

THE  
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I. THE PLACE OF CHRIST IN MODERN THEOLOGY.<sup>1</sup>

THE aim of the large volume (556 pp.), which we shall review in the study of the theme which it presents, is the recovery of the historical Christ. Criticism, it is claimed, "has placed constructive thought in a more advantageous position than it has ever before occupied in the history of the Christian church. It has done this by making our knowledge more historical and real, and so bringing our thought face to face with fact. But, for the Christian theologian, the most significant and assured result of the critical process is, that he can now stand face to face with the historical Christ, and conceive God as he conceived him. What God signified to Jesus Christ he ought to signify to all Christian churches; and here all can find a point from which to study themselves and their systems." (*Preface*, p. 8.) The claim here advanced for criticism is certainly a very large and a very important one. If it is to be conceded, it must be admitted that, hitherto, the Christian theologian has never been brought fully and clearly face to face with the historical Christ. "The most significant and assured result of the critical process is, that he now sees the Christ of history as he has never before seen him, and through Christ, as thus unveiled, can see God as he has never before been in a position to conceive him." It is not claimed that the Christian theologian has not had hitherto a knowledge of the historical Christ. Even the most advanced critic would hardly put forward such a claim. The thing claimed for criticism is, that it effects a change in theology such as Copernicus

<sup>1</sup> *The Place of Christ in Modern Theology.* By A. M. Fairbairn, M. A., D. D., Principal of Mansfield College, Oxford, etc., etc.

## II. SIDE-LIGHTS ON THE CORRELATION BETWEEN THOUGHTS AND WORDS.

IF it can be made out that there is such a thing in the domain of reality as the exercise of what may be broadly termed intelligence, where consciousness is held in abeyance, then it would appear that no arguments drawn from the actual or supposed invariable *nexus* between thought and language in the case of our conscious mental exercises are germane or relevant to disprove the possibility of thought in the absence of language. For, manifestly, if thought may take place without consciousness, the ascertainment that language is the necessary instrument of a part (even though the greater part) of our thinking leaves the question undetermined whether language is or is not the necessary instrument of *all* our thinking; it would certainly look, though, as if there could be no reasonable demand or promising field for language in the case of operations so entirely occult and withdrawn so completely from the recognition of their own subject. Or we may put it in this way: If it should turn out that consciousness itself can be dispensed with in certain forms of what, for the lack of a better term, we may call our thinking, it would seem to follow *à fortiori* that language can be dispensed with too. Furthermore, this realm of unconscious mental activity may be a wider one than has ordinarily been imagined. Professor Müller,<sup>1</sup> as we said, protests against what he stigmatizes as the philosophy of the nursery and the menagerie. We are inclined to the opinion that he does so with some show of reason, but that he carries his protest too far. Not very much, perhaps, can be learned from the silent and unfathomable experiences of the brute creation, and of infancy; but it may be, and we think it is a fact, that something can be learned from them. In like manner it may be true, after all, that there may be a vast *terra incognita* lying back of

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<sup>1</sup> We are indebted to this gentleman for free access to several of our most important sources of information and authority.

the triangulated regions of consciousness, and that a wholly unsuspected proportion of our mental processes are secretly carried on in that unknown region, as if in some mysterious laboratory.

On the other hand, if the existence of these latent mental exercises—which take place without the coöperation or intervention of consciousness—shall have to be denied, or should be disproved, the physiology of the brain, and the new science based upon it that has succeeded in obtaining a rather precarious foot-hold in Germany and elsewhere under the name of physiological psychology, have a good deal more to say on the question under consideration.<sup>1</sup>

Let us now approach the subject of thought and language from another angle. Everything here depends upon the truth or falsity of what is technically known as the "localization" of nervous and cerebral function. If the theory of local determination and exclusion is ascertained to be the true one, and if the local centres of thought and language are discovered and are found to be normally distinct and separate, though connected, and yet to be capable of disconnection, but also of continued, albeit disjunctive, activity, the conclusion will be favored that in all but exceptional conditions thought and language are closely if not inseparably associated together; but that in abnormal and exceptional situations language and thought may each (or may either one) live on in a state of divorce *à vinculo* from its ancient consort. If, on the contrary, the whole theory of psychological "localization" should have to be abandoned; or if the specific local centres of thought and language should be found to be identical; or if essentially different in cranial situation, yet in an anatomical and physiological sense to be inseparably conjoined; then very obviously, Professor Müller's contention would be the one supported, viz., that we can only think in words. If *this* be so, we say again (as we said in the former paper), *tant mieux* for that doctrine of inspiration which carries with it the corollary of

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<sup>1</sup> The great work is still that of Wundt. Professor Ladd, of Yale College, has given us the best thing on the subject in English, in his capital book entitled *Physiological Psychology*.

a verbal no less than of an "ideational" infallibility. If the opposite view to that of the renowned Anglo-Teuton is the one we must accept; if, in other words, we are driven to the conclusion that *all* our thought is not dependent upon words, or their equivalents, yet if the study of the brain should point to the certainty or likelihood that language is the *normal* instrument of thought; the probability would surely be a high one, that even when the Divine thoughts now embodied in the sacred Scriptures lay originally and unexpressed, *ad extra*, in the minds of the inspired penmen, they were already clothed in the hallowed vesture of an appropriate and Divinely suggested language. But such an affirmation is not requisite to the establishment of the particular doctrine of inspiration in dispute. For while there is difference of opinion, as we have seen, in reference to the point as to whether we are compelled to *think* in *words* or else give up thinking altogether, there is practically no difference of opinion as to the proposition that we cannot *convey* our thoughts to others except through the instrumentality of some kind of expressive or symbolic language; and, further, that in the case of all oral or graphic statements the truth or falsity of the averments is of such a character that the outward vehicle of the thought, which in such cases is admitted to cohere with it, is affected no less than the inner kernel of the thought itself, and consequently that in such a case it would be obtrusively absurd to brand the word or *sign* as *false*, and yet applaud the idea or *concept* which the word or sign expresses or conveys as *true*.

We now proceed to the examination of these questions. The first thing to do is to investigate the phenomena of "*latency*," as the philosophers have called it; and to do so both in the light of psychology pure and simple, and also in that of physiology and the peculiar psychology that is based upon it. It will, then, behoove us to view the physiology of the brain more comprehensively, and to see what additional light is shed upon our intricate problem by the theory of "*localization*," and a scrutiny of the brain-centres and of their mutual relations in the normal state of health and in abnormal conditions of disease, or of traumatic lesion.

Everybody who has gone to college, and many who have not enjoyed that privilege, remember Sir William Hamilton's two famous lectures, the seventeenth and eighteenth of his course on metaphysics, in which these interrogatories are dealt with: "Are we always consciously active?" and "Is the mind ever unconsciously modified?" This tract of the discussion is by this time beaten ground. It is, nevertheless, a fascinating inquiry that is started under each one of these two heads, and there is much that is still undetermined in relation to the whole matter. With the first of these interrogatories our subject in this essay has only an accidental connection. The second of them has a more intimate bearing on the topic in hand.

Under the first head, that is in considering, in the seventeenth chapter, the question whether we are always consciously active, Sir William concerns himself chiefly with the phenomena of sleep. It is in connection with this that he presents the now well-known statements of M. Jouffroy, the illustrious French writer on psychology and ethics, which are of the greatest interest and value. Jouffroy seems to have demonstrated, and to have been the first to do so, that the mind is in some sense active in sleep; and his contention appears to be indisputable. If it be true, however, that there may be such a thing as a modification of the mind of which we are unconscious, as Sir William maintained, then we do not see that either he or Jouffroy has demonstrated that the mind is always *consciously* active. This, however, is, on the whole, equally, or more than equally, probable. Jouffroy discusses, like the master that he is, the state of distraction (*être distrait*). Here the simple explanation is, that the attention is drawn entirely off from one object, and powerfully concentrated on another, which more strongly attracts it.

But we leave that branch of his discussion which has to do with our waking hours, and confine ourselves to his arguments to show that we are always mentally alert and conscious in our sleep.

He appeals to the fact that the unaccustomed noises of a great city, such as Paris, at first wake a countryman, but that he soon becomes habituated to them. This was, indeed, his own invariable experience in returning from the country to the town. He

also appeals to the still more significant fact that the sound of a light brush on the carpet, if unusual, should wake a man who slept through the noise of great wagons.<sup>1</sup>

The Cartesian system *assumed* that the mind is always conscious. Malebranche takes for granted that we are conscious in our sleep. Locke adopts the negative, and demands proof of the Cartesian thesis. Leibnitz, in his turn, came to the rescue of the Cartesians. This was in the *New Essays on the Human Understanding*, a masterly reëxamination of the whole field covered by Locke's great work. As to the alleged contradiction involved in saying that a being can think and not be conscious of thought, Leibnitz observes that "in this lies the whole knot and difficulty of the matter." But the difficulty, he holds, is not insoluble, and he endeavors to elucidate it. Leibnitz does not, however, precisely say, as against Locke, whether the mind is conscious in sleep, or only unconsciously active. Wolf enounced the same doctrine with that of Leibnitz before the publication of the *Nouveaux Essais* of his redoubtable master. Kant met the issue fairly and squarely, and agrees with Plato and the Cartesians. Kant maintains that, when asleep, we always dream; that to cease to dream would be to cease to live; that those who fancy that they have not dreamed have only forgotten their dream; that one can dream more in a minute than he can accomplish in a lifetime.

John Locke supposes that most men go through a great part of their sleeping hours without dreaming. He adds that every

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<sup>1</sup> We here, once for all, refer our readers to Hamilton's two great chapters, where they will find a rich vein of anecdote, as well as of psychological reasoning. The amusing stories of the postman of Halle, and of Erasmus's learned friend Operinus, the professor and printer of Basle, will be found at the close of chapter xvii., whereas chapter xviii. fairly bristles with interesting narratives, such as the one by Dr. Rush about one of his insane patients; that of Mr. Hurt concerning his own experiences during a fever; the surprising tale of Lord Monboddo respecting the daughter-in-law of the Maréchal de Montmorenci de Laval; and the extraordinary relation of Coleridge touching the dull maid-servant who, during a nervous fever, seemed to priests and monks "to be possessed with a very learned devil." [See *Lectures on Metaphysics*, by Sir William Hamilton, Bart.; edited by the Rev. H. L. Mansel, B. D., Oxford, and John Veitch, M. A., Edinburgh. William Blackwood & Sons, Edinburgh and London, MDCCLXIX.]

And for all that can be said on the other side, we point to Mill's *Examination of Hamilton*, chapter xv. Longmans, Green, Redder & Dyer, 1867.

one knows, or knows of, persons who pass most of their nights without dreaming.<sup>1</sup> He concludes, in his robust, hearty way, speaking of the acknowledged silence here, as regards the fact asserted, of the paramount witness to one's own mental states, consciousness: "This, some may think to be a step beyond the Rosierucians, it being easier to make one's self invisible to others than to make another's thoughts visible to one which are not visible to himself. But it is but defining the soul to be 'a substance that always thinks,' and the business is done."<sup>2</sup>

A considerable space is devoted by Sir William to a study of somnambulism and of ordinary slumber. The somnambulist notoriously has some of his powers exalted. This is true of "the imagination, the sense of propriety," "the faculty of reasoning," and of the bodily powers, which last are under the complete dominance of the will. While in the trance-state, the somnambulist can perform feats, both physical and mental, of which he is wholly incapable when awake. The difference is one of kind as well as of degree. A person without an ear for music has been known to sing with correctness and pleasure. A somnambulist will climb a roof, and move with ease and safety where he could not go, unless with the greatest trepidation and danger, under ordinary conditions. We are ourselves advised of an authentic instance of this very sort. Persons have spent half a lifetime alternating betwixt the two states, and going on indifferently well in both; only one who is a dullard when in the normal state will be "comparatively alert and intelligent" when in the abnormal.

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<sup>1</sup> The great Scottish philosopher, Reid, held that a man might school himself to abstain from dreaming altogether, and that he had himself acquired, and for many years practised, he habit. But we understand him to be speaking of those dreams only that can afterwards be recalled to mind. There is a reference made by one of the authorities to a man who never had dreamed until after his recovery from a brain-fever. The eccentric pianist, Von Bülow (just dead), is declared to have manifested no remarkable talent for music until he had emerged in boyhood from a similar ordeal. Soon after that he came to be looked upon as a youthful prodigy.

<sup>2</sup> This puts us in mind of an exquisite passage in *The Eclipse of Faith*, where Harrington quizzically argues that a certain view, which he opposed, logically involved the conclusion that we must go to some one else to acquaint us with the contents of our own consciousness.

Sir William was the owner of three works written by three several somnambulists when under the stimulus of the trance-condition.<sup>1</sup> Here we have consciousness in an exalted form, yet it is consciousness bi-sected: The somnambulist, while in his abnormal state, has a complete memory of both states, but when in his normal state, is wholly and invariably oblivious of the events of his abnormal. This differentiates this mystic trance from ordinary sleep.

This brings us at once to the question propounded by Sir William Hamilton in his eighteenth chapter, namely, "Is the mind ever unconsciously modified?" and to the parallel physiological inquiry as to what has been somewhat roughly defined as "unconscious cerebration."

At this point it is proper to observe that, since it would appear to have been indubitably established that the mind is active in apparently dreamless sleep, and is, therefore, presumably, *always* so, the unavoidable alternative is presented, that, sleeping or waking, the mind is either in a state of conscious, or else of unconscious, activity. The refutation of Hamilton's seventeenth chapter would, therefore, be *pro tanto* a complete vindication of the ground he occupies in his eighteenth. On the other hand, just as certain of the phenomena explainable on the assumption that we are always conscious, are also explainable on the assumption that the mind may be unconsciously modified, just so certain of the phenomena which are relied on to prove the fact of unconscious mental activity may by possibility only go to prove the fact that the human thinker is, while alive, at all events, when not under the influence of syncope or coma, unceasingly conscious. Once more: on the assumption that Hamilton is, in point of fact, wrong in his contention that we are conscious even in deep slumber, then it follows from what goes before that he is just as certainly right in his contention that our minds may be, and sometimes are, unconsciously modified. But this amazing assertion, as we shall have ample occasion to point out as we advance further, does not by any manner of means depend solely on that circumstance.

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<sup>1</sup> *Ibid.*, Vol. I., page 320. Mansel here adverts to the well-known fact that Abercrombie's *Intellectual Philosophy* gives a number of curious examples, apparently unknown to Hamilton.



As an illustration of our meaning, there are incidents which are common to the trance of the somnambulist and the sleep of the ordinary dreamer, which would seem to admit of either explanation. One of these is what is familiarly known as *talking in one's sleep*. Another is the capacity to make fruitful progress in some intellectual work which at the time happened to be engaging one's attention. Of course the jaded body is rested, and what we speak of as the "tired" mind. But this is not judged to be a fully satisfactory account of the matter. Subjects flash before one in the morning in wholly new relations and felicitous adjustments before unperceived, and that would not have been apt to occur to one otherwise—except after severe lucubration. It is often better than long hours of additional toil to have a chance to "sleep on it."<sup>1</sup>

Every extemporaneous speaker knows the advantage of keeping a subject "in soak" in his mind for some time before the moment of delivery. Consciousness in such circumstances seems often to be wholly busy with other matters.<sup>2</sup> Remembering important things, or solving hard problems, or composing poetry

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<sup>1</sup>So thought Leibnitz; and later, Hamilton and Carpenter. With this, too, accorded the opinion and practice of Dr. Archibald Alexander; of his son and biographer, Dr. James Waddel Alexander; of the late Professor William H. McGuffey, LL. D., of the University of Virginia; and of Professor John Randolph Tucker, LL. D., of Lexington, Virginia, and of Washington and Lee University.

<sup>2</sup>Doctor Holmes once inhaled a considerable dose of ether, intending to record the thought which he should find uppermost in his mind on regaining consciousness. "The mighty music of the triumphal march into nothingness" rolled through the corridors of his being. Eternity was unveiled to him. The one great truth underlying all human experience, and that is the key to every earthly and celestial mystery, was revealed to him. As he began to come to himself he recollected his purpose, and staggering to his desk scrawled in wandering characters these momentous words: "A strong smell of turpentine prevails throughout." (*Mechanism*, etc., pp. 54 and 55.)

Sir Humphrey Davy, after inhaling nitrous oxide gas, in the manner of an ancient soothsayer or augur cried out to Dr. Kinglake: "Nothing exists but thoughts. The universe is composed of impressions, ideas, pleasures, and pains." (See *Ibid.*, p. 56.)

The mellow-minded "Autocrat" regards our definite ideas as so many stepping-stones, but says we do not take the step ourselves. The mystery of unconscious mental action, he holds, is exemplified in every act of mental association. (*Ibid.*, p. 59.) There is a Delphi in every human breast. We are *improvisatori*. (P. 60.)

as Coleridge says he composed *Kubla Khan*, or constructing arguments or orations, in one's sleep, are not usually cases in point; for the mental exercises are recollected by the next morning, or the next day. It frequently happens, though, that what seemed to be genius in the dream is recognized as fustian or incoherent nonsense when we wake.

But one sometimes wakes with some such valuable "find" in actual possession, yet without being able to say that the golden discovery took place in a state of consciousness or in one of latency. In such a situation of things, the experience might be cited as possibly *ad rem*.

The question immediately before us is whether the mind ever puts forth energies, and is ever the subject of modifications, of which it is unconscious.<sup>1</sup> This question was mooted in Germany and France long before it was approached in Great Britain. The German philosophers were far ahead of the French in the investigation. The suggestions of Condillac, as well as the previous speculations on the continent, were followed up much later by two French writers who seemed to fancy that they had been the first to stumble upon the doctrine that the mind can be modified and at the same time be unconscious of such modifications. The Germans took this view almost to a man; Condillac tried to explain away the phenomena. Doctor Oliver Wendell Holmes, in that marvellous little volume of his in which philosophy, science, literature, wit, and even theology, are so cleverly combined, and technical terms are so constantly avoided,<sup>2</sup> expresses himself as

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<sup>1</sup> "Do we ever think without knowing that we are thinking? The question may be disguised so as to look a little less paradoxical. Are there any mental processes of which we are unconscious at the time, but which we recognize as having taken place by finding certain results in our minds?" (*Mechanism in Thought and Morals*. An Address with Notes and After-thoughts, by Oliver Wendell Holmes. "Car il ne faut pas se méconnaître, nous sommes automates autant qu' esprit." Pascal: *Pensées*, Chap. XL, § 4. London: Sampson Low, Son, & Marston, Crown Buildings, 188 Fleet Street. 1871.)

\* \* \* "Such a process of reasoning is more or less implicit, and without the direct and full advertence of the mind exercising it." J. A. Newman, *Essay in Aid of a Grammar of Assent*. (See *Ibid.*, p, 37.)

<sup>2</sup> Credit, Dr. Holmes urges, should be given to these earlier authorities as well as to Unzer and Prochaska. See *Mechanism*, etc., for Hartley's account of what he calls automatic motions of the secondary kind. [*Mechanism*, etc., p. 40.]

follows: "That there are such unconscious mental actions is laid down in the strongest terms by Leibnitz, whose doctrine reverses the doctrine of Descartes into *sum, ergo cogito*." (P. 37.) He goes on to say that the phraseology of Leibnitz had to be changed to suit the advance of science, but that that great thinker evidently anticipated in its essence the theory of Hartley a half a century later, who himself was hampered by the "vibrations" of Newton, and was in error as to the true interpretation of the cerebral structure. Hartley, in his turn, anticipated in a remarkable manner some of the most startling ideas of modern times. But Leibnitz fifty years before had perceived the analogy betwixt the mysterious process of our thoughts and the series of reflex actions described with fulness and accuracy by Hartley. (Ibid., p. 39.) "Something," Leibnitz maintained, "goes on in the mind which answers to the circulation of the blood and all the internal movements of the viscera." (Ibid., p. 38.)

Unconscious activity is the rule and not the exception, we are told, in the case of those of our actions which have the most important bearing upon life. (Ibid., page 40.) These "unconscious or reflex actions" the Boston professor attributes to a mechanism which, he says, was never more simply expounded than it was by Hartley. Hartley looked upon them as the effects of "vibrations which ascend up the sensory nerves first, and then are detached down the motor nerves, which communicate with these by some common trunk, plexus, or ganglion." (Ibid., p. 41.) The operation is, crudely, like the movement of a rope over a pulley, though it is in some respects like the transmission backwards and forwards of electric currents.<sup>1</sup>

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<sup>1</sup> We shall not repeat here the well-known facts concerning the reflex actions of decapitated frogs, and frogs that have had the hemispheres injured or extirpated; but simply refer our readers to such pages as those of Ranney, Flint, and Martin. Physiologists distinguish between orderly and disorderly reflex movements. In orderly reflex movements of a headless frog, the following parts, according to Professor Newell Martin, of Baltimore, must be intact: "(a), The end organs of sensory nerve-fibres; (b), Afferent fibres from these to the cord; (c), Efferent fibres from the cord to the muscles; (d), The part of the spinal cord between the afferent and efferent fibres; (e), The muscles concerned in the movement."—*The Human Body*. . . . By H. Newell Martin, M. A., M. D., F. R. S., Professor of Biology in the Johns Hopkins University, etc., etc. Sixth edition, revised. New York: Henry Holt & Co. 1890. (Pages 576 and 577.)

The doctrine of Leibnitz (and, we may add, of Hamilton and Carpenter) is, "that the brain may sometimes act," "as the heart commonly does, and many internal organs always do," "without our taking cognizance of the fact." (Ibid., page 42.) The idea would seem to be, in the main, a modern one, and its wide diffusion and acceptance to belong to our own era. The root of all the matter in Hamilton, Mill, Holland, Abercrombie, Laycock, Maudsley, Sir John Herschel, Carpenter, Draper, Lecky, Dalton, and the rest (p. 42), may be found in the discussion of that prince of the optimists who discovered the differential calculus.

Here are a few instances of what is meant by the advocates of "unconscious cerebration": We say, "Wait a minute, and it will come to me"; and it does. We go on talking, till all at once the idea comes back to us—delivered like the cash at Wanamaker's—"laid at the door of consciousness like a foundling in a basket." (Ibid., page 43.) How it got there, we cannot say. It could not have come there of itself. The mind must have been groping for it in the dark. (Page 43.) Aged persons, and certain others, cannot reply to a question until the answer has been evolved by some occult process. An old wagoner's daughter, whom with her father Dr. Holmes once met on the highway, said to the interested expert, "Wait a minute or so, and he will tell you"; and so he did, and spoke to the purpose. The doctor compares this delay to what machinists term "lost time," or "*back lash*," in turning a screw that has a worn thread. (Page 44.) A young man who was once a successful pupil of the doctor's "betrayed the same curious idiosyncrasy." (Page 45.)<sup>1</sup>

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<sup>1</sup> Much might be said about the revival of obsolete impressions. De Quincey, Dr. Holmes, and Mr. Moody testify from their own experiences after having been nearly drowned. A man was once rescued out of the Charles River, nearly dead from cramp and suffocation. When he came to, he went to his bookcase, and took a missing bond from between the leaves of a book. As he sank, the act of placing the bond there and of putting the book back in the bookcase had been printed on the retina of his mind's eye. [*Mechanism*, etc., page 93.]

The story of Argus, the dog of Ulysses, in *The Odyssey*, and that of the parrot, told by Campbell, will occur to some of our readers. Laycock tells of some old war-horses that formed in line in a thunder-storm. After the carnage of Vionville, when the evening roll-call was sounded by the first regiments of dragoons of the Guard, "six hundred and two riderless horses answered the summons. Jaded,

Sir Isaac Newton, if we are to accept the averment of Dean Swift, "would revolve" a question "in a circle in his brain, round and round, . . . before he could produce an answer." The numerous cases here come in again, where questions have been answered and problems solved in dreams, and even in what the savant of the breakfast-table styles "unconscious sleep."<sup>1</sup>

Somnambulism and other forms of double consciousness afford an additional magazine of illustrations. A brother of Lord Culpeper, who was, in 1686, arraigned and indicted for shooting one of the guards, was acquitted at the Old Bailey, on the ground that he was a somnambulist, and that the act of killing took place while he was in the trance-state.<sup>2</sup>

"Absent" persons furnish a still more familiar example of unconscious mental action. La Bruyère is said to have thrown a glass of wine into the cavity of the backgammon-board, and then, in his confusion, to have swallowed the dice. Hartley is full of instances of "automatic movements of the secondary kind," as where one knits or plays, and at the same time carries on an easy conversation. A youth and a maiden walk slowly, side by side, in the vernal sunrise, without once considering the "wonderful problem of balanced progression, which they solve anew at every step." (Ibid., page 49.)

On the fifteenth of October, 1843, Sir William Rowan Hamilton, so he writes to a friend, was walking from his observatory to Dublin with Lady Hamilton. On arriving at Brougham Bridge he "felt the galvanic circle of thought close, and the sparks that fell from it were the fundamental relations between i, j, k." This was the completion, or practically such, of one of

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and in many cases maimed, the noble animals still retained their disciplined habits."—*German Post*, quoted by *The Spectator*. [Ibid., page 94.]

Dr. Holmes wrote too early to speak of the distinction which some would now make between what they, somewhat ignorantly, style the "objective" and the "subjective" minds. Many of the alleged facts of the spiritists are thus accounted for. The "subjective" mind acts unconsciously.

<sup>1</sup> Does the charming American "Autocrat" here mean to take sides against the Scotch philosopher in the inquiry whether the mind is or is not always consciously active?

<sup>2</sup> A similar and a memorable case was reported in this country.

the most—probably the very most—novel and amazing discoveries in the higher mathematics, namely, that of quaternions.<sup>1</sup>

On the question as to whether there is, or can be, physiologically, such a thing as “unconscious cerebration,” the valuable opinions still differ. The alleged phenomena are incapable of denial, and are universally admitted. The only debate is as to their proper explanation. One method is that of referring some of them to the category of things forgotten, and accounting for the rest on the principle of “reflex action.”<sup>2</sup> On this view, the phrase “unconscious cerebration” may still be retained for the sake of convenience, but it has become a palpable misnomer.

The celebrated Dr. William Carpenter of England, in his work entitled *Principles of Human Physiology*, and again in his later and more special work on *Mental Physiology*, has pretty nearly exhausted this subject. In the first of these books the philosophic advocate of the theory gives an interesting account of the seemingly miraculous arithmetical powers of Zerah Colburn. He also descants upon Mozart’s unequalled gift of “automatic” musical production, and up on Coleridge’s, of “automatic” yet transcendent monologue.

Sir William Hamilton, the metaphysician, as is so well known, distinguishes three degrees of mental latency. We threw out the hint a while ago that the range of this species of psychological activity might perhaps be ascertained to be a broad one. This is, in fact, undoubtedly the case, as might be shown in a moment. For this statement there is high authority. “In the first place,” says the Scotch professor, “it is to be remembered that the riches, the possessions of our mind, are not to be measured by its

<sup>1</sup> *Nature*, February 7, 1870, page 407; *North British Review*, September, 1866, page 57. (In *Mechanics*, etc., page 50.)

<sup>2</sup> Dr. Holmes is a little ambiguous on this point. He may intend to distinguish between “reflex action” and “unconscious cerebration.” On the other hand, he might be understood to identify them. Professor Hartigan leans towards the “reflex” explanation (ultimately through the coöperation of the *optic thalamus* and the *corpus striatum*), but, if there were only such a word, he would prefer to call it “unconscious ganglionization.” He, however, admits the *possibility* of a true “unconscious cerebration” in certain layers of the cortex, especially if Dr. Baker should prove that only Meynert’s “psychic-cells” are concerned with consciousness.

present momentary activities, but by the amount of its acquired habits. I know a science, or language, not merely while I make a temporary use of it, but inasmuch as I can apply it when and how I will. Thus, the infinitely greater part of our spiritual treasures lies always beyond the sphere of consciousness, hid in the obscure recesses of the mind. This is the first degree of latency. In regard to this there is no difficulty or dispute \* \*."

The second degree of latency, he holds, is that in which the mind contains systems of knowledge or habits of action, which, in its ordinary state, it is wholly unconscious of possessing, but which are revealed to consciousness in certain exceptional conditions of extraordinary exaltation. This phenomenon Sir William justly pronounces one of the most marvellous in the whole compass of philosophy. That in fever, in somnambulism, in madness, and other abnormal states of its activity the mind should give clear evidence of capacities and extensive systems of knowledge with which at other times it had no acquaintance, is something that can be credited only upon irrefragable proof. But that proof is at hand in abundance. The testimony adduced is that of the most intelligent and competent observers and veracious men; and, in most cases, that of reporters wholly independent of one another. The phenomena observed and reported were unambiguous and palpable.

The noted physician, Doctor Rush, of Philadelphia, testifies that a female patient of his who became insane after parturition, in the year 1807, sang hymns and songs of her own composition, and yet had previously given no sign of having a turn for either music or poetry. So soft and agreeable was the tone of the woman's voice that the sympathetic auditor hung upon it with delight. Doctor Rush also mentions two instances of a talent for drawing, that had been evolved in the same way by madness, which had come to his knowledge. Every hospital for such people, the same expert declares, has in it mechanics who have made "elegant and completely rigged ships and curious pieces of machinery," who never displayed the least knack for such things until they went crazy.<sup>1</sup>

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<sup>1</sup> Beasley, *On the Mind*, p. 474.

The accumulated data, Sir William maintains (and with reason), evince the general fact that proof of the inactivity of consciousness in a given case is not necessarily proof that the mind may not have been modified—all the same.

He then takes up the third class or degree of "mental modifications." This is the most difficult and abstruse part of the discussion, but it is, in our view, equally convincing as what precedes; and is fully corroborated, alternatively at least, by the phenomena of cerebration as described by the physiologists.

Sir William Hamilton puts the question thus: "Are there, in ordinary, mental modifications, *i e.*, mental activities and passivities, of which we are unconscious, but which manifest their existence by effects of which we are conscious?" In reply to this interrogatory, the great modern interpreter of Aristotle boldly proclaims himself as follows: "\* \* I am not only inclined to the affirmative; nay, I do not hesitate to maintain that what we are conscious of is constructed out of what we are not conscious of; that our whole knowledge, in fact, is made up of the unknown and the incognizable."

We are not sure that we could go the whole way with Sir William, if this affirmation could be fully expanded according to his notions. We are far from being out and out Hamiltonians. We stand nearer to Mill than to Hamilton, as to many points on which Mill takes Hamilton to task; while we differ widely from both on some of the same, and on other points. But we are in cordial agreement with Hamilton<sup>1</sup> in the main in what he urges in these two chapters, as also in his view elsewhere presented, concerning the relation between thoughts and words.

We shall not lay before our readers the articulated proofs of the doctrine as given by Hamilton. It would be demurred that the theory of unconscious mental modification is more than paradoxical; it is contradictory. The objection might be twofold: How can we know something (anything) to exist beyond the boundaries of consciousness—the one condition of all our knowledge; and how can knowledge arise out of ignorance—or one opposite of any kind proceed out of another? The decisive

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<sup>1</sup> In *Hamilton*, Vol. I., p. 341.



answer to the first point of objection is, that there are many things which we do not and cannot know directly, but which manifest their existence to us indirectly through their effects. We have no general consciousness. We are conscious only of particular perceptions, remembrances, etc. But we can have no consciousness of the rise or awakening of the thought or feeling, for its rise or awakening is equally the rise or awakening of consciousness itself.<sup>1</sup>

The answer to the second point of objection is tantamount to the establishment of the thesis supported. The succeeding argumentation is accordingly devoted simply to a conclusive proof of the main position. We can only refer those who are attracted to the topic to Sir William's arguments from the *minimum visibile* and the *minimum audibile*, which are as beautifully ingenious as they are practically cogent. When we gaze upon a sylvan landscape no leaf or tree may be separately visible in any distinctness. It is the total impression of which we are conscious. Yet that total impression is incontestably made up of innumerable small impressions of which we are unconscious.

And so it is also with the hearing and with all the other bodily senses. When we listen to the distant roar or murmur of the sea, we are conscious, again, only of the total impression, and this, again, is made up of parts, and these must count as something, or the sum would only amount to zero. "The noise of the sea is the complement of the noise of its several waves: *ποντίων τε κυμάτων, Ἀνήροθμον γέλασμα*;<sup>2</sup> and if the noise of each wave made no impression on our sense, the noise of the sea, as the result of these impressions, could not be realized. But the noise of each several wave, at the distance we suppose, is inaudible; we must, however, admit that they produce a certain modification beyond consciousness on the percipient subject; for this is necessarily involved in the reality of their result."<sup>3</sup> Similar inferences are drawn from the operation of the other senses.<sup>4</sup>

<sup>1</sup> *Ibid.*, pp. 348, 349.

<sup>2</sup> Æschylus, *Prometheus*, I., 89.

<sup>3</sup> Hamilton, Vol. I., pages 350 and 351.

<sup>4</sup> Dr. Oliver Wendell Holmes inquires: "Is memory, then, a material record?" The brain is, in a manner, "written all over," like the Sinaitic rocks, "with inscriptions left by the long caravans of thought." When we try to listen to the

The lecturer goes on to argue from facts connected with the association of ideas, illustrating his point very neatly from the action of physical forces resulting in certain effects upon ivory balls: when a series of such balls are at rest in a straight row and touching each other, and another ball is made to strike the first one in the row, and in the line of the row, it is only the last one in the row that is propelled.

Something like this, Hamilton holds, appears often to take place in the train of one's thoughts. We are unconscious of the intermediate ideas of the series. He gives this curious example from his own experience, and it might be easily duplicated from the experience of others: One day he happened to think of Ben Lomond, and that thought was immediately succeeded by that of the Prussian system of education. He was at the time unconscious of the links connecting these two ideas. On reflection, he became convinced that they were these: a particular German he had met on the summit of Ben Lomond—Germany—Prussia—Prussian schools. This instance is very instructive.

Sir William controverts at some length the explanation offered by Stewart, which is just Locke's view over again applied to the case in hand; namely, that the intermediate ideas are for an instant really awakened into consciousness, and then immediately forgotten.

Hamilton's most telling argument is derived from "our acquired dexterities and habits." Three views are considered under

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dotard's well-remembered story, we naturally think of the railway train which we daily see moving in the same line, and in both cases we infer that there must be a guiding track. Shakspeare was nearer right than he may have known himself when he used the language: "Pluck from the memory a rooted sorrow; *Raze out the written troubles of the brain.*" We carry with us our old scars. The Boston expert illustrates this point from the exploits of microscopic photography. He has a glass slide on which is a photographic picture that may be exactly covered by the head of a pin. This speck of matter may be made to reveal the Declaration and its signers; the arms of the thirteen original States; the Capitol at Washington; portraits of all the presidents from Washington to Polk. Dr. Holmes comically adds that Jackson appears there "with that bristling head of hair in a perpetual state of electrical divergence and centrifugal self-assertion." Now, there must have been an interval when these pictured objects existed potentially and quite invisible in a drop of collodion film no bigger than the smallest grain of sand. [Cf. Haller, quoted by Laycock, in *Mechanism*, etc., page 91.]

this head: The first is that of Reid and Hartley, that the acts are strictly mechanical, or automatic; and that, as there is no active and voluntary intervention of the mind, consciousness has nothing to do with them. The second is that of Stewart, who is held to have invalidated the view of the two preceding philosophers, but not to have successfully sustained his own. Stewart's view "allows to each several motion a separate act of conscious volition." The third view is the one advocated by Sir William himself, who takes a middle ground, and again controverts Stewart's view, and does so with the utmost force and ingenuity.<sup>1</sup>

Hartley takes up the case of a performer on the harpsichord. (What would he have said could he have heard Liszt or Rubinstein play upon the piano!) In course of time, after years of practice, the acts of volition become less and less express, till at last they are evanescent and imperceptible. A great expert, such as the now regretted Von Bülow, has been known to play a sonata of Beethoven, or a crashing rhapsody of Liszt, from memory, and at the same time pursue a wholly different train of thought, or carry on a conversation with a friend. Faced by undeniable facts of this sort in his own day, Hartley concluded that there could be in such cases "no intervention of the idea or state of mind called will." To such phenomena Hartley gave the name of "transitions of voluntary actions into automatic ones."<sup>2</sup> It seems difficult to resist this reasoning, but Sir William rather dubitatively does so.

Stewart adverts to the well-known ease with which an expert accountant, does he mean what we call a "lightning calculator"? can sum up, almost at a glance, a long column of figures, and with unerring certainty;<sup>3</sup> and yet this man cannot, perhaps, recollect any of the figures of which that sum was composed.

Just as Hartley preceded the reigning school of modern physio-

<sup>1</sup> *Ibid.*, Vol. I., pages 355-360.

<sup>2</sup> Hartley, *Observations on Man*, Prop. xxi. In Hamilton, Vol. I., page 35. Hartley's views are precisely those of contemporary experts. [Cf. Kirke's *Handbook*, Vol. II., page 87.]

<sup>3</sup> Mr. Stewart might have said *three columns* instead of one. We are personally acquainted with an actuary in New York who can do that, unless he has lost the power from disuse.

logists, and an influential school of modern psychologists, in his mode of advocating, as well as (after a few changes in terms) of formulating, the automatic or mechanical theory, so old Leibnitz, if we allow a similar revision of the nomenclature in his case, anticipated all succeeding philosophers in the arguments, as we saw, which they have employed in support of the doctrine of unconscious modification.

The reference just made to Hartley affords a natural introduction to the more purely physiological branch of our investigation. This cannot be dealt with at the heel of this essay *in extenso*, or in any other than what we fear must be regarded as a very perfunctory manner. The first thing in order in any adequate, or approximately adequate, treatment of this broad subject would be a scrutiny of the hypothesis of what has for a good many years been currently spoken of as "unconscious cerebration," for this is substantially the very same question we have just been discussing; only the topic of debate is expressed in terms of physiology instead of terms of psychology, and the scene and subject-matter of the debate itself has been transferred from the twilight recesses of the conscious or unconscious soul to the almost equally mysterious chambers of the brain.

We have already glanced, in passing onwards, at this ancient and hyper-physical *quæstio vexata* as it thus reappears, identical in its essential features, and yet so strangely altered both in shape and vesture. But in order to a competent survey of this and the other physiological aspects of our general inquiry, it would be necessary to take up, first, the vital question concerning the exact relation betwixt the brain and the thinking subject. This would lead up at once to a settlement of the dispute as to cerebral and nervous "localization," and then to a consideration, first, of the brain-centres, regarded as organic parts of an entire system, and afterwards of the specific brain-centres, which are supposed to control respectively the tracts of thought and language, viewed independently and also as mutually interdependent. Both these points of inquiry might well yield a momentary precedence to an examination of the materialistic tendencies of craniology.

This is really the gist of a larger question, relating to the ten-

dencies of medical studies in general, and of physiology taken in its widest scope, but especially that of the brain and nervous system. The larger question we shall not touch, except as its determination is involved in that of the smaller one; and in fact the whole danger, if danger there be, from the pursuit of such studies lies in the temptation to confound the immortal spirit with its physical environment in the great nervous mechanism and economy, ramifying everywhere, but centring mainly in the head and the back-bone. It is painfully true and evident that such studies too often have a deplorable effect upon the minds of thoughtful men, as well as upon the common herd who merely follow their leader, as sheep go over the fence after their bell-wether. It is a still more painfully impressive fact that a good majority of writers and authorities on the functions of the cerebral and ganglionic organs would at first sight appear to give conscious encouragement to the most advanced views of the skeptical materialist. This inference, however, is sometimes an erroneous one, so far as it points to any positive or deliberate leaning in that direction; and is sometimes due to a total want of apprehension of distinctions, fully recognized by the authorities misjudged between things that stand apart from one another as separately and distantly as the heavens and the earth. The actually sinister tendencies of such studies as now too frequently directed have to be admitted.<sup>1</sup> The legitimate tendencies of such studies in them-

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<sup>1</sup>The "Autocrat's" devotion to literature and philosophy, and his sound sense of humor, together with his native vigorous sagacity, have saved him from the favorite sophisms, as well as the fantastic caperings, of most of the materialists. He somewhere says, that while the hieroglyphics scrawled on the brain may be "material," *that* is not "material" which reads and ponders over them. Professor De Motte, of Cincinnati, has developed a grand lecture we once heard into a useful book (unless the book was reduced to the lecture) on "Character-Building"; where he finely points out how the "nerve-tracks," good and bad, are (or may be) formed, changed, obliterated, reconstructed. He dwells much, however, on the persistence of early, protracted, and deep impressions. Doctor Oliver Wendell Holmes, after justly scoring other physiologico-ethical philosophers, goes himself dangerously and erroneously far when he maintains that the moral world "includes nothing but the exercise of choice; all else is machinery." [*Ibid.*, p. 96.] This is pretty much Carpenter and Draper over again. The stanch Puritan goes, too, not only for freedom and responsibility as against fatalism, but for the automatic independence of our volitions as against determinism. [*Ibid.*, pp. 96-100.]

selves, and when under proper supervision and direction, remain an open question so far as their results can be inductively determined. Yet the aspiration and quest after truth in the realm of nature—as of grace—are certainly not unacceptable to him who is the author and infinite exemplification of the truth; and when accompanied by the docile and child-like but profound and discriminating spirit enjoined and recommended in the gospel, are not likely to issue in evil or to fail to be richly rewarded.

What is more: whilst the effect of such studies when of the right sort, and when conducted under the proper restrictions and guidance, has not yet been inductively ascertained on a great scale, it has been determined on a smaller one. Even under the present conditions, and beneath the salutary care of heaven, many who have imbibed the principles of physiology as taught in our day have been securely protected against a deleterious residuum; and the noble science, as we esteem it, that so fundamentally underlies both the theory and practice of the art of healing has been able, in all Christian periods and countries, to point to conspicuous, as well as multifold representatives, who were also adherents and ornaments to our holy religion.<sup>1</sup>

The question of the consonance with Christian theism of the radical view of the brain and nervous centres, that is accepted and propagated by the leading physiologists of our time, is closely bound up with the one just under consideration. That view, it may be said here, universally involves some form of cerebral and sensory “localization,” and associates the operations of the human intelligence and volition, as manifested in this world, inseparably with definite changes in the gray matter of the brain. In its extreme form, indeed, it contends that molecular transpositions tally not only in general, but with precision, with the vicissitudes of thought; and that waste of tissue conforms with the same mathematical exactness to the expenditure of mental, as it does to that of muscular, energy. High authorities agree that the relation between thought and brain tissue has not as yet been so

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<sup>1</sup> We refer here with pleasure to one verifying example furnished by a capital book of J. Milner Fothergill, M. D., Edinburgh, entitled: *The Will Power, Its Range in Action*. Cleveland and Cincinnati: W. W. Garfield. 1889.

accurately fixed as in the other case; but most of them—many of them certainly—appear to think that the removal of this difference is only a question of time.<sup>1</sup>

It will be observed that an acceptance of the doctrine of "localization" need not bind one down to all the particular opinions and whimsies that are often associated with it.

We have used this term hitherto in its most extensive signification, as denoting the hypothetical but accepted view that the function-centres of brain work of every kind can, in most instances, be at least approximately located on an outline map of the cranium as they have been, in fact, objectively located in the human organism. The term, we shall presently see, is used by certain physiologists in a more restricted sense.

For ourselves, we have no dread of the ultimate results of this investigation. No one need be afraid of acknowledging the existence of facts; and surely anything short of the facts need give nobody the slightest alarm. The trouble with the skeptical theorists in the department of cortical and sensory-motor physiology is not with their proved facts, or even, for the most part, with their rashly *asserted* facts, some of which are false, and others of them at present devoid, if not incapable, of proof; but with the wild and often senseless *inferences* they have ventured to draw from them and then boldly to enunciate.<sup>2</sup>

<sup>1</sup>The poet-doctor of the breakfast tea-cups holds that people ought not to be frightened off by the bold language of "certain speculative men of science, from a subject as much belonging to natural history as the study of any other function in connection with its special organ." [*Mechanics, etc.*, p. 5.] Professor Huxley defines our thoughts as "the expression of molecular changes in that matter of life which is the source of our other vital phenomena." [*On the Physical Basis of Life*. New Haven. 1870.] The reverend Professor Haughton most guardedly conjectures that "our successors may even dare to speculate on the changes that converted a crust of bread, or a bottle of wine, in the brain of Swift, Molière, or Shakespeare, into the conception of the gentle Glumdalglitch, the rascally Sganarelle, or the immortal Falstaff." [*Medicine in Modern Times*. London. 1869. In Holmes, p. 6.] All this should not deter us from studying the thinking organ in connection with thought, just as we study the eye in its relations to sight. [*Ibid.*, p. 6.]

<sup>2</sup>The "materialist" contemplates the brain as wound up by the ordinary cosmic forces, and as giving them (or the effects of their activity) out again as mental products; the "spiritualist" believes in a conscious entity not inter-

The whole thing is as plain as a pike-staff. If the establishment of the point that an inseparable connection, resulting in certain fixed, and, in some cases, commensurable effects, exists in this world between the mind and the brain in the human organism necessarily leads to skeptical materialism, then we all have good reason to go over, bag and baggage, without delay to the materialists. For such a connection *has* been incontestably established, as is notorious to all men. Knock a man "on" the head, as our English friends say, with sufficient force, and you knock him, as both Americans and English say, out of his senses; by which we mean that we knock both sensibility and consciousness out of *him*. Where there is slight or more serious concussion of the brain, as when one falls when walking and strikes one's head very hard on a stone pavement, or as when one is dashed from a runaway horse against the abutments of a railway bridge, or the pediment of an heroic statue, the physician can often tell to a nicety, from the situation and violence of the blow, how long it is likely to be (on the assumption) before loss of consciousness takes place, or how soon (if ever) the man who is already unconscious is likely to "come to his senses."

Place a certain carefully selected person, an undoubted "professional," in a warm and crowded auditorium, in exciting circumstances, and an expert judge in such matters can almost foretell the very moment when she is going to faint or to have hysterics. Slap a quick-tempered and sensitively honorable man in the face, or tweak his nose, and you can predict pretty accurately, if you know the man well enough, the series of mental, no less than physical,

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changeable with motive force, which plays upon this instrument. "But the instrument must be studied by the one as much as by the other; the piano which the master touches must be as thoroughly understood as the musical-box or clock which goes of itself by a spring or weight." [*Mechanism, etc.*, p. 7.] An eminent writer in the *Journal of Psychological Medicine*, for July, 1870, is cited as declaring that the best cerebral physiologists agree that the brain is not governed by the mind, but that the mind is a force developed by the action of the brain. Physiology, however, manifestly leaves us free to reverse this statement in reference to the thinking subject. Besides, there are physiologists (like Professor Hartigan; and Carpenter's leanings appeared to be in the same direction) who make a distinction between "the mind" and the will, or "thought," and the imperishable "soul."



demonstrations that will immediately succeed. Horace knew that the healthy mind is not to be looked for, though it may exceptionally be found, in an unhealthy body, and *we* know that it never coexists with certain grave lesions of the brain. Whatever may be true of the human intelligence in a disembodied state, or in some other sphere, we are all aware that on earth and in the conditions which now obtain, a man who has been long decapitated can neither think nor feel.<sup>1 2</sup>

We have never been able to see why the ascertainment of a *quantitative*, as well as a *qualitative*, correspondence between the molecular changes in the gray matter of the cortex on the one hand, and the expenditure of mental energy on the other, could give

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<sup>1</sup> We put the matter cautiously, so as to be on safe ground. In a delightful address (since printed as an equally charming essay) by the American Goldsmith, Doctor Oliver Wendell Holmes, now probably the most venerable and shining ornament of cis-Atlantic letters, after alluding to the story told of Charlotte Corday, reproduces the ghastly but grotesque one of Sir Everard Digby, that when the executioner held up his heart after execration as that of a traitor, "the severed head exclaimed 'thou liest.'" These tales, he argues, evince the popular conviction that the seat of personality is in the great nervous centre. A dog's severed head, with freshly injected blood, looks as if it "saw you." (*Mechanism in Thought and Morals*. London: Sampson & Co. 1871.)

<sup>2</sup> The Autocrat may be pardoned for asserting, that "the material or physiological coefficient of thought" appears to be "indispensable for its exercise during the only condition of existence" of which we have any solid personal experience. (*Mechanism*, etc., p. 82.) As to the seat of the will he says that it appears to be, by turns, everywhere. It belongs in some sense to the cerebrum. It seems (like the memory) to vary with the organ it directs. As in the case of the general in command, its headquarters are shifted over the field, as circumstances may demand or suggest. "It is the least like an instrument of any of our faculties; the furthest removed from our conceptions of mechanism and matter as we commonly define them." [*Ibid.*, p. 27.] Carpenter, too, retreats before the materialist, to the impregnable citadel of the human *will*. We have to thank the author of a century of *bon-mots*, and of such lines as "The Last Leaf," and "The Chambered Nautilus," for a capital rejoinder to the materialists as to the mind. He urges that "the intellectual product does not belong to the category of force at all," as defined by the men of science. . . . "One cannot lift a weight with a logical demonstration, or make a tea-kettle boil by writing an ode to it." [*Ibid.*, p. 77.] "A given amount of molecular action in two living beings represents a certain equivalent of food in the case of two human beings," but "not an equivalent amount of intellectual product." Bacvius and Maevius were no doubt as good feeders as Virgil or Horace [*Ibid.*, p. 18]; and Nahum Tate probably ate as much as Tennyson. [Pp. 78, 81.]

any real—we mean any legitimate—aid and comfort to the atheistic or agnostic materialist, when he is not admitted to deserve any from the broader facts, some of which have been already mentioned.<sup>1</sup> For surely it is not the *degree* so much as the *fact* and *inseparableness* of the unchallenged connection between the body and the spirit that chiefly, however vainly, threatens the position of the natural realist. Skeletons, manikins, mummies, and ordinary cadavers, are everywhere admitted to be incapable of rational or emotional exercises. There is the whole trouble; and its existence and the problematic mystery that hangs about it, will have to be, and it is, universally conceded. The attempt to magnify it by descending into minute particulars will surely be unsuccessful, and might seem to argue, on the part of the hostile and over-boastful critic and *doctrinaire* who does so, a certain deterioration of the gray matter of one or other (or more) of the layers of the cortex; most probably, some may say, that one con-

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<sup>1</sup> A slight congestion or softening of the brain immediately discloses to us all, says Doctor Holmes, the strict independence of mind on its organ in the only condition of life with which we have any experimental acquaintance. (P. 7.) Such an irresistible demonstration ought really to have been unnecessary. Ordinary good sense should teach us that the microscopic, chemical, experimental study of the organ of thought in lower animals and man, in health and in disease, is just as important as if mind had been ascertained to be simply a function of the brain, just as digestion is a function of the stomach. (See *Ibid.*, p. 8.)

Doctor Holmes asks why there may not be in the human brain a latent property (or capacity) analogous to the one in iron which causes a bar through which the electric current has passed to be magnetized? Force-equivalent is one thing. *Quality* of force product is a thing altogether different. *Ca, ce n'est pas q'un autre chose.* The same movement of the hand (so far as the *amount* of muscular waste is concerned) may grind coffee-berries and play on a hurdy-gurdy. (*Ibid.*, pp. 80, 81. This is less a digest of the author's own words than it is a restatement of his ideas.)

The brain record may perish before the volume on which it was inscribed. He does not quote Johnson's lines:

"In life's last stage what prodigies arise;  
Fears of the brave and follies of the wise!  
From Marlborough's eyes the tears of dotage flow,  
And Swift expires a driveller and a show."

Yet Doctor Holmes denies that "*Hamlet* and *Faust*, . . . the valor of men and the purity of women," can be found "by testing for albumen, or examining fibres in microscopes." [*Ibid.*, p. 9.]

taining Meynert's so-called "psychic-cells." If the grand concession we all make cheerfully to the materialists, that we must be alive and have sound brains in order to think to any purpose, does not involve the surrender of what may be called objective dualism, all that follows is a mere process of differentiation—a practically irrelevant affair of minor details. With "The Duality of the Brain and Thought"<sup>1</sup> placed upon a firm basis, the laws conditioning their mutual existence and coöperation are very obviously of wholly secondary importance. Some of the skeptical experts go so far as to say in effect, as more than one with only verbal variations has positively or more tentatively said in terms, that "the brain secretes thought as the liver secretes bile."<sup>2</sup> This to an adept in hyper-physical studies would probably be regarded as mixing things badly, by confounding together two principles which, for aught that any purely physical science (*ex vi termini*) could prove, may be utterly distinct, and which have always been regarded as distinct by the vast body of the sane portion of the human race. But if such statements as the one just now given as a specimen are merely a hopeless jumble in the phraseology, and are simply to be taken in the sense that a portion of the brain is modified in a certain way, and to a certain extent in exact accordance with an analogous and synchronous modification of the mind, whether considered as conscious or unconscious, how could such a fact, even if it were one, be of any benefit to the materialistic skeptic?

Suppose the ladies of New York or London had never gazed upon the chrysanthemum crest of Paderewski, or never known directly of his existence, or that of any other pianist, and he were placed so as to be unseen, yet, if the fact could be certified to them that a different little hammer was lifted at every note, and then came down again on the right metallic string, would there have been any sense in jumping to the conclusion that those little

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<sup>1</sup> The title of a sinewy and unanswerable argument in *Christian Thought*, from the pen of Noah K. Davis, LL. D., Professor of Psychology and Moral Philosophy in the University of Virginia.

<sup>2</sup> Vogt, Maudsley, perhaps Haeckel and Büchner, and others of like note, have been credited with what is substantially this assertion.

hammers were living demigods of genius, who made all the music?<sup>1</sup>

Our problem manifestly has to do only with that portion of the human anatomy known as the cerebro-spinal system, except, of course, as that is necessarily affected by its organic connection with the rest of the body. Indeed, our researches, so far as the purposes of this article are concerned, may be practically restricted to the upper portion of that system, and almost exclusively to what is popularly called the brain. The cerebro-spinal system as a whole consists of the spinal cord, the medulla oblongata, and the brain itself, together with the nerves and ganglia appertaining to this, as distinguished from the sympathetic, or organic system,<sup>2</sup>

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<sup>1</sup> When we penned these words, we had never seen those of Dr. Holmes which somewhat resemble them; and we were not thinking of Mr. Mallock's, which we had, nevertheless, perused a number of years ago: "The brain is the organ of consciousness, just as the instrument called an organ is an organ of music; and consciousness itself is as a tune emerging from the organ-pipes." [*Is Life Worth Living?* By William Hurrell Mallock, author of *The New Republic*, etc. . . . New York; G. P. Putnam's Sons, 182 Fifth Avenue. 1879. Page 224.] The writer here finds two pertinent and quite distinct questions, namely: (1), Why do the pipes resound when the air goes through them? (2), What controls the mechanism by which the air is regulated—a musician, or a revolving barrel? He admits that we cannot answer the first, but that this fact has really no bearing at all on the answer we are called upon to give to the second. Here emerges the great dilemma as to the unity or duality of being, and as to the independence or automatism of human life and will. [*Ibid.*, page 224] ". . . It is not denying the existence of a soul to say that it cannot move in matter, any more than it is denying the existence of an organist to say that he cannot play to us without striking the notes [keys?] of his organ. Dr. Tyndall, then, need hardly have used so much emphasis and iteration in affirming that 'every thought and feeling has its definite mechanical correlative'; that it is 'accompanied by a certain breaking up and remarshalling of the atoms of the brain.' And he is no more likely to be 'hacked and scourged' for doing so than he would be for affirming that every note we hear in a piece of music has its definite correlative in the mechanism of the organ, and that it is accompanied by the depression and rising again of some particular key. In his views thus far the whole world may agree with him. . . ." [*Ibid.*, page 226.] Professor Clifford's atheistic inference from the absence of a universal brain is obviously based on the fallacy that consciousness is itself a function of the brain. [*Ibid.*, page 210.]

<sup>2</sup> "The sympathetic or organic system, especially connected with the functions relating to nutrition," analogous to what goes on in the vegetable kingdom, and "sometimes called the functions of vegetative life." Though these functions are distinct from those that are peculiar to animals, the centres of this system are

which is so intimately attached and related to it. The brain and the spinal cord are enveloped in three well-known membranes. Of the spinal cord itself, with its white matter and gray matter, its cross actions, its functions as a nerve centre of conduction, transference and reflex action, its bearing upon our voluntary movements, its extensive control of our involuntary activities, we need say nothing more. "The medulla oblongata is a column of gray and white nervous substance, formed by the prolongation upward of the spinal cord, and connecting it with the brain." Like the cord, it, too, possesses functions of conduction, transference, and reflexion, and the addition of what passes under the name of automatism. In the medulla are believed to be situated the special centres of respiration, deglutition, mastication, the secretion of saliva, the inhibitory regulation of heart-action; and the vasomotor operations, including, probably the diabetic tendency, which also centres here; the regulation of the iris and certain other muscles of the eye; hearing, taste, speech, vomiting, and some would say others besides. The brain, or encephalon, is made up chiefly above and in front of the two hemispheres of the cerebrum, and behind and beneath of the cerebellum. There are besides these, and adjacent to the medulla and the cerebellum, the organs spoken of as the pons Varolii, a bridge for nervous impressions; the crura cerebri, which unite the medulla with the cerebrum, and offer another conduit for both sensory and motor impressions; the corpora quadrigemina, now regarded as the principal nerve-centres for the sense of sight;<sup>1 2</sup> the corpora striata,

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anatomically and physiologically connected with the cerebro-spinal nerves. [Flint, p. 506. *A Text-Book of Human Physiology*. By Austin Flint, M. D., LL. D., Professor of Physiology and Physiological Anatomy in the Bellevue Hospital Medical College, New York, etc., etc. [\* \* \*] Fourth edition, entirely rewritten. New York: D. Appleton & Co. 1891.]

<sup>1</sup> The thalamus, the outer geniculate bodies, the anterior corpora quadrigemina, the cortex of the occipital lobes, are in some way associated with the perceptions afforded by the retina. [Munk, Weinicke, and others. Ranney, *Lectures on Nervous Diseases*. Philadelphia: 1889. P. 25. Cf. Flint.]

<sup>2</sup> The cortical "nerve-centre" [area?] for *smell* has been said to be situated in the hook of the Hippocampe region and contiguous to the somewhat variable nerve-area for hearing. [See *Handbook of Medical Sciences*. 1888. Article by Dr. Keene.]

apparently the grand motor ganglia, and the optic thalami, apparently the grand sensory ganglia.<sup>1</sup> (K. p. 114.)

We are thus brought to the consideration of the cerebrum, or cerebral hemispheres, which are universally believed to be in some way, and to some extent, mysteriously related to thought, will, and consciousness, and by all competent physiologists to contain the grand physical centre, or centres, of all our intellectual and moral activity. So far as mind can, with any semblance of propriety, be said to be "localized" in matter, it is undoubtedly localized somewhere within the compass of these cerebral lobes and convolutions. (K., p. 120.)

The well-known parts connecting the cerebrum with the other principal divisions of the cerebro-spinal system may be regarded as a continuation of the cerebro-spinal axis, or column. Superimposed on this axis, "as a kind of offset from the main nerve path," is the cerebellum. On the farther continuation of this axis in the direct line is situated the far greater bulk of the cerebrum. The cerebrum, like the other main divisions of the whole system, is constructed of gray matter and of white. The white is simply fibrous, but the gray is both fibrous and vesicular. The lower and greater part of the brain-substance is made up of white matter; but the superior and most important part of it is composed wholly of gray matter. Unlike the gray matter of the spinal cord and the medulla oblongata, the gray matter of the cerebrum, as is also true of that of the cerebellum, is *exterior*, and forms a sort of capsule or covering for the white substance. This outer bark, or rind, of the upper brain is aptly styled the *cortex*. All this gray matter is "variously infolded" into what are called the *cerebral convolutions*. The obvious pur-

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<sup>1</sup>[Kirke, p. 114. Flint, p. 606. P. 608, etc. Kirke puts in a caveat of caution on p. 115.] We refer our readers here to the beautiful colored outline maps in Ranney, *passim*; and in particular to the diagrams of magnified nerve-cells, etc., plain and colored. See *Lectures on Nervous Diseases: From the Standpoint of Cerebral and Spinal Localization. The Later Methods employed in the Diagnosis and Treatment of these Affections.* By Ambrose L. Ranney, A. M., M. D., Professor of the Anatomy and Physiology of the Nervous System in the New York Post-Graduate Medical School and Hospital; Professor of Mental and Nervous Diseases in the Medical Department of the University of Vermont, etc., etc. Philadelphia: F. A. Davis, Publisher. 1889.

pose of this treatment of the cerebral gray matter was to increase its amount without unduly enlarging the space it occupied. The *weight* of the brain is a considerable factor in human and comparative anatomy. Still more importance is attached by craniologists, who are also psychologists, to the depth and complexity of these peculiar convolutions.

It has become common to speak of the brain, contemplated superficially, as divided into five lobes: the frontal, the parietal, the temporo-sphenoidal, the occipital (behind), and the central—which last is also known as the island of Reil. The anterior, or frontal, lobe is limited in the rear by the great central fissure, known as the fissure of Rolando; and underneath by the fissure of Sylvius. The parietal lobe (lying on the top of the head, and well back of the frontal lobe) is bounded in front by the fissure of Rolando, and below by the fissure of Sylvius. The temporo-sphenoidal lobe is also, but not so far, back of the frontal, and is also back of and *underneath* the fissure of Sylvius. The occipital lobe is, as its name imports, at the base of the brain, and lies behind the external perpendicular or parieto-occipital fissure. The central lobe, or island of Reil, lies deep down beneath the concealing folds of the fissure of Sylvius.

Of the *internal* surface of the cerebrum it is not necessary to speak, with its well-defined fissures and convolutions.

The principal seat of the sense of taste is in the tongue, but the soft palate and its arches, the uvula, the tonsils, and probably the upper part of the pharynx, are also involved. The centre of *smelling* is in those parts of the nasal cavities in which the olfactory nerves are distributed.<sup>1</sup> The nerves of *hearing* have been said to “clasp the roots of the brain” as a vine clasps the bottom of an elm.<sup>2</sup> The centre of *sight*, as we found, is at the base of the brain. The seat of *touch* is everywhere, for touch is only a varied modification of common sensation or sensibility.<sup>3</sup>

In man, the motor region of the cerebral hemispheres comprises, in general terms, the convolutions about the fissure of Rolando, and in or hard by the great, especially the anterior and central, convolutions.<sup>4</sup> The great centre for sensory impressions (the *sen-*

<sup>1</sup> Kirke, II., p. 169. <sup>2</sup> Ibid., p. 176. <sup>3</sup> Ibid., p. 162. <sup>4</sup> *Mechanism*, etc., p. 23.

*sorium*) is not so clearly defined, but is supposed to lie in the posterior part of the hemispheres.<sup>1</sup>

The cerebral cortex<sup>2</sup> (or a portion of it)<sup>3</sup> is universally regarded as the central field for the manifestation and exercise of consciousness and intellect.<sup>4 5</sup>

Three opposing views have been advanced by physiologists in reference to cerebral localization. The first is the extreme position at one remove, and is maintained and strongly advocated by Ferrier and Munk.<sup>6</sup> These authorities teach that the cortex can be accurately mapped off, in such sense that its limits and functions can be clearly and certainly determined.<sup>7</sup>

<sup>1</sup> See Flint, p. 432. Extirpation of the corresponding organ in dogs has been held to have determined this.

<sup>2</sup> In man the general result of injury or disease of the cerebrum is disturbance of the intellectual faculties. One of the earliest and most constant of these phenomena is an impairment of memory. Mental derangement often discloses itself in exaggerated estimates of passing events. Then it goes on till the patient has to be governed like a child or an imbecile. When the cerebral injury is excessive, the senses may be impressible, though intelligence is utterly gone. "The frequency of these results in lesions of the hemispheres, without loss of sensibility or motion, shows the close connection between the mental powers and the nervous action of this portion of the brain. The same connection is seen in congenital idiocy with imperfect development of the brain. In many cases the immediate condition upon which idiocy depends is the small size of the brain as a whole, and particularly that of the cerebral hemispheres. \* \* \* " [Dalton, p. 424.]

<sup>3</sup> Hamilton, p. 424. "The cerebrum is the organ of will in so far at least as each act of the will requires a deliberate, however quick, determination." [Reil, p. 17.]

<sup>4</sup> Dr. Baker, of Washington, D. C., was, at last accounts, disposed to restrict the field of consciousness to Meynert's "pyramidal psychics."

<sup>5</sup> The classic work in Germany on this subject (unless it has been lately superseded) is that of Wundt, which is a treatise of striking ability and knowledge. We have had occasion in these columns to differ with Professor Ladd, of Yale College. It is pleasant to have this chance of saying that we agree with him on the essential parts of the valuable book in which he has not only given to English readers the gist of what was hidden away in Wundt, but struck out independently for himself, and written the only thoroughly competent work on "Physiological Psychology" that we have seen in the vernacular. Strong ground is taken in the final chapter as to the existence of the spiritual principle in man, and the utter distinction between the body and the soul.

<sup>6</sup> Ferrier's brilliant, but rather audacious, treatise is commended to the reader, on *The Functions of the Brain*.

<sup>7</sup> I am indebted for this statement (which is partly, however, in my own words) to the kind and valued instructions of my friend and teacher, J. W. Hartigan,



The extreme position at the other remove is that occupied by the modern school of Goltz. This denies point-blank and *in toto* the former theory. Goltz has, however, only revived the old theory, first promulgated by Flaurens, whose contention was that the brain could only act in its integrity, or as a whole.

Both of these extremes have been widely superseded by the view of those who advocate a middle ground. The theory which is now authoritatively held to be most in accordance with clinical and pathological evidence is that of Exner and Luciani, who in their teaching protest against sharply defined areas, and contend for the overlapping of areas, especially those of the cortex associated with the senses.

The earlier attempts at the localization of the mental faculties were principally those of Spurtzheim and Gall. Just as astrology preceded and was absorbed by astronomy, so phrenology preceded and was absorbed by psychological physiology. So far as the battle of the phrenologists was one for "localization" it was victorious; on the other hand, the detail of their system has been ascertained to be erroneous. Lavater's scheme of *physiognomy*, a very different, though related matter, is not only strangely fascinating, but has in it an element of undoubted truth. The pretension of Spurtzheim that the mental traits can be read from the superficies of the cranium, if true at all is true only to a very limited extent. If the shape of a man's head has anything to do, and often it seems to have, with his intellectual and moral character, this significant conformation appears to be, in great part, symbolical (and providential) rather than to be caused by expansive pressure and development from the interior. The true science of the brain has demonstrated, too, that the phrenologists were all wrong in their precise chart of the faculties and dispositions mapped out on the surface of the encephalon. From the view-point of suggestive *physiognomy*, the "bumps" of comparison and ideality, and even of memory, as well as those of veneration and combativeness, for instance, may, perhaps, be allowed,

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M. D., Professor of Biology in the University of West Virginia, who himself employs the term "localization" to denote the scheme of precise definition advocated by Munk and Ferrier.

in a general way, to stand. They are, however, unrecognized by the scientific analysis of the material organs that are now known to be so mysteriously correlated with the activities of the soul.

Take for example the cerebellum, which has been called "the opprobrium of the physiology of the brain,"<sup>1</sup> and of which much remains to be learned with exactitude. The phrenologists made it the seat of animal passion, whereas it is now believed to have but little to do with brute instinct, but is known to exert a controlling effect, in some way, on the coördination of muscular movements. (Dalton, 1882, page 436.)<sup>2</sup> The seat of consciousness is no longer placed specifically in the forehead, but in the layers of the cerebral cortex; and, as has been lately and strongly urged, in what, considered perpendicularly, is their deep central portion, as distinguished from what is higher or lower.

It used to be believed that the two so-called *hemispheres* of the brain were completely homologous; that the two walnut-shaped kernels were like the twin duplex lamp-burners, or like the twin engines in a great steam-ship. Wigans, in his brilliantly ingenious work on the alleged Duality of the Mind, sought in this way to account for what has been oddly styled "the sentiment of pre-existence," that is, the irresistible impression that one sometimes has that one has been in a certain situation before, when, in fact, this is not, and often could not have been, the case. Even to-day the theory is plausibly upheld in high quarters that, for a majority of the ordinary acts of the mind, only one of the hemispheres of the brain need be called into exercise. It is the hypothesis of some, that for the highest and most comprehensive mental actions both the hemispheres must be exerted.

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<sup>1</sup> Dr. Ranney once, in a lecture, spoke of the cerebellum as "the *terra incognita* of the brain." [*Nervous Diseases*, page 39.]

<sup>2</sup> See, on the functions of the cerebellum, Kirke's *Handbook*, p. 118; Dalton (1882), p. 426; and Flint (1889), p. 608. Flint concedes to Gall an apparent connection of some sort between the cerebellum and the generative organs, but denies the presidency of the cerebellar centre over such functions. "The region overlapped by the cerebellum is interspersed with important collections of gray matter, which act as nuclei of origin for important nerve-tracts. . . ." [Ranney, page 53.] The view held by some is, that "the cerebellum is, for certain purposes, subordinate to the cerebrum"; that it is, in effect, "an informing dépôt for coördination, rather than a distinct centre." [Ranney, page 41.]

It was, however, in 1862 that Broca made a discovery that was destined completely to revolutionize the accepted instructions on this subject. It had long been suspected that there was an affection of the brain leading to a disarrangement of the faculty of speech. This disease is known under the name of Aphasia, and is frequently, but not invariably, connected with muscular paralysis. The experience is distinctly one of disassociation: thought remains intact; but the sign, the mode of expressing the thought, is absent and has been forgotten. When a man's vocal organs are paralyzed, he is unable to speak distinctly or to speak at all. There is a form of aphasia known as the *ataxic* variety, in which the organs of speech are thus compromised. But aphasia, pure and simple, is the *amnesic* variety. Here the man can no more speak than in the other case, but the organs of articulation may be uninjured. The lesion is here, as Binet says, more delicate, more complex; it effects the inner sources of language, not its exterior organs. Before we pronounce a word, we must first definitely think of it. This definite thought of the word is just what the bewildered aphasiac gropes for in vain. This, as Dalton points out, is only an exaggeration of the common failing of otherwise healthy persons of halting for the word. (*Dalton*, p. 432.) The studies of thirty years and more had shed little or no light on the *rationale* of this phenomenon. With Broca's investigation all was changed. The particular form of aphasia which he studied specially was the variety resulting in the loss of articulation.

Some of the sufferers were complete mutes; others kept on repeating gibberish; others apply one correct word or phrase to everything. In light cases a large number of words are remembered; but certain parts of speech, particularly the nouns, are gone.

Broca's researches seemed even to himself to be subversive of the principles of physiology. This only led him to continue his fruitful investigations. In March, 1864, the number of his examinations had increased to twenty. The problem as to the local seat of articulate language was solved. It is fixed at the base of the third frontal convolution of the left cerebral hemisphere.

There is there situated a small quantity of gray substance which must be considered as the motive organ of articulate expression. Unless this organ remain unimpaired, the possessor cannot properly express his thoughts.

Facts must prevail over current notions; and it is a fact that in the case of all of Broca's patients, the lesion, or disturbance resulting in aphasia had been one affecting the left side of the brain. Broca's ingenious and reasonable way of accounting for this is the one still adopted. He suggests that our right-handed movements are directed by the left hemisphere in consequence of the well-known decussation, or "crossing," of the motive fibres at the base of the brain.<sup>1</sup> This reasoning involves the corollary that in the case of left-handed persons the disease attacks the right hemisphere, and there are not wanting tangible indications pointing to the same conclusion.

Some time after Broca's discovery it was ascertained that the special disease he studied was only one of several kinds of aphasia. One is that of verbal blindness, where the visual pictures and definite forms of the letters are recognized and differentiated, but the words convey no meaning. The source of this trouble manifestly is not in the eye, but somehow in the action of the perceptive mind. Charcot reports this interesting case. A tradesman one day at a hunting-party lost his consciousness. When he came to the fact was disclosed that he was paralyzed on the right side. He talked jargon, and misplaced words.<sup>2</sup> Gradually

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<sup>1</sup> "The decussation of the pyramids in the medulla oblongata." [*Dalton*, p. 397.] This decussation does not invariably take place. According to Charcot exceptional cases exist, though their occurrence is extremely infrequent, in which a majority of the fibres of the pyramidal tract in man are direct, and only the minority decussate. Under these conditions, contrary to the rule, paralysis would take place on the same side with the lesion which produced it. Similar variations have been observed in other decussating tracts in the nervous system. See *Leçons sur les Localisations dans les Maladies du Cerveau et de la Moelle épinière*, Deuxième Partie. Paris, 1880, p. 195. [*Dalton*, p. 398.]

<sup>2</sup> For an admirably clear and sufficient account of aphasia see *Dalton*, pp. 432, 433. One variety of the disease has been termed *paraphasia*, and is the kind where a wrong word is regularly substituted for the right one. We have it on high authority that "observations on the locality of the centre of language tend to place it more especially in the *convolutions surrounding the lower end of the fissure of Sylvius, and in those of the insula*." [*I. e.*, in the island of Reil.] "Broca re-

he grew better, until after fifteen days he supposed himself to be entirely restored. One day he gave a business order in writing. Under the impression that he had forgotten something, he opened his letter and found out that he could not read a word of any written or printed matter. To overcome this disability he had to begin over again, and learn to read like a little child.

Another form of the malady is word-deafness. In this case it is the verbal-hearing which is destroyed. The victim in this case distinctly hears the sound, but is wholly unable to apprehend the meaning of what is said to him. He is in a situation not unlike that of a man transported to a foreign land, where the people speak an unknown tongue. There is another form of aphasia where the patient suffers from an inability to write, although he can readily understand both what is written or spoken. This is known as *agraphia*.

On the basis of these facts Charcot has constructed a complete psychological theory of language. It is agreed among physiologists that, instead of there being but one brain-centre for memory, there is a plurality of such centres; and that every sensory and motor centre is associated with a memory of its own; and that any one of these may be exclusively impaired. Acting upon this, and developing it in a new way, Charcot has established the fact that every human being who makes use of the conventional language has four distinct kinds of special memory: one for reading, one for understanding words when spoken, one for the utterance of words, and one for writing. The child first brings into play the auditive memory, then the memory of articulation. At

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fers it to the posterior part of the third frontal convolution, while others consider it as belonging to the frontal lobe in general. The evidence for this localization consists in a number of instances in which aphasia has been found in post-mortem examination to be accompanied by lesions of the brain confined to the points indicated" [With or without paralysis.] *A Treatise on Human Physiology*. By John C. Dalton, M. D., Professor of Physiology and Hygiene in the College of Physicians and Surgeons, New York, etc., etc. Seventh Edition. With two hundred and fifty-two illustrations. . . . Philadelphia: Henry C. Lea's Son & Co. 1882. This, we demur, is not an entirely complete statement. For a full, strong exposition of the variety and strength of the evidence for determining the locality of brain-centres and ascertaining the functions of nerves or organs we refer the reader to the text-book by Dr. Ranney.

a later stage he learns to read and write. This explanation sheds light on the four different kinds of aphasia. The loss of the visual memory simply entails the inability to recognize written or printed words. The signs awaken no memory, and consequently present no idea. When any of the other kinds of memory are affected, a similar result is observed. As all persons are not constituted exactly alike, so each one naturally has his own peculiar style of remembering, of thinking, of reasoning, just as he has also of feeling, in the domain of the sentiments and the passions. This psychological individuality has been thought to arise from the preponderance of certain impressions (or sensations) over others. We here repeat the admirable statement of Binet: "A thought always presents itself to the mind accompanied by a sign. This sign is a word which remains in the mind. It varies in its nature with each individual. For one, it is an interior murmur, vague and confused; for another, it is a perfect word, clear and distinct. These two classes of persons *hear* themselves think. There are others who *read* their thoughts, who *see* them, either in the form of mental pictures of objects, or of mental words." Another class cannot think without wanting to articulate. Still another can appeal at will to any one of all four memories. The loss of the memory of *sound* is a graver one than any of the others. This will gradually bring on trouble in speaking, then in reading and in writing, resulting in a species of secondary aphasia, which is comprehensive, but, unlike the primary one, is curable.<sup>1</sup> When one memory is obliterated, the others can be

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<sup>1</sup> Dr. Flint has marked within a circle, on an outline map of the encephalon, the figures 9 and 10. "These numbers," he says, "taken together, on the third frontal convolution, mark the centre for the movement of the lips and tongue, as in articulation." This is Broca's convolution, the seat of aphasia. [*Physiology* (1889), p. 615] The place is "at or near the island of Reil." [*Ibid.*, p. 622.] In some few instances, he states, the organ "seems to be in the corresponding part upon the right side. [*Ibid.*, page 622. Cf. Dalton, p. 433, for "exceptional cases," in which aphasia coincides with left hemiplegia.] Hypothetically, both sides may originally have been equally related to language. [*Ibid.*, page 622.] He cites "some cases" of recovery from lesion of the speech-centre in the left hemisphere, and some cases of relapse after fresh lesion. [*Ibid.*, page 622.] Gratiolet (Hardigan and Flint) maintained that the left side probably was the first developed.

trained in a great measure to take its place. It has been an accepted fact for some time, that the nervous centres are composed of two principal elements, cells and fibres. The cerebral changes resulting in aphasia have been found in some cases to affect the cells; in other cases, the adjacent fibres. There may thus be an isolated lesion of the cells, and there may be an isolated lesion of the fibres. Déjerine for several years made a special study of the lesion of the conducting fibres, and cites the case of a man who could read aloud, but who could not understand what he was reading. The man was in full possession of the memory of sight and the memory of hearing, but there was in his case an interruption of the regular connection by the fibres communicating between these two memory-centres and the centre of ideas.

It will be perceived, then, that at the present time at least three forms of aphasia are distinguished: that brought on by some injury to the verbal centres; that brought on by induction, and that brought on by privation of the ordinary means of conductibility.

Binet winds up by saying that in a normal condition of things there is a harmonious coöperation of all the special memories, so that the outcome is "that well-coördinated grouping of sensations of thoughts and facts, which we call language."<sup>1</sup>

If there is anything in the received tenet or doctrine of cerebral localization, it would certainly appear that as the cortex, including Meynert's large pyramidal so-called "psychic-cells," the acknowledged seat of thought, and the whole Broca tract, and its continuations, the acknowledged seat of language, are, or may become, mutually independent; and as disease may result in the impairment of either of these organs without impairment of the other, it would certainly seem to follow that there can be no absolutely essential conjunction of words and of *ideas*. We have seen that philology and psychology point, though somewhat like a wavering vane, to the same conclusion. In this case the necessity of language to the preservation and conveyance of thought remains undisturbed. On the other hand, if the other horn of

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<sup>1</sup> "Aphasia," by Alfred Binet, in the *Revue de Deux Mondes*. [See the April number of *The Chautauquan* for 1892.]

the dilemma should be taken, and it should be insisted, on a final summing up, that, in the light of the most advanced science, thought, unembodied in language, is incapable of existence, as has been pointed out already, so much the better for the old-fashioned and conservative view that still adheres to the formal, as well as the substantial, infallibility of the holy Scriptures.

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