The Pathology of Aphasia. By Alexander Robertson, M.D., Physician to the Town's Hospital and City Parochial Lunatic Asylum, Glasgow.

(*Read at the Annual Meeting of the Medico-Psychological Association held at Edinburgh, July* 31, 1866.)

To the students of mind in its healthy as well as in its diseased condition, the doctrine that certain portions of the brain are associated with particular mental powers is necessarily one of engrossing interest. Until lately, however, the facts advanced in support of the existence of this association have been so inadequate, that the majority of thinkers have regarded the doctrine itself, maintained as it has been with so much zeal by Gall and his followers, to be little more than a theory, no doubt probable enough, but deficient in that solid basis of proof which alone could warrant its acceptance on any higher ground. But it has recently been confidently asserted that evidence is at last forthcoming that the organ of one faculty, the faculty of articulate language, has now been discovered. Still, the alleged discovery, though it were established, would give only qualified support to the phrenological view just referred to, as, contrary to all preconceived notions derived from the bilateral symmetry of the brain, the supposed organ is declared to be situated on its left side alone. Conclusions of so weighty moment evidently require that the validity of their premises should be thoroughly tested; and it is in the hope that I may be able in some degree to show how far they are trustworthy, that I have ventured to bring the facts and considerations embodied in the following paper under the notice of this Society.

It is my desire to adhere as far as possible to the department of the subject which I have selected, and I must, therefore, refer those who wish fuller information to the writings of many able observers published in the medical periodicals and more systematic works. I would especially mention the communications of Dr. Hughlings Jackson of the London Hospital, Dr. W. T. Gairdner of Glasgow, Dr. Sanders of Edinburgh, the clinical lectures of Trousseau lately translated, besides the articles in the French journals, of which an excellent abstract, as far as its date, will be found in the 'Journal de Médecine Mentale,' of September and October of last year.

In order to the better understanding of the view of the aphasic lesion which I am about to submit, it is necessary that I should shortly describe three cases which have recently been under my care. Full reports of all the symptoms were taken by myself at the bedsides of the patients; but those points only will be stated which

by-and-by will be seen to have some bearing on the nature of the pathological condition.

Case 1.—Ann Darroch, æt. 28, married. Admitted into hospital 21st of last March. From information derived from her friends, it appears that she lost the power of speech suddenly, about fifteen months before admission, and from the first has been all but completely unable to express her ideas in language. Lately she has improved a little; but even yet, as we found on examination, she can only articulate the following words and short phrases, viz.: "No"—"Yes"—"Oh yes"—"Faither"—"Aiton" (her first husband's name); and, "I don't think." "Yes" and "no" she apparently uses correctly in reply to questions; but it was often noticed that she failed in the attempt to articulate any of these words when her attention was distinctly directed to their pronunciation. Thus, I desired her to say "yes." She tried repeatedly, but was unable to utter any intelligible sound. I then remarked, "You said 'yes' a little ago." She smiled, and answered easily, "Oh yes." I asked her again to say "yes:" after some attempts, ejaculated "Faither" Was next tried with "June:" made several attempts, but always said "Aiton." Many other words were proposed: generally she did not try to pronounce them, seemingly conscious of her inability; or, if an effort were made, it was either quite unsuccessful, which was usually the case, or one or other of her stock words was uttered. When the latter occurred, judging from the expression of annoyance on her face and her gestures, she was evidently fully aware that she had not complied with my wishes.

With the view of ascertaining as completely as possible the condition of her mental powers, I questioned her frequently on a variety of subjects; and the following conversation is given in illustration:—"How old are you?" No reply. "More than twenty?" "Yes." "More than twenty-five?" "Yes." "How much?" Held up three fingers, making twenty-eight, really her correct age. "How many more than twenty-three?" Held up five fingers. "Than twenty-four? Held up four. "Suppose," I said, "you got articles in a shop to the value of eightpence; how many pence would you bring back out of a shilling? four fingers were held up. "If the house were on fire, what would you do?" Moved towards the door, and indicated very clearly that she would run out. "Show me what you would do if that bed were on fire?" pointing to one at hand. Went to the end of the ward, lifted a basin of water off the table, and brought it to where I was standing, at the same time making signs that she would pour the contents on the bed. "Suppose you were walking along the street, and some one were to steal your shawl from your shoulders; what would you do?" Looked eagerly and somewhat excitedly, and at length to my astonishment, ejaculated "Police!" On saying so, her face bore the expression of great satisfaction.

At another examination, the nurse who was standing by said, "Doctor, though she canna speak, she's grand at swearing when anything puts her about." And, on inquiry, I was told that if annoyed by any trifling circumstance, the patient not unfrequently gave vent to two or three stock oaths. Several times I asked, "Why do you not speak?" Shook her head and pointed to her teeth. "Do you know what to say?" Answer, "Yes." "Can you read?" To my great surprise, replied, "Every word." This phrase, only once uttered, and "I don't think," were the nearest approaches to sentences during her entire stay in the hospital. At my request, turned up the 3rd chapter of Luke and the 10th of Exodus without mistake, showing that at least so far she understood what she read.

Her general conduct in the ward was quite rational. She assisted the nurse in sweeping the room, arranging the beds, and in attending to the sick. However, was very variable in her temper, being easily irritated by

trifles. Indeed, notwithstanding the rational character of her actions, the general impression left on the minds of myself and others was that her mind was weak and childish.

On admission, she walked well, and moved both hands and arms freely, so that I thought at first there was no hemiplegic complication, which so usually accompanies the aphasic condition; but, on examination, it was very evident that she could not grasp so firmly with the right hand as with the left, and I afterwards ascertained that before admission she had dragged the right leg slightly in walking. Her voice was clear and distinct; moved the tongue with perfect freedom in all directions; swallowed without difficulty; and there was no stuttering in the articulation of her small vocabulary. Left the establishment in the beginning of May of her own accord; and it was remarked that she showed considerable determination in leaving, as others besides myself urged her strongly to remain for a few weeks longer.

Case 2.—Mary Kelly, æt. 47, millworker,* Is aphasic and hemiplegic on the right side, and has been so for upwards of nineteen years. Both lesions occurred simultaneously, and were very complete from the beginning. For several years was constantly confined to bed, and could only articulate the words "Dear, dear;" but gradually the power of the lower extremity was partially recovered, and for ten years she has been able to take walking exercise, though she still drags the right leg considerably. The right arm is wasted, and its flexors contracted. At present can say, "Dear, dear!"—"Ay"—"Oh ay," and "No." These words she uses relevantly and apparently always with judgment, and has never any difficulty in their expression. Moves the tongue freely in all directions. Is able to gesticulate, and the varying expressions of her countenance are very significant. Her pronunciation is distinct; can sing; and, at my request, hummed over an old Scotch air; of course, without words. Nurse says that patient often sings the baby asleep. Is sensible and correct in her conduct. Makes herself generally useful. Knows all around her, and, judging by her actions, she can comprehend questions and observations both clearly and quickly. Thus, on asking her to go to another ward and bring two women, simply naming them, she went at once and brought them to me.

The following are a few of the questions addressed to her, with their answers: "What would you do, supposing any one were to attempt to steal your basket from you in the street?" Laughed, clenched her left fist and shook it, showing most unmistakeably that she would defend her property. "If the nurse's arm were bleeding, and no one were present but yourself, what would you do?" Thought for a little, then went up to the nurse and began to wrap a piece of cloth round the arm, meanwhile making signs that the bleeding would be checked by that means. In the early part of the present month, being about ten weeks after the conversation just detailed, no reference having been made to the subject in the interval, I said, "Do you remember the questions I put to you in the month of April? Just show me what you did?" Considered for a little, went to the nurse, caught her arm firmly, and made signs that that was one of the points referred to. "Anything else?" Took a basin of water, went towards an adjoining bedroom, at the same time indicating that I had asked her what she should do in the event of the bed being on fire,—which was correct, as I did put that question to her. "Why do you not speak?" I said. She smiled sorrowfully, and touched her tongue with the left forefinger. "Do you know quite well what to say?" Replied earnestly, "Oh ay!" "Suppose your arm were broken, to whom would you apply?"

* I may remark that I showed this person to Sir James Coxe, on the occasion of his official visit to the City Parochial Asylum, in the month of April.

Pointed laughingly to me. "If you considered yourself dying, what would you do?" Smiled again and pointed to me. "But," I added, "I refer to your soul." She shook her head slowly, and looked devoutly upwards. Communicates her age, intervals of time, and money transactions by her fingers, rarely making a mistake. Unfortunately, was never taught to read or write, so that the state of her mental powers cannot be tested by those means.

Case 3.—James Wright, æt. 47, has suffered from right hemiplegia with defect in language since August, 1864. Was admitted under my care on the 7th January, 1865. The following is his condition at this date, June 30th, 1866:—The motor lesion is nearly complete in the arm, and is likewise severe in the leg, as even yet, though there is some improvement, he is unable to stand or get out of bed without assistance. The aphasia during the first year of his residence was so great that he could only say "yes" and "no;" but in the course of the last six months his power of expression has been gradually improving, so that he can now articulate a good many words, and is able, though with some difficulty, to carry on a short conversation. However, he still frequently fails to utter the words he wishes to express in order to convey his meaning. Thus, I asked him, "When was your brother here?" Thought a little; then said, "Two months." Shook his head,—"Twelve months;" again shook his head. "Six weeks, that's it now;" the last reply being really correct. It is evident that he knew quite well what to say, but that somehow, against his will, the wrong words were uttered. I found that very often he could not articulate the word "months," even when it was repeated several times in his hearing; in his attempts, not unfrequently said "weeks," but generally succeeded after several efforts. He was asked to read short devotional sentences printed in large characters, but could only make out, and with some difficulty, two or three monosyllabic words. It was also clear that he could not understand their import. Previously he had received an ordinary education for his position in life, *i. e.* he had been taught reading, writing, and arithmetic. His mental faculties are generally very weak, much more so than either of the two patients whose cases have just been described. But it is manifest that attention, perception, and memory have existed from about the beginning of his illness in some degree; for though he has now been resident for more than a year, when he is questioned he replies correctly in regard to some of the ward arrangements of the Royal Infirmary in Glasgow, to which he was taken immediately after the paralytic seizure, and also alludes to circumstances which occurred some months ago in this hospital. His aspect suggests the idea of great mental weakness, even in a greater degree now than a year since, when the aphasia was much more decided. From slight causes he is very apt to laugh and to weep, especially the former.

In investigating these three cases my inquiries were framed so as to ascertain as correctly as possible the condition of the mental powers generally, but more especially that of the reasoning faculty. In the first two, the ready obedience to orders and the prompt attempt to answer questions in their own way distinctly proved that attention and perception were little if at all impaired. In Case 3 they were unquestionably enfeebled. I have also shown, particularly in regard to the woman Kelly, that at least the general faculty of memory was good. In the other two, and also in most of the published cases, its presence is also equally clear. It is, however, chiefly to the evidences of the reasoning power that I wish to direct attention, as

positive proofs of its existence are of great importance in solving the question of the presence or absence of language in the minds of aphasics.* In this relation the method I adopted of testing the condition of that faculty by a consideration of the acts which the patients performed as replies to definite questions, is, I think, of considerable value. All the actions of aphasics are by no means of equal importance in this aspect. The majority are probably to a considerable extent automatic in their nature, or, at least, do not necessarily imply the exercise of reason or judgment; but it is different with respect to some of the actions of the women Kelly and Darroch which I have just mentioned. It was stated that they were requested to show me what they would do in certain supposed circumstances. As no assistance was given to guide them to the course they adopted, before they could arrive at the conclusions evidenced in the acts in question, it must, I think, be admitted that processes of reasoning were carried out in their minds. It is highly important that this point should be fully established, and I have, therefore, turned some of the implied arguments into the syllogistic form. It will be remembered—1st, when Kelly was asked what she would do if the nurse's arm were bleeding, that she began to bind it up firmly with a cloth. We have here first the apprehension of the problem by her mind; then follows the syllogism—

All bleeding wounds ought to be bandaged: this is a bleeding wound: therefore it ought to be bandaged.

2nd. When Darroch was asked what would be her course if the bed were on fire, she indicated that she would pour water on it. The process now is—

All fires are extinguished by water: this is a fire: therefore it will be extinguished by water.

3rd. When Kelly was asked how she would act if any one tried to steal her shawl, she shook her clenched fist very significantly. The reasoning in this instance is probably as follows:—

I have a right to defend all my property: this person would seek to rob me of a portion: therefore I have a right to resist him.

It is not necessary to carry this analysis farther, as these illustrations will probably suffice to prove that sufferers from aphasia are capable of reasoning correctly.

We have thus brought out prominently that the powers of atten-

* By the term *reasoning*, I mean the discursive faculty we possess of deducing conclusions from premises, distinguishing it from the more comprehensive powers which *reason* is understood to imply. Dugald Stewart remarks that this distinction has not always been clearly kept in view by metaphysicians.—*Philosophy of the Human Mind*, p. 288.

tion, perception, memory, and the reasoning faculty are possessed by Darroch, but more especially by Kelly. From long observation of her actions, I regard the latter as a person of average intelligence, sensible and prudent in all her conduct. In both we have also seen that the will was little, if at all, impaired; the emotional powers had not suffered except to a slight extent in Darroch. In Wright, however, the intellect, the emotions, and the will are all seriously involved; it would be difficult to say which is affected in the greatest degree.

The very interesting fact of the ejaculation of words and even short sentences under emotion was strikingly exemplified in Darroch. To Dr. Hughlings Jackson is specially due the credit of having first pointed out this peculiar feature in some aphasics, and of having established the distinction between intellectual and emotional language in these cases.

It will be afterwards shown to be of moment in our inquiries into the nature of the aphasic condition, that I should state to what extent the mind is implicated in ordinary hemiplegia without aphasia. In the course of last year I examined carefully the symptoms, both psychical and somatic, in forty non-aphasic hemiplegics who were under my care. The duration of the paralysis varied from a few days to many years; in degree a few were but slightly affected, but the great majority had either entirely lost the power of the extremities of one side, or could use them only to a very limited extent. With respect to their mental condition, twenty-six said that memory was greatly, in many cases very greatly enfeebled since the shock; the other fourteen thought it was little, if at all, affected. In thirty the perceptive faculty had not suffered materially, judging from the ready apprehension of questions in regard to everyday life; the remaining ten were slow, dull, and easily confused. The reasoning power was not tested in the way I have spoken of, but it was my impression, both from their conversation and their actions, that it was feeble in most of the cases, even more so than the patients themselves were aware of, or were willing to admit. In five cases the emotional powers were not appreciably weakened, though three of these suffered from severe motor lesion; in three others the enfeeblement was slight; in fifteen considerable; and in seventeen extreme. Many of those last referred to, both males and females, could scarcely answer the simplest question without at the same time sheding tears. In five instances there was a disposition to laugh immoderately from slight and insufficient causes; and in ten the two tendencies were combined, the patients laughing and weeping after the most childish fashion. In those instances where the emotional powers were weak, the will was also feeble, the majority being very infirm of purpose. To sum up, we have seen that in cases of simple hemiplegia, *i. e.* hemiplegia without loss of articulate language, the faculties of the mind generally suffer in a greater or

https://doi.org/10.1192/bjp.12.60.503 Published online by Cambridge University Press

less degree, and especially that memory, the reasoning faculty, the emotioual powers, and will are all involved.

At the outset of this paper, reference was made to the opinion that aphasia depended on injury to a special organ, which has been called the organ of articulate language, and is believed to be situated in or near the external frontal convolution of the left hemisphere of the brain. Last year, in the course of a discussion on the subject at the French Academy of Medicine, this view was both opposed and defended with much ability. Baillarger, the distinguished alienist physician, while rather adhering to the localisation theory, also held that in its nature aphasia consisted in the loss of the memory of the movements necessary for articulate language, and sought to establish a distinction between that form of recollection and the memory of words or of writing. Trousseau, who took a prominent part in the proceedings, has entered into the question very fully in the clinical lecture lately translated. He there states, "In aphasia, therefore, there is not merely loss of speech, but there is also impairment of the understanding. But he has not lost all these faculties in an equal degree, for the understanding is less injured than the memory of the acts for producing words, and this latter faculty less impaired than that of remembering words."*

It seems to me that much light is thrown on the subject by considering the views entertained by metaphysicians and philologists on the association of thought and language. Thus Mill, in his 'Analysis of the Human Mind, says†

"In all the more complicated cases of human consciousness, something of the process of naming is involved." Again,‡ "A word is pronounced in conjunction with an idea; it is pronounced again and again; and, by degrees, the idea and the word become so associated, that the one can never occur without the other." "We§ are also to remember that the idea and the name have a mutual power over one another: as the word 'black' calls up the complex idea, so every modification of black calls up the name; and in this, as in other cases, the name actually forms a *part* of the complex idea." Max Müller, in his remarkable work lately published on 'The Science of Language,' says‖—"I therefore declare my conviction, whether right or wrong, as explicitly as possible, that thought in one sense of the word, *i. e.* in the sense of reasoning, is impossible without language."

Schelling says,¶ "Without language it is impossible to conceive any philosophical—nay, even any human consciousness." Hegel observes,** "It is in names that we think." Dugald Stewart re-

* 'Lectures on Clinical Medicine,' by A. Trousseau; translated by P. Victor Bazire, M.D.; p. 273.

† 'Analysis of the Phenomena of the Human Mind,' vol. i, p. 84.

‡ Ibid., p. 202.

§ Ibid., p. 218.

‖ 'Lectures on the Science of Language,' by Max Müller, M.A., 2nd series, p. 62.

¶ Quoted by Max Müller, ibid., p. 72.

** Ibid., p. 73.

marks, "In treating of abstraction, I endeavoured to show that we think as well as speak by means of words." The last-mentioned writer also quotes from Des Cartes as follows: "And lastly, in consequence of the habitual use of speech, all our ideas become associated with the words in which we express them; nor do we ever commit them to memory without their accustomed signs." Trousseau, in the lecture above alluded to, expresses his concurrence in this view. He says,* "I incline to the opinion advocated by Condillac and Warburton, that words are necessary—nay, indispensable instruments of thought." If, then, we concur in this doctrine of the intimate and necessary union of thought and language, supported as it is by so great a weight of authority, it follows, if it can be shown that thought, at least thought in the sense of reasoning, is carried on in the minds of aphasics, that words are likewise present at the same time. It is hoped that sufficient evidence has been brought forward to prove that the patients under my care, especially the two women, reason correctly; and I am satisfied that an impartial consideration of the records which have been published by physicians in the medical journals both in this country and in France will convince that, as a rule, in their patients also the power to reason was retained more or less completely, even though in many instances the results of examination in this aspect are not so conclusive as could have been wished. By way of corroboration, let me refer to the experience and opinions of three well-known observers. Trousseau† enters very fully into the case of M. A., a gentleman aged 58, aphasic, and only able to say "Yes." Amongst other proofs of his intelligence, he states, "Although his son manages all his affairs, he insists on being consulted about the leases, contracts, &c.; and the son states to me, that the father shows perfectly well by gestures, which are understood by those habitually around him, when certain portions of the deeds do not please him, and that he is not satisfied until alterations are made, which are, as a rule, useful and reasonable." Dr. Gairdner says,‡ "It is evident in many of these cases that the mind is at least so far unaffected as to permit of the exercise of all its ordinary active functions to a certain extent, and there is no direct proof of even seriously impaired intelligence; while it is equally plain, that all the ordinary emotions and voluntary acts, with the single exception of those implicated in the expression of the thoughts in words, are performed without much difficulty, and often in a perfectly normal manner." Dr. Sanders,§ in his account of a case of aphasia, remarks, "From the completeness of the loss of speech, it was

* 'Lectures on Clinical Medicine,' by A. Trousseau; translated by P. Victor Bazire, M.D.; p. 271.

† Ibid., p. 230 et seq.

‡ 'On the Function of Articulate Speech,' &c.; being a paper read before the Phil. Society of Glasgow, March 7, 1866; p. 8.

§ 'Lancet,' June 16, 1866.

impossible accurately to test her memory or her mental faculties; but her eye looked bright and intelligent, and the impression after careful observation was, that though it had received a shock, her mind retained its essential powers of thinking, feeling, and willing." In short, the testimony of observers generally supports the view, that aphasic patients in the majority of instances are able to reason more or less perfectly; and, as I have already stated, admitting the doctrine of the necessary association of thought and language, so strongly maintained by Max Müller and others, and which, I feel, commends itself to my own consciousness,* we are committed to the conclusion, that in most cases the inability to speak is not occasioned by forgetfulness of words—in fact, is not amnesic. This conclusion is, I need scarcely say, opposed to the prevailing belief that the absence of articulate speech depends principally on the loss of the memory of words, and which, we have seen, has the support of so distinguished a physician as Trousseau.

Certain facts have, however, been brought forward, showing that in some instances words are really forgotten; but before seeking to explain this apparent difficulty, I wish to direct attention to another aspect of the subject—the light thrown on the nature of the aphasic lesion by a consideration of the anatomy and physiology of certain portions of the brain. Avoiding, as far as possible with a subject of this kind, the region of speculation, I would ask, Is a lesion of parts whose functions are known, or at least generally admitted, competent to explain the phenomena of aphasia? Let me first, as briefly as possible, recall a few anatomical points which have a bearing on the question; and I would add, that in my statements I adhere principally to the views of Dr. Carpenter:—The sensory fibres passing upwards from the medulla oblongata, and conveying impressions coming from the body generally, terminate chiefly in the thalamus opticus; motor fibres proceeding to the spinal cord have their origin (so to speak) in the corpus striatum. Operations of the intellect, by general consent, are held to be associated with the grey matter of the surface of the brain. Between the latter and the two great centres just mentioned, is the mass of medullary substance, analogous in structure to the nerves, and believed to have a similar office. Dr. Carpenter considers that fibres connected with the cells of the thalamus opticus radiate to similar cells in the surface grey matter, where they terminate; and that another system of fibres, coming from the surface, having also their origin and termination in ganglionic cells, converge to the corpus striatum. The former, he holds, convey upwards sensory impressions; the latter transmit downwards the mandates of the will. It is with the latter that we are specially concerned. If their continuity be broken—for instance, by an apoplectic

* This *nominalistic* view of the union of thought and language is not, however, *universally* received.

https://doi.org/10.1192/bjp.12.60.503 Published online by Cambridge University Press

effusion—or should they be defective from any cause whatever, volitional impulses not being transmitted to the corpus striatum and other co-ordinating centres, no voluntary actions will be produced.

Let us now apply these views to the solution of our question. Thought and language may both be present in the mind of a person, and he may also will to express his ideas in words; but if the fibres are ruptured which act as the medium of communication between the surface grey matter and the co-ordinating centres for articulation, volitional incitations not being conveyed, there will be no speech. In the normal condition these incitations must vary extremely in accordance with the variety of words which the mind employs to express its ideas. Indeed, every word selected by the mind must have its own particular impulse, differing from that of every other word. Along these fibres, then, in course of ordinary conversation, impulses are constantly being conveyed, varying almost indefinitely in force and character, and producing equally dissimilar impressions in the centres in which they terminate. If, instead of being entirely incapable of function, the conductors are simply damaged—if the channel is only partially obstructed, so that the changes consequent on volition can still be transmitted in an imperfect manner—it would seem by no means improbable that impulses though perfect in their formation in the vesicular grey matter, and continuing unchanged as far as the connecting medium remains in its normal state, become altered beyond that point; and what more likely than that they should be transmuted into those which most frequently travel along the same road, and may therefore be conceived to admit of such conversion without much difficulty? We have here, then, an explanation of the constant expression of the same few common monosyllables in reply to all questions. Ask an aphasic to pronounce some word not included among his few stock ones, and, as a rule, possibly after many attempts, he will either completely fail, or one or other of his small vocabulary will be ejaculated. At the same time, there is evidently a clear determination of the mind, and a strong effort to comply with your wishes; but still there is failure; the wrong word is uttered, the impulse somehow becomes changed in its transit, and does not produce the desired effect.

Here I would observe, that surely, in such cases, when the word is reiterated again and again in the hearing of the patients—when many will tell you, by every possible sign except the one whose defect we are considering, that they know full well what they wish and strive to say—but more, even when their eyes are fixed on a book, and they have shown that they understand what they are reading (instance the woman Darroch);—I say, surely in such cases the want of utterance cannot be due to forgetfulness of words.

As I have said, the great majority of the sufferers from aphasia are in the condition just described; but there are a few exceptional cases on

record where the persons were able to articulate words without much difficulty, when they were spoken in their hearing. In them there is probably an unusual defect in memory; but it is not shown to have been confined to *words* alone. In a previous part of this paper I described the mental condition of a large number of persons hemiplegic, some on the right and others on the left side; but not aphasic, and it will be remembered that very great difference existed in the degree to which special faculties were impaired. Memory, however, was weakened more than any other; they almost all gave testimony to that effect. It is not, therefore, surprising that along with a slightly defective transmitting power there should be sometimes conjoined a great enfeeblement of the general faculty of memory, including, of course, the names of things, which, as they embody the more concrete ideas, tax the recollection to a greater extent than other parts of speech. But the cases we are now adverting to, as we have said, are rare, and do not represent the usual condition in aphasia, where, strive as they may, the patients are unable to utter the words which they declare to be in their minds—excepting always their few stock ones.

This latter statement is corroborated by many observers. I quote in illustration the following remarks of Dr. Moxon, in the 'Medico-Chirurgical Review' for last April. He says,* "One may, as I have frequently proved, repeat in the ear of a person so afflicted, a name whose meaning is comprehended by him, and yet no effort of his will induce that word to pass to his tongue. Thirty or forty times over I have pronounced the word to endeavour to make him able to speak it after me, but his tongue uttered only an unintelligible noise having no connection with the word required; yet he fully understood the name, and showed plainly his recognition of the right name when tried with others."†

There is one peculiar feature in aphasia, already mentioned in this paper, requiring explanation—the expression of words, and even short sentences, under emotion, which cannot be articulated by the sufferers during mental composure. We have seen that it was manifested in a marked degree by the patient Darroch. On the view of the lesion which I have advanced, it is not difficult to explain the occurrence of this interesting phenomenon, but for its elucidation I shall require to refer again to one or two anatomical

* P. 488.

† Since writing this paper, I have had another aphasic patient under my care in whom the feature referred to here was distinctly marked. Most words he completely failed to pronounce. He was annoyed at his failures, and much pleased when on two or three occasions he succeeded in his attempts at articulation. I specially remarked in this case that the emotional powers were much weakened, even as greatly as in the majority of cases of hemiplegia without aphasia. Thus, his voice quivered and he began to shed tears when I was questioning him. This is opposed to Trousseau's view, who holds—and, I think, correctly, in most cases—that in aphasia the emotions are little, if at all, affected.

points. It is now generally believed that there are many distinct sets of fibres for the transmission of independent sensations and motor impulses. Dr. Brown-Séquard holds that in the spinal cord and nerves there are ten or a dozen, and probably more, classes of conductors, exclusive of those which minister to special sense. Dr. Anstie, in the "Lettsomian Lectures" which have just been published in the 'Lancet,' adopts this doctrine, and gives reasons for his belief that in the fifth nerve there are six kinds of afferent fibres, and three classes of efferent ones, whose functions are isolated, no fibre of one kind being able to convey the particular impression transmitted by the conductors of another group. I am aware that Dr. Handfield Jones and others are opposed to this doctrine; but the prevailing opinion, formed on good grounds, is in favour of many conductors, each having its own special office. If this be so, by analogy we may justly infer that the medullary fibres connecting the grey matter at the surface of the brain with the sensorial centres are not all alike; very probably they are of different kinds, according to the particular function they have to discharge. On this hypothesis a separate system of fibres may be associated respectively with the will and the emotions; and it is quite conceivable that the former may be more implicated in disease than the latter. But if we decline to admit that there is more than one species of efferent fibres, then these, when diseased, may transmit one kind of impulse more readily than another; for instance, the emotional (perhaps on account of its probably greater strength) rather than the intellectual. In either case the impulses developed by emotion would be conveyed to the co-ordinating centres stimulating them to action, and speech would be produced.

But, after all, it is scarcely necessary that we should account for emotional language on the supposition that the stimulus for its production requires to be transmitted from the surface grey matter, as there is reason for believing, along with Dr. Russell Reynolds,* that the emotions are directly associated with the sensori-motor ganglia, and consequently do not require the supposed transmission before originating the co-ordination of acts. In this case a lesion above these ganglia will not interfere with the production of emotional language; on the contrary, the controlling influence of the will being removed, that form of speech may be developed with greater facility.

We now pass on to the consideration of a very important variety of the aphasic condition, in which the patients retain the power of expressing their ideas in writing.

We can seldom test the ability of aphasics to communicate their thoughts by that means, as, generally speaking, there is also hemiplegia on the right side; but where the aphasia exists alone, or the palsy

* 'Diagnosis of the Brain,' &c., by J. Russell Reynolds, M.D., p. 239.

is but slight, usually the sufferers are no more able to write than to speak. On the Amnesic theory the exceptional cases are not to be explained. Trousseau* and Dr. Gairdner have both appreciated the difficulty in accounting for them in accordance with that theory. Dr. Gairdner says,† "Either the alleged cases of aphasia with ability to write were not *true* aphasia, but cases of sudden and complicated paralysis of the organs of articulation, or we must admit two *perfectly distinct* kinds of aphasia, only one of which affects the *ideation* of language, so to speak, while the other affects in some complicated way, as yet imperfectly studied, but perhaps differing from paralysis properly so called, the *innervation* of language, or rather of speech, while it leaves the *ideation* of it on the one hand, and the mechanism of it through the writing hand on the other, absolutely or nearly intact." I think there can be little doubt of the occasional occurrence of such cases. One is narrated by Trousseau,‡ in which the patient was unable to articulate, but could swallow, and move his tongue perfectly in all directions, and had himself written a sensible, well-worded note, detailing his symptoms. Dr. Hughlings Jackson,§ describes another, where the sufferer could only say "Gee, gee," but had full power over the movements of her tongue, and could write her name correctly with her left hand.

It can scarcely be maintained that words are not present in the minds of individuals labouring under this form of aphasia; but although a stumbling-block on the amnesic supposition, it may easily be explained on the view which I have advanced. I have said that, on the ground of analogy, it is probable that there are several different kinds of conductors in the medullary substance of the hemispheres. Speech is so important a function, that it may well be conceived to have a separate system of fibres for conveying those impulses from the mind which occasion its expression. On this view, the impulse for writing may be transmitted by other fibres, and all the more likely when it is remembered that in all probability there are different co-ordinating centres for articulation and for the movements of the fingers. The two kinds of conductors may lie side by side, so that both will generally be implicated in the same lesion; but in some rare instances those escape which I believe to be concerned in the transmission of the mandates for writing, so that the words present in the mind can thus be communicated.

Gesture is sometimes retained and sometimes lost. It is evident that the same hypothesis is applicable to the explanation of this other seeming anomaly.

We now proceed to consider the results of post-mortem examina-

* 'Lectures on Clinical Medicine,' p. 261.
† 'The Function of Articulate Speech,' p. 20. The italics are his.
‡ 'Lectures on Clinical Medicine,' p. 262.
§ 'London Hospital Reports,' vol. i, 1864, p. 400.

tions of the brains of persons dying aphasic. It is manifest that this department of our subject is a very important one. Is there a uniform lesion present, or are abnormal conditions of many different parts met with on inspection? It must first be remarked, that the number of inspections recorded up to the present time is not by any means large, so that we are probably not yet furnished with a sufficient basis for induction. But with respect to the *general* localisation of the morbid change, we are to a large extent independent of post-mortem inquiries. We have seen that very generally right hemiplegia accompanies aphasia; and it is further to be stated that, with the exception of solitary instances reported respectively by Trousseau and Dr. Hughlings Jackson, and one or two more of a somewhat doubtful nature described by other observers,* no defect in articulate language has been observed along with left hemiplegia. Observations are now so numerous, that these two points may be allowed to be fairly established. Moreover, on the ground of the association, it is inferred that both the palsy and the aphasia are results of the one lesion in the left hemisphere. But when we come to inquire in what part of the left hemisphere the pathological change is situated, there is much less of certainty. In some remarkable instances communicated by Broca, Dr. Sanders, and others, the lesion was confined to the left external frontal convolution; and there is a short notice in the 'Lancet' of the present month (July) of a remarkable case—also recorded by Broca—in which there had been left hemiplegia without loss of language, occurring about two years before death, and afterwards right hemiplegia with aphasia, which soon terminated fatally. At the autopsy the remains of an old clot were found in the right outer frontal convolution, and a recent one in the corresponding part of the left hemisphere. I have not, however, seen a detailed account of this case. But in other dissections of aphasics the left outer frontal convolution has been found intact. Broca himself was the first to record an instance of this kind. Similar examples are given by Trousseau and others. Dr. Gairdner has published one in the 'Glasgow Medical Journal' for last June, in which no lesion of any kind was found; and another, exactly similar, by M. Hilliaret, is described in the 'Journal de Médecine Mentale' for September and October of last year. But in these latter it will scarcely be denied that some obscure morbid alteration actually existed.

I would, however, specially notice that wherever morbid change of structure has been observed, the medullary or conducting substance of the hemisphere has always been involved. So far as I can find, in no case has disease been found in the grey substance alone.

* Since writing the above, Dr. Crichton Browne, Medical Superintendent of the West Riding Asylum, mentioned to me that he had lately under his care a case of *left* hemiplegia in which there was almost complete loss of language.

On the other hand, among the insane, and especially those dying of general paralysis, we often perceive deterioration in that vesicular matter; but aphasia is certainly rare in insanity. About four months ago a case occurred in my own practice which I think is of importance in its bearing on this point. The patient, an old man, was not aphasic, as he was at no loss for words; but his mind was very feeble, and he talked incoherently. The following morbid conditions were found after death :*—The dura mater covering the left hemisphere was lined by a false membrane fully thicker than the dura mater itself. This new structure closely adhered to the latter, but could be separated in a distinctly membranous form. It was exactly limited to the left hemisphere, stopping at but not investing the falx cerebri above, and, at the base, extending to but not crossing the middle line of the skull. Near its margin below it was much thinner, and had the appearance of delicate fascia. The grey matter of the convolutions under this membrane was brown, softened, and eroded; these changes being most marked in the frontal and parietal regions—the external frontal convolution being distinctly implicated in its entire extent. Its appearance contrasted very strongly with the ordinary grey aspect of the convolutions of the right side. The softening was quite superficial, and, so far as I could judge, did not involve the white substance.†

Several cases are on record in which the lesion was *entirely* confined to the white substance of the hemisphere. Trousseau gives one observed by Dr. Vulpian, in which there was softening of the posterior half of the white supra ventricular nucleus of the left cerebral hemisphere, and no trace of disease in the frontal or other convolutions; and Dr. Dodgson, of Cockermouth, in the 'Lancet' of April 14th of the present year, describes another, where the convolutions on the left side were sound, but the medullary substance above the ventricle was softened and broken down around an apoplectic cyst.

So far, then, as light is thrown on the question by post-mortem research, we are led to the conclusion that the most uniform lesion is in the conducting fibres of the hemisphere. This is clearly opposed to the Amnesic theory, which supposes a defect of the mind,

* I may state that Dr. Barbour, a gentleman of considerable experience in necroscopical examinations, assisted me in making the inspection.

† The membrane was shown and the case described at length at the June Meeting of the Medico-Chirurgical Society in Glasgow. Since writing the above, I have inspected another very similar case, except that in it the false membranes extended over both hemispheres. The arachnoid and pia mater were even more thickened, and the latter was distinctly adherent in many places to the cortical substance, markedly so over the left external frontal convolution. Under the microscope, sections of grey matter from this convolution, and also from the surface of the island of Reil, presented many cells in a state of fatty degeneration. The symptoms were those of great mental weakness, with a degree of general paralysis; *but there was no aphasia.*

more especially in one faculty, and therefore ought to be associated with disease of the vesicular substance of the convolutions, with which we have reason to believe that at least the intellectual powers are specially connected. But we have seen that even where such lesion existed, and involved the particular convolution supposed to be connected with language, when it was limited to the surface grey matter there was no aphasia. On the other hand, a constant lesion of the white fibrous element strongly supports the view which regards the *essential* defect as one of transmission.

According to the latter hypothesis, the same effect will be produced by an interruption to the fibres at any part of their course, whether it be close to their origin in the convolutions, or possibly near their termination in the co-ordinating centres; for, if completely ruptured at any point, volitional incitations will no longer be conveyed, and words cannot be articulated, at least in their usual way, in obedience to the will. In this relation, it is surely of significance that hemiplegia, a loss of *motor* power, in the great majority of cases accompanies aphasia. This fact of itself seems to suggest that the latter is probably of an analogous nature.

This paper has already extended further than I anticipated, so that I can do little more than refer to the other hypotheses which have been advanced in explanation of the aphasic condition. Baillarger holds that the lesion consists in the loss of the memory of the movements necessary for articulation. This theory would require, as a preliminary step, that proof be submitted of the existence of that form of memory. No doubt, certain plausible statements have been advanced to show the probability of its gradual formation; but they are of too speculative a kind to impart much weight to any doctrine which has no other foundation.

Dr. Lordat (quoted by Trousseau), who was himself aphasic for some time, considered that the defect consisted in a morbid change of the co-ordinating centres for speech. If that were so, there ought to be imperfect articulation; but such is not the case. There is no stuttering in the expression of words, however small the vocabulary; as a rule, they are spoken clearly and distinctly.

It will naturally be asked, is any light thrown on the localisation of the lesion in the left hemisphere by the view which I have suggested? Admitting its correctness, I fear we only substitute one difficulty for another. We would certainly thereby get rid of the necessity for supposing that a particular mental faculty was confined to a special part of one side of the brain, as, in accordance with the hypothesis, the mind may be considered to operate as a great whole, in connection more especially with the vesicular matter of the convolutions, while at certain points of the hemispheres it transmits its impulses on volition, along special systems of fibres, to the co-ordinating centres. The conductors for articulation, on grounds

already stated, may probably unite with the surface ganglionic cells somewhere in the region of the external frontal convolution, and thence proceed to the corpus striatum. But we have still to account for these conductors being apparently unilateral. Dr. Moxon, in the paper already referred to, has suggested an ingenious theory in explanation of this seeming infraction of the law that all "organs of relation" are bilaterally symmetrical. At present I can do little more than state his conclusion, which is, that although analogous parts exist in the two hemispheres of the brain, the educated association of movements takes place only on the left side, whilst on the right side corresponding parts remain in an undeveloped state. It does, however, seem inconsistent with the general plan of nature, that a part should have been created simply to remain in an undeveloped condition, as he maintains. Besides, as his theory is based on the greater attention to the movements of the right hand than the left, arguing from that fact, a probably greater attention to the right side of the tongue than the left (memory accumulating on the left side of the brain, where he thinks attention is fixed), it follows that left-handed people ought, when aphasic, to have their hemiplegia on the left side, which *possibly* is the case. Again, how does it happen that even after nineteen years, as in one of my cases, during which, according to the theory, attention ought to have been transferred to the left extremities, memory has not gradually grown up in the right hemisphere?

I would suggest, with hesitation however, as the results of post-mortem examinations seem rather unfavorable to the view I am about to submit, that, on the hypothesis I have supported, when there is hæmorrhage into, or softening of the *right* hemisphere, the conductors for language generally escape, possibly on account of some slight, and hitherto unobserved anatomical difference in the vascular arrangements of the two hemispheres. Should these conducting fibres occupy only a narrow portion of the medullary substance, it is evident that if the lesion be situated immediately before or behind their course, they will not be implicated; and a difference of a line or two would suffice to produce this result. Slight anatomical differences in other bilateral organs are held to dispose to disease of the one rather than the other. Thus, the left spermatic cord is much more subject to varicocele than the right one; and this is alleged to be principally due to the angle of junction of the spermatic veins, respectively with the left renal and inferior cava, being different on the two sides. The brain itself is not perfectly symmetrical in its two halves. Thus, Dr. Robert Boyd has shown that the average weight of the *left* hemisphere is one eighth of an ounce greater than the *right* one; and it may also be mentioned that Baillarger, on the authority of Gratiolet, states "That the frontal convolutions of the left side are in advance of those on the right in their development."

I have already stated that the number of inspections of persons dying aphasic has not been large; but it must be granted that some of them do not favour this explanation: still it can hardly be held to be entirely negatived; and, in connection, it must not be forgotten that undoubted cases of left hemiplegia with aphasia have occurred. No doubt, in these instances lesions of both hemispheres have been supposed to exist, the right producing the hemiplegia, the left the aphasia; but this supposition is unsupported by post-mortem observation, so that possibly both results may have been caused by a morbid change on the right side of the brain alone. It will be observed that I cling to any solution which will obviate the difficulty which arises by conceding that there are organs on the one side of the brain which do not exist on the other.*

Let me, in conclusion, shortly state as a summary the views which I entertain of the cause of aphasia:—There is a lesion usually in the left hemisphere of the brain, of efferent fibres passing between the convolutions and the great co-ordinating centres, probably at some point of a line extending from the external frontal convolution to the corpus striatum, so that voluntary motor impulses for the articulation of language cannot be transmitted. The *essential* morbid change is, therefore, *motor*, and not *mental*. However, there is in most cases an accompanying degeneration of the powers of the mind, which varies in degree in different persons, but in the majority distinctly involves the general faculty of memory. The condition of the intellect does not differ from that which is associated with non-aphasic hemiplegia; but it would seem that the emotional powers are less frequently disturbed. It follows that there is no necessity for supposing the existence of an organ for language, as a defect in transmission along with general weakening of the mental faculties is competent to account for the various phenomena hitherto observed in the sufferers from aphasia.

At present there is no sufficient explanation of the almost constant occurrence of the lesion in the left side of the brain. Theories have been advanced which either involve the belief in a departure from the general plan of nature in the duality of our "organs of relation," or suppose, what seems inconsistent with the wisdom of Divine arrangement, that organs have been created which never discharge the special functions with which they were endowed. It is suggested that it would be well, in the first instance, to establish beyond doubt that the absence of aphasia in morbid states of the

* It is not necessary to suppose that the same fibres in every case act as the conductors for the incitations which give rise to language, as speech is an *acquired* faculty; so that possibly different fibres in different persons may transmit the impulses for words, provided only they are connected with the co-ordinating centres for articulation. If this were so, a lesion of precisely similar situation in two persons which caused aphasia in the one might not implicate speech in the other.

right hemisphere is not to be accounted for by the escape of parts usually implicated on the left side, owing to some slight anatomical difference, such as is known to exist between other bilateral organs. Failing this hypothesis, let us search anew for some more satisfactory solution of the difficulty than has yet been proposed.*

CLINICAL CASES.

I. *Illustrations of Pathology and Morbid Anatomy in the Insane.*

By W. Lauder Lindsay, M.D., F.R.S. Edin., &c.; Physician to the Murray Royal Institution for the Insane, Perth.

The pathological records of hospitals for the insane seldom contain details of much novelty, or of special significance in relation to abnormal or diseased mentalisation. But occasionally exceptional cases occur interesting in our comparisons of the phenomena—mental and material—which are currently supposed to distinguish sanity from insanity. To this category, apparently, belong three cases which recently occurred in the practice of this institution; the one following the other within a few weeks.

The first lesion to be recorded—an osseous isolated body in the cerebral substance—appears to be, if not unique, at least rare either in the sane or insane.

The second—a typical case of chronic Bright's disease—is an illustrative instance of a disease hitherto generally regarded as either altogether absent, or at least very rare, among the insane.

While the third—stricture of the colon, extensive abdominal cancer, and other lesions—illustrates well (as do the other cases)

* The view of the aphasic lesion explained in this paper was communicated by me, in the beginning of last April, to a meeting of the Medico-Chirurgical Society in Glasgow, on the occasion of the reading of a paper on the subject by Dr. W. T. Gairdner. At that time I was not aware that an explanation in *any degree similar* had been previously proposed. However, in the French 'Journal of Mental Medicine,' referred to in the text, and perused by me in the month of June, I noticed that MM. Letourneau and Cerise had suggested that aphasia may *partially* be due to a defect in transmission; but they hold that there are other causes—Letourneau says there are five different ones. Certainly, the hypothesis as stated by them did not meet with general acceptance. Trousseau's view is, I think, at present, the one generally received—that the principal defect is amnesic. On the other hand, as I have said, my opinion is, that the lesion is *essentially* a MOTOR one.

https://doi.org/10.1192/bjp.12.60.503 Published online by Cambridge University Press