through the microscope, we shall, perhaps, have a true physiology of the mind.

In any case the theory of "Unconscious Cerebration" derives no support from physiology. It is a child of the old metaphysics, to be brought forward and repelled by the study and analysis of mental operations, cognisable by internal self-examination.

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