

On certain disorders and defects of memory / by Thomas Laycock, M.D.

Contributors

Laycock, Thomas, 1812-1876.
University of Glasgow. Library

Publication/Creation

Edinburgh : [Printed by Oliver and Boyd], 1874.

Persistent URL

<https://wellcomecollection.org/works/vzusajup>

Provider

University of Glasgow

License and attribution

This material has been provided by This material has been provided by The University of Glasgow Library. The original may be consulted at The University of Glasgow Library. where the originals may be consulted. This work has been identified as being free of known restrictions under copyright law, including all related and neighbouring rights and is being made available under the Creative Commons, Public Domain Mark.

You can copy, modify, distribute and perform the work, even for commercial purposes, without asking permission.



Wellcome Collection
183 Euston Road
London NW1 2BE UK
T +44 (0)20 7611 8722
E library@wellcomecollection.org
<https://wellcomecollection.org>



Digitized by the Internet Archive
in 2015

ON CERTAIN

EXB
8

ORGANIC DISORDERS AND DEFECTS
OF MEMORY.

BY

THOMAS LAYCOCK, M.D., ETC.,

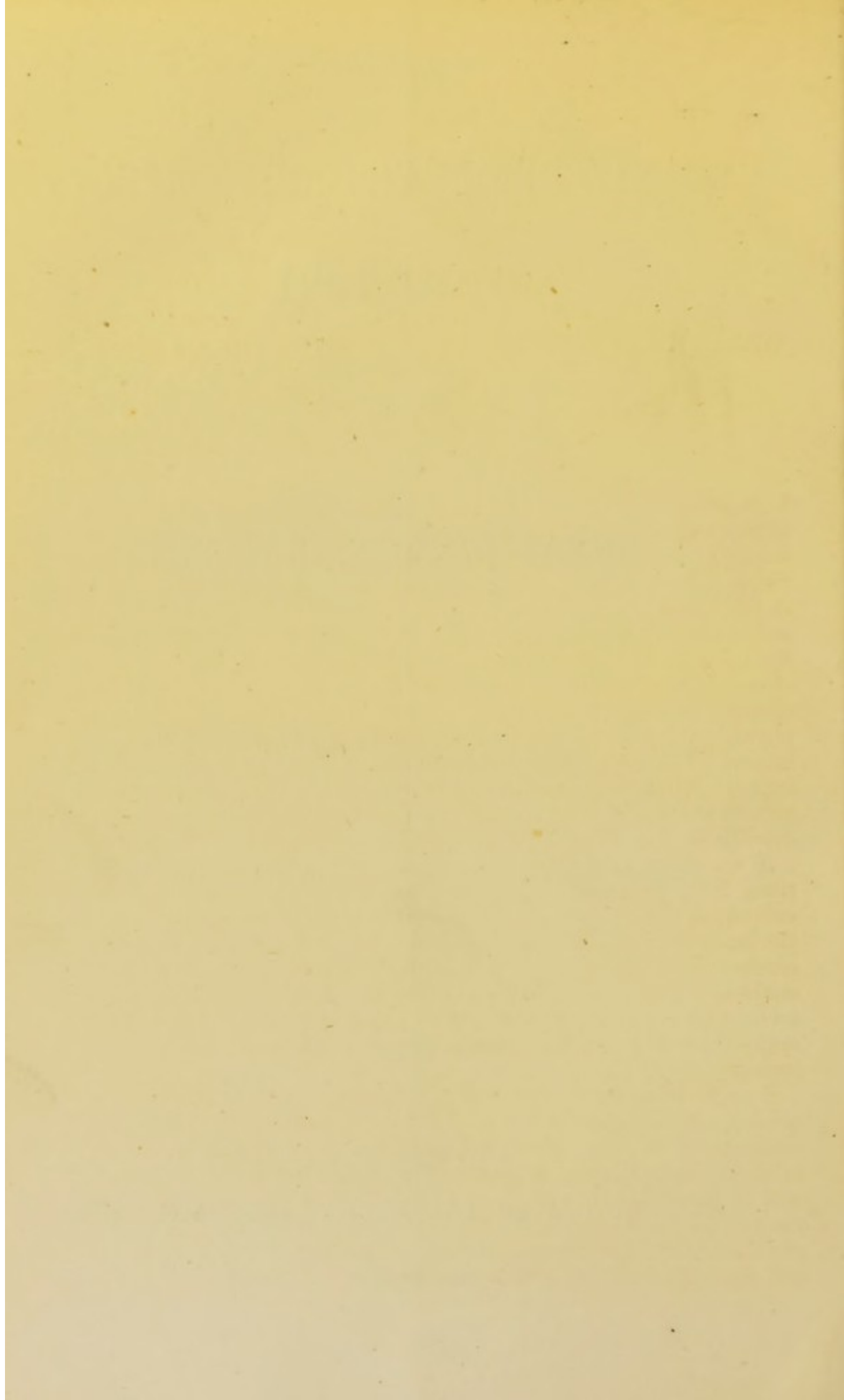
PHYSICIAN IN ORDINARY TO THE QUEEN FOR SCOTLAND, AND PROFESSOR OF MEDICINE
AND THE PRACTICE OF PHYSIC IN THE UNIVERSITY OF EDINBURGH.

REPRINTED FROM THE EDINBURGH MEDICAL JOURNAL FOR APRIL 1874.

EDINBURGH:

PRINTED BY OLIVER AND BOYD, TWEEDDALE COURT.

MDCCCLXXIV.



ON CERTAIN
ORGANIC DISORDERS AND DEFECTS OF MEMORY.

I PROPOSE to illustrate by cases, certain defects and disorders of memory, due to a class of organic conditions not heretofore considered, with a view to a better understanding of their causes and treatment. It is necessary to premise some explanatory observations, so little being known practically of the nature of organic memory and of its relations to mental states. The metaphysician who follows the speculative method either denies that there is an organic basis of memory, or, admitting the general fact, neglects to inquire into its relations to thought and other mental states. On the other hand, physiologists and pathologists who endeavour to elucidate these relations by adopting the abstract terms used by metaphysicians—such as mind, will, memory, attention, perception, association of ideas—without bearing always in mind that these are physiological conditions, are apt to fall into confusion and error.

I have now for many years past viewed all these mental conditions from their anatomical and physiological aspects, and by extending the doctrine of the reflex function of the spinal cord to the brains (and by brains, I mean the whole encephalon, including cerebellum, pons Varolii, and medulla oblongata), I have been enabled to obtain a better insight into the difficult problems which arise in considering the relations of mind and body. I propose to apply the doctrine of the cerebral reflex function to cases of defective memory.

I must premise one general principle, viz., that in all these inquiries, consciousness of any kind is held to indicate a physiological condition of the encephalon, and is not the cause of these conditions or of any mental state, as was held by Descartes and his followers, and by physiologists who speak of sensation or will as a cause. On the metaphysical side, this is the cardinal fact in the study of mental physiology and pathology according to the laws of reflex action. I will first differentiate the states included under memory.

There are two physiological processes included under the word memory, which are fundamentally distinct. Sir William Hamilton thus defines what memory is metaphysically :—

“Memory, strictly so denominated, is the power of retaining knowledge in the mind, but out of consciousness ; I say, retaining knowledge in the mind, but out of consciousness ; for to bring the *retentum* out of memory into consciousness is the function of a totally different faculty. . . . It is not enough that we possess the faculty of acquiring knowledge and of retaining it in the mind, but out of consciousness ; we must further be endowed with a faculty of recalling it out of unconsciousness into consciousness,—in short, a reproductive power. This reproductive power is governed by the laws which regulate the succession of our thoughts—the laws, as they are called, of mental association.”

All this needs to be converted into scientific and physiological language to render it intelligible. It is enough to say here, that the first organic stage—or the *retentum*—is such a change in the brains somewhere, that an act of reminiscence, remembrance, or recollection can take place at all.

But it is necessary to discriminate between various forms of memory and recollection. The word memory is commonly used to denote both retention and reproduction ; consequently, these two fundamental processes are confounded with each other when the word is so used. Then, again, it is as often used to denote the reproductive process alone, because want of this is the only sign of defect in the retentive process ; hence, the phrase loss of memory generally means loss of recollection. Again : there may be reproduction as a lower mental process, but no memory in the sense of knowing that what is reproduced denotes what occurred in past time. Aristotle notes this kind of memory, and says that lower animals possess it. By reminiscence he meant the higher faculty of knowing the past, and therefore implying the knowledge of time. This is more especially intellectual memory—the memory of events in orderly suggestion. It would be well, therefore, to restrict the use of the word reminiscence to this higher intellectual process of reproduction, as distinguished from that simpler form of memory possessed by lower animals, in which there is reproduction without the concurrence of abstract ideas as to time. Aristotle makes the interesting observation, that the memory, as thus defined, is the more powerful when the intelligence is the dullest, but reminiscence more vigorous when the intellect is the brightest.

As the word memory is usually understood, it implies that some state of consciousness always coincides with both retention and reproduction, the intervening space of time being named by Hamilton, “Mental Latency” and “Latent Consciousness.”¹ Consciousness is a term including very different states of brain ; but as to organic memory, it is certain there may be organic reproduction without either reminiscence or recollection—only an associated feeling of pleasure or pain. Whether retention as an organic process can take

¹ See chap. “On Latent Consciousness” in “Mind and Brain,” vol. i. p. 175, for a description of this doctrine in its various aspects.

place with the brain in the state in which there is no consciousness of any kind whatever, is doubtful.

The notion of an organic change with retention, or the primary and most essential part of memory, has always had practical recognition; but abstract terms, such as mind and memory, have been used by metaphysicians to indicate the *locus in quo*. Thus thoughts, events, and things are often described as recorded in—written on—impressed on—stamped on—rooted in—burnt into—the memory; the various phrases being used to indicate intensity of the retentive process. Nor has it been uncommon to substitute brain for abstract notions. In the passage in which Macbeth addresses the physician, and asks for relief, Shakespeare denotes four distinct theories of memory. I quote three of them: “Canst thou not minister to a mind diseased? pluck from the memory a rooted sorrow? raze out the written troubles of the brain?” Any hypothesis of this kind is, however, too materialistic for use. The brain is not and cannot be “written on” or “impressed.” What happens is a cerebral vital change, which is the double result of mind or mental energy and vital energy acting conjointly with certain molecular energies, under certain physical conditions of the organic basis. The whole series of processes are vital, and have their analogies in other vital processes.¹ Simply, the mechanism is this: the process of retention takes place in relation, firstly, to some antecedent retention; and, secondly, to some external impressions: the one includes recall, as “association of ideas;” the other, recall in relation to external impressions, as recollection or remembrance. Thus, when a man ties a knot on his handkerchief, in connexion with a certain intention he has fixed in his mind, so that he may be reminded of his intent by the touch of the knot, he receives virtually, when so reminded, a physical impression on or through the sense of touch, which being transmitted onwards to the *locus in quo* in the brain, acts on the organic seat of the retention, and so the organic change coincident with remembrance is excited, and he does what he intended. This process is, in fact, one of those cerebral states which, according to my view, are dependent on the reflex action of the brain. The first stage is an example of cerebral sensory reflex action or association of ideas; the second, of reflex cerebral motor action. In thought without volitional activity, the reflex action is not directly induced by external impressions, but indirectly and by successional waves of change in the sensory vesicular neurine.

It is a well-established fact of experience, that all the processes included under memory and association of ideas are natural and vigorous, according as the nutrition of the brain is healthy and vigorous. The state of nutrition thus suitable to healthy mental activity depends upon various conditions, of which I may mention chiefly four:—1. A supply of healthy blood containing suitable

See, for a discussion of this point, “Mind and Brain,” vol. ii. chap. i. 2, “On the Substratum of Conscient Mind.”

nutrient materials. These may be deficient from exhaustion, either by too great muscular or cerebral work, or from a defective diet or supply of food. 2. A competent blood-distribution, which will depend on the structure and vaso-motor activity of the bloodvessels and capillaries. Incompetence is common in diseases of the bloodvessels, such as occur in general paralysis, senile dementia, and other like conditions. 3. A competent fitness on the part of the organic basis to take up and assimilate nutrient stuff. This often depends upon congenital or hereditary quality of brain, or amount of nutrient or evolutionary energy. And, 4. A due accumulation of the assimilated material, to which the state of sleep is most subservient. This accumulation of material for work in the essential tissue is in accordance with a law which extends throughout all organisms, whether plants or animals. The food stored up with seeds and eggs, the storing up of food for ova when developing, of fat, water, are instances.

Looking, then, at the physiology and pathology of organic memory from this trophic point of view, we can distinctly generalize two different, yet closely-related, processes: the one kind including that organic nutrition of the brain on which depend the well-known mental processes termed remembrance, recollection, recall, reminiscence, and association of ideas, and which are determined according to the laws of sensory reflex action of the brain; the other kind, without a distinct name, but which consists in the production of those states of molecular nutrition of the brain upon which the former depend. As this organic basis of memory is the result of mental, vital, and physical energies operating conjointly, I have elsewhere designated the process by which it is formed *synesis*, or a coming together, and so tried to indicate that conjunction. I subjoin an extract from my published work explanatory of my views as to this process:—

“ All experience proves that memory, whether it be retention or reminiscence, or both, is inseparably dependent on vital changes; but the physiological explanations hitherto given have been wholly unequal to the exigencies of the problem; and, at this moment, advanced physiologists pronounce the phenomena inscrutable and mysterious. But, by taking a more comprehensive grasp of the subject, and looking for the biotic correlatives of these changes [upon which memory is dependent], we find that they can be brought under fundamental laws of life and organization. The conservative or retentive process is manifested in that vital process, whereby the modes of vital energy that are, or have been, realized in time and space whether in plants or in animals, and whether manifested as energies, functions, faculties, or states of consciousness, are potentially conserved and retained in those particles of living matter, out of which a new organism is evolved, whether they be termed germs, pollen, zoids, zoospores, and spermatozoa, or primordial cells. This process not only secures the conservation and retention of the type [or the specific identity, corresponding to personal identity], but of all those departures from it, induced by the adaptation of the parent organism to new external conditions, so that special hereditary tendencies and new instincts are developed, as well as new species and varieties. In short, it is the process which lies at the foundation of the Lamarckian and Darwinian hypotheses. This most fundamental vital

process has received no name, neither has it been considered, so far as I know, in its relation to memory and thought. I propose, therefore, to designate the general process by the term *synesis* (a classic Greek word), and adjectively, *synetic*," etc.¹

We can now generalize further: The organic cerebral or encephalic process I term *synesis*, which corresponds to memory, considered as the process which subserves to the retention, conservation, and accumulation of knowledge and experience, being a manifestation of a general law of life, the correlative organic process which corresponds to that element of memory termed recollection, reproduction, and reminiscence, must be also a manifestation of some equally general vital law correlative with *synesis*. Now, these two laws are, in fact, none other than those termed evolution and reversion. To understand this, it is necessary to remember that the brains go on evolving long after the body has ceased to evolve, and that every addition to a man's experience and knowledge is practically a higher evolution of brains, or of some special portion of them. And this higher evolution, due to ever-recurring *synesis* in individuals, families, and races, may, and in fact does, become hereditary. So that a return in memory at any moment to that which was evolved *synetically*, a day, a week, a year, or a lifetime before, is, practically, a reversion to an antecedent evolution. So, in like manner, a return of civilized man to the habits and sentiments of uncivilized races is a reversion to antecedent but ancestral *synesis* as evolutions. Whether or not there be with the organic or ancestral reversions thus established the knowledge that they belong to the past, and, as such, are true reminiscences, is another question, which I will not now discuss.² As to these phenomena, whatever they may be—whether merely reversionary or reminiscent also—the process of recall is one of cerebral reflex action; they are re-excited by external impressions.

It follows from all this, that the organic conditions upon which memory depends have a *locus in quo*, and that there is a portion of the brains in which the processes of *synesis* or evolution and recall or reversion occur. All organic memories are therefore local. This is, in fact, the principle which underlies the phrenological doctrine of "organs." Gall's attention was first directed to the "organ of language" by observing that persons with good memories had prominent eyes. But, then, these persons have not only a *copia verborum* as to knowledge, but a volubility sometimes amounting to a logorrhœa in expressing what they do know—although that may not be much. Hence there is a motor as well as a sensory or sentient element in the processes to which the "organ" is subservient. In phrenology, memory is the result of activity of each of the organs or faculties; thus, by the the organ of "Time," a man

¹ Mind and Brain; or the Correlations of Consciousness and Organization. 2d edition, vol. i. p. 407, sec. 301.

² I refer the reader to "Mind and Brain," 2d edition, vol. i. pp. 404, 411, for facts on this point.

remembers music, as well as language and words. The differences in power of retention of "impressions on the memory" manifested by individuals is recognised by phrenology, as a quality of brain, but the cause is not known. It is not difficult, however, to determine three conditions as necessary to the proper functional activity of the organic memory, viz. :—1. Those of nutrient energy of the *locus in quo*, whereby synthesis and recall are duly perfected; 2. Those upon which thought and ideation, or the association of ideas, depend, which are sensory; and, 3. Those which subserve to the expression of thought or feeling by words or acts, and which are motor. The pathology of memory must therefore discriminate as to these, both as to causes and seat.

That the seat of the motor and sensory are distinct, may, I think, be learnt by an observation, which, however, each reader must make upon himself. Having selected some song of which both the air and the words have been stored up in his brains, the reader should first try to sing both the air and the words mentally, that is to say, without any motor activity whatever, and he will find that he can do this—unless it be that, perchance, his breathing keeps the time of the air involuntarily. Having done this sufficiently often, let him next end the process by energizing into actual singing. In this way he cannot fail to discover that he has been engaged in two distinct cerebral processes, the one restricted to consciousness, thought, or mind, the other combining motor activity with the mental states. Now, let it be supposed that the former or sensorial brain-state is induced physically or morbidly, and independently of volition and thought, then, in this case, the hallucination of hearing the words or the air, or both words and air, would occur; or, if that cerebral sensorial condition which corresponds to the volitional production of the air and words mentally were induced, he would have the hallucination that he sang them, although perfectly silent. This is, in fact, what occurs in dreaming of acts done. Again, suppose, further, that the motor portion of the synthesis—that which corresponds to actual vocalization—be also morbidly excited, then he would repeat the words or sing the song automatically or involuntarily. Neither class is of unfrequent occurrence during sleep and dreaming, in delirium, and in insanity. One day I had an interesting illustration of the dreaming class at the Royal Infirmary. A patient at visit complained that he was ridiculed by the nurse and the other patients. They pretended that he had been singing a Scotch song (which he named, a comic song of domestic life) in the night, but which it was impossible he could have done, as he neither knew the words of the song, nor could he sing the air. Upon inquiry, I found that it was indeed the fact that he had so sung, and loudly. This patient had no special head-symptoms, but he was hypochondriacal, and had a spinal neuralgia, and the singing might have been due to reflex action, originating in the spinal cord. To have this result, the patient either must have previously acquired the

corresponding organic conditions by synesis, or else had derived them from his parents. The former is by far the more probable, although the latter is not perhaps absolutely impossible.

These views are of general application. The acquisition of language is in precisely the same order as the acquisition of the power and habit of walking. In both cases external impressions are needed to develop that motor and sensory synesis upon which speech, use of the hands, and direction of the limbs and balancing of the body in locomotion depend. None of us remember how painfully we acquired the facile use of our legs; but if the sensory impressions upon which they depend are no longer transmitted from the plantar surfaces in walking, as occurs in locomotor ataxy, the individual must trust to visual impressions; and failing these, when the eyes are shut, he can no longer resist gravity, and so maintain his equilibrium. So, also, if a person become deaf, he generally becomes defective in his speech; if born deaf, he is mute. If suffering from aphasia, he may be able to read when he cannot express his thoughts, because the visual excitor impressions from the printed or written page reproduce the synesis, although those of audition or from above, and connected with association of ideas, being cut off, he is speechless. I have repeatedly shown this difference in the reflex phenomena of aphasia to my clinical class, as to both audition and vision, and I conclude that to understand its pathology we must thus differentiate the various sources and centres of cerebral reflex action into at least motor and sensory.

What name should be given to the organic condition, the result of synesis, upon which memory in all its forms depends? Many years ago, when inquiring into the reflex functions of the brain, I noticed the homologies between the spinal and cerebral reflex acts, in this, that they were due to some special molecular constitution of the sensory and motor centres—to “laws writ on the nervous path,” to use a phrase of Prochaska, as to spinal reflex acts. The phrase “material ideas” has been used by various authors to express the organic basis, but the terms are contradictory, since ideas, in the proper meaning of the term, cannot be material. The word “substance” has been commonly used by metaphysicians to express the immaterial basis of mind, but the word has passed into an abusive use, so as to express something quite the opposite. In truth, these conditions, although material since matter underlies them, are not material in any scientific sense of the term, but vital. The material basis has in fact evolutionary properties as manifestly as the primordial cell of the seeds and ova of plants and animals. I have therefore designated them substrata, those which belong to states of consciousness being *ideagenic*, and those subservient to volition and muscular action *kinetic*. The evolutionary properties of these substrata are best indicated by the phrase *ideagenic*, inasmuch as new ideas, the result of new acquisitions of

knowledge, tend to evolve and develop as certainly as a seed or an egg, so that they are in nowise merely material. I have repeatedly indicated these characteristics—first, in an appendix to my paper on the Reflex Function of the Brain, read to the British Association for the Advancement of Science, at its meeting at York in 1844, and published in the *British and Foreign Medical Review*, January 1845; and next, in my review of Unzer's "Erste Gründe," when I specially pointed out their relations to external impressions, and how they differed from the "material ideas" of metaphysicians and physiologists; observing that these substrata "were due to certain changes in the molecular arrangement or constitution of the neurine induced by frequently recurring impressions communicated from without, and corresponding to these impressions and to none other."¹ The acquisition of a song and a tune is an illustration of this process. In 1855 I again explained the meaning of the term, and showed how the substrata have special evolutionary properties:—

"By the term psychical substrata I do not mean to imply a certain material arrangement of cells or their elements only, but such an arrangement that a fixed order of successional changes or plan of action may be impressed upon them. Thus, every primordial or embryonic cell has its psychal substrata, in virtue of which there is a continuous series of successional changes, in a fixed, predetermined order, and according to a fixed plan [constituting evolution]. So also in the cell-masses (or vesicular neurine), appropriate to special ideas, there are psychal substrata, in virtue of which there is a constant construction of new cells, corresponding to those new states of consciousness comprised under the general phrase *development of ideus*, the ideas being developed, and the new cells constructed, according to a fixed and predetermined law of development (or evolution). The substrata have [like primordial cells] *potential* properties—that is to say, they contain the elements of further and indefinite series of future changes, as well as properties in actual use in relation to the external world."²

It is absolutely essential to practical ends that the true nature of the organic basis of memory should be understood to be something more than a physical mechanism, like a muscle, or a merely mechanical arrangement of cells and fibrils, the numbers of which may be counted and reckoned as so many "acquisitions." This is an old anatomical and physiological doctrine, taught by Hartley, Bonnet, Hooke, Haller, and others, and by Akenside poetically, and which has been recently revived by Professor Bain.³

Looking at each synesis as the last evolution of the brains at the moment it occurs, we must necessarily connect each successive mnemonic evolution with those which have preceded it. This is the law of associated continuity, and is that which underlies all the theories of evolution of whatever kind they may be. The descent of

¹ Review of Unzer's Principles of Animal Physiology. *British and Foreign Medical Review*, July 1847, p. 186.

² Further Researches into the Functions of the Brain. By Thos. Laycock, M.D., etc. *British and Foreign Medico-Chirurgical Review*, July 1855, p. 187.

³ *Mind and Body*. 1874, p. 107.

man from an ascidian, according to Darwin, is according to the same law whereby cerebral changes occur in associated sequence, so as to constitute personal identity.

The proof of this is not difficult to follow as to the life of each individual in so far as reminiscence extends to infancy, but during the early period of infantile life the synesis is such that under ordinary states of brain there is no reversion possible to infantile evolution, no reproduction, and no reminiscence; it is only in morbid states, as general paralysis and fevers, that these occur. But extending the law of evolution and reversion to ancestral phenomena, the law of heredity comes into relation with encephalic synesis, both as to continuity and evolution and reversion. Hence it follows that that part of the brains (if any) which subserves to the production of the sperm-cell and germ-cell (the two microscopic portions of living matter which are the media of continuity, as heredity or parental transmission of mental qualities, and functional activity and development of the brain in general) must be in some practical relation to the nutrition and development of those portions of the brain in which are the seats of organic memory. The concentration of the "potentialities" of organic memory in the sperm-cell and germ-cell is itself a most curious synesis, which I have named *genetic*, just as the production of a primordial cell is the most striking manifestation of reversion to the simplest form of life. The power and activity of organic memory—the intensity of synesis and of hereditary transmission—must therefore have some relation not only to nutrient brain-energy, but to the potential energy of the primordial cell upon which the hereditary transmission of acquired faculties, instincts, and habits depends. There can be no more difficult problem for inquiry than the transmission of ancestral organic memory; but I believe it will never be solved so long as inquiry is turned to the merely mechanical arrangements of the nerve-centres, to the exclusion of vital dynamics. I have elsewhere endeavoured to show that the encephalic synesis upon which organic memory depends and the genetic synesis necessary for its hereditary transmission, are both dependent on energy stored up in the cerebellum, and that the amount of this energy, as influenced by blood-supply and other trophic conditions of the organ, influences in no slight degree the evolution of the faculties and the vigour of memory. Referring to my published views as to these functions of the cerebellum,¹ I will now subjoin illustrative cases.

CASE I.—*Loss of Memory of Events after a Fall; Counter-irritation of the Occiput. Recovery.* (I am chiefly indebted for notes of this case to my friend and former class-assistant, Mr R. Lawson, M.B.)

During the session 1871-72, a stout young man, an engineer of a steamship trading to Constantinople, applied to me at the Infirmary on account of an

¹ Mind and Brain, 2d edition, vol. ii. p. 452.

entire loss of memory. He was accompanied by his wife as his interpreter, and at her request was placed on the out-door list. Her account was, that her husband had, through injuries sustained by falling into the hold of his ship, suffered from an almost complete loss of memory of events subsequent to the accident. The account that had been submitted to her was, that he had fallen into the hold backwards; had struck the back of his head against some hard object; that he remained for some time unconscious, and subsequently forgot almost immediately every transaction engaged in by himself or occurring under his observation.

When he came to Ward III., he had complete use of his limbs, with regard both to sensation and motion. His facial expression was that characteristic of absent-mindedness. He looked at objects without manifesting any sense of appreciation, while, at the same time, the impression suggested to an observer scanning his features was, that he was an intelligent man. His facial muscles were symmetrical in disposition, and there was no strabismus. There was no incontinence or retention of urine, and the bowels acted well and under control. On examining the occiput, a slight want of symmetry in the parts corresponding to the superior curved lines was observed. The prominence of the line upon the right side was more pronounced than that upon the left, but neither the extent of the induration nor the recorded symptoms justified the diagnosis of a recent fracture; while the position of the thickening and the defined anatomical nature of it militated against such a conclusion. There had been no discharge from the ears, nor any other characteristic symptom of fracture of the base.

The account given was, that though bodily, and, as far as execution went, mentally fit for his work as an engineer, his forgetfulness, not only of his orders and his own intentions, but of the identity of the piece of work he was engaged upon, frustrated his efforts.

On immediate examination of his mental state at the time when he was first seen, it was found that the recorded statements were completely confirmed. He could remember events anterior to the accident throughout a course of years; but his recollection of circumstances, even of a strictly personal nature, subsequent to the time of the injury, was blank. So complete was the failure of memory on the occasion of the first visit, that though his wife and he had arrived from Leith shortly before the hospital visit, he could not tell whether they had walked or come by train or by omnibus. He could not remember what he had had for breakfast immediately before starting, and had no idea what day of the week it was, nor what period of the day. He endeavoured, by rational propositions, which he could not follow up, to arrive at a satisfactory answer to each question, and, when he failed, gave a negative reply, accompanied by an intelligent and good-natured smile. His special senses were intact. His speech, like his walking, was slow, but precise. He said what he meant to say, and could read correctly.

His wife was directed to have the back of his head completely shaved, and linimentum iodi was ordered to be regularly applied. At the same time, he was prescribed a mixture of iodide of potass in infusion of quassia.

In a week he was brought back, and his memory for recent occurrences had decidedly improved. He could answer clearly such questions as had been formerly put to him unsatisfactorily. He was ordered to continue the treatment as already directed; and, in about three weeks from the time of his first appearance, he was almost completely cured. He was again directed to persevere with such a modification of the remedies as the circumstances demanded, and to return; but neither his wife nor he came back. I had no opportunity of learning whether, with his improved memory as to synesis, he could also remember late events.

It will be observed that this patient had a peculiar expression of "absent-mindedness." It is not easy to be described, but is very characteristic of the kind of case, and indicates that the physical

basis of the faculty termed attention is deficient. But an act of attention is a complex reflex act, and, according to my view, includes the various motor structures which subserve to the use of the senses in the faculty termed perception and apprehension, or that stage of the process in which synesis occurs. If the reader will look at an object, or listen to a sound or to a speaker, and examine what he does physiologically, he will find that he adapts not only his eyes or his ears, or both, in the act of attention, so as to receive impressions well and duly, but combines in the act various muscles, which move the head and sometimes the whole body. So also, even in writing or speaking, the whole body is often co-ordinated.

The act of perception has also its reflex motor phenomena; and these are shown in two ways—first, in the expression of the countenance, as indicative of the act of reminiscence, or of judgment or understanding; and, secondly, in the volitional acts which follow thereupon. It is as to the phenomena of expression of thought or apprehension that there is deficient motor manifestation concurrently with deficient perception and imperfect synesis. The expression of absent-mindedness in the preceding case has its analogy in the blank physiognomy of dementia and idiocy. Again, in the motor act of will (or volition) which accompanies a desire to give effect to a thought, the individual equally combines, by reflex action, numerous muscles to the desired end. Now, according to my theory, the *motor* co-ordinative centres of all these cerebral reflex acts are in the cerebellum, and their sensorial connexions in the sensory ganglia and hemispheres. Hence, in this case, either the sensorial impulses from the hemisphere, or the impressions derived from external things, were too feeble to excite the cerebellum so as to induce a proper act of attention, or else the cerebellum was too feeble to react on the muscles, so that a proper reflex act of attention and the consequent perception and synesis should result. It seemed to me that there was no essential or structural disease of the frontal convolutions, or of their bloodvessels, such as is found in cases of dementia and in certain kinds of aphasia, but that there was defective nutrient energy, and, as a result, imperfect synesis from defective excitation in that portion of the frontal lobes which subserves to the memory of events—"the organ of eventuality" of phrenology. This local defect having no motor relations, must be held to be sensorial, and dependent either upon defective sensory stimulus of attention, or deficient power in the tissue to react upon the stimulus. Thus, synesis being imperfect, there could be no reminiscence as to events. In short, as to the tissue itself, it was in the same condition as in dreaming states.

In attributing this morbid condition to occipital shock, involving the cerebellum and sensory centres, and caused by the fall backwards into the ship's hold, I do not overlook the very important facts, that the hemispheres develop backwards, and that there is a community of blood-supply through the basilar artery between the

cerebellum and its sensory ganglia and the occipital and temporo-sphenoidal lobes, and, consequently, that disease of the basilar artery, or its branches, may, and indeed does, influence the nutrition of that portion of the hemispheres, as well as of the cerebellum. Indeed, I am well convinced that that community of vascular area has an important practical significance.¹ I wish, however, to use the simpler cases in illustration, like the preceding. But although the patient recovered so rapidly, and for the time probably completely, mischief of a latent kind might still exist, and progressive trophic defects in the hemispheres might arise subsequently, to end in dementia. In such a case the real termination cannot be known until months, or even years, have elapsed. But a wider area of mischief may result from cerebellar shock, as the following two cases tend to show:—

CASE II.—*Maniacal Excitement after a Fall; on Recovery, Loss of Memory of Events; Counter-irritation of the Occiput, with temporary Beneficial Results; consecutive Dementia and Epilepsy.*

In May 1871, an Irish gentleman, aged about 30, came to me, by the advice of Dr M'Munn of Sligo, accompanied by his wife, to consult me regarding his mental state, but more especially that of his memory. I was informed that he almost immediately forgets where he puts things, what shop he had been at, what he has been reading, etc., and seemed childish in his conduct. This had come on as the sequel to a mental attack, which he had in the autumn previously, when he became very excitable, had grand notions about building a new mansion and extending his affairs, and at last became so unmanageable that it was thought advisable to leave him alone in his own house with a suitable attendant. Under the care of Dr M'Munn, of the Sligo County Asylum, the excitement calmed down, chiefly by the use of chloral, bromide of potassium, and digitalis, and subsequently the iodide of potassium; but the feebleness of memory remained, when in all other respects he seemed restored to health.

The patient was of a nervous sanguine temperament, sharp and somewhat "peppery" in temper, but amiable. He seemed to be a man of superior intelligence, and yet, when asked as to very recent events, where he had been, what doing, etc., an expression of absence of mind came over his countenance, and he appealed to his wife for information. I observed that his *right* pupil was contracted, but his wife was confident this was due to the constant use of an eye-glass to that eye. He complained of neuralgia on the *right* side of the head and at the occiput, and the æsthesiometer indicated diminished sensibility on one side. The heart's action was feeble, but regular. No sufficient cause or causes could be assigned for the mental attack which preceded the loss of memory; but on close inquiry, I discovered that a few weeks previously his horse had fallen with him when hunting, and that he had had the back of his head struck. He was stunned and unconscious for a short time, but subsequently felt nothing amiss; and both he and his wife felt satisfied that the fall had nothing to do with his illness. Being, however, from experience in such cases, of a different opinion, I directed the liniment. *iodi*. to be freely rubbed over the shaven occiput, and the tincture of digitalis taken thrice daily. The patient, in the meanwhile, took a house on the Clyde, near Dunoon. At first, little improvement was manifested, but by the beginning of July, his memory was so much improved, and he was altogether so much better, that he returned to Ireland, his wife writing me a very grateful letter before leaving Dunoon, and saying that he was "decidedly much better."

¹ See my Lectures on a clinical and vaso-Motor Anatomy of the Brain from a new Point of View.—*Medical Times and Gazette*, Aug. 1871, pp. 211, 269.

This improvement was not, however, to continue. The contracted right pupil, the localized occipital pain and anæsthesia on right side, together with the particular kind of loss of memory of events, too clearly pointed to basilar mischief, which might readily become progressive, both in the cerebellum and its sensory ganglia, and in the frontal lobes or hemispheres. And, accordingly, Dr M'Munn, kindly writing to me lately as to the progress and termination of the case, reports this to have been the melancholy termination, to the effect that our patient died just before Christmas last—"He gradually merged into a state of dementia, with hemiplegia of right side, and frequent epileptic attacks."

Such is the course of numerous cases of epilepsy otherwise arising, of sunstroke, and of the result of injuries to the bones, nerves, and of the face as well as of the head. Even an injury to a *sensory* nerve in the finger may progress upwards to the cord, and thence extend to the cerebellum, on the one hand, and onwards to the hemispheres, inducing palsies, epilepsy, insanities, and dementia in its course.

Undoubtedly a certain predisposition to defective nutrition of the brains is an essential element in the causation of these cases, for the subjects are commonly predisposed hereditarily either to hysteria or epilepsy or insanity, or to waywardness and eccentricity of conduct verging thereon. Drunkenness, or a drunken parentage, sunstroke, syphilis, a previous wound or injury to the head, are also predisposing conditions. I was not able to ascertain much as to the influence of any of this class of causes in the case just detailed, and it may be doubted whether the insanity and dementia were wholly due to the fall. It is, however, a fact of experience, that apparently trivial injuries to the occipital region are so followed by serious results. Often, indeed, it is because the immediate results are so trivial that they do not attract attention, or are not remembered, as in this case.

It will save much circumlocution if a distinctive name be given to this kind of loss of memory. *Amnesia*, the old term, is too general, meaning loss of both retention and reminiscence, or else loss of reminiscence alone, whereas neither states were present in this case. I think it may, therefore, be usefully named *asynesia*. What interested me much was to ascertain whether the asynesia came on before, with, or subsequently to, the mental excitement. The patient evidently remembered the accident, and it was clear that nothing seriously wrong with the memory had been noticed before the excitement. Fearing to hurt his feelings, I made no reference in conversation to the excitement itself, having had the particulars from his wife, but I led the conversation up to it, so that he might speak of it, if he had any remembrance of the attack, and the impression left on my mind was that it was very vague, if he had any. In cases of insanity there are two kinds of synesis. In the one kind, it is so intense that an ineffaceable impression is left on the memory—a *hypersynesia*—perhaps, of some offence taken, causing an antipathy or a delusion of the acute state, which becomes chronic

as a "fixed idea," never to be got rid of. In the other kind, the remembrance of the period of excitement is very much like that of a dream, or there may be no more than is seen in delirium, so that the synesis is either very imperfect or *nil*, just as in epileptic impulses or natural dreaming. I am satisfied these are important practical differences as to prognosis and treatment, and I conclude that my Irish patient was to be classed with the latter. I shall, however, refer to the question of the relations of memory to the delusions of the insane, and to illustrate this better, I subjoin a case:—

CASE III.—*Contused Wound on Occiput; Unconsciousness; after Recovery of Consciousness, Loss of Memory of Events, and Delusions of Place; Counter-irritation over Occiput and Forehead; Amendment.* (I am indebted to Mr M. Macleod, M.B., for notes of this case.)

George M'K., aged 53, of intemperate habits, was admitted into Ward X., Royal Infirmary, on 30th Nov. 1872, insensible, and with a contused wound in the occipital region, got in a fray. He came under the care of Dr Joseph Bell, who subsequently kindly asked me to see the case with him. On examination at his admission, it was observed that his pupils were equally contracted and immovable; the muscles of his left arm were rigid, and there was facial palsy on the left side, but he could shut the left eye. The following day at visit, he was able to tell his name, but was very slow in answering questions, and usually only said yes or no. He passed urine involuntarily. After a few days of suitable antiphlogistic treatment, it was thought advisable (on 5th Dec.) to let him have a better diet, to apply counter-irritants to the occiput, and to give him tincture of digitalis in combination with tincture of ginger.

For a while, subsequently to this, his intelligence improved rapidly, so that he answered questions more quickly; but his articulation was not distinct, the words running into each other, and he would lie with his eyes shut, but in a half-awake state, muttering to himself, and when roused, he had not the power of attention.

On 14th Dec. it was found that the pulse had improved, the facial palsy had almost disappeared, and the rigidity of the left arm had ceased, but he still passed his urine and fæces occasionally in bed. It was now observed, further, when he could speak better, that he had quite lost the memory of the most recent events, but was able to recall those which took place years ago, with some accuracy. He did not sleep well, for which he was ordered to have supper with a stimulant, and which was beneficial. On the 23d Dec. there was little improvement as to his memory, and he had now delusions as to the place in which he was, not recognising it or understanding it to be the Infirmary. We now thought it would be useful to blister the temples and give him a tonic—a combination of strychnine and iron. After this, the patient improved rapidly, and was able in a few days to remember recent events better; his delusions as to place ceased. He also laid with his eyes open and did not mutter to himself, and his bodily health also improved rapidly. A few days before his discharge on 10th Jan. 1873, his left pupil began to dilate, and so remained up to his leaving the Infirmary.

Although treatment was so beneficial in this case, the morbid state was far from its termination in health, when the patient left the Infirmary. A man aged 53, of intemperate habits, is little likely to escape from the sad fate of the last case. In both, local basilar symptoms were manifested, and in both, it is probable, the cerebellum and its sensory ganglia were shaken.

But in M'K. there were two points of difference: one at the

beginning, as to the prolonged state of insensibility following upon the injury, and which was much more like sleep than coma—an important difference; the other that, when attention and perception became possible with returning functional activity of the cerebellum, he had such a condition, probably of the frontal lobes, as often occurs in senile dementia. In old age, the chief defect of memory is as to synesis and the recollection of recent events—in short, senile dementia is in the first stage senile *asynesia*, and with this there may be even a very vivid reminiscence of long past events—so vivid, indeed, that it is unnatural and is a hypermnesia. The conjunction of this with loss of memory of recent events, is a mystery to those who do not discriminate the two processes physiologically and pathologically. When, however, both are defective, and senile dementia is established, there is often also manifested characteristically the delusions as to persons and places which M'K. manifested. These also arise from a defect in two distinct processes. Firstly, there is no sufficient reminiscence; and, secondly, what reminiscences are excited by impressions from surrounding things, develop into delusions, which are not corrected, because of the defective reminiscence. If a man has a morbid recall, when his brain is otherwise healthy, he recognises the recall as erroneous and delusional; but when the impressions from external things do not induce normal reflex sensory action, then either hallucinations as to persons, places, and events will arise, or delusions from incoherent associations of ideas. This often occurs in old age, in insanity, and in delirium. There is no correcting recall, and so no discovery of error. This is also what occurs in dreaming. Impressions from external things being shut out in sleep, there is no knowledge of place or things, or of time past or to come, so that when there is reproduction and excitation of association of ideas in an imperfect sleep, there is no correction by external impressions, no proper reminiscence and normal perception, and consequently there is no correction of the delusions which arise. Impressions as to time and place being shut out by closure of their inlets—the external senses—the dreamer has no proper conception of time and of his surroundings, and of the sequence of events in time or locality. Space is annihilated because not perceived, and moments are years.

It is a fortunate circumstance, that the exclusion of all external impressions during sleep prevents the process of synesis; if it were otherwise, our lives would be as incoherent as those of the delirious or the lunatic.

The pathological conditions under which motor synesis, in relation to reproduction and reminiscence, occur, are so numerous that I must defer their consideration.

