obstacles doubtless exist in the advancement of our art which did not, at all events to the same extent, hamper the efforts and retard the work of those who went before us. These difficulties still exist, and are likely to continue until, in more enlightened days, they are swept away with the contempt which they so richly merit. I allude more particularly to the difficulties thrown in the way of the experimental physiologist in these countries, and to the cruel and insensate opposition made to the Contagious Diseases Acts, both striking illustrations of how sentiment may get the better of judgment, and both mischievous products of what has been well termed the "Lues Philanthropica," that weak, flabby, boneless, Utopian humanitarianism now so prevalent, and that has done so much to sap the judgment, discretion, and good sense of so many men as well as women. You should look upon it as one of your great duties and privileges in the present as well as in the future, to aid in bringing about that happy era, sure to come sooner or later, when all such opposition and obstacles shall exist only among the traditions of our art, and when, to quote Graves's noble words, "the stream of knowledge, now fed by a thousand new sources, flows along deep and rapid, sweeping away every obstruction, and defying all human opposition." Then the obscuring mists of prejudice and folly will be lifted off the ground, and dispersed as by a magician's wand, and the physician and the surgeon will not have so often to fold their arms and sorrowfully confess that they can do no more, confess that they stand baffled and powerless in the presence of disease, which, perhaps, they may have vanquished for a time, but never conquered; then the State will no longer be guilty of thwarting efforts which, if allowed to be made, would, we know, aid signally in stamping out that fell disease which is such a cruel and relentless scourge and curse to humanity, which counts more victims than cholera, small-pox, or yellow fever put together, and which spares neither age nor sex, not even the innocent child unborn.

In your professional life hereafter, if slow to accept new principles and practice, be also slow to reject them. Remember there is nothing so cheap or so nasty as senseless detraction, nothing so vulgar, so stupid and contemptible as an unreasoning scepticism, and that indulgence in either or both has not infrequently brought persons into a position at once melancholy and at the same time ludicrous. I allude more particularly to the hostility that was formerly evinced by "practical" persons to the many instruments of precision now so indispensable to every well educated practitioner, and of late years, mainly, I regret to say, in the surgical ranks of our profession, to the principles and practice of antisepticism as elaborated by Pasteur and Lister. When we consider how recently we have heard antiseptic practices held up to contempt as little else than a fashionable but essentially ephemeral craze, and its professors and advocates described as persons apparently temporarily afflicted with a form of harmless lunacy, which in time, and with a more extended experience, they may reasonably be expected to recover from, we have a good example of the humiliating position unthinking detractors may eventually find themselves in.

You may be well congratulated at beginning the work of your lives —that which I trust may soon prove to you all a happy toil—at a time in which the advances made and the results obtained have been so signal and so great as to justify its being termed the "Golden Age" of surgery, and to prove how rash it was even of so great a surgeon as Boyer, upwards of seventy years ago, to express his conviction and belief that surgery had already attained perfection. In dealing with the present epoch, the future historian will doubtless place in boldest relief the revolution that has taken place in the treatment of wounds, one which has been attended with such amazing results, and brought about, not by any chance or inspiration, but by the application of knowledge gained of late from three of the great sources of scientific wealth—Physiology, Chemistry, and Therapeutics.

As a proof of what we have gained in our power of warding off and disarming what are not inaptly termed "preventable" diseases following wounds, all more or less connected with septic infection, let us briefly glance at some statistics connected with comparatively recent wars, for which I am indebted to my friend Sir William Mac Cormac.[1] In the Crimean war the number of men who lost their lives in the French Army was 95,615, of whom only 10,240 perished at the hands of the enemy, the remainder succumbing to diseases resulting directly from their wounds. In the American war 95,000 men died from wounds, while 184,000, nearly double the number, perished from septic affections consequent on them. A remarkable change for the better was observed in the Franco-German war. In this campaign 28,282 died of their wounds, while only 12,253 died of preventable disease. But the greatest result of all yet obtained was in the Egyptian campaign of 1882, in which not a single instance of death from pyæmia, septicæmia, erysipelas, or hospital gangrene is recorded.

In fulfilling the task you have laid out for yourselves to accomplish, I trust you will not be merely steady workers, but earnest enthusiasts. I believe that in the study and scientific pursuit of our profession the highest exercises of the mind are acquired, and the best charities of the heart are elicited. To insure honourable success here—by which I mean not so much the acquisition of State honours or wealth as the sympathy and goodwill of your contemporaries—bind yourselves by a true and exalted line of conduct; be strong, courageous, and stern in resisting all temptation to evil-doing; cherish always the worthy aspiration that your energy in all right and honourable action may not fail, and that you may not, in consequence, fall into that hopeless quagmire of mental stagnation into which so many sink, and from which so few have power to emerge; and, above all, remember that those talents with which you have been entrusted—to some more and to others less—should not be wrongly buried in the ground, but returned with interest to Him to whom you are indebted for them. Let it be your ambition as well as your prayer that you may be ever animated by the spirit of that great and solemn obligation which the philosopher and physician, Hippocrates, the Father of Medicine, required from his pupils: "In purity and holiness I will spend my life and practise my Art." Do this, and then:

Shall inferior eyes
That borrow their behaviour from the great,
Grow great by your example.

[1] On Abdominal Section. By Sir William Mac Cormac. Annual Oration delivered before the Medical Society of London, 1887.

ON DIFFERENT KINDS OF APHASIA, WITH SPECIAL REFERENCE TO THEIR CLASSIFICATION AND ULTIMATE PATHOLOGY.

Read in the Section of Medicine at the Annual Meeting of the British Medical Association held in Dublin, August, 1887.

By H. CHARLTON BASTIAN, M.A., M.D., F.R.S.,
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[*Concluded from page 936*].

PART II.

Defects of Speech from Lesions of Commissures between the Different Word Centres.—Something must now be said concerning the speech defects which result from lesions of the commissures between the different word centres. It seems to me better to reserve the word "commissure" as an appellation for the fibres which connect centres of like kind, that is, either sensory centres or motor centres; and to name "internuncial" the fibres which connect sensory with motor centres. These two orders of fibres will thus be clearly distinguished from one another, as well as from so-called sensory and motor nerve fibres, namely, those which connect the periphery with sensory centres, or those which connect motor centres in the medulla or cord with muscles.

The speech defects that result from lesions of commissures have elsewhere been referred to by me. They will be found to be in some cases *(a)* interesting and important owing to the peculiar combination of defects to which they give rise; or in other instances, that is, when other commissures are involved, such lesions are interesting *(b)* because of their importance from the point of view of the regional localisation of aphasic speech defects.

(a) As already stated, the commissures between the auditory and the visual word centres are habitually called into play in certain mental operations, such as naming objects at sight or reading aloud, when stimuli have to pass from the visual to the auditory word centre (by the visuo-auditory commissure) before the naming or the reading aloud can occur. Again, in writing from dictation, and probably also in writing any spontaneous effusion, stimuli require to pass between these two centres in an opposite direction, namely, from the auditory to the visual word centre, and through a different set of fibres (the audito-visual commissure).

In 1880 I published (*The Brain as an Organ of Mind*, p. 640) some details concerning a man who has been ever since under observation from time to time, and who is well known to many students of University College Hospital, whose main defects in intellectual expression seem to be referable to a lesion involving both these commissures

between the auditory and the visual word centres. I called attention at the same time (*loc. cit.*, p. 645) to a case that had been recorded by Dr. Broadbent, which, according to my interpretation, was in part due to damage of one of these sets of commissural fibres only, namely, the visuo-auditory. While, more recently, my friend and former pupil, Dr. Dingley, has published (*Brain*, vol. viii, p. 492) the details of an interesting case of speech defect in which the above-mentioned half of the commissure was intact, although there appeared to be a lesion in the course of the other half of the commissure, namely, the audito-visual, this patient being quite unable to write from dictation, although he could read aloud very well.

(b) A reference to Fig. 1 will show that the other commissures, lesions of which have to be considered, are those which unite the auditory and the visual with the glosso-kinæsthetic and the cheiro-kinæsthetic word centres respectively. Defects in the course of the audito-kinæsthetic and of the visuo-kinæsthetic commissures are, in my opinion, of interest more especially from the point of view of a regional diagnosis. I consider, for instance, that lesion of any part of the audito-kinæsthetic commissure should produce an aphasia indistinguishable from that which would be produced by damage to the glosso-kinæsthetic centre itself. If this be true, it is, of course, a very important point, because it would show that it is an error to suppose that typical aphasia can only be caused by a lesion in Broca's region, seeing that complete destruction of the audito-kinæsthetic commissure at any point between that region and the neighbourhood of the

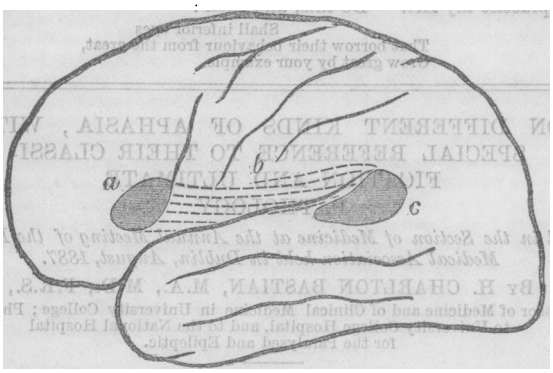

Fig. 2.—Diagram showing the possible location of an Aphasia-producing Lesion, either in the Kinæsthetic Centre (*a*), in the Auditory Centre (*c*), or severing the commissural fibres between them (*b*) in any part of their course.

occipital lobe where the auditory word centre is situated, ought also to give rise to a typical aphasia similar to that resulting from a lesion in Broca's region (Fig. 2).

This point, like the existence and interpretation of aphemia, will be found to be a touchstone for testing the truth of my doctrines as compared with those of Stricker and Hughlings Jackson. Thus, according to Stricker, the commissural fibres, to which I am now referring, pass between the auditory and the "motor centre" for articulation (that is, the centre which I term "glosso-kinæsthetic" and believe to be of sensory type). A damage occurring in the course of these fibres would cause, according to Stricker (*Le Langage et la Musique*, 1885, p. 73), not aphasia, but word deafness. His view being that words are realised mainly by memorial revival in motor cortical centres, so that in the case assumed there would be word deafness, because stimuli could not pass from the auditory to the assumed motor centres in which the essential part of the apperceptive process is carried on. Stricker would, I suppose, be supported in this view by Hughlings Jackson; and it seems to me clear that these doctrines would also necessitate the view that an isolated lesion in Broca's region only should cause "word deafness," as well as aphasia, which it certainly does not do. How can they explain this discrepancy?

I point out these opposite interpretations in order to call prominent attention to crucial points so far as our respective theories are concerned, in the hope that after a time some further decisive evidence may be accumulated tending to show which view is most in accordance with clinico-pathological facts.

The evidence already in existence in regard to this point, which is not inconsiderable, may be best summarised by a quotation from my recently published work, *Paralyses: Cerebral, Bulbar, and Spinal* (pp. 292-294):—

"It seems certain, *a priori*, that the auditory centre must be connected by means of commissural fibres with the centres situated in the posterior part of the third frontal convolution (whether we call them motor or whether we regard them as kinæsthetic centres); and it seems equally clear that a lesion which should cut across these commissural fibres in any part of their course between the posterior extremity of the Sylvian fissure and the third frontal convolution ought also to produce a typical aphasic condition (Fig. 7). This conclusion I announced in 1880 (*Brain as an Organ of Mind*, p. 686). This *a priori* deduction is not without evidence in support of it, even at present, though more will doubtless soon be forthcoming. The fibres connecting these two parts of the cortex have not yet been traced by the anatomist. If, however, we examine sections of the brain, such as are shown in Figs. 55 and 60, it will be seen to be a matter of almost complete certainty that fibres connecting the upper temporal with the third frontal convolution must pass in the first place (*a*) not very far away from the posterior extremity or sensory division of the internal capsule, and thence (*b*) onwards by way of the island of Reil. But these are just the regions the damage of which may, at times, as much clinico-pathological experience has shown, be associated with aphasia.

"(a). Grasset, about the same time that I dwelt upon the above-mentioned view, called special attention to a fact which had not previously attracted much attention, viz., the not unfrequent association of aphasia with loss or disturbance of general sensibility (hemianæsthesia) on the right side of the body (*Des Localisations*, 1880, 3me édit., pp. 272-277). He refers to several cases illustrating this association, but gives, as I venture to think, an erroneous explanation when he attributes it to the supposed propinquity of the third frontal convolution and the sensory segment of the internal capsule (*loc. cit.* p. 277). A reference to Fig. 55 will show that the posterior part of the hinder segment of the internal capsule is far removed from the region of Broca and the contiguous portion of the insula, though it must be very close to the posterior part of the commissural fibres connecting the upper temporal gyrus with Broca's region.

"(b). Again, the island of Reil lies in the direct track which must almost certainly be taken by such commissural fibres. But, since 1868, when Meynert originally advanced the notion, and supported it by cases, that a lesion in the island of Reil might produce a typical aphasic condition, other cases of the same kind have been published, and these have been analysed by Boyer (*Etudes Topographiques sur les Lésions Corticales*, Thèse de Paris, 1879, No. 115). There are now over thirty of such cases on record, so that there can be no doubt as to the correctness of Meynert's position.

"As I said therefore in 1880, Broca's special localisation of the third left frontal convolution as the seat of aphasia-producing lesions, must be held to hold good only for one particular, though very common, form of aphasia, and not exclusively even for this form.

"The above considerations may make us thoroughly admit the real validity of the objections raised by some against the old doctrine of Broca and his immediate followers, that the posterior part of the left third frontal gyrus is *the* region always damaged in cases of aphasia. We must now be prepared to admit the existence of many closely allied forms of aphasia and a comparatively wide area in which lesions may give rise to this or that variety. Subsequent experience tends to confirm the hypothesis which I then advanced, to the effect that the tendency to mental impairment with aphasia, and the degree of such impairment, will, other things equal, increase as lesions of the left hemisphere, capable of producing this condition, recede in site from the third frontal convolution, and approach the posterior extremity of the Sylvian fissure."

Such evidence as is here referred to seems decidedly to favour my interpretation, and to be adverse to that of Stricker and Hughlings Jackson, seeing that the speech defect produced by lesions occurring in the course of the commissural fibres between the auditory word centre and Broca's region has been found to be aphasia rather than "word deafness." Another point equally adverse to their views is the well-attested fact above referred to that a lesion limited to Broca's region does not give rise to "word deafness," though it should do so in order to meet the requirements of their hypothesis.

The fibres already spoken of undoubtedly constitute the principal commissures between the different word centres. Others, however, seem to exist.

As I have elsewhere remarked, there is reason to believe that in some persons the glosso-kinæsthetic centre may be stimulated directly through the visual word centre (as it is habitually in deaf-mutes who are taught to speak). Such cases as those of Hertz and Hun (quoted and commented upon in *The Brain as an Organ of Mind*, pp. 623-625), in which, though the patients could not speak, they could read aloud with facility, seem only explicable in this way. (Fig. 1, *e*.)

There is also strong reason to believe that in some persons the cheiro-

kinæsthetic centres may be stimulated directly from the auditory (Fig. 1, *f*) rather than from the visual centres, and when such persons become word-blind they are able, in this manner, to write from dictation when they cannot perform the simpler act of copying writing; they write, moreover, as well with their eyes closed as with their eyes open (Ross, *On Aphasia*, pp. 17 and 83). Again, the fact that such patients are sometimes able to read writing aloud, by executing the manœuvre of tracing over the outline of the letters with pen or pencil, would seem to show that in them, at least, the cheirc-kinæsthetic centre may transmit its different impressions direct to related portions of the auditory word centres (Fig 1, *f'*), so that the written words may then be spoken by the ordinary process. There is thus reason to believe that this particular commissure may be double, and therefore capable of transmitting impressions in both directions between the auditory word centre and the cheiro-kinæsthetic centre (Fig. 1, *f*, *f'*).

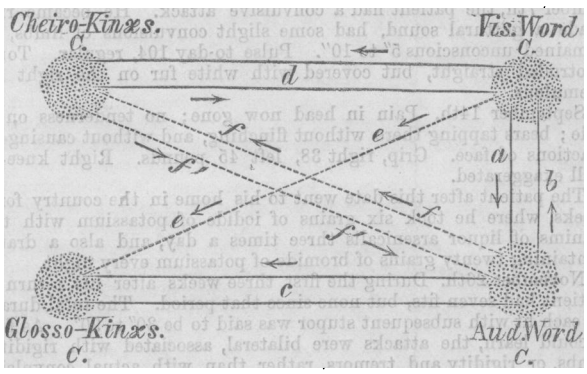

Fig. 1.—*Aud. W. C.*, the auditory word centre; *Vis. W. C.*, the visual word centre; *Glos. Kinæs. C.*, the glosso-kinæsthetic word centre; *Chi. Kinæs. C.*, the cheiro-kinæsthetic word centre; *a*, the visuo-auditory commissure; *b*, the audito-visual commissure; *c*, the audito-kinæsthetic commissure; *d*, the visuo-kinæsthetic commissure; *e*, *e*, the visuo-glosso-kinæsthetic commissure; *f*, *f*, the cheiro-kinæsthetico-auditory commissure; *f'*, *f'*, the audito-cheiro-kinæsthetic commissure. The last three commissures represent unusual routes for the transmission of stimuli between the word centres.

Does a commissure exist between the glosso and the cheiro-kinæsthetic centres? The existence of such fibres is indicated by Charcot in the diagram with which he illustrates speech defects, but I am not aware of any facts or theoretical considerations which would tend to support the necessity for their existence. It is highly probable that neither of these centres ever acts alone upon subjacent motor centres. One or other of them seems always to be called into activity by the auditory or by the visual word centre respectively, and as a result there is immediate action upon the subjacent motor centres. The two kinæsthetic word centres are, in my opinion, not much or necessarily concerned with the web of thought, so long as it be silent thought, though I believe they are immediately called into full pla when thought translates itself either into speech or writing. Sti the effect of lesions in these two kinæsthetic centres seems to show that the process of word revival and of thought may, nevertheless, be distinctly interfered with by any such damage even to these the least used stations for the memorial recall of words in silent thought. The mental condition of the most intelligent of patients suffering from simple aphasia is, I believe, inferior to that of the patient suffering from pure aphemia or from nuclear anarthria (owing to bulbar disease). But concerning patients presenting these latter defects I have now to speak.

Defects of Speech from Lesions of Internuncial Fibres.—Formerly, when I knew nothing about kinæsthetic functions or centres, I fell into what I now consider to be the common error of considering pur- aphasia and pure agraphia in "motor defects." Nor was I able then to make any clear distinction between simple aphasia and simple aphemia, such as I shall now endeavour to indicate.

It will be found, indeed, that the adoption of my views permits a full explanation of aphemia, which proves such a puzzle to Stricker, Hughlings Jackson, and those who hold similar doctrines as to the mode in which words are revived in silent thought. They rather ignore this form of speech defect, or else doubt the genuineness of the disabilitv when they meet with it. The difficulty for them is of this sort. They assume that Broca's region is really a motor centre, and that for the revival of a word in thought the muscles that would be concerned with its pronunciation should be gently stimulated from this centre. For them, therefore, a lesion of what I am now terming internuncial fibres (fibres connecting Broca's centre with others in the bulb) should, in any part of their course, produce an aphasia just as typical as that caused by injury to Broca's region. Indeed, in accordance with this theory of Hughlings Jackson and Stricker, it seems to me that a lesion in the articulatory centres of the bulb (as in extreme glosso-labio-laryngeal paralysis) ought also to produce a typical aphasia, whereas we know that it produces a very different condition, and one which is very rarely regarded as an aphasic defect. These are, for most authorities on this subject, cases of mere difficulty of articulation, or anarthria.

The nearest approach to a motor speech defect among those which are usually included under the aphasic category is that which I am now about to consider under the name Aphemia.

Here there is loss of speech without any mental impairment, and with the power of writing preserved intact. In such cases, also, there may, after a longer or shorter period, be complete recovery, either owing to the disease being originally produced by some mere functional defect, or by the gradual establishment of a new "way out" for speech incitations, namely, from the left to the right third frontal convolution (through fibres of corpus callosum), and thence down-

CLASSIFICATION OF SOME DEFECTS OF SPEECH AND WRITING.

		Seat of Lesion.		*Name and Nature of Defect.*	
Cortical Lesions.	Lesions or Defects in Word Centres.	Auditory Centre	*a.* Simple Amnesia (from Functional Defect)	1. Spontaneous Speech impaired (*Slight Simple Amnesia*).	Different Forms of Aphasic Defect in Speech or Writing.
				2. Spontaneous and Associational Speech impaired, but Imitative Speech retained, and the patient may be able to read alond fluently (*Profound Simple Amnesia*).	
			b. Word-Deafness and Aphasia ..	3. Word Deafness combined with complete Aphasia, owing to destruction of Centre (*Auditory Amnesia and Aphasia*).	
		Visual Centre		4. Word Blindness and Agraphia (*Visual Amnesia and Agraphia*).	
		Glosso-Kinæsthetic Centre		5. Aphasia (typical) (*Kinæsthetic Amnesia*).	
		Cheiro-Kinæsthetic Centre		6. Agraphia (*Kinæsthetic Amnesia*).	
	Lesions or Defects in Commissures between Word Centres.	Audito-Visual Commissure		7. *Commissural Aphasia.*	
		Visuo-Auditory Commissure		8. *Commissural Aphasia.*	
		Audito-Kinæsthetic Commissure		9. *Aphasia* (typical).	
		Visuo-Kinæsthetic Commissure		10. *Agraphia.*	
Sub-Cortical Lesions.	Lesions or Defects in Internuncial Fibres.	Internuncial Fibres connecting Glosso-Kinæsthetic Centres with Bulbar Motor Centres		11. *Aphemia* (more or less marked, difficulty in Articulation, or actual Dumbness.	
		Internuncial Fibres connecting Cheiro-Kinæsthetic Centres with Spinal Motor Centres		No special defect known.	
Lesions in Motor Centres.	Lesions or Defects in Motor Centres.	Motor Centres concerned with Speech in Bulb ..		*Anarthria* (more or less marked, difficulty in Articulation).	
		Motor Centres concerned with Writing in Spinal Cord		No special defect (Paralysis of hand and arm).	

wards through the right hemisphere to the bulb, as originally suggested by Broadbent. Of this variety of speech defect I have recently had a most typical example under my care, agreeing in all essential details with the well known case of a carrier, briefly described by Trousseau (*Lectures on Clin. Med.*, translated by Bazire, 1866, p. 261). Some details concerning my own case are here given, in which the very gradual restoration of power is strongly suggestive of a slow opening up of new channels of communication between the cortex and the bulb.

W. D., aged 20, a young gentleman, seen by me in September, 1885, in consultation with Dr. W. A. Phillips, of Faversham, was found to be quite unable to articulate a single word, though able to express himself freely and without the slightest hesitation or mistake by writing. He understood everything that was said to him, and promptly answered all questions with the aid of a pencil. He had been in this speechless condition for about nine weeks, when first seen by me.

There was no specific history; no history of a previous blow or fall, or of intemperance. No history of previous neurotic attacks of any kind. The following is the substance of all the facts that could be ascertained concerning the patient's illness previous to the date of my seeing him.

He left England in good health on October, 1884, for a temporary residence in Calcutta, where he arrived on December 14th. He soon commenced some light duties in a merchant's office, and continued well till the beginning of the month of May, 1885. During the first three weeks of that month he suffered from a general eruption of boils. On May 25th, a very hot day, he went to see a military review, and early in the evening did not feel well. It was thought he had been slightly affected by the heat. On that evening he complained of pain in the left side of his chest, and next morning of pain in the back and left side of the head. He had to leave the office about midday, not feeling well, and the same thing occurred on the following day. There was no actual sickness and no fever, but he remained rather unwell, keeping either to his bed or the sofa till June 2nd when he went for a short sea voyage to Madras and back. At this time no weakness of the right limbs was appreciable, and a few days after being at sea he lost the pain in his head.

He returned to Calcutta on June 21st, 1885, and whilst at dinner on that day quite suddenly became very excited and boisterous, and had a convulsive attack of some kind (no details as to nature could be ascertained). The next day he was received into a private room at the General Hospital, and from some notes which have been handed to me, made by Dr. J. Cleghorn, who saw him there, I extract the following, as being the most important particulars.

On admission, temperature 98° F. "When spoken to he answered clearly and sensibly, but when left alone he talked and muttered unintelligibly, occasionally breaking out into a laugh." On the two following nights and days he slept well, took his food well, and was quiet, though rather taciturn. On June 25th he became very emotional, "laughing when spoken to, and jerking his body about. He refuses to answer questions, and declines his food. He appears to have a difficulty in swallowing, but refuses to allow his throat to be examined." June 26th. "Temperature 97.2° at 7 A.M.; urine, no albumen. Says his throat feels easier, but he is disinclined to talk, and when spoken to he jerks his body and turns his face away." On this day he was removed from the hospital to a friend's house. "After this he appeared to improve for a time, and conversed very freely with me, but at times was sullen and morose. The jerkings of the muscles continued, especially those of the shoulders and face when he was annoyed. *One day he suddenly lost the power of speech*, but his intelligence was unaffected, and he was able to write sensibly and express his wants in writing. He was very irritable and jerky in his movements. He made frequent attempts to articulate before me and others, but failed. He, however, wrote me that on one or two occasions when in his bath-room he did manage to utter a few sounds.... ..... The disease was supposed to be a form of chorea, and he was treated with arsenic."

This patient (as before stated) was first brought to me on September 4th, 1885, and he had been speechless since the end of June. He was perfectly intelligent, understood readily all questions that were put to him, and wrote his answers freely and without any hesitation or mistake. He could move his tongue and lips in all directions, but could not utter a sound. The tongue came out straight. During the previous ten days (since his return to this country) he had suffered a good deal from pains in the left parietal and occipital region, and on two occasions had twitchings on the left side of the face. When seen, on tapping the head over the left posterior parietal region, there seemed to be tenderness there, and the tapping gave rise, curiously enough, to twitching of the left side of the face and distinct drawing up of the left angle of the mouth. Otherwise there was no lack of symmetry or mobility about the face. The pupils were equal, of medium size, and sensitive to light. The optic discs presented nothing distinctly unnatural. He heard the ticking of a watch at 8″ on the left and at 14″ on the right side. There was some paresis of both upper extremities, though this was most marked on the right side; his grip, as measured by the dynamometer, being right 35, and left 47 pounds. Some distinct tremors of the right arm were noticed while the instrument was being pressed with the left hand. The knee-jerk on the right side was distinctly exaggerated, both actually and as compared with that of the left side. There was no lack of sensibility on either side of the face, trunk, or limbs. Pulse 100, regular; no cardiac *bruit*.

September 9th. A small blister to the nucha having been ordered for the relief of the pains in the head, just after its removal, on September 7th, the patient had a convulsive attack. He became rigid, made a guttural sound, had some slight convulsions of limbs, and remained unconscious 5″ to 10″. Pulse to-day 104, regular. Tongue protruded straight, but covered with white fur on the right side, tremulous.

September 14th. Pain in head now gone; no tenderness on left side; bears tapping there without flinching, and without causing contractions of face. Grip, right 38, left 45 pounds. Right knee-jerk still exaggerated.

The patient after this date went to his home in the country for six weeks, where he took six grains of iodide of potassium with three minims of liquor arsenicalis three times a day, and also a draught containing twenty grains of bromide of potassium every night.

November 26th. During the first three weeks after his return the patient had seven fits, but none since that period. The total duration of each fit with subsequent stupor was said to be 30″ to 90″. As far as I could learn, the attacks were bilateral, associated with rigidity of limbs, or rigidity and tremors, rather than with actual convulsions, though sometimes these supervened towards the close. No headache now; this disappeared soon after return. No twitchings of face. Pupils equal, rather sluggish to light. No deviation of tongue or lack of symmetry about face. No tenderness to percussion anywhere over head. Knee-jerks now equal, no exaggeration on right. Can walk ten miles without fatigue. Grip much improved, but still weaker on right; right 70, left 93 pounds. Now hears ticking of watch at 14″ on each side. Optic discs healthy. Pulse 84, regular. There was no improvement, however, in regard to speech; I tried in vain to make him utter simple sounds, even after faradisation of muscles of throat and assuring him that he would then probably be able to speak. He said that a few days previously he had, when alone, been able to repeat simple vowel sounds to himself; and in reply to some of my questions he wrote this statement: "I felt almost able to speak the other day. I was reading a book to myself, and the words 'Great Scot' came out aloud. I don't know the reason."

December 2nd. Says that yesterday he repeated to himself the whole of the vowel sounds, and also about twenty monosyllabic words of three letters.

December 4th. Had a fit on the 2nd whilst at the dentist's, just as he was beginning to inhale laughing gas. I tried to induce him to read to me from a child's primer. He sat gazing at the book for several minutes, some tremors and slight twitchings of the facial muscles occurring while the efforts were being made. At last he uttered two or three monosyllables in an explosive fashion, at first very indistinctly in a sort of loud whisper, but afterwards others more plainly and at short intervals, not in quick succession. Thus, he uttered "cup," "boy," "hat," "hog," and afterwards read more currently these words: "Let us go to the cow."

December 8th. In the interval he has been practising reading aloud, mostly when alone.[1] I now made him try again to read to me, and made this note: "He sits gazing at the book, with his hand between me and the upper part of his face; but I can see his mouth plainly. His lips move, his breathing is irregular, and he seems to be making efforts to pronounce the words he sees; but no sound comes till the expiration of 4¾″, when he said two words in a quick explosive manner, followed at intervals of about a quarter of a minute by two or three words more, and so on through a page of Bell and Sons' "School Primer" composed of short monosyllabic words. Afterwards he tried to read another page more continuously. This was done rather better, but was accompanied by much working of facial muscles and apparent effort. His voice was cracked and squeaking in character.

[1] About this time, when he told me he had been repeating the vowel sounds to himself, I said he should repeat them to some one else, and he at once wrote: "That is the difficulty. It seems so stupid. I can do it when I am alone, but not to anyone."

December 10th. Reports that he has read aloud to himself six pages of the "School Primer" since he last saw me. When told to read aloud, he began after an interval of 3", and read two pages in a low voice, but more quickly than on the last occasion. Right 65; left 70. Stands equally well on either foot, but says the right leg was a little weak after the last fit; also the right arm for one or two days. The fits seem to be sometimes preceded by a feeling of numbness in the right arm and leg.

December 15th. Previously I had never been able to get him to repeat any words after me, nor to utter any words except what he read in the book as above described; but this morning he repeated after me the following phrases: "Good morning;" "It is a foggy day;" "If I go on like this, I shall soon go home." Each of these phrases was uttered after a moment or two of delay, with facial quiverings, and then sudden commencement after the fashion of a stutterer.

December 30th. He has not spoken to anyone at home, but he reads better and with less delay. Has been reading to his sister and to his mother. Read more distinctly to me also.

January 15th, 1886. Hesitates and makes abortive stuttering efforts for 3" before he can say "Good morning," and finally utters it very imperfectly. When set to read from the "School Primer," he began after 1" to read in a very weak, cracky voice. He read a page in an indistinct and very hesitating manner. Says he reads to himself daily, and speaks to himself when he is alone. When told to utter his own name, "William," he only pronounces it, after several abortive trials, in a very indistinct manner. Has no pain; sleeps well; appetite good. Grip, right 77, left 77 lbs.

February 15th. He went on fairly well till February 4th, though for some days previously, his sister informed me, he had not "seemed quite himself"—in fact, from the date when his father (thinking he was so much better) gave him, in accordance with his own wishes, some work to do in the form of accounts and writing in connection with his country estate. About 7.15 P.M. on February 4th he was found by his sister in a room alone and unconscious, in an arm-chair. He had not been in this room more than about fifteen minutes when he was thus found. He remained unconscious rather over an hour, having from time to time tremors over the whole of the body, the right leg being extended, stiff, and with the toes turned inwards. The right arm was also stiff, but in a flexed condition. His face was dusky. Five days afterwards he had another slight attack, a "sort of fainting fit." When over-tired since, some twitchings have been noticed in the right limbs. He has had no practice in reading or speaking since the fit, and has been more listless in manner. Previously he had been making some progress. In writing he told me that, after commencing the work for his father, he began to have pains in the left side of his head again, though these pains were not worse on the day of the fit, nor had he been over-fatigued on that day. He also said he had not been sleeping well for two or three nights before the fit, having a few days previously left off a bromide draught which he had hitherto been taking every night. I found, on examination, no tenderness of the head to percussion. Pupils equal, though the left was rather more sluggish than the right. Optic discs healthy. Right 68; left 80. He read decidedly worse than he had done previously, and with a very uncertain, either whispering or extremely cracked, voice.

A few days after this he was seen for the second time in consultation with me by an eminent physician, who took the view (as he had done before) that there was some "humbug" about the case, at all events, that it was not one of genuine disability. This opinion I did not share, though we both were so far agreed that we thought the patient would ultimately recover his power of speaking. We counselled that there should be, as before, continual practice in reading and speaking, and further advised that he should have daily lessons in reading by some master who would see that there was an adequate amount of practice, as well as of effort to speak more loudly, and with a clearer voice.

Subsequently I learned that the patient was taken on three occasions to the head-master of a "deaf and dumb institution," but that he could do nothing with him, and recognised that it was an altogether unusual kind of defect. I did not see him again till October 9th, when he was brought to me by his mother. I learned that from early in June to the middle of August he went away alone to a village in Derbyshire, and lived at an inn there. One of his sisters then went to stay with him, and found him somewhat better. He has been at home for three weeks, and during this time has been communicating with his mother orally, not having occasion to resort to writing once. He has also been reading aloud daily.

On examination, I entered the following particulars in my case-book:—He complains of no pains in his head, and has no local tenderness. Appetite good; sleeps well. Pulse 88, regular; pupils equal and fairly sensitive; face quite symmetrical; tongue protruded straight; grip, right 90, left 117. Knee-jerks slight, equal; no ankle clonus on either side. He reads aloud much better than he did; begins without delay, but reads with a weak, rather cracky voice, and with much apparent effort and facial contortion, a page from Humphry's essay on "*Old Age*," the monosyllables of the school primer being discarded. He speaks, too, in reply to questions, though much more slowly and indistinctly than he should do. His voice is husky; he articulates with much effort and facial contortion, and after an explosive fashion, somewhat like that of a bad stutterer. He was directed to practice reading several times daily, uttering each word as distinctly as possible, and also to resume doing some work for his father in connection with his farm.

After this I heard nothing till February 28th, 1887, when I received a letter from Dr. Phillips, of Faversham, in which he says in reference to our patient, "he has now quite recovered his lost faculty, and is occupied in business in London. This result was not in any way sudden, but came about slowly, and by continued effort and tuition." In short, he went on slowly but steadily improving from the time I saw him last, till he was sufficiently well to enter his father's office in London.

An exact pathological diagnosis in this case is very difficult to make, though I feel fully convinced that there was a definite lesion of some kind, and that there was not the least ground for supposing that the disability was not a genuine one. As to the question of the locality of the essential part of the lesion, the following remarks may throw some light.

This form of speech defect is, I believe, capable of being produced by damage to efferent internuncial fibres in any part of their course from the left glosso-kinæsthetic centre to the articulatory centres in the bulb. The mental condition in these cases is as clear and unaltered, and the power of writing just as perfectly preserved, as it may be in cases of bulbar disease, in which the motor articulatory centres are the seat of lesion, and where indistinct speech, or loss of all intelligible speech, results without mental impairment or any necessary interference with the power of writing.

Aphemia is clearly not a sensory defect—it is not a form of amnesia—because the subjects of it can revive words in all possible modes, and are, therefore, able to think and express their thoughts with an unimpaired freedom by writing. If the aphemia be in any way incomplete, moreover, such a case can be easily discriminated from a case of aphasia by the fact that the aphemic patient will always at once make an attempt, when bidden, to pronounce some simple word or syllable (however poor the attempt may be), while the typical aphasic patient is unable to make any such attempt—he will not try even to repeat the simplest vowel sound.

The reason of this important distinction seems to me to lie entirely in the situation of the lesion in the two cases. In aphasia, one of the most important word centres for the expression of thought is affected; whilst in aphemia, as I understand it, all the centres in which the memory of words can be revived are intact, the damage occurs beyond these, and there is consequently nothing to interfere with the flow of thought and, in incomplete cases, nothing whatever to prevent attempts at articulation being made, just as similar attempts can always be made by patients suffering from disease which involves the bulbar articulatory centres. These two classes of cases are, indeed, less separable clinically than they are from a theoretical or scientific point of view. Formerly I have been in the habit of using the term "aphemia" as applicable to both classes, understanding that aphemic defects of speech may, in either case, be partial or complete.

I now think, however, that it would be better to limit the term aphemia to that class in which the speech defects are caused by lesions in the course of the internuncial fibres; and to reserve the term anarthria for those defects of speech caused by morbid states of the bulbar articulatory nuclei, with the full understanding, however, that these two classes of speech defect will often be indistinguishable from one another by their own intrinsic characters, though the causal conditions are generally quite capable of being diagnosed from one another by taking into consideration the mode of onset, and the particular grouping of other collateral signs.

I have tried of late to test the correctness of the above-mentioned view as to the form of speech defect that results from lesions in the course of the internuncial fibres, by examining the records of many cases with *post-mortem* examinations, which have been published during the last twenty years. Several of such cases are referred to by Boyer (*Etudes Cliniques sur les Lésions Corticales*, 1879), and others have more recently been cited by Dr. Ross (*On Aphasia*, 1887, pp.

59 and 60), but not one of these cases, unfortunately, is capable of affording any conclusive evidence on the point now in question. Some of them are doubtful cases, where there was more than one lesion; others are cases in which the lesion was too extensive to be at all conclusive; and others again are cases in which no adequate clinical details are given to enable us to say whether the defect of speech from which the patient suffered was aphasic or aphemic in character. This is a point, therefore, to which I hope future workers will direct special attention, both clinically and in *post-mortem* examinations, in order that we may know for certain whether with Broca's region thoroughly intact, but with a lesion in the left centrum ovale or internal capsule (cutting across or otherwise damaging the fibres between this centre and the motor centres of the bulb), the speech defect is of the kind which I name aphemia, that is with mental power intact, so that if the hand be not paralysed, thoughts can be expressed freely, by writing, and if speech be not entirely lost, of such a kind that the patient will, when bidden, make an attempt (however rude) to pronounce any simple word or vowel sound, whilst the true aphasic patient will not, when bidden, attempt to repeat the most simple word, or even one of the words or sounds which he often utters of his own accord as one of his stock expressions.

The fact that double lesions of these internuncial fibres lead to a clinical condition closely resembling that of bulbar paralysis is now well recognised. Several instances of this kind have been recorded by Ross (*Brain*, vol. v, 1882-83, p. 143). More recently referring to these cases, he says (*On Aphasia*, p. 105): "The first which came under our observation was kindly sent by Dr. Leech. The patient presented all the symptoms commonly observed in cases of progressive labio-glosso-laryngeal paralysis, but at the necropsy, conducted by Professor W. H. Young, 'each cerebral hemisphere presented a single well-defined cystic cavity, containing clear straw-coloured fluid, and occupying the position of the lenticular nuclei,' while the medulla oblongata was free from disease. As these cavities, especially the one on the right side, were larger than the normal size of the lenticular nuclei, the fluid doubtless compressed and injured the motor conducting paths of the internal capsules." My contention, however, is that mere pressure upon or destruction of the conducting (internuncial) fibres on the left side alone would produce such a defect of speech, and that the only result of the addition of a similar lesion in the right hemisphere is to make the case absolutely incurable, since no restoration of speech could then possibly be brought about in the manner suggested by Broadbent, that is by conduction of the speech stimuli from the left to the right region of Broca, through callosal fibres, and thence downwards to the bulb.[2] Other points of some interest must now be referred to in regard to this particular kind of speech defect.

First of all the question arises, whether such defects are always functional or of so-called "hysterical" type. My rejection of this notion is clear from what I have already said in regard to its causation.

Secondly, comes the question whether they are not, like almost all other forms of speech defect, occasionally of functional type, and of more or less brief duration. To this view I should assent.

Thirdly, the question arises as to the part of the brain which is at fault in these cases of aphemia which are of functional type, or not caused by "gross" lesions. I maintain that in such cases we cannot imagine the defective function to be that of any set of afferent fibres, nor of the cortex, seeing that lesions neither of the word centres, nor of either of the sets of commissural fibres between them, would suffice for the production of the uncomplicated aphemic group of symptoms.

I raise these latter questions because it seems to me that the powers and disabilities encountered and so well described by Charcot in what he terms "Hysterical Mutism in the Male," agree exactly with the condition which I name complete aphemia.[3] All I would urge, however, is the very strong probability that such a state cannot be caused by functional defects in parts usually implicated in hysteria (that is, either of afferent fibres or cortical centres), and that this particular kind of speechlessness, which I name aphemia, can only be accounted for by a defect either functional or structural in the course of the left internuncial fibres connecting Broca's region with the bulbar motor centres.

No isolated defect of writing corresponding with aphemia as a speech defect seems to exist in a recognisable form. This is due to the fact that a lesion involving the internuncial fibres between the cheiro-kinæsthetic centres and the motor centres in the cervical region of the cord, in any part of their extent, would almost certainly cause paralysis of the hand also for movements other than those concerned with writing. Thus the mere agraphic defect would be merged in and concealed by a wider form of paralysis. The reason why this same kind of result does not occur in the aphemic class of cases is because here, even though the internuncial channels may be blocked in the left hemisphere, by means of which the specially combined movements needed for articulate speech are called into play, the right hemisphere is still capable of calling into action the bilateral bulbar nuclei concerned with other less specialised movements of lips, tongue, and palate; consequently, it is only the articulatory movements of these organs that are paralysed in a case of aphemia. The special paralysis of speech is not merged in a wider defect simply because, for the actuation of movements other than those of speech, the bilateral motor centres of the medulla may still be called into play by the undamaged right hemisphere. If the result is different in the case of writing with the right hand, this is simply due to the fact that here we have to do with unilateral motor centres, and that these unilateral centres in the right cervical region of the cord can only be roused into activity by fibres proceeding from the left cheiro-kinæsthetic centre, and that the internuncial fibres concerned with writing movements are so intimately mixed up in their course from the cortex downwards with the internuncial fibres concerned with other movements of the right arm and hand, that agraphia as an isolated defect cannot be produced—that is, it is almost certain to be associated with paralysis of other less specialised movements, and thus to be unrecognisable as a distinct defect parallel with aphemia.

It seems clear, moreover, that in the remarkable case of agraphia recorded by Pitres (*Rev. de Médecine*, November, 1884, p. 855) there was a defect of the cheiro-kinæsthetic centre itself, and not of the internuncial fibres leading from it; because in the latter event there would not have been the existence of a sign which was met with in this particular case of agraphia—namely, diminution of "muscular sense" in the right hand.

It will be seen that no reference has been made in this communication to the very interesting defects of speech and writing in which wrong words rather than no words are used—that is, to cases which are now commonly spoken of under the head of paraphasia and paragraphia respectively. This omission has not been because I in the least underrate the great interest attaching to this kind of defect in intellectual expression, but because I hesitate to trespass longer upon the time of the meeting, and feel that many distinct issues have already been raised which will afford abundant scope for discussion, and issues, too, of a kind which are more fundamental and less purely theoretical than any pertaining to those divisions of the subject concerning which I have been silent.

[2] The conclusions which Dr. Ross deduces from such cases, in favour of the view that Broca's region is a real motor centre (*loc. cit.*, pp. 106 and 107) are to my mind altogether invalid. He does not distinguish (p. 107) between the different effects which would result from destruction of muscular sense centres, and those that would result from mere severance, in some part of their course, of the afferent paths for muscular sense impressions. I would ask him whether the reasoning which he employs would not also lead him to conclude that the auditory word centre is a true motor centre, seeing that a cutting across of the fibres between it and Broca's region also produces aphasia, as I have previously shown.

[3] See *Med. Press and Circ.*, June 22nd and July 6th, 1887, for a lecture on "Hysterical Mutism in the Male," by Professor Charcot.

THE TREATMENT OF PULMONARY CONSUMPTION AT HIGH ALTITUDES.

By A. TUCKER WISE, M.D., Maloja.

As the results of high altitude treatment in the following twenty-three consecutive cases are highly satisfactory, I think a brief extract from my paper read before the Climatological Section of the International Medical Congress at Washington will prove interesting.

Putting aside all observations by instruments of precision, there is one unique feature of Swiss mountain climate which must be kept in mind, especially with respect to pulmonary troubles, namely, the possibility of respiring cold, dry air, without the sensation of feeling chilled and pinched by the low temperature. Various explanations have been given for this; the main reason, however, for the immunity from the sensation of cold is the small amount of watery vapour suspended in the air. Whether the dread of a low temperature exists in the minds of Americans to the same extent as amongst many English in Europe I am unable to say; this fancy, nevertheless, drives hundreds to the shores of the Riviera, who would obtain more amusement and do much better, as regards permanent benefit to their health, in the sunshine of the Alps.

The outdoor amusements, which enter really into a part of the