

structure, although this, of course, is the final determining cause.

In the same way the common reaction of tissues, which I have so far ascribed to their possessing some substance in common, may arise from community of physical relationship, and I wish to avoid the implication borne by the word "substance," which I have used in the widest sense, such as is justified perhaps only by its historical employment in theological or philosophical controversy. The reaction of living tissue to chemical agents may arise from a specific arrangement in its molecule, but may equally be attributed to the arrangement of the molecules themselves. And the curious relationships in the reactions of different tissues may indicate, not any common chemical factor, but a common arrangement of the aggregate molecules. We are far from being able to decide with even a show of probability which of these alternatives is the correct one, and my object to-day has been to draw attention to these relationships rather than to attempt their elucidation. Hitherto the speculative pharmacologist has been much engaged in comparing the chemical relationship of the drugs which he applies to living tissues; much useful knowledge has been incidentally acquired, and the law has been formulated that pharmacological action depends directly on, and can be deduced from chemical structure. This view, first elaborated in this country, has in recent years shared the fate of other English products in being advertised from the housetops and practically claimed as the discovery of more vociferous investigators. On examining the evidence, old and new, one cannot help feeling that attention has been too much directed to those instances which conform to the creed, while the far more numerous cases have been ignored in which this so-called rule fails. The difficulties are very great; for example, what chemical considerations can be adduced to explain why the central nervous tissues react differently to bromide and chloride, while the other tissues these are almost equally indifferent; or how can the known chemical differences between potassium and sodium be brought into relation with the fact that they differ in their effects in almost every form of living tissue?

Less attention has been paid to the other factor in the reaction, the properties of the living tissue which lead one cell to react to a poison, while another fails to do so. I have pointed out some curious relations between different organs, but much needs to be done before any general view can be obtained. Further detailed examination of the exact point at which poisons act, and much greater knowledge of the physical characters of the drugs themselves and of the relation of colloid substances to these characters, are needed. We must attempt to classify living tissues in groups not determined by their morphological or even functional characters, but by their ability to react to chemical agents. Advance is slow, but it is continuous, and if no general attack on the problem is possible as yet, our pickets are at any rate beginning to give us information as to the position of the different groups to be attacked. And when a sufficient number of these qualitative reactions have been ascertained for any form of living matter, it may be possible for some Darwin to build a bridge from the structural chemistry of the protein molecule to the reactions of the living cell. We can only shape the bricks and mix the mortar for him. And my purpose to-day has been to indicate how the study of the effects of drugs on the living tissue may also contribute its mite towards the great end.

CENTENARIANS.—Miss Martha Trenear, of St. Just in Penwith, died on August 13th. She celebrated the hundredth anniversary of her birthday on Feb. 23th last.—Mrs. J. Trueman recently died at Bristol in her 102nd year.

EDINBURGH FACULTY OF MEDICINE: THE ADMISSION OF WOMEN.—At a special meeting of the Edinburgh University Court on August 23th the report of the committee appointed on July 10th to consider the admission of women to the medical faculty came up for discussion. The Court resolved that, except in the cases of (a) materia medica and (b) midwifery and gynecology, women students should be admitted to the lecture courses in every subject. Separate sections should be instituted for women in all practical courses, except in advanced courses and in special cases that may be arranged by the head of any department, subject to the approval of the Senatus. The provision of clinical teaching for women students by the University was reserved for further consideration.

CONTRIBUTIONS TO THE STUDY OF SHELL SHOCK.

BEING AN ACCOUNT OF CERTAIN DISORDERS OF SPEECH, WITH SPECIAL REFERENCE TO THEIR CAUSATION AND THEIR RELATION TO MALINGERING.

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IV.¹

THE principal disturbances of speech which I have observed may be grouped under three heads—aphonia, dysarthria, and mutism. This is the order of frequency in which, from our experience of functional disorders in times of peace, such disturbances of speech might be expected to occur. But in the class of cases with which this war has familiarised us, (for reasons which we shall see later) the order is exactly reversed. Dumbness is by far the commonest disorder of speech, occurring in about 10 per cent. of all cases of shock which have come to my notice; I have met with affections of articulation, e.g., stuttering, or jerky speech, only in about 3 per cent.; while loss of voice, as the result of shock, is of somewhat rarer occurrence.²

Mutism.

Immediate causes.—For the present the immediate causes of mutism may be most conveniently grouped as (A) "physical," the patient having been lifted, buried, or knocked over by a shell, or having otherwise felt the effects (physical or chemical) of its explosion; and (B) "psychical," where, for example, the noise of the shelling has terrified him or a shell has burst near to him, horribly mutilating several of his comrades. Henceforth I shall, for brevity's sake, allude to cases of mutism by the letters A or B, according to their apparent origin. The relative frequency of the A and B cases is difficult to determine. Histories are not always easy to obtain; and some cases may belong to both groups, or apparently to A, though really to B. But my general impression is that the two groups occur with equal frequency.

Predisposing conditions.—In about one-third of the cases of mutism various predisposing affections may be demonstrated, e.g., "nervousness," "fits," stuttering, wounds, or exposure to the enemy's gas. These predisposing affections occur as often in the cases of group A as in those of group B. Mutism is not restricted to any one age. I have met with cases in men of 30, 40, and even 50 years. The average age of the cases of mutism I have seen is about 25 years. Mutism is extremely rare among commissioned officers. I have heard of one or two cases; but among the many officers I have seen I have not met with one so affected.

Immediate effects.—The usual direct result of the shock, as described to me by mute patients, is "loss of consciousness" or "loss of memory." I have seen only three cases in which complete preservation of memory was claimed; two of these were highly "nervous" subjects, of whom one had stammered formerly and the other had been subject to fits in childhood. It was, of course, difficult to decide whether a given patient had suffered from unconsciousness or merely from amnesia when I saw him after he had "come to himself"; but where, on the one hand, his condition appeared to have resulted from physical violence, or where, on the other hand, he had been able to walk down with assistance from the trenches, or had been affected with automatism (fugues), or was still preoccupied with the visual or auditory hallucinations of coming shells, a tolerably reliable decision seemed possible. Both loss of consciousness and loss of memory occur alike in groups A and B; but, as we should expect, unconsciousness appears to be commoner in group A, and amnesia in group B. I have little doubt that the amnesia complained of is almost always due to the onset of a semi-stuporose state, and that most cases of initial loss of consciousness are really the expression of, or, at all events subsequently pass into, a condition of confusion or stupor.

¹ The previous communications on this subject appeared in THE LANCET of Feb. 13th, 1915 (p. 616), and Jan. 8th (p. 65) and March 13th, 1916 (p. 608).

² This certainly held good for, say, the first thousand cases of shell shock which I saw. But of late relatively more cases of aphonia have come to my notice.

Stupor.—Indeed, a definite history of stupor is obtainable in a very large number of mute patients. Others were still in that condition at the time of my examination of them, staring vacantly into space and taking no notice of their surroundings. Stupor is apparently commoner in the B than in the A cases, but it does not seem specially prone to occur among those predisposed to shock. Of the varieties of stupor a detailed description may be deferred until I come to deal with this condition at some later date. But I may note that in this communication I have not classed a man as mute until his stuporose state has so far passed off that he is clearly capable of observing and reacting to his environment; being able to write or at least to gesticulate.

Onset of mutism.—As regards the speed and mode of the onset of mutism my records are unsatisfactory, no reliable information being usually obtainable on these points from the patients or from the medical officers of regiments or field ambulances. Most of the patients claim to have found themselves mute on "coming to." That is to say, their functional condition is "of unconscious origin"; whereas in the cases of mutism in which no loss of memory occurs it is probably often "of conscious origin."

The following is a typical history given in writing, but otherwise unsupported, by an A case. "A shell burst about two yards away; it lifted me up in the air. I don't know what happened afterwards. [When I came to myself] I was watching the trench mortars coming over and killing my mates, and I could not tell them [what was the matter], because I couldn't speak."

The following is an equally typical history of a B case, obtained from the patient's regimental medical officer. "It appears that he was in the trenches at —, where he was subjected to heavy shelling one day. Several burst near him, one blowing in the dug-out and wounding several men. They were relieved two nights or so later and went into billets at —. Whilst in a courtyard outside his billet a shell exploded in the yard and wounded several men, but he was not blown up in any way. He then cleared out to the billet of the other company. Here he was quite dazed, would answer no questions, and if any one came near him he would either jump at them or draw away."

In only a few cases was the onset late or gradual (see, for example, Cases 17 and 18, described below).

I have had opportunities of seeing cases of mutism at field ambulances and clearing stations—that is, within a very short time after the occurrence of the shock. They differ usually from those which I have seen (in greater numbers) at the base hospitals (a) in being more completely mute, (b) in being more intensely pre-occupied and more intolerant of suggestion. For example, one man, admitted as deaf-mute into a field ambulance, could be induced, when hypnotised, to react to my spoken order (viz., to put out his tongue), but thereupon he awoke and seemed as deaf and as "stupid" as before. Another mute, seen at a clearing station, could be made by post-hypnotic suggestion to pronounce his regimental number, but was found an hour later to be as completely mute, dazed, and dismal as on admission. A third mute was so preoccupied with thoughts and hallucinations of the shelling that it was quite impossible to obtain his attention for more than a few seconds continuously.

Degrees of mutism.—As I have just said, many of the men, seen soon after onset, were absolutely dumb. Most of those, however, whom I saw later, could be speedily induced to whisper consonantal sounds and sometimes vowels, while a few had so far progressed as to be able, with encouragement, to repeat in a whisper single monosyllabic words or even to reply (almost always monosyllabically) to questions. On the other hand, certain cases, including a few which I believe to have been partially malingering, stolidly maintained an absolute mutism when evacuated to England. I have not seen a case in which meaningless jargon was uttered. With very few exceptions mutes could be induced to cough. Whistling or forcible expiration was often impossible.

Deafness.—A considerable number of mutes give a history of initial deafness. Deafness is as common in the A as in the B group. In many cases it is clearly due to inattention, being part of the vacant, semi-stuporose, or pre-occupied condition of the patient. Such men can occasionally be made to hear, but fail to appreciate what is said to them.

In others, especially in the A cases, the deafness appears due to diminished sensory acuity; and in these there may have been recent aural discharge. Certain deaf-mutes, nearly all of them B cases, can be made to give an involuntary start on first hearing an unexpected noise, but not again; or they can be induced to carry out the first order addressed to them (e.g., to put out the tongue), but no subsequent order. This condition is generally associated with one of stolid stupidity, and with complete mutism. Deaf-mutes usually recover their hearing before their speech.

Other concomitants of mutism.—Stupor (with the defects which may be considered as part of this condition), amnesia, and deafness are by far the commonest concomitants of mutism. Besides these the following affections may be mentioned, in their order of frequency: muscular tremor, contracted visual fields, unsteady or incoordinated movements, defective cutaneous sensibility. I have not seen a case of functional hemiplegia or of hyperæsthesia associated with mutism. I have seen several showing choreiform, spasmodic, or "jumpy" movements at an early stage, in some of which, I believe, mutism developed from a previous stage of dysarthria. A very few cases give a history of vomiting. The pulse, when altered, is usually quickened and weakened. The patellar reflex is often exaggerated; it may be normal, but I have not seen a case of mutism in which it is sluggish. I have not examined the palatal reflex in many cases, but I have not yet found it absent in mute patients. The superficial reflexes of the abdomen and sole are often difficult or impossible to obtain. In a few of the severe cases fugues or hysterical fits occur at the outset; in other severe cases voluntary movement is slow, and handwriting is accomplished with difficulty; but, as a rule, writing is easy, and the mute patient is eager to describe on paper his experiences—as far as he can recollect them—ending typically with the expression of a wish that he may soon regain his speech.

Experiences of mutes when trying to speak.—In fully 25 per cent. of the cases reference is made by the patient to discomfort or pain in the throat, the complaint being that "with each attempt something grips me at the sides of the neck," that "my throat is sore," "tickles" or "pains"; a few refer to inability to move the tongue freely (although they can nearly always protrude it), "something holding my tongue at the back," "my tongue seems to stick," "it curls up at the tip," &c. Now and again this had occurred during the mental strain just preceding the final breakdown.

Some patients make the most violent grimaces on attempting to imitate the sounds of consonants. Not infrequently they complain of headache, "drumming in the head," or "dizziness" when they try to talk. One of my cases remarked, "I seem silly when I try to talk"; since wounded previously, he had been subject to hysterical fits. I have not met with any instances of paralysis of the parts concerned in articulation, although their movements may be restricted or clumsily executed.

Recovery from mutism.—In over 75 per cent. of the mute patients I have seen their improvement was rapid, the B cases (especially those whom I knew to have passed through a stage of stupor and to be free from any suspicion of malingering, whose mutism was of "unconscious origin") recovering much more rapidly than the A cases. The majority were cured by simple encouragement, persuasion, and suggestion, aided or unaided by hypnosis; some were cured by an anæsthetic, a few recovered their speech spontaneously, and a few did so after being harshly reprimanded and isolated from other patients. One patient began to speak spontaneously six hours after the administration of chloroform had failed to effect a cure. A small proportion (about 24 per cent.) of the cases were unavoidably sent mute to England, where no doubt they have all since recovered.

When speech returns after mutism it is often laboured or hesitating, more rarely whispered or stuttering, but these defects almost always disappear rapidly. Sometimes the voice is temporarily altered in character, one patient, for example, not recognising it as his own for a few days.

Those who recover spontaneously do so either on waking from sleep or through some unusually powerful or sudden motive for verbal expression. Such cases have often been previously heard to talk in their sleep.

In curing mutism by persuasion I have found the following to be a successful procedure. In the first place, I assure

the patient that I have already cured many cases of loss of speech by the method I am about to adopt in his case. Next, I ask him each time to copy me as I successively make the sounds (not the accompanying vowels) of B, D, and finally of V, S, K. In by far the majority of my cases I have soon been able to induce the patient to make the necessary movements of the lips, tongue, or throat for the production of these sounds. Then I encourage the patient thus: "You see you are beginning to talk. Now let me hear you cough." After he has done so I say, "You see, you are able to make a noise. I want you next to cough out an A [continental pronunciation.]" After a few trials the patient is usually able to add this vowel to the end of his cough, whereupon I proceed to teach him other vowels, finally prefixing a consonant instead of a cough to the vowel, and making him vocalise Ba, Di, So, &c. By this time he is delighted with, and assured of, his progress towards recovery, and it is comparatively easy to get him to combine monosyllables together so that he can repeat after me his surname and regimental number.

The employment of an anæsthetic was first suggested to me by Captain E. T. C. Milligan, R.A.M.C., who had successfully used it at a clearing station. Recovery should be expected during the stage of excitement preceding true anæsthesia. I remember one patient who began to speak after he had had only two or three "whiffs" of chloroform. I have already mentioned another in which recovery occurred some hours after the administration of the anæsthetic. These cases are instances in which the excitement occasioned by the procedure proved in itself an adequate stimulus. On the other hand, I have anæsthetised some mute patients who have passed into a condition of deep anæsthesia without becoming excited, and did not subsequently regain their speech despite strong verbal suggestion, face-slapping, skin-pinching, &c., applied before the complete loss and during the recovery of consciousness. I have also met with cases in which, although speech returned with the aid of suggestion during the stage of excitement, a relapse to mutism occurred when the effects of the anæsthetic had passed away.

Where simple suggestion and encouragement are only imperfectly successful, a complete cure may often be made by recourse to hypnosis. The following cases may be cited as examples.

CASE 17 (Case-number 575).—Sergeant, (actually) aged 18, with 19 months' service, and 11 months' service in France, seen by me on admission to a clearing station to which he had been transferred after three days' stay in another clearing station. The latter clearing station was situated in the town of B— near the front, and the officer in charge transferred the patient with the following particulars: "On the day of admission he was found in the streets of B— asking his way to the fire trench. Could not be got to speak on admission, nor since; seems deaf, but now writes rationally."

On admission to the second clearing station he was at first quite mute and very deaf, but his deafness at once improved on my talking encouragingly to him, and I could soon induce him to cough and to utter the sounds of P, B, F, S, and gradually to whisper, very imperfectly, his name, regimental number, &c. He could write fluently, and wrote that he had no recollection of what had happened to him after being buried, until he found himself at the cross roads in B— asking the way of a military policeman. Then he "lost" himself again and remembered no more until he had been 48 hours in the clearing station at B—.

He complained that when he tried to speak, his throat hurt as if it were pulled down, and that when he tried to recall the past his head ached. He was very tremulous, especially in the right arm.

He was then taken into a quieter adjoining room, where his tremors at once increased and he became greatly agitated. But I was able to allay his very obvious fears by suggestions of a cure and by encouragement, and ultimately I induced a mildly hypnotic state in which for the first time he began to speak aloud, at the outset with hesitation, but later fluently. He claimed to have no memory of what had happened after being buried (on the night before his arrival at B—) when he was alone in the dark with his telephone wires. Then after persuasion he began to remember that when he had extricated himself he ran, as he thought, towards the fire trench, but taking the wrong direction he found no one in it. Giddy, terrified, and in pain (he had been buried by 3 feet of earth), he found his way to a road, by which time he was scarcely able to walk. He remembered that he met a Frenchman, who helped him to his cottage, gave him eggs and bread, and allowed him to sleep on a couch, putting him on a cart at dawn and driving him "a

long way" to the outskirts of B—. At B— he could hardly see owing to extreme "giddiness," when he spoke to the policeman. He said that he was "terribly shaken" by the shell (a "coal-box"), and still more so when he found the fire trench empty.

I gave him suggestions that on waking his headache (already dissipated by suggestion during hypnosis) would not recur, and that on returning to the ward from which he had been brought he would shake hands with the orderly and tell him how glad he was to be well again (which he did without knowing why). On waking he was delighted at his recovery and talked in a good loud voice, perhaps at first a little hesitatingly. His face, previously clay-coloured, assumed its normal aspect, and he looked, as the orderly well said, "another man."

He had a good night's sleep and was evacuated the next day to a base hospital and thence to a hospital in England, from which he wrote 16 days later, of his own accord, to thank me for the successful treatment he had received, adding that save for a shakiness of his hands he was nearly well, and hoped soon to be fit for light duty. Six weeks afterwards, in reply to my inquiries, he wrote me that he was still "dizzy" and unsteady, that he had never previously met with men who had lost their speech, had never been afraid of losing his speech, had never stammered as a child, and had "always been possessed of good nerves." He could now recall nothing after being driven into B— (save giving his address to a chaplain) until he found himself at the second clearing station. He remembered, however, losing his way in the front lines, wandering into a listening sap, where he found himself "in front of the Huns' barbed wire," and "having a bit of a tussle with three Huns at close quarters," on his way back from which he was buried during heavy shelling.

CASE 18 (Case-number 422).—Private, aged 21, with 14 months' service and seven months' service in France, seen by me the day after admission to a base hospital suffering from mutism of over six weeks' standing. His regiment had been heavily shelled when in support during an important attack. He did not go into the fighting line, but the severe shelling upset him. "My nerves got the better of me, I cried, and my speech got worse and worse." He was taken down to the first-aid post, where and at the field ambulance he could speak a little, but after that he rapidly became quite mute. He had since spent five weeks at a convalescent camp, where, despite motor drives, frights, and promises, he made no progress. He worked well at the camp and was then sent to work at the base, whence he was transferred to a base hospital.

He was in an extremely nervous state when I saw him, breathing very rapidly, but with a not very rapid pulse-rate (of 90). He could be induced to cough, and soon imitated vowels and the noise of consonants, but could not successfully combine vowel and consonantal sounds. He showed no defects of sensibility; visual fields normal. Pupils large, reacting poorly to light. No nystagmus. Conjunctival reflex feeble; corneal and palatal reflexes normal. Knee-jerks brisk. Other reflexes not examined.

Two days later he had improved considerably. He told me that he always used to stutter when excited, and was always nervous, so much so that his mother had induced him to give up his sergeant's stripes as he was not expected to be fit for a responsible position under fire.

The next day, under hypnosis, he was able to talk far better. He told me more about his experiences, of which he had before been very "hazy," and could be made to repeat "Peter Piper picked a peck of pickled peppers" with fair speed and accuracy. His voice, however, had a peculiar droning, monotonous character.

He was sent to England, and a month later was discharged from hospital there. Two months after this he wrote me: "My speech has improved greatly, and it is only when anyone in authority speaks to me I seem to lose control of myself and start and stammer, but I hope soon to be able to conquer both my nerves and my speech. It is very dreary here (in a depot), but I hope to progress better when I get back to my unit."

By written suggestions I have hypnotised a few cases of deaf-mutism, but in only one case have I succeeded in dispelling the deafness during hypnosis. The patient, however, awoke immediately, mute and again deaf. I have had some promising success by employing lip-reading, in suitable cases, which is often learnt with a rapidity clearly indicating the "functional" character of the deafness. But my experience is that until their deafness has disappeared (which occurs in course of time) it is difficult or hopeless to attempt to cure mutism in such patients.

The recovery of speech often causes great excitement in the patient, and may even induce a hysterical crisis, as in the following case:—

CASE 19 (Case-number 153).—Private, aged 28, seen by me on admission to a base hospital, suffering from deaf-mutism.

He wrote: "I was standing and a shell burst and that is all I can remember." He thought it had occurred at R— six days previously, and wrote vaguely about a walk (date unknown) from H— to "Windy Corner," where he was billeted in a dug-out, about a train journey, and about being in another hospital at C—. He was found to be quite deaf and very deficient in sensibility to superficial and deep prick and to light touch, especially on his left arm and on the left side of his face. He complained of severe headache. No limitation of visual fields. Movements normal.

Two days later his condition was unchanged, but he distinctly started when I clapped my hands while he was occupied in writing for me. The next time I clapped there was no response. I wrote down, "Imitate me." I began by making the sounds of consonants, which at length he succeeded in imitating fairly well. Then I uttered the sound A (continental pronunciation), which he reproduced as Ba, and other syllables, separately and in combination, which he repeated correctly. "You hear me a little now," I wrote; "Is this the first time you have spoken?" He wrote in reply, "I hope the Lord I can get my speech." "But you *did* speak to me just now," I urged; "Read this word, say it," I wrote, showing him his written name (of two syllables). I also got him to say his number. His speech was slow and rather stammering, but he still appeared not to realise that he had recovered his speech. I was proceeding to convince him that he could now speak and hear me, when suddenly he stretched out his arms and was seized with convulsions, the limb movements being for the most part clonic, with his back arched, and the eyes at first staring, later upturned. Reaching towards the locker beside his bed, he pulled out a crucifix which he held at arm's length and regarded with an ecstatic gaze. Pulse 85; corneal reflex active throughout. At length, after about three minutes, he became quieter, and, although still very agitated, could be induced to talk. His first words on recovery from the attack were about his wife. Then he told me that he had been "seeing a farm and all the fighting." He thought that a shell must have come in there. He had also "seen the Lord Who saved" him. He could not recollect having seen me before, but the faces of his neighbours in the ward seemed familiar to him. At first he insisted that he was still at the farm, and every now and again he tended to pass into a convulsive state. He complained of intense headache and thirst, and later explained that his excitement was due to his recovery of speech.

On the following day he told me that he had no recollection of my trying to get back his speech, and that he could not recall seeing me before he came to himself. "It was just like a dream when I came to. I was sweating awful. I was seeing the Lord, while I was in the farm by the captain. I dreamed that I had the Cross in my hand to meet Him coming. I saw the trenches and the dug-outs and the wife." He remembered that at the farm where he had been with trench mortars he had gone to see his captain, whose arm had just been blown off. He found him lying on the straw unconscious. He came to himself, he said, on a stretcher at a dressing station. Under hypnosis I was able to get little additional information. From the farm he appeared to have gone to a dug-out. He believed that at the clearing-station he was "raving, seeing things, shells, trenches, and things like that, Sir." He had a vague recollection of the train journey to the base, and his admission to the hospital here.

He was evacuated to England, where he made a slow recovery. He returned to the front seven months later.

Conditions determining recovery from mutism.—The youngest patients appeared to regain their speech rather less rapidly than the oldest. The B cases recovered more readily than the A cases; the predisposed rather more readily than those not predisposed; the stuporose cases more readily than those in which stupor had not been observed, in certain of which some degree of malingering doubtless played a part.

The methods of treating mutism which I have described may be broadly described as "psycho-therapeutic." For a successful issue they should be employed neither too soon nor too late after the onset of the condition. The obstinate cases of which one receives accounts from England are no doubt partly due to the ineffectiveness, or lack, of earlier treatment, which has thus allowed the processes of inhibition at work to become systematised into a habit difficult to cure. I have already pointed out the difficulties of dispelling mutism by suggestion too soon after the shock. The same holds for the tactless administration of an anaesthetic. I remember a case of shell-shock admitted immediately after onset into a casualty clearing station in a maniacal condition. Two days later he had become quite quiet and had written an intelligent history of his condition, but was mute. An anaesthetic was given, and he spoke while under its influence, but not subsequently. Two days after this an

anaesthetic was again given. As before, when "going under," he swore and shouted loudly about British pluck and the Germans. But on discontinuing the anaesthetic he passed into a deep sleep, from which it was impossible to rouse him. A few more whiffs of the anaesthetic were then given, and the words "German shells" were uttered in his ear. He was immediately seized with the most violent convulsions, which rapidly passed into powerful efforts to get out of bed and to fight the imaginary Germans. Five men could hardly restrain him. Ultimately he sank back exhausted, assuming his previous condition of almost complete mutism.

After-history of mute cases.—Of 12 cases of which I obtained some after-history, only one appeared to be doing well with his regiment at the front; two others whom I returned apparently fit to duty reported sick repeatedly with trivial ailments, until at length they succeeded in coming into hospital again. Of the nine who were transferred to hospital in England (only two of whom were mute on leaving France), two were readmitted to hospital after previous discharge to duty, one collapsing while on guard in England, nine months after the onset of mutism, the other developing dizziness and fits; three were still unfit for duty after four months; two, though on light duty after three months, and two, though on duty after seven months' treatment, had not completely recovered from shock. Several of the patients protested to me that they had "received no treatment" in England—a complaint condemning the policy of mere rest or *laissez aller* to the exclusion of more active and continuous persuasive or disciplinary measures.

Causation of mutism.—The first question of importance is whether there are two forms of mutism—the one due to the effects of actual concussion or gas fumes, the patient having been lifted, buried, knocked over, or otherwise immediately exposed to the explosion of a shell, and the other due to horror from some shocking sight or to terror from the heavy bombardment. There cannot be the slightest hesitation in giving a definite answer to this question.

There is no reason whatever to suppose that whereas mutism in the B cases is due to functional inhibition arising from mental shock in the A cases it is immediately due to minute hemorrhages or to gas poisoning.

The A and the B cases present precisely the same features of mutism, just as when dealing with disorders of cutaneous sensibility we found they presented similar features of hyperaesthesia and anaesthesia. As would be expected, mutism in the A cases (where the shock must have been grosser and more profound) generally proves more severe than in the B cases, and, as we have just seen, the less resistant subjects—e.g., the predisposed patients—are more prone to mutism and more readily recover from it. We may conclude, then, that whether mutism occurs as the *apparent* result of physical, chemical, or of mental causes—i.e., as an A or a B case—it is *actually* always the result of mental—i.e., psycho-physiological—shock.

The next question concerns the relation of mutism to stupor. I am unable to produce evidence that those mutes who have at once been rendered unconscious, through fainting or through being buried or lifted by a shell, pass into a state of stupor before recovering. But I believe that this was the case in at least the large majority of my patients. Indeed, I have only the patients' account that they "lost consciousness." Extremely few cases have come down to me with an official note of true unconsciousness. There is hence a strong presumption that most, if not all, of the cases of alleged prolonged unconsciousness were really due to deep stupor. I have thus come to regard mutism as in nearly every instance closely dependent on some form of stupor, mild or severe, momentary or lasting, and as being generally a relic of that condition after it has passed off.

Where, in cases of mutism, loss of consciousness has occurred through the patient being lifted or buried, it is, in my opinion, sooner or later an expression of the most profound stupor, in which all cerebral activity is inhibited save those processes that are essential for the continuance of life. From this stage there is a transition to one of ordinary stupor where, although the patient's intelligence is clearly active, he is still absolutely unresponsive to the external world. The inhibitory processes, producing such excommunication, may be regarded as protecting the individual against further shock. (So, too, the pain or discomfort in the throat or tongue, or the severe headache, evoked by the mute's efforts to speak, tends to preserve the condition

of mutism.) As the stupor passes away, what is more natural than that inhibition should disappear last in the case of hearing and speech, the two main channels of intercourse with others? Thus we may account for the surprising frequency of mutism, compared with the other disorders of speech. With few exceptions, mutism is a functional disorder of "unconscious origin," whereas aphonia is commonly, and dysarthria occasionally, a functional disorder of "conscious origin."

I have not found any evidence pointing to the necessary dependence of mutism on suggestion. Various *a priori* views are possible. We may argue, in the manner of Babinski, that whatever can be cured by suggestion must have been produced by suggestion. We may suppose that a patient, afflicted with mutism, had previously heard of the likely onset of mutism after shock, or that he had already had some disorder of speech (e.g., stammering) in his forgotten youth, or that, on recovery after being knocked down by a shell, he had spoken to a comrade, when, amid the din of bombardment, he could not hear himself talk nor hear what was said to him by others; hence through suggestion, conscious or unconscious, from within or without—through "auto-" or "hetero-" suggestion,—the onset of mutism.

But stupor, to which, as I have urged, mutism is, as a rule, closely related, is the very antithesis of a state of suggestibility; it is a condition of extreme "auto-fixity" in which the patient is totally impervious to impressions from without. His field of consciousness has been narrowed by the shock in such a manner that, instead of responding easily to suggestion, as happens when a person's attention has been fixed and his field of consciousness narrowed during the process of hypnosis, he is absolutely cut off from the external world, as happens in the state of fixed attention and narrowed field of consciousness induced through religious ecstasy. In bringing about the latter condition it is perfectly obvious that suggestion plays no part. So, too, it plays no part in producing mutism or stupor where the patient has undergone a severe mental shock, but has never suggested to himself that he shall lose all contact with, and yield no response to, his environment.

The tendency already described of early cases of mutism to revert to a stuporose state after momentary improvement is another indication of the close relation between mutism and stupor. This relation is further well shown in the following case, which also explains the momentary lapses from deafness in deaf-mutism to which allusion has already been made.

CASE 20 (Case-number 465a).—Stretcher-bearer, seen by me two days after admission to a base hospital. He was a stolid-looking youth. Although mute, he had been heard to talk in his sleep; he could be induced to write a few words about "shells coming over"; he understood on admission what was said to him. When first I saw him, my notes run, "He puts out his tongue and closes his eyes, and holds out one hand when I ask him to do so, but gets stupid (as if sulky) when I ask for the other hand. He will not hear any more." On the following day he appeared quite deaf. The day after that he was lightly anaesthetised with ether, whereupon his hearing at once returned, he put out his tongue to order, and he began to talk, repeating syllables spoken to him and counting to order one, two, three, &c., as he passed into deeper anaesthesia. On waking he cried as he was induced to resume his speech, and complained of pains in the head.

Two days after he seemed quite normal, and he admitted to me that he could have spoken on the second day after his admission to the hospital. He attributed his behaviour when I first saw him to the fact that his "eyes and ears began to swim," and that he "felt dizzy." He said that he was "afraid to talk" and that he did not want to be sent back to the trenches. He described to me the severe shelling to which he had been exposed, and said that after the shells had burst he lost consciousness until he awoke in hospital at Y—. By further persuasion I induced him to recall little by little how he had been taken by a corporal to the cellar of a school after the shells had burst in the garden of his billet at Y—. I then asked him what he would like to do. He replied that he had excellent chums at the front and had been preparing for a jolly Christmas. "I would rather go back," he said, "but would like a rest here first." He had no home in England, as his uncle, with whom he had worked, was serving now in France. He returned to his unit, where, I am informed by his medical officer, he has been for four months and is "doing well,..... and never comes sick."

Mutism and malingering.—The above case is also valuable for the light it throws on the relation between mutism and

malingering. The lad admitted that he could have spoken before he was induced to do so. There is no reason to believe that he was not genuinely mute from the start, and for my own part I do not believe that he was truly malingering at the end. The inhibitory effects of the mental shock were slowly passing off after their onset, and it was only a matter of time until they were overcome altogether. I have met with other patients who, on recovering their speech, told me that a few days before they actually talked they had felt that they would soon be able to do so. I recall the case of one man who, after having had his speech restored by faradisation of the throat (aided by strong suggestion), told me that as soon as he met the doctor he "at once saw that he had great will power" over him. Such patients are apt falsely to believe that they have been malingering.

On the other hand, cases occur like the following, in which there is graver doubt as to the absence of malingering:—

CASE 21 (Case-number 423).—Private, (actually) aged 13½, with six months' service and four months' service in France, was admitted to a base hospital seven weeks after the onset of mutism. He was a healthy-looking lad of stubborn demeanour, refusing to make any sound or whisper, or even to cough; and a few days after his admission he wrote a note of complaint to the medical officer about his treatment in hospital. He showed no defects of sensation and no other signs of shock. I saw him five days after his admission, and after giving him a stern reprimand ordered him to be isolated from the other patients in solitary confinement, to be deprived of cigarettes, and to be given milk diet. The very next morning he regained his speech. He attributed his recovery to a dream in which he thought he was at home with his mother, who had received the tidings that his two brothers had been killed at the front. He said that he dreamed that he went off to tell the news to his third brother, but he could not speak to him. His brother pressed him to talk and he awoke, sitting up in bed, speaking. When I saw him he was absolutely normal, with no lapse of memory whatever of the events which had preceded the onset of mutism. It had been his first engagement, he said; he had seen for the first time the dead lying about; he became dizzy, thought he fainted, "a chap came along and asked me if I was wounded, but I couldn't tell him, so he took me down, and a major directed me to a cellar and I slept there." He remembered the various hospitals to which he had been sent, and the convalescent camp in which he had spent five or six weeks as a mute. He was sent back by me to his unit.

I have since heard about him from his regimental medical officer, who wrote four months later: "I have since seen Private—several times at sick parade, complaining of vague and trivial matters, such as pains in the legs, pains in the back, and headaches. At his last appearance on sick parade he complained that his varicocele was giving him considerable discomfort."

His healthy appearance and stubborn manner, his absolute mutism, and inability to cough, the manner of his recovery, the absence of stupor, amnesia, tremor, or any other signs of shock, certain discrepancies between his written and (later) spoken history, his general behaviour while in hospital and after, all throw grave suspicion on the absolute genuineness of the patient's condition. But none of these can be regarded as certain guides. Functional disorders are apt occasionally to simulate malingering, just as at other times they simulate organic lesions. How even the most experienced may be deceived is shown in the following case:—

CASE 22 (Case number 450).—Private, aged 26, with one year's service and three months' service in France, admitted into a base hospital for deaf-mutism of nine weeks' standing. He wrote: "I should be very happy if you can do anything for me. I cannot give a very clear account of what happened, as it is some time since. I remember retiring from Hill—with some more to some trenches, and in the open we were shelled and I lost touch with our chaps or else they were killed. I remember a great concussion and finding myself on the ground, and a soldier dragged me up and we ran for the trench. I was very thirsty and I ran down the trench to get some water. I met one of our chaps and tried to ask him for some, and I could not make him understand. He only smiled at me. The man who picked me up took me to an officer who was sitting on the edge of the trench and tried to make me understand, and then he sent me with this man to a dressing station, and from there I have been to different places, the names of which I do not know, except the last place, No. — Convalescent Camp. I have been there about two months"

He appeared an honest lad, anxious to get well. He wrote that he could hear me, but could not understand what I said. When I whistled he wrote, "I think I can hear a drone." He himself could not whistle, although he "used to whistle.

as a youngster." He could not protrude his tongue without first pulling down his lips. He could move it from side to side. He was anaesthetised on the following day, but he did not pass through a stage of excitement, and failed to regain his speech. He was evacuated to England.

Three months later he wrote me the following "confidential" letter from "a convalescent home" in England: "Sir,—I regret very much to have to inform you that I was imposing upon you. I may state that I was physically unfit for the Front. During the whole time of training my pay was chiefly spent in tonics and drugs, but I kept going as I was determined to see what it was like at the Front. I have written this that your 'notes' on cases will not suffer any detrimental effect through my imposture. I have not got my discharge yet, but shall stick out for it. I 'speak' but do not 'hear' very well." He had been for over six weeks in a certain hospital in England, the medical officers of which have had unique experience in the functional nervous disorders arising in this war, but they inform me that they did not regard him as a malingerer. There he repeated to them the same history as he had given me, and spoke of a previous nervous breakdown and recourse to sulphonal and Easton's syrup. His "hearing somewhat improved, but he has always been a little deaf." Before his departure "he could speak, hear a watch, and sometimes hear spoken words." The "convalescent home" (he was careful not to name it) from which he purported to write to me turned out to be another hospital for functional nervous cases to which he was afterwards transferred, the medical officer of which wrote me: "In my opinion this man is not a malingerer. He is very dull and stupid, which perhaps is partly explained by his deafness. His condition appears to me to be one recovering from severe mental shock."

This seems to be an instance of pure malingering.³ By a pure malingerer I mean one who, although in perfect health, of set purpose initiates a quasi-pathological condition which he will discard when he has gained his end or when he is assured that he is unobserved. So far as concerns disorders of speech, such cases are extremely rare in the present war. With few exceptions the "simulators" of disorders of speech who have come to my notice have been feeble, nervous subjects themselves. Several have come to maintain a disorder which was involuntary and functional in origin, and due, perhaps, to suggestion; they are not pure malingerers.

It is a matter of considerable difficulty for even the most experienced medical officer to decide whether the lack of volitional impulse to overcome the disorder is intentional or is for the time being beyond the individual's control. From the therapeutic standpoint, the difficulty is not of great importance, as long as treatment be confined to such procedures as persuasion, isolation, or anaesthesia; by which means I have "cured" several cases of intentional malingering. From the standpoint of military discipline, however, the difficulty becomes of vital importance; and from this standpoint it is to be remembered that, although long experience yields a highly probable conclusion, absolute certainty can only be reached by detection in *flagrante delicto*.

In theory we may distinguish (a) the stage of mutism which is absolutely irresponsive to treatment, and (b) the stage in which recovery is possible if only an adequate motor impulse can be aroused to overcome the inhibition. And in (b) we may distinguish (i.) the condition in which the patient is constitutionally unable to make the requisite volitional effort; (ii.) the condition in which he refuses to attempt to make that effort; and (iii.) the condition in which he deliberately maintains his mutism by counter-availing volitional effort. But in practice every grade of transition may be met with between (a) quite uncontrollable functional disorder and (b iii.) sheer purposeful malingering.

At the pathological extreme of the series are to be seen clearly enough cases of true mental shock and, far less commonly, cases due to suggestion, both of which groups evidently belong to that hitherto undifferentiated entity, hysteria. Now, of hysteria no medically qualified man, unless he be steeped in the profoundest ignorance, would assert that it is identical with, or that it necessarily implies, any of the above-mentioned degrees of malingering. The cases of mental shock that recover their speech in a music-hall or at a cinematograph entertainment, or that recover their sight or the movement of their limbs upon receiving another mental shock, clearly need not have been malingerers. It is hardly less obvious that malingering has not necessarily

been present in mutes who become cured through suggestion, encouragement, or threats of punishment, or under the excitement of early anaesthesia, by faradisation of the neck or larynx, or by the vomiting brought about by the administration of ipecacuanha.

Dysarthria.

The cases of dysarthria with which I have met range from a slight stutter, stammer, or jerkiness of speech to almost complete anarthria, according to the degree of disturbance in the correct working of the articulatory mechanism. These cases are almost invariably associated with other motor incoördination of a functional character, and in consequence will be more conveniently described in a later communication dealing with disorders of the voluntary muscular system generally.

Aphonia.

Cases of primary aphonia from mental shock, "of unconscious origin," as contrasted with functional aphonia due to suggestion, conscious or unconscious, are, in my experience, rare. In this and in other respects aphonia is distinguishable from mutism; they are not to be considered as differing from one another merely in degree. I have seen several cases where the hoarseness originating from a severe cold passed into a functional aphonia which was subsequently allowed to persist. I have cured some of these cases by persuasion, and some by such mild torture as pin-pricking, continued until the patient is induced to give his answers in a loud voice. Usually a feeble "nervous" fellow, he at length speaks aloud, bursting into tears as he realises that his simulation has been detected.

Malingering plays a far more important factor in this variety of speech defect than in any other. I have met with a few cases of pure malingering.

Not infrequently a mute patient begins to whisper when he first recovers his speech. But I have not had a case in which, by further suggestion, I have failed at once to overcome the obstacle to phonation.

General Conclusions.

The views already expressed in this communication, as to what mutism is due and to what it is not due, are also applicable to dysarthria and aphonia.

Such disorders, I repeat, are not immediately attributable to violence, gas poisoning, or other physical causes. They are the result of a functional inhibition, which is usually traceable to intense fear or horror, but which may, I believe, occasionally arise in circumstances where consciousness has been so instantaneously lost that the emotional effects of the shock have not been actually experienced by the patient.

These disorders are not generally to be regarded as the direct outcome of suggestion or association, although, as in the other manifestations of shell shock,⁴ previous experience or congenital tendencies may influence the form in which the disorder gains expression. In some instances, no doubt, the speech mechanism is a weak spot in the patient's nervous armour. He may have stuttered when a child, he may have been subject to attacks of hoarseness, he may have passed through an abnormally long period of "infancy," he may never have been as ready of speech as most of his fellows, and so on. But though these may be contributing factors, they are not the prime cause of the disorders of speech in shell shock, save in the exceptional cases previously mentioned.

Nor are they due to some "fixed idea of paralysis" in the cortical structures controlling voluntary speech. Such terminology belongs to an effete psychology; it has been long in vogue among physicians for the explanation of functional disturbances generally. A woman suffering from hysterical palsy of a leg has been often said to be possessed of the "fixed idea" that she cannot move it. If we insist "How do you know that she has this fixed idea if she stoutly denies entertaining it and even evinces a keen desire to recover the use of her limb?" the retort comes, "Ah! the idea of paralysis is subconscious; she does not know that she has it, but it is there."

The word "idea," however, necessarily implies the presence of a personality that consciously experiences and admits it. And to speak of the existence of a fixed idea which cannot be

³ For various reasons I think it highly improbable that the letter is that of a hysteric weaving a tissue of accusations against himself for the sake of attracting attention and gaining notoriety.

⁴ Cf. in the third of my communications the influence of past history.

proved to be in consciousness under any conditions whatever is a sheer abuse both of psychological language and of scientific method. In the case of the disorders of speech arising from shock, I have never found the slightest evidence that the subject, whether in his normal or in a hypnotic state or in any derived personality, has a "fixed idea" that he is mute or that he is powerless to converse save in a whisper or stuttering.

I have little doubt that this pseudo-psychological explanation proceeds from two sources: (i.) from the notion that functional disturbances are fundamentally due to disordered volition; and (ii.) from the notion that, in order to carry out a willed movement, the idea of that movement must necessarily be present to the subject's mind. Neither of these notions is correct. In the first place, one of the most important lessons to be learnt from the study of shock in this war is that its effects are primarily due to derangement not of the will, but of the conscious and unconscious processes which are the foundation of personality, and that (through mechanisms and causes of which at present we know little) this derangement may indirectly become manifest as functional disorders, e.g. of intelligence, memory, movement, sensation, or reflexes, at various levels of the central nervous system. In the second place, modern psychologists have come to recognise that volitional movements may, and commonly are, performed without the subject having in consciousness an idea, or even a kinæsthetic image, of those movements.

It is, then, not the idea of paralysis of volition that is fixed, but the psycho-pathological process of inhibition. Inhibition, arising primarily from disorder within the personality, is the fundamental cause of the effects of shell shock.

Now in dealing with the disturbances of cutaneous sensibility (in the third of these communications), we saw that the responsible inhibitory processes are of two kinds. On the one hand, we traced *diminished* sensibility to a blocking of the ascending paths which normally enable the subject to become aware of his cutaneous sensations, the block preventing these sensations from entering into and becoming part of his personality. On the other hand, we traced *increased* sensibility to a blocking of the descending paths that control normal sensibility, in the absence of which control cutaneous sensations become more diffuse and the affective and sensori-motor reactions more intense. In the case of the disorders of speech two similar kinds of inhibition are discernible, the one due to a blocking of the paths that subserve the mechanism of articulation or phonation, the block producing the *quasi*-paralysis of functional mutism or aphonia; the other due to a blocking of other paths that control and coördinate those mechanisms, the block producing the *quasi*-spastic, -clonic, or -ataxic conditions of functional dysarthria.

In some cases of mutism the block yields a condition, to some extent comparable to a so-called "kinæsthetic apraxia." The patient appears to lack all notion of how to talk, to whistle, or to cough. Instead, he makes extraordinary grimaces, his mouth often continuing to work long after he is actually endeavouring to imitate a given word. It may be called a state of functional motor aphasia, and it is due, like that of organic motor aphasia, to an inability to translate normally produced internal language into the corresponding movement. In both forms the patient may read and write intelligently, but the functional form may differ from the organic in that in the former speech may be completely absent, whereas in the latter the patient is occasionally able to utter a few words normally articulated.

In other cases of mutism the inhibition is of a higher order, and it results in a state comparable to an "ideational apraxia," in which the subject can perform simple articulatory movements but is powerless to combine them into the movement complexes of speech. Thus, I have seen patients well able to reproduce consonants and vowels, but yet unable to unite them into a syllable or word.

In other cases, again, the inhibition produces a state resembling "verbal agnosia," in which the patient has forgotten the meaning of words heard or read. Such cases have not been included in this communication, as they may be more conveniently considered under the head of amnesia. They differ from those of organic verbal amnesia in that the disturbance does not necessarily relate to all words, and so does not result in a total verbal apraxia.

Lastly, the areas inhibited may spread still wider or higher, producing partial or complete amusia, alexia or agraphia, or narrowing the field of consciousness to a condition of general amnesia in which the patient has lost all memory of the past, or to one of stupor in which he has lost all power of response to his environment.

In every case the inhibition is purely functional, originally dependent on the character of the total psychosis—i.e., the personality of the subject, at any given moment. That personality may be changed again in sleep, under light anaesthesia, during hypnosis, or through strong emotion or desire, or during momentary lapses when, for unknown reasons, the inhibition is, so to speak, "caught off its guard"; and in these conditions the inhibitory process, and hence the disturbances of speech, may disappear, only to return on the revival of the disordered personality. The inhibitions caused by shock are primarily the expression of disordered personality.

Such disturbances of speech, such inhibitions, are not, as has been urged, maintained by fear, nor need they be evoked by fear. They may be evoked by various other emotions, by horror, grief, disappointment, anxiety, or they may be due merely to the obscure neuro-pathological concomitants of shock when no emotion, as such, has had the opportunity of being experienced; and they are maintained by the persistence, not of the emotion as such, but of the pathological disorder of inhibition thus arising.

It may be objected that the inhibition often seems to outlast the return of the normal personality. Yet the claim may be fairly put forward that when a mute patient has recovered from a condition of stupor but is still amnesic in regard to some of the experiences through which he has passed, the restoration of his normal personality is apparent rather than real. If personality be viewed from a wide enough standpoint, no one can claim to have a normal self so long as part of the activities of that self, once functional, are pathologically inhibited.

It must be conceded, then, that, as in most cases of mutism, the changes of personality may be obvious at the outset (involving amnesia, stupor, automatism, &c.), but that later the normal personality may be apparently—but only apparently—restored while the functional disorder in some form persists. In such cases, as we have seen, the disorder is usually of unconscious origin, due directly to the shock, and may occur in men free from suspicion of prior neuropathic taint.

It must also be conceded that, as in a few cases of mutism and as in nearly all cases of aphonia, the change of personality may be imperceptible from the outset. In such cases the disorder is perhaps of conscious origin, due to suggestion or the persistent expression of a powerful emotion (e.g., mutism during fright), and it occurs usually in men of a neurotic constitution.

Into these two classes, I suggest, such cases of shell shock, and of functional or hysterical disorder generally, may be divided. But it must be recognised that neither between these two classes nor between the second class and the class of malingers is it possible to draw any definite line. Not only do they merge into one another, but occasionally a case may belong to more than one of these classes.

THE annual distribution of prizes will take place in the Out-patients' Hall of Charing Cross Hospital on Monday, Oct. 2nd, at 3.30 P.M. Dr. J. Mitchell Bruce, consulting physician to the hospital, will give away the prizes. A reception will afterwards be held at the school, when the laboratories, museum, and library will be open to inspection.

DEATH OF DR. E. B. GRAY.—Edward Benjamin Gray, whose death occurred recently at Oxford, was one of the oldest medical practitioners of the city and consulting physician to the Radcliffe Infirmary. He was in his eighty-fifth year and had been associated with the medical life of the city since his early days, when he was appointed house physician at the Radcliffe Infirmary and County Hospital on leaving St. Bartholomew's Hospital. He graduated at Exeter College in 1852, became M.R.C.S. in 1856, and took the degree of Doctor of Medicine in 1861. He was also for some time Litchfield lecturer in clinical medicine, and examiner in medicine. He had a wide practice and was exceedingly well known and highly respected. He had not practised since 1902, when he had a severe illness.