Sections of Psychiatry and Neurology.

Section of Psychiatry.

President—Major F. W. MOTT, M.D., F.R.S.

(*January* 25, 1916.)

SPECIAL DISCUSSION ON SHELL SHOCK WITHOUT VISIBLE SIGNS OF INJURY.

Opened by the PRESIDENT.

"SHELL SHOCK" is a term applied to a group of varying signs and symptoms indicative of loss of functions or disorder of functions of the central nervous system, arising from exposure to forces generated by high explosives. The forces producing shell shock are most commonly generated by the explosion of large shells, but also by mines, aerial torpedoes, whizz-bangs, trench mortars, bombs and hand grenades charged with high explosives. In a large number of cases, although exhibiting no visible injury, shell shock is accompanied by "burial." Sandbags may be dislodged from the parapet of the trench and strike the individual on the head or spine, and cause concussion without visible injury, or the roof of a dug-out may fall in. While lying partially buried he may be subject to the inhalation of noxious gases, so that a combination of causes may account for the severer effects of shell shock.

Although there may be no visible sign of injury, yet from the point of view of compensation or pension the War Office authorities very properly regard shell shock as a definite injury. This fact is of considerable importance, for as in the case of pension or compensation

in traumatic neurasthenia under the Employer's Liability Act, the notion of never recovering may tend to become a *fixed idea*. The detection of conscious fraud is not easy in many cases of shell shock in which recovery may be reasonably expected, for it is difficult in many cases to differentiate malingering from a functional neurosis due to a fixed idea. The first point is to be sure of your diagnosis that the disease is altogether functional, and being satisfied thereof to avoid all forms of suggestion of non-recovery. The second point is to strive against auto-suggestion of non-recovery by taking the man's mind off himself with amusements, games, and occupation, if possible in the open air. Prolonged massage and electricity of all forms are better avoided, as a rule, unless as a means of suggestion of cure by their use. Look cheerful and be cheerful should ever be the mode of greeting these patients.

At the Neurological Section of the Fourth London General Hospital exceptional opportunities have occurred for studying the functional neuroses, and to a less degree psychoses arising from shell shock. A considerable number of cases have occurred in which shell shock has been associated with visible injury. In a large number of cases there may have been physical concussion from the patient having been struck by sandbags when the parapet was blown down. Again, the explosive force may blow the man up into the air, and he may fall heavily on his head or spine on the ground, and, without producing any visible injury, aggravate, by concussion, the "commotio cerebri" produced by the violent aerial disturbance. Another and very important factor is "psychic trauma," engendered by sudden fear of death as well as by horror caused by the terrible destructive effects on comrades. It has appeared to me that the cases of shell shock have latterly not been so severe as they were in the spring of last year. I attribute this to the fact that life in the trenches has not been associated with such continuous and severe nervous strain and fearful apprehension. Our men have felt that in numbers and in effectiveness of our artillery the balance of power is no longer with the enemy. The joy of hope has replaced the depression of fear.

That "psychic trauma" plays a very considerable part in the production of the functional neuroses and psychoses of shell shock without visible injury is shown by the fact that neuro-potentially sound sergeants, non-commissioned officers, and privates, who, after fighting at the front for long periods, have been the subjects of shell shock, as a rule do not manifest severe and prolonged symptoms

of functional neurosis. Officers who have been exposed to shell-fire and have suffered temporary loss of consciousness, according to my experience, recover much more quickly. I have not seen a single case of mutism among the large number of officers that I have had under my care, nor have I, with one exception, seen severe cases of amnesia from shell shock without visible injury in officers; the one case I have seen had a marked retrograde amnesia and chorea, but in his case there was evidence of physical concussion; and this leads me to say that when there is retrograde amnesia there is usually a history of physical concussion, such as the head being struck with a stone or piece of shrapnel, or there is a history of burial. These facts undoubtedly point to the importance of the personal factor. A considerable number of the cases of shell shock without visible injury, in my judgment, occur in individuals of a neuropathic or psychopathic predisposition, or of a timorous or nervous disposition.

As none of the cases of shell shock under my care have died, no opportunity has occurred of examining the central nervous system in the severe cases of shell shock without visible injury admitted to the Fourth London General Hospital.

Disorders and Loss of Consciousness.

Shell shock without visible injury is usually followed by a complete loss of consciousness, due to "commotio cerebri" of variable intensity and duration; in some cases the forces generated by the high explosive may cause such a disturbance of functions of the whole central nervous system as to arrest the activities of the vital centres, especially of the medulla, and cause instantaneous death. As I intend to deal with this aspect of the question in the Lettsomian Lectures, which I am giving shortly, I will not touch on this subject now. In the majority of cases the shock mainly affects the cortical structures, the vital centres, as in apoplexy, continuing to function; in some cases the subconscious centres (Jackson's middle level), which preside over the inborn instinctive and habitually acquired purposive sensori-motor actions subserving the preservation of the individual and species, are able to perform their complex functions; but of the experiences the individual has had during this period of automatism he has no recollection whatever. Several cases of this kind have come under my notice, but I will describe only one of the most reliable, as it is a history obtained from an officer. His company had dug themselves in, in a wood; he went out into the road to

see if a convoy was coming. A large shell burst near him; it was about 2 o'clock in the morning, and quite dark; about 4.30 a.m. it was light, and he found himself being helped off a horse by two women who came out of a farm-house. He had no recollection of anything that happened between the bursting of the shell and this incident. It is interesting to note that the single cigarette in his case was yellow on one side, no doubt due to fumes of the explosive containing picric acid. It is possible, therefore, that noxious fumes may get into the air-passages and be a contributory factor to the physical shock.

Nearly all cases of shell shock are associated with a disturbance or loss of consciousness of variable duration. Sometimes the patient is only dazed, and partially or completely unaware of his surroundings. All degrees of effects on consciousness may be met with, from a slight temporary disturbance to complete unconsciousness with stertorous breathing, continuing till death. It is always, however, difficult to decide from the history obtained from the patient whether the unconsciousness which he speaks of was truly unconsciousness for a whole or a portion of the period, or whether his unconsciousness was not due wholly or partially to the fact that his recollection was blotted out for a time. In support of this I may mention that Major Meyers has informed me that he has been able, by hypnosis, to revive in consciousness events which have happened during this state. Again, it is difficult to decide whether the forces generated by the explosion were alone responsible for the effects on consciousness. Many of those suffering with shell shock without visible injury have been buried, and a sandbag striking the head would easily account for a sudden loss of consciousness; again, burial or partial burial might be a contributory cause from the production of asphyxia of mechanical origin, or from the enforced inhalation of poisonous gases. The history obtained from comrades and from R.A.M.C. officers at the field hospital was, however, that there may, indeed, be a complete loss of consciousness for days.

Occasionally cases have been admitted under my care who had not yet recovered normal consciousness, and for some days lay in a dazed, somnolent, or even semi-conscious condition. Usually these cases came at a time when large convoys were sent from the Front owing to a recent engagement.

I came to the conclusion, from the investigations made by myself and Dr. Cicely May Peaké,[1] that in the majority of the cases of shell

[1] Dr. Cicely Peaké was for six months research scholar for the Medical Research Committee.

shock resulting in functional paralysis, tremors, tics, and disordered movements; in amaurosis, deafness, and loss or defects of the other special senses; in anæsthesia, hyperæsthesia, and hyperacusis; in speech defects—e.g., mutism, deaf-mutism, aphonia, stammering and stuttering, verbigeration; in amnesias, mental confusion, and other psychic disturbances; in sweats, cold blue hands and feet, and the facial expression of terror or vacant bewilderment; these symptoms, especially if persistent, occurred in individuals who gave a history of a neurotic temperament or neuropathic predisposition. However, in a certain proportion, a little more than one-third, the cumulative effects of stress of active service combined with repeated and prolonged exposure to shell fire or high explosive projectiles apparently had induced a neurasthenic or hysteric condition in the nervous system of a potentially sound individual. I have met with severe cases of shock among good soldiers and non-commissioned officers of years in active service—men of excellent physique who have led active lives, without any evidence of a nervous breakdown. Some of these had served all through the South African War, and others had fought in many actions and battles in this campaign. Such men, as a rule, have not succumbed after a single shell shock, but only after several, and when they have been working under the stress of responsibility, with insufficient sleep and constant apprehension. On the other hand, "among the rapid breakdowns," as a result of shell shock, there are a large number of men who give a history either of a timorous disposition, easily frightened, who feel faint at the sight of blood, or of anxiety neurosis, or of a nervous breakdown in ordinary life, or after some special stress, or of injury to the head causing traumatic neurasthenia. Again a few are mental defectives, as shown by their low wage-earning capacity, their inability to obtain regular employment or to keep their place, or of only having reached a low standard at school. Moreover, their expression is often dull and vacant.

Occasionally cases have been met with where there was a history of the patient having in early life witnessed a terrifying scene, and that this may have produced a deep impression on the mind, predisposing the individual to the emotion of fear, which seems probable from its frequent recurrence in terrifying dreams.

In not a few there was a history of *petit mal* or epilepsy, in spite of the fact that this should have excluded them from the Army as medically unfit. Cases which were said to have developed true epilepsy as a result of shell shock, the history showed, were nearly always individuals who had previously suffered with epilepsy or an anomalous

form of it, or that they were potential epileptics prior to the shock might be assumed from the fact that they had suffered from what they termed "slight faints," or automatisms; or that there was a history of epilepsy or insanity in the family. Some of the cases which showed mental symptoms had been in an asylum, or their parents or some near relative had; these were usually cases in which the mental symptoms which followed the shock were not transitory, but persisted after they had been treated in hospital. These patients not infrequently, prior to the shock, had shown symptoms and signs of mental instability. A few cases developed general paralysis of the insane or syphilitic brain disease, and although shock could not introduce the spirochætes into the brain, the commotion caused by it might have lowered the resistance and so enabled the latent organism to become active. Although in the large number of cases which have come under my care I have had the opportunity of observing almost all the neurological and mental symptoms which can be produced by shell shock, I shall limit my address to this Section to the more important psychic conditions caused by "commotio cerebri" occurring in shell shock, leaving the neurological symptoms to discussion at the Neurological Section.

Other mental symptoms of "commotio cerebri" from shell shock, especially when there is besides psychic trauma actual concussion, as evidenced by burial and a history of injury or retrograde amnesia, are continued slow reaction, mental dullness, confusion, and inability to undertake any prolonged mental effort without headache and fatigue. There is, however, for some time headache without any exciting cause. Any mental effort requiring sustained attention the subjects of psychasthenia the result of shell shock are unable to undertake, and irresolution and indecision are a frequent result. Officers and non-commissioned officers feel this acutely, and say that they are unable to carry out responsible duties in consequence thereof. This condition is aggravated by insomnia and worry, for they are conscious of their mental state and are filled with apprehension of making mistakes. If there is an inborn insane tendency, this "anxiety neurosis" may be complicated by delusions of persecution and obsessions. In severe cases of "commotio cerebri," especially where there is concussion as well as psychic trauma, the symptoms of Korsakoff's psychosis may occur; thus there may be, as in the cases of severe amnesia narrated, marked mental confusion, disorientation of time and space, mistakes of identity of persons, and especially loss of memory of recent events without delusions or hallucinations.

Hyperacusis is a frequent and very troublesome symptom. The explosion of bombs in a Zeppelin raid had a pronounced effect on many of my cases, causing relapses. The firing of the guns at Woolwich, the noise of passing trains, even of billiards and music, produced in several severe cases distressing symptoms. One case in particular I might cite in illustration. A sergeant reservist who prior to re-enlistment had been a well-known pugilist of great repute, was invalided home for neurasthenia, the result of long active service at the Front. He was progressing favourably when a Zeppelin raid occurred; the noise of the bombs caused a serious relapse. The man was continually making involuntary and uncontrollable movements of the muscles of the face, head and neck, and shoulders, such as he was accustomed to make when fighting. When he was recovering the slightest noise set up these movements. The hyperacusis was so marked that he resented the noise of the billiard balls and would like to have prohibited playing, if necessary by force. The soldiers found the most effective method of causing his retirement was to bang their slippers hard on the ground.

Amnesia.

Loss of memory is a very frequent result of the effects of high explosive forces upon the central nervous system. It may be a complete loss of power of recollection and of recognition. Consciousness, except for the immediate present perception, may be a blank, and there is in such cases, as a rule, "no art to find the mind's complexion in the face," for a patient so afflicted exhibits a dazed, mindless expression. Three cases in particular I will cite as exhibiting this intense form of amnesia. One case was that of a sapper who, upon admission, could give no information himself, but we learnt from a comrade he had been blown up by the bursting of a large shell in the trench. He could not recollect his own name; he did not recognize his name when it was written; he did not know the season of the year; he could not recognize any coins except a half-crown, but he possessed this coin, which had just been given to him. He did not recollect anything that was told him, so that his memory for recent events as well as for the past was lost. He had a dazed expression, exophthalmos of the right eye, and enlargement of the thyroid, especially of the right lobe. This man rapidly improved and recovered completely.

Another case was remarkable in several ways. The patient's mind was a complete blank, and this condition was reflected in a dazed,

mindless, mask-like expression. When asked where he lived he said "Wakefield"; he did not know it was in the West Riding; he did not know the address of his home, and when shown a letter from his father with the address on the top he did not recognize it, nor his father's handwriting. When shown a photograph of his home with a group of his father, mother, and three brothers and himself in front of it, he maintained the same wondering, dazed expression, and failed to recognize the nature of the picture. His father had heard from a comrade that he had been buried by the explosion of a shell in the trench; he had been unconscious for some time and lost his speech. We heard from his father that he was a good musician, and I said to him, "G., I hear you are a good musician"; so I asked him if he could play the piano or sing. There was the same wondering, bewildered look, and he muttered something which was to the effect that he could not sing or play. Three days later I said, "Come, you can whistle 'God Save the King.'" He took no notice, but upon pressing him he looked up and a glint seemed to come to his eyes as he said, "You start me." I whistled the first bar; he took it up and whistled the tune admirably. I then asked him to whistle "Tipperary," but he could not do this until I started him; and the same with several other tunes. Once started he had no difficulty, and I recognized from the admirable intonation that he was, as his father described him, an excellent musician. I could not, however, that day get him to start upon his own initiative any one of the tunes he had whistled. The next visit, three days later, I observed that his expression had changed. He smiled when I spoke to him, and I recognized clear evidence of a mind that had found itself. He could now whistle any of the tunes I had previously started him on by himself when I called for them. I then said, "Come along to the piano." He came, and I got him to sit down in front of it. I said, "Play." He looked at the instrument with a blank expression as if he had never seen such a thing before, and I could not get him even to put his fingers on the keys. I then took one of his hands, and holding his forefinger, I made him play the melody of "Tipperary." He looked at me, and again I noticed a glint in the eye and a change of his blank expression, indicative of associative and recollective memories. He put his other hand on the keys and played a few chords. I went away feeling confident now that his musical talent would reveal itself. He played for half an hour while I was in the ward without a single discord. The next time I came he was able to play any music set before him. His associative memory and recollection of music were in advance of other associative memories.

Thus eight months after he had recovered his musical memory he had very imperfectly recovered his memory of elementary facts regarding his profession of a land surveyor—e.g., he could not tell me how many poles there were in a rood—and there was still a tendency to a vacant, mindless expression and prolonged reaction-time, as shown by delay and slowness in responding to questions, as if there were a difficulty in linking up the necessary associations.

This early return of the musical memory happened also in another severe case of amnesia which I will briefly relate. This patient was admitted for shell shock. He had almost a complete loss of recollection of all the incidents of his past life except some experiences of early life, such as when he went to school. His powers of recognition were limited to knowing his parents. He had a bewildered, vacant expression and a slow reaction to questions; when interrogated, his countenance assumed the puzzled aspect of one trying to recollect. His memory for recent events was absent, and persons that he had frequently or daily seen he failed to recognize. After four months he had made but little improvement. His memory of the past seemed to show the first signs of awakening in the associations of music. He recollected musicians that he had heard and songs that he had sung, although, as in the case of G., he remembered nothing of his professional occupation. He said that while with his friends he had been asked to sing songs which they said he had sung before—that he did not recognize them at all when he saw them; that after they had been played to him two or three times he was afraid to begin as he felt he did not know them, but that once he started "he seemed to know without remembering" and got through quite well. One song he managed after it had been played through only once ("I hear you calling me").

It may be asked, Why should the memory of music be more readily revived in consciousness than other experiences—for example, those connected with the professions of these two young men before they entered the Army? I would explain it by the fact that there can be no doubt that cognitions, whether pleasurable or painful, are more deeply graven on the mind and more firmly fixed in associative memory when associated with feeling. Music, of all the arts, appeals most to the emotions, and probably this is the reason why countless men and women, even the uneducated, can recall the words of songs and hymns when they hear the first bar of the musical setting.

A short period of amnesia is common in shell shock; in fact, many of the cases of supposed loss of consciousness may really be partially or

wholly due to amnesia. Many instances of high explosions of aerial torpedoes, mines, and large shells, causing shock without visible injury, have occurred resulting in amnesia; but those which have been followed by a complete amnesia or retrograde amnesia have been cases where (as in two of the three first narrated) there has been a history of shock with burial, or there has been visible evidence of concussion, either from the man being blown into the air and coming down on the ground, striking the head, or from a stone hitting his head. In the case of burial, the man may be struck on the head with a sandbag and no visible sign of injury occur, or he may be unconscious in the trench or dug-out, or remain so covered up that he cannot move and thus be exposed to poisonous gases. In respect to concussion producing retrograde amnesia, I will mention one case of many that I have seen; it was that of a young officer who was admitted for acute chorea; there was no history of rheumatism, and I have not any doubt that his condition was due to the shock and concussion. In his case there was a complete retrograde amnesia of two weeks' duration. He could recollect nothing from the time he arrived in Havre till he reached the hospital at Boulogne. The only incident he could vaguely recollect was arms and legs flying into the air, and of this and other terrifying things he dreamed continuously. It turned out that he had been at Hill 60 and the battle of Neuve Chapelle. I asked him to write down any recollections that returned to him. His brother had received a letter from him telling him that he was moving to the Front; he did not recollect it, nor could he tell me anything that happened after arriving at Havre. Reading the newspaper, he saw the word Bailleul, and recalled the fact that this was a place he had been at, but this was merely a word-association, for he had no recollection of the place or of any incident that happened there. I formed the opinion that this retrograde amnesia was due to concussion, how produced we do not know. I asked him to write down for me some of his dreams. They were as follows: playing with red-hot billiard balls after playing billiards; charging up an inclined plane, where a huge Prussian sat down and swept them all away (this dream had doubtless a partial origin in his having seen a torpedo-boat launched); blown up in a house bit by bit; red-hot trenches and burning liquid; in trench by himself. These terrifying dreams continued for a considerable time. The mere bursting of a shell or explosive in the neighbourhood of a man does not appear to do more than produce cerebral commotion and a subsequent amnesia, for, as a rule, the man can recollect everything that happened prior to loss of consciousness. One officer told me as he was blown up

in the air he remembered seeing the terrible effects of the shell as pieces of it struck his comrades.

Psychic Trauma and Terrifying Dreams.

Psychic trauma, in my opinion, plays a very considerable part in the production of symptoms of shell shock without visible injury; in many cases the patient will tell you that he can picture in his mind's eye the shell coming and recollect the sound of the explosion, and even recall its terrifying effects, causing death and destruction of comrades. Seeing that in severe head injuries causing "concussion" there is nearly always some retrograde amnesia, it may be assumed that in these cases "emotional shock" is a very important factor in the resulting "commotio cerebri." The frequency with which these cases of shell shock suffer with terrifying dreams at night and in the half-waking state points to the conclusion that psychic trauma is exercising a powerful influence on the mind by the thoughts reverting to the terrifying experiences they have gone through, and probably their continuous influence on the subconscious mind accounts partially for the terrified or vacant look of depression on the face, the cold blue hands, feeble pulse and respiration, sweats and tremors which some of the severer cases manifest. As these dreams cease to disturb sleep, so these visible physical manifestations of fear pass off and give place to the sweet unconscious quiet of the mind. Occasionally during the waking state contemplation of the horrors seen, visual hallucinations or illusions may lead to motor delirium or insane conduct. At least that is the interpretation I should put upon the symptomatology of the following illustrative cases:—

Case I.—A captain, aged 20, was admitted under my care in a state of restless motor delirium; he moved continually in the bed, sat up, passing his hand across the forehead as if he were witnessing some horrifying sight, and muttering to himself; yet, when interrogated, he answered quite rationally. This motor delirium I associated with the continuous effects on the conscious and subconscious mind of the terrible experiences he had gone through. His whole company had been destroyed, and, while talking to a brother officer, the latter had half his head blown off by a piece of a shell. He improved very much, but a relapse occurred after a night disturbed by terrifying dreams. He recovered sufficiently in a week to go out.

Case II.—Paroxysmal Attacks of Maniacal Excitement following Shell Shock.—A young man, aged 19, was admitted suffering from shock, due to emotional stress and shell-fire. He suffered with terrifying dreams, and after

he had been in the hospital a short time he developed sudden paroxysmal attacks of maniacal excitement. The first attack occurred suddenly. One afternoon he had been helping as usual in the kitchen, and then he went and laid down on his bed and apparently went to sleep; he suddenly woke with a startled, terrified look, became flushed in the face, sweated profusely, and made for the door as if to get away from some terrifying conditions. He was with difficulty restrained. He remained in this excited state, glaring rapidly from side to side, giving one the impression that he was suffering from terrifying hallucinations of sight and hearing, although he would make no response to interrogation. He did not recognize his wife, the doctors, or the sisters. Once when I, accompanied by two medical officers in uniform (strangers), came up to speak to him, he became violently agitated, as if some terrifying conditions had been aroused by the sight of the uniforms; the face was flushed and he sweated so profusely that the perspiration dripped in a stream off his nose. The attacks would last from a few hours to a few days; they came on quite suddenly like an epileptic fit, and often without any apparent cause. They became more severe and frequent, and when we had moved the neurasthenic patient to the schools, he one day ran out of the building into the playground and attempted to get over the wall. He was brought back, and I saw him sitting in the ward on his bed; his head was buried in his hands. I spoke to him; he immediately got up, looked at me in the most terrified manner, and made for the door; it required four orderlies to restrain him, and he fought and kicked violently, exhibiting great strength and nervous energy. Much to my regret, I found it necessary to have him sent to Napsbury. I have heard that he has made a complete recovery and been discharged. It may be mentioned that there was no history of epilepsy or insanity in the family obtainable. The case rather suggests the psychic equivalents of epilepsy in the attacks.

Case III.—Traumatic Neurasthenia prior to Enlistment; Emotional Shock.—Private P., aged 25, admitted on November 11, 1915; occupation, a coal-miner. He had a bicycle accident five years ago, was unconscious two and a half hours, off work for five weeks; ever since has had headaches and been subject to fainting fits and nervousness. He has imagined "he saw things when there was nothing to be seen." On September 19 he was under heavy shell-fire in trench and dug-out. He saw the sergeant and three men who had been working with him killed by a big explosion, and remembers his cap being lifted off his head. He came to in 46 Rest Camp; he does not know how long afterwards. He could not see clearly and could not hear or speak; he had bad headache and could not sleep. The notes which accompanied him from the hospital in France related that he was deaf and dumb from shock, but that he could write intelligently. The paper in his handwriting makes this statement: "Doctor! I had an awful dream last night again; I was dreaming that I was in the trenches. I could see the men falling and the great big shells exploding. I could see the light from the bursting of the shells very plain; they fairly lighted all the place up. I woke up very

nervous, I can tell you. I wish that I could give over dreaming, and I keep having pains in my head right across my eyes." He recovered his speech in the following manner: On October 15, while sitting outside by himself, he felt a slight crackling in his head, and then noticed he could hear sounds faintly, and in a few minutes he could hear fairly well. On October 17 he was heard making inarticulate noises in his sleep. The corporal next him told him he had been making noises, and in a half-drowsy state he tried to speak. He said "Mother," then felt "very queer all over, with pain in his head." After this he was able to talk very well with only very slight hesitation.

Case IV.—Shell Shock and Psychic Trauma from witnessing Death of Comrades; Psychic Trauma maintained by Terrifying Experiences and Dreams; Nervous Predisposition; Recovery after Six Months.—Private L. R., aged 21. Admitted to Fourth London General Hospital on June 20, 1915. Was at Boulogne about two weeks. Present condition: Lying in bed on back; continuous jerky lateral movements of head and movements of the arms, especially the left. He utters slight groans, and every now and then the eyelids are elevated, producing a staring expression and look of bewilderment and terror. Mouth is slightly open. He appears to comprehend what is said to him and answers questions in a muttered whisper. He occasionally raises his right hand to his forehead. The movements are exaggerated when he is being observed. The movements cease during sleep and become much less when he thinks he is not observed, but the muttering continues. He continually says: "You won't let me back." Asked about what he dreams he says: "Guns." The pulse is fairly good; no cold sweats; hands and feet not blue. On attempting to obtain reflexes he exerts voluntary movements which prevent their being obtained. No Babinski sign. The jerky movements of the head continue even while he drinks. When I went to look at the pupils they dilated, and there was a marked facies of terror. The eyes were opened wide and staring, transverse furrows were formed in the brow, and the inner extremities of the eyebrows were contracted by the corrugators. Apparently this was from the impression caused by seeing a uniform. (He has a continued dread of being sent back.) A marked similar effect was produced by the flash of an electric lamp under his eyes. June 24: Much better. Spoken words more intelligible. He had only been a few weeks at the Front when "knocked out." *It occurred in this way: He was carrying sandbags with thirty men in daylight under shell-fire. One explosion flung him into a deep hole, and he climbed out (no loss of consciousness) to see all his friends lying dead around him. This was his first sight of any bad injury, and he keeps seeing it again with bright lights and bursting shells. He does not hear the shells, but sometimes the men shouting. He dreams he sees and hears both shells and men.* Complains of pain in back and right side of head. June 26: Improved. No involuntary movements except slight tremor of hands. Still pain in back of head, especially when he tries to remember. He remembers being very cold and shivering in hospital at Boulogne, and being given many hot baths. Does

not know the day or date, but knows it is morning (11 a.m.). Says he has always felt sick at the sight of blood, and that he had very bad headaches from the sun when he first went out (May, 1915). No cranial nerve paralysis. Pupils equal, slightly dilated, react well to light, less to accommodation (still reads even large print with great difficulty). Anæsthesic to pain and light; touch arms and trunk. Knee-jerks, abdominal reflexes, and ankle-jerk very brisk. Flexor plantar response. Dreams he sees and hears shells bursting. Sent to Morden Hall six months later, boarded for home service.

The Origin of Dreams.

Dreams are not "born of fantasy, children of an idle brain," but are based upon experiences of the past, often linked up in incongruous association. I could cite many instances of this: two will suffice. An officer who had served in South Africa told me that he had had a dream from which he awoke in a fright. He was in a mine passage at the Front when he met a leper, who came towards him. Upon questioning him and asking him to recall some period of his life in which his mind had been disturbed by a leper, he said that when serving in South Africa he remembered that he and his comrades were very much upset by a leper being allowed to remain in an adjoining sangar.

A sergeant who had been a school-master was asked to write down his dreams: "I appeared to be resting on the roadside when a woman (unknown) called me to see her husband's (a comrade) body, which was about to be buried. I went to a field in which was a pit, and near the edge four or five dead bodies. In a hand-cart near by was a legless body, the head of which was hidden from sight by a slab of stone. (He had seen a legless body, which was covered with a mackintosh sheet, which he removed.) On moving the stone I found the body alive, and the head spoke to me, imploring me to see that it was not buried. Burial party arrived, and I was myself about to be buried with the legless body when I awoke."

Terror is contemplative fear, it is fear made more or less permanent by the imagination fixing in the memory past terrifying experiences, repressed in great measure by conscious activity of the mind during the waking state, but evident in the dreams which afflict nearly all these soldiers suffering from shell shock and trench warfare. Shakespeare has not only in his characters shown how a passion steals into the soul, so that it becomes the sole tyrant of the desires, but he has clearly indicated how dreams influence the minds of men, and how they are based upon past experiences. Thus Mercutio, in the description of

Queen Mab, refers to the soldiers' dreams in the following lines, which are as true to-day as when Shakespeare wrote them :—

> Sometimes she driveth o'er a soldier's neck,
> And then dreams he of cutting foreign throats,
> Of breaches, ambuscadoes, Spanish blades,
> Of healths five fathom deep ; and then anon
> Drums in his ear ; at which he starts and wakes ;
> And, being thus frighted, swears a prayer or two,
> And sleeps again.

Although this terror has a more profound influence upon a neuropathic individual, yet all the symptoms I have mentioned may be induced in an individual of sound neuropotentiality, but as in the case of the captain, recovery is more likely to occur.

The following case is of interest in connexion with dreams of past experiences :—

A deaf-mute, aged 24, with no history of a neurotic temperament or neuropathic predisposition, was admitted under my care on November 16, 1915. He wrote the following account of himself: "I left England the 8th March and went to Gallipoli on the 26th May, and about the middle of August one of our monitors fired short. I felt something go in my head, then I went to the Canada Hospital ; they said it was concussion." In answer to questions he says the last thing he remembers is seeing the monitors firing. He came to in a dug-out about one hour after. He could see and speak a little, but was quite deaf, and his head felt as if it would burst. He lost his speech completely when Bárány's test (hot and cold water tests) were applied. He does not now complain of headache, but is quite deaf and dumb. Captain Jenkins reports that the ears are normal ; it is therefore a functional deafness. He is able to cough and whistle, but cannot speak. His wife says that she has letters from him, in one of which he described how he killed a Turkish woman sniper. He does not remember writing this letter, but there is evidently some retrograde amnesia. He says he does not dream, but it seems certain that he has dreams but does not recollect them, for the sister of the ward says that while asleep he assumes the attitude of shooting with his rifle, and he gives a jerk as if pulling the trigger, then he assumes the attitude of using his bayonet ; the other men in the ward tell her that he gives the movement of the right parry, then the left parry, and lastly the thrust, as if he were in action. He sometimes jumps his whole body as if he heard or saw a shell coming, and he catches his right elbow as if he were hit there. He was then observed to open his eyes wide, get up, and look under the bed. Apparently he is not conscious of this. He then awakens and begins to cry, but there is no sound. These defensive habitual attitudes have been also noticed in soldiers when under an anæsthetic. During hypnotic sleep he did not assume these defensive attitudes, although he dreamt of his trench experiences.

Speech Defects.

About one in twenty of those suffering with shell shock and having no visible signs of injury have lost their speech, and yet are quite able on admission to write a lucid account of their experiences. As a rule, these men are unable to whisper or produce any audible sound; thus there is no sound when they laugh. They are unable to whistle or to cough, and in severe cases there is difficulty of putting out the tongue, and in one case of swallowing. Why should these men whose silent thoughts are perfect be unable to speak? They comprehend all that is said to them unless they are deaf, but it is quite clear that in these cases their internal language is unaffected, for they are able to express their thoughts and judgments perfectly well by writing, even if they are deaf. The mutism is therefore not due to an intellectual defect, nor is it due to volitional inhibition of language in silent thought. Hearing—the primary incitation to vocalization and speech—is usually unaffected, yet they are unable to speak; they cannot even whisper, cough, whistle, or laugh aloud. Many who are unable to speak voluntarily yet call out in their dreams expressions they have used in trench warfare and battle. Sometimes this is followed by return of speech, but more often not. One man continually shouted out in his sleep, but he did not recover voluntary speech till enjoying the festivities of singing the old year out and the new year in, eight months after he had suffered the shock. It was thought that his loss of speech might be connected with adenoids, and he was told that if these were removed under an anæsthetic he would certainly be cured; but in spite of the strong suggestion he did not recover his speech. In another case of a severe character the larynx was faradized, but it made no difference; in fact, it did harm, as it increased the emotional condition. The sudden and varied manner in which these mutes recover their power of articulate speech and phonation is indicative of a refractory condition of the voluntary cortical mechanism of phonation. In some cases there is a history of a blow on the chest—e.g., from a sandbag—or of being buried and partly asphyxiated, and it is usual for the loss of speech to occur at the time of the shock. One patient, however, gave a history of difficult speech for two days after the shock—he lost his speech completely only after his vestibular reactions had been tested; while another who, after the same investigation, became a deaf-mute recovered his speech upon hearing a man in the hospital say the word "Rose"; he at once sat up and repeated the word, proving, as he said, "I could both speak and hear."

Some of the earlier and more severe cases of shock followed by mutism were unable to expire forcibly enough to cough, whistle, or blow out a candle, but the less severe may be able to perform these acts and yet be unable to speak or whisper. The latter cases recover usually more quickly than the former, but sudden recovery may occur in the severe cases. Thus a private, who went to France in October, 1914, on August 9, 1915, was going to pick up a wounded comrade when a shell came and blew his comrade to pieces, and he then knew no more till about half an hour later, when he recovered consciousness, but found himself deaf and dumb. There evidently were two factors in the production of the symptoms: the physical and the psychical. He was admitted under my care. Some weeks later his fellow-soldiers thought he ought to hear and speak, and they adopted energetic measures to make him shout out for help. Two of them leathered him with a slipper and then nearly throttled him. He struggled and shouted "Stop it." Another man dreamt he was falling over a cliff, shouted out, and recovered his speech; another dreamt he was blown up by a trench mortar, and shouted for help; finding himself speaking, he continued to speak aloud, and did not go to sleep again for fear he might lose his speech. Another man, a deaf-mute, was heard to speak in his sleep. He was told by a comrade. He said, "I don't believe it." Some have suddenly recovered their speech by crying out when unexpectedly feeling physical or mental pain; for example, one man cried out when some boiling tea was spilt over him, another when he was held down and his feet tickled. In most cases it is the sudden and unexpected which restores the function of the vocal mechanism. Thus a mute sergeant saw some soldiers larking in a punt, and he suddenly shouted out, "You will be over." Occasionally the stimulus of a well-known chorus has broken down the refractory condition in the psychic mechanism of the voice, and the mute has surprised himself and others by finding himself singing. This mutism is due to an emotional shock; it is a psychic rather than physical trauma in my judgment, for it in no way differs from the description of hysterical mutism. "Some of the leading peculiarities of hysterical mutism are these: its onset is very sudden, and often after a fright or some strong emotional disturbance; sometimes it follows an hysterical seizure, either with or without paralysis of limbs; at other times it occurs without assignable cause, or it may be induced, as already stated, in some hypnotized persons by suggestion. The subjects of this disability are completely mute—presenting in this latter respect a notable contrast to ordinary aphasics, who so frequently make use of recurring

utterances or articulate sounds of some kind. The intellect seems unimpaired, and they are able freely to express their thoughts by writing. Though the common movements of the lips, tongue, and palate are preserved, these parts (constituting the oral mechanism) are unable to act in the particular combinations needful for speech movements, in association with the other combinations of muscular action pertaining to the vocal mechanism.

Bastian[1] notes also that there may be more or less complete anæsthesia of the pharynx in hysterical mutism; this I have observed in some of the mutes. He notes that, as in these soldier mutes, hysterics may recover their speech suddenly as a result of a strong emotion; also, as in the soldiers, recovery may be followed by stammering or stuttering. I have noticed that the stammering more frequently occurs in a person who had a tendency to stammer before the shock occurred.

Bastian refers to a case in which frequently recurring attacks of deafness were generally associated with blindness or deafness, one or both. These conditions are also observed associated with mutism in soldiers the subjects of shell shock. He also cites a case of his own—a sailor who suffered with a great number of attacks of mutism (the first occurring as a result of fright) who previously had not suffered from any nervous disease and previously had led an active life in all parts of the world. We may therefore conclude that this mutism resulting after shell shock in no way differs from hysterical mutism. It appears, therefore, that there is nothing new in these functional disturbances and disabilities of speech and special senses except it be their severity and frequency in men the subject of shell shock.

We may now inquire into the pathogenesis of mutism. Charcot attempted to draw a distinction between aphonia and mutism. He adopted the doctrine of Marey and other physiologists that the larynx takes no part in whispered sounds. According to Charcot, therefore, aphonia (in which the power of whispering is preserved) is a result of a partial paralysis of the adductor muscles of the larynx; while as to hysterical mutism, Charcot writes: "If the individual suffering from the affection is unable to whisper, it is not because he is aphonic, or rather because his vocal cords do not vibrate; it is not because he has lost the common movements of tongue and lips—you have seen that this patient was able to blow and whistle; it is because he lacks the ability to execute the proper specialized movements necessary for the articulation of words. In other terms, he is deprived of the motor

[1] Bastian, "Aphasia and other Speech Defects," p. 126.

representations necessary for the calling into play of articulate speech." Charcot therefore believed the oral division of the speech mechanism only to be at fault in hysterical mutism. Wyllie maintains that whilst this may be so in some cases, in a second group it is the laryngeal division of the speech mechanism which is at fault, and in a third set of cases both oral and laryngeal mechanisms are simultaneously disabled. Bastian alludes to a remarkable case recorded by Guido Banti, in which the individual lost his speech owing to a lesion of Broca's convolution, but was able to write and the general intelligence was not interfered with. Charcot considered hysterical mutism to be an instance of pure "motor aphasia," resulting from a functional trouble in Broca's region. Bastian, however, agrees with Wyllie that aphonia and mutism are most intimately related, differing in degrees only; "and the oral and vocal speech mechanisms are concerned in all speech mechanisms, whether it is sonorous or whispered." Bastian considers that the clinical differences between simple aphasia and hysterical mutism force us to believe in the existence of a bilateral cortical disability in the third inferior frontal convolution.

Sir Charles Bell, in his great work on the expression of the emotions, first drew attention to the influence which powerful emotions exercise upon the respiration. A part of the cortex controls the mechanism of breathing in the production of all voluntary audible sounds, and this, like the movements of the vocal cords, is represented in both halves of the brain, for the muscles of the two sides of the body which control the breath and phonation always act synergically and never work independently. In the oral division of speech mechanism the muscles of one side never act independently of the other. Bastian is probably therefore correct in asserting that it is a functional disability of cortical structures in both hemispheres. Whether he is right in asserting that it may be localized in the third inferior frontal is another matter. I believe this mutism is due to an inhibitory functional paralysis of the voluntary central nervous centres which control the management of the breath and its mode of escape through the glottis, mouth, and nostrils, for I have seen many cases where they have involuntarily and unconsciously in their dreams talked and uttered cries and swears, but in their conscious state were unable not only to talk or sing, but to whisper, whistle, utter a cry, cough, or laugh aloud. The worst cases were unable even to blow out a candle. I examined one with X-rays and found the diaphragm could by no effort of the will be made to descend in an adequate way to fill the bellows sufficiently to produce an expiratory blast for coughing.

The sudden mode in which these mutes recover is remarkable, some trivial circumstance bringing it about—e.g., a mute went out of the ward and to his surprise met an orderly, who asked him what he was doing there; he replied he did not know he was doing wrong. The element of surprise and unconscious effort seems to be essential. The more they wish to recover the less likely they are to do it. Conscious efforts, therefore, will not help. I tried offering a bottle of stout to a man as soon as he spoke; it had no effect. This is, however, a useful method to apply to soldiers who have been mute and who are not desirous of getting well too soon. One man I had who screwed up his face as if he could only articulate in a whisper with the greatest efforts of the will. He over-acted the part. "Sister," I said, "this patient is ill: he should be kept in bed and put on No. 1 diet. When he asks loud enough for you to hear he may have a mutton chop and a bottle of stout." He was not long in recovering! A case which did not recover for eight months was most anxious to recover and tried very hard; he became depressed when he saw others had recovered their speech. All these facts make it probable that an *anxiety neurosis* keeps up this mutism by dissociating the cortical ideation neurones of internal language and feeling from the effector neurones which direct and control the breath and its mode of escape. Why should they be able to write and yet not produce audible sounds? Written language expresses comparatively little feeling as compared with spoken language in which, by the control of the breath and phonation, the voice is modulated and suffused with the appropriate affective tone to express the various emotions and passions. Moreover, inarticulate audible sounds, expressive of the primitive emotions and passions dependent upon the management of the breath and phonation, constitute an important part of a universal language understood by all mankind. The mutism following shell shock cannot be explained by cerebral commotion caused by the dynamic force generated by the explosive in a definite anatomical region of the brain, but must be associated with emotional shock caused by terror, which would affect the whole seat of consciousness.

Suggestion.

Suggestion plays an important part in the determination of functional disabilities. Thus one patient was blown up and fell on his right side, bruising the right leg: he afterwards had a functional paralysis of that limb. Some of the cases of mutism followed burial and compression of the chest. A soldier became a functional deaf-mute after the Bárány

test had been applied (*vide* p. xv). A case of functional amaurosis was interesting: a shell burst near a man and wounded a comrade; he dragged the wounded man into a culvert; there he lost his sight, and he could not have found his way out if another wounded man who had taken refuge there had not assisted him. He could see only dimly, as through ground glass, when admitted; he could not distinguish colours or the form of objects at first. He recovered quite suddenly after I had paid a visit and tested him. It is possible that in this case the darkness of the culvert had suggested the loss of vision, and set up a dissociation between the cortical visual perceptor and the terminals of the visual path to the cortex.

Case to illustrate the influence of personal suggestion of recovery by the abolition of a fixed idea.

Shell Shock, without Visible Injury, from a 17-in. gun, affecting a Gunner of Fifteen Years' Service; Severe and Continuous Symptoms following Loss of Consciousness; Tremors, Analgesia and other Sensory Disturbances, Hyperacusis. —Gunner H. A. S., aged 39; fifteen years' service R.F.A., 49th Battery. Out in France ten months; admitted Fourth London General Hospital in January, 1916. Last August, between Ypres and Flamentières, about 3 o'clock in the morning, a Jack Johnson exploded near him, and he remembered no more until he found himself in the Military Hospital, Chatham, fourteen days later. The Colonel told him he was lucky to be there at all. He believes the shell killed a number of his comrades. He was afterwards transferred to Colchester, and from there to the Fourth London General Hospital. When I examined him he was sitting in a chair; legs, hands, and jaw were in continuous rhythmical tremor, exaggerated when he was spoken to; the tremor resembled a clonic spasm so large was the amplitude of the movement. Every now and again he starts, and looks laterally and upwards as if he feared a shell would drop on him; his hearing is extremely acute—in fact, there is hyperacusis—the firing of the guns at Woolwich causes him alarm. In narrating his history there is a constant repetition of words—e.g., he said "in action" five times, "between" five times, and then finished the sentence. He dreams of shells bursting, and a fellow-patient says he has disturbed sleep, groans, and utters moans and sounds, and he wakes up with a start at the least noise. It is very difficult to test the reflexes on account of the continuous coarse tremor. The face is flushed, the palms sweating, but the surface temperature is not lower than normal. The pulse is good. He states that he feels better, he can now feel the floor, but he cannot stand or walk without assistance, largely because there is constant tremor. Sensibility and special senses: He does not feel the prick of a needle on the lower limbs, or left arm and hand, but responds on right hand after delay. On the face he responded immediately. He does not feel the vibrations of the tuning-fork on the feet, legs, or hands, but does on forehead, and there was a marked contrast between the bone sensibility of

these parts. He hears the fork quite well at 6 in. from the ears. He has some difficulty in recognizing colours: he picked up the blue box, but was a long time before he picked up the red. His sense of weight was not abolished, but it was difficult to test because of the tremor, which became of much greater amplitude, resembling, in fact, the intentional tremor of disseminated sclerosis, causing the pennies to rattle in the boxes. It is possible that his judgment of the relative weights was aided by hearing the pennies rattle. He could taste very bitter fluids, but could not recognize vinegar, salt, or sapid fluids. The sense of smell was considerably affected, for he did not recognize tincture of asafœtida, attar of roses, and oil of cloves; he smelt nitrite of amyl, and recognized strong ammonia and glacial acetic acid, but they seemed to have much less stimulating effect than might have been expected. The long time which has elapsed since the shell shock, and the severity of the symptoms which have persisted, coupled with the fact that the man was a gunner of fifteen years' service, renders it probable that this may be a case in which functional disturbance due to emotional shock is not the sole cause of the symptoms.

Although I felt that there was possibly some organic change in his brain to account for the severity and persistence of these rhythmical tremors, increased by attention, yet I felt sure that the only hope of recovery was by suggestion; therefore I assured this man that he would recover and that the tremors would cease. I told him that the careful examination I had made assured me that there was no organic disease and made me certain that he would recover. A steady improvement has occurred, and yesterday, a fortnight after admission, he is sitting in his chair without any tremors and with a profound belief in me, and most grateful. I use him now as an object-lesson to all those who are affected with tremors. If I had used hypnotism I do not think I could have done better, and I might have done worse. Captain Brown, who looks after my cases, will tell you of a case where the arousing during hypnotic sleep of terrifying experiences in dreams had a very bad effect on one of my patients. However, I do not think this should stop us using hypnotism in cases where suggestion by personal influence fails. I will relate another case, one of paraplegia, which I saw at a convalescent home, that was supposed to be of organic origin and had been massaged and electrified for months. I examined him and found no signs of organic disease. I said: "Get up"; "I can't," he said. "I will help you," I replied, and at first I supported him, then, while conversing with him, I relaxed the hold I had, and after a little while I told him that he had been standing by himself, and if he could stand he could walk, which I made him do, supporting him a little. "Sister," I said, "take away that wheeled chair, take away sticks. He must get up

and walk without any aid." A month later when I visited I found him quite well. I could relate experiences of malingerers and the difficulties experienced in discovering them, but possibly some cases which one suspects could only be found out in a way which was suggested to me in a dream. A man that I felt convinced was a malingerer, but I could not decide whether he might not be a case of astasia-abasia, was boarded out of the Service. I dreamt about this man being before a medical board, and that he was made to walk by the threat that if he did not do so he would be court-martialled and shot the next morning.

I will conclude by briefly summarizing some of the remaining important functional disturbances noted in these cases of shell shock.

Hearing. — There may be complete deafness as a result of the shock; in some cases sounds are heard, but their meaning is not comprehended. In many cases there is at first an organic cause for the deafness due to the explosion; this deafness is worse on the side on which the shell has burst. In some cases the drum is found to have been damped off by wax which has been forcibly driven against it. Hyperacusis is a common and a very troublesome symptom, causing apprehension and even morbid fear of noises. Hallucinations of hearing are fairly common—the patients complain of hearing shells coming, of bullets whizzing and whistles blowing. Many get a drumming in their ears, especially when they have had headache, but this may be replaced by ticking or clucking.

Vision.—This also may be completely disturbed during the acute stage of shell shock, but more often the patient complains of "smoky vision" than blindness. Attacks of smoky vision may occur. Failure of accommodation and feeble reaction to light are common in the acute stages, and it may be weeks before the patient is able to read even the largest print. Occasionally there is diminution of the colour sense and of the visual field. One officer, a Canadian, complained of seeing everything greatly magnified—his bandolier of cartridges looked as large as a pom-pom belt.

Illusions and hallucinations are not uncommon symptoms in the acute stage of shell shock.

Headache invariably follows shell shock: it affects especially the occipital region, passing down the back of the neck; other positions are frontal, supra-orbital and vertical, in one or both temples, or behind the eyes. The pain is variously described as burning, stabbing, like a tight-fitting helmet or hat, or like a hot wire being run through the head.

At the same time there may be a dull aching. It is worse at night, especially on lying down and on trying to go to sleep. It seems often to be associated with the revival of terrifying thoughts, and is increased by the mind dwelling on them and trying to repress them. Some of the mutes complain of headache when they make efforts to speak, and deaf men when they make efforts to hear, or the functionally paralysed to use his limbs.

Headache.—Conscious effort—attention—uses up natural energy, and this gives rise to headache. Strange to say, some few patients on suddenly recovering their speech have felt ill and complained of headache for some hours afterwards. Headache is aggravated by noise, and insomnia and sleep disturbed by terrific dreams, and by physical or mental effort; it is one of the most intractable symptoms of shell shock. It only passes off gradually, and may be so severe as to give rise to depression, melancholy delusions and suicidal tendencies. Inability to concentrate attention and irresolution are common symptoms.

I will not do more than mention the fact that the motor disturbances may be various—tremors, tics and paralyses. These are:—

(1) General tremors, which may be very marked, especially in the acute stage, coarse and medium.

(2) The tremors, which may be coarse, medium, or fine, limited to the hands. There may be tremors of the tongue and face muscles, like those seen in general paralysis of the insane.

(3) The tremors affecting the legs are coarse and exaggerated by attempts to move them, especially if the patient attempts to walk.

Various tics are observed. Torticollis, facial spasm, blepharospasm and lateral movements of the head upwards and over the shoulder, as if anticipating a shell coming.

Gaits.—A curious dancing gait, a short rapid step, hardly raising the feet from the ground, a shuffling of feet along the ground, making hardly any progress. Inability to stand or walk. Astasia-abasia.

I trust that our neurological colleagues will fill up the many gaps I have purposely left; for to deal with such a vast subject is more than can be expected. I have therefore dwelt especially upon some of the more interesting psychical aspects of the subject with a view to promote, at this Section, a discussion thereon.

In the Lettsomian Lectures which I shall deliver at the Medical Society I hope to have time to deal more fully with the subject of the possibility of the causes underlying "commotio cerebri" following shell shock.

Major W. McDougall, R.A.M.C.

At Netley, where I have been in charge of the Neurological Section since last May, the shock cases are of especial interest to members of this Section of the Royal Society of Medicine, for all Expeditionary cases labelled "mental" are sent there in the first instance. That is to say that at Netley we see many shock cases which present positive symptoms of mental disease in addition to, or in place of, the functional disabilities of mind and body which are the most frequent effects of shell shock. We see, therefore, many cases of mental disorder in early or incipient stages. In a surprisingly large number of cases the symptoms are sufficiently pronounced to lead the officers who see them abroad to the diagnosis of definite mental disease. The diseases most frequently diagnosed (often by officers of asylum experience) seem to be dementia præcox, melancholia, paranoia, mania, and stupor. The following points of interest occur to my mind in connexion with these cases. In a large proportion of them the symptoms clear up very rapidly. In explanation of this fact I would suggest the view that in these rapidly recovering cases we are dealing with persons whose constitutions are naturally stable and elastic—constitutions, that is to say, which were liable to break down only under the extremely severe shocks and stresses of modern warfare. Another point of interest is the fact that the leading mental symptoms, such as delusions and hallucinations, are so frequently traceable to particular experiences of a vivid and generally of a distressing kind.

As the period of the War lengthens out, I am increasingly impressed by the frequency of cases of the following character: A man sustains shell shock, and is sent home with some functional disability such as amnesia, mutism, paralysis, or tremor. After some months he returns to the Front seemingly cured, and there he very soon develops positive symptoms of mental disease. Another way in which the profoundly disturbing nature of shell shock reveals itself is illustrated by cases of the following kind: A man passes many months at the Front, sustaining with equanimity the various stresses, until one day a shell explodes near him without incapacitating him from duty, perhaps merely causing him to be shaky and dazed for a few minutes. From that time on he is a changed man; he can no longer come under shell fire without distress; he is always anticipating the shells with dread, and before long he breaks down with hallucinations or delusions or all the symptoms of mania or of melancholia.

My experience leads me to agree with Dr. Mott's observation that at present functional disabilities due to shell shock are less frequent and profound than they were earlier in the War; and I am inclined to accept the explanation which he has suggested this evening. If this view is true, we may see in it one among many other indications that shell shock is in many or, as I think, in almost all cases, not a merely physical concussion, but involves, as an element of large and often preponderating importance, a moral or emotional shock.

As I listened to Dr. Mott's comprehensive and most interesting account, I tried to call to mind cases of types not described by him, and I have found only one such. This is a type of which I have seen only two well-marked instances. It may be roughly described by saying that the patient is reduced, both intellectually and morally, to childishness. One of these cases has been discharged recovered, the other remains very obstinate.

Very interesting and also satisfactory (in that they are readily curable by suggestion) are the cases of simple amnesia following on shell shock. I am disposed to question Dr. Mott's generalization that retrograde amnesia results only from physical concussion and not from the mere explosion of a shell in the vicinity of the patient. For I have had under my care several cases of very profound retrograde amnesia in which there has been no bruise or other evidence of concussion by impact with a solid body. One of these cases was especially interesting in that the patient's memory function seemed to be reduced to its most rudimentary or primitive condition, such as we may suppose to obtain among the lower animals. It was eventually proved that he had been a barber; and we were led to suspect this by the fact that, when a pair of scissors was put into his hand and he was asked to cut the hair of another patient, he showed great aptitude for the task and said it seemed familiar. When an old friend entered his ward for the first time, he started up, calling out the Christian name of the visitor; yet he could recall no further fact connected with him and did not know that he had seen him before. Again, although the patient had been a choir-boy, he could not recall any melodies, and when a popular air was whistled before him, he did not recognize it; but he reproduced it accurately and said that as he whistled the air it seemed familiar.

But the lateness of the hour forbids me to pursue further any of the multitude of interesting questions raised by Dr. Mott.

Captain WILLIAM BROWN, R.A.M.C., M.B.

Speaking as a psychologist rather than as a neurologist, I should like to mention quite briefly a few facts that I have been able to observe while treating shell shock cases at Maghull and at the Fourth London General Hospital. At the latter hospital I have had the privilege of working under the direction of Dr. Mott, and have treated two of the cases to which he refers in his paper. The deaf and dumb patient from Gallipoli was hypnotized by me repeatedly. In hypnosis, somewhat to my surprise, he did not go through the movements of fighting, &c., which often occurred during his ordinary sleep, but on being brought out of the hypnotic state he intimated by writing that he had been dreaming that he was back in Gallipoli. I hypnotized him repeatedly, and after each hypnosis he described some part of his experiences in Gallipoli, the accounts when put together being a fairly complete record of his terrifying experiences while on the Peninsula. But he is still unable either to hear or speak. I have not completely given up hope, but the conditions are difficult, since no suggestion can be given to the patient during hypnosis. I mention the case to show that, in one instance at any rate, mere hypnosis in itself is not sufficient to effect a cure. I have tried hypnosis with a number of other cases, and to my own surprise did not meet with a single failure. But the effects of the hypnosis have not always been good. One patient, with a tremor of the left hand, found himself back in France under shell fire during hypnosis, and despite suggestions made to him in this condition, his arm trembled more than ever, and on being brought out of the trance he implored me not to repeat the treatment, as the events he had been re-experiencing were too awful. He had just seen his "pal's" head blown from his body by a shell. When the lost memories are not too painful, a patient may undoubtedly benefit by their recall through hypnosis.

With regard to the dream which Dr. Mott quoted, in which a legless body figured, I might add a few remarks. The patient who dreamt this dream is a well-educated sergeant, and by means of mental analysis —I will not call it psycho-analysis—I have discovered that all his dreams are full of significance, and his other mental symptoms likewise. He dreams repeatedly of a wounded man taken up on the field of battle by one of his stretcher-bearers, who had had both of his legs shot away; but in the dream the head of the wounded man is replaced by that of the patient's wife or mother. Anxiety about his wife, whom he had recently married and who was much younger than himself, was found

to explain this characteristic of the dream. Thoughts about his mother were involved in the same worry. The patient had suffered from several fainting fits since falling ill in France, and himself remarked on the fact that they always occurred in the dark. While I was cross-questioning him about this he suddenly remembered that he had received a very severe fright one dark night near his dug-out. He went out to view some dead bodies, one of which was the body of a close friend. On drawing aside the macintosh sheet from this body, to his horror it stretched out its arms, although its head was smashed in and it was otherwise severely mutilated. In fact, the man was alive and did not die till four hours later.

The patient himself volunteered the suggestion that this was the origin of his fits at night. The incident appears, with very little alteration, in the dream which Dr. Mott has quoted. This same patient tells me that he now notices a tendency in himself to become suspicious of people around him on slight provocation. In particular, he feels irrationally suspicious of his wife, without any justification whatever. Cross-questioning elicited the fact that the patient, when about the same age that his wife now is, had become somewhat intimate with a married woman, and he now admits that he sub-consciously fears lest the tables may be turned upon himself. In ways like this it has been possible to show and—what is most important—to convince the patient himself that his symptoms, apparently so irrational, are adequately explicable in terms of his earlier history. The effect of this mental analysis on his mind seems to be definitely beneficial.

This case brings me to a brief illustration of the kind of work which I have been doing at Maghull, under Major R. G. Rows. Major Rows, with his splendid enthusiasm for the method of analysis and re-education, has encouraged the same interest in his staff, and has given every opportunity and facility for detailed work upon these lines. Out of numerous analyses which I have of my own cases, some extending over many months, I will mention two very briefly, as illustrations of the method and its *rationale*.

One is the case of a young soldier suffering from hallucinations of hearing. He was continually hearing the voices of his brother and sister upbraiding or admonishing him. He called it "supervision," and his own theory was that it was a case of telepathy, and that the supervision was intentional. Investigation showed that he first began to hear these voices five years previously, three months after returning to his parents from a holiday at Brighton, where for the first and only time in his life he had gone with a woman off the street. In the train

on his way home he became physically sick, for no reason whatever so far as he could discover. It became quite evident on analysis that this yielding to temptation on the part of a well-educated son of respectable parents had been the chief factor in the origination of the disease. The vomiting was a translation into the physical of the subconscious mental, and the voices heard later were the externalization of the boy's feelings of remorse and lack of sureness of himself. There were many additional symptoms and factors which I cannot go into here. My treatment consisted in revealing to the patient, through his own confessions, the chain of mental causation which led up to his symptoms, and in persuading him to accept this view in the place of the systematized delusions of telepathy and supervision which he had been fostering. As my aim was to give him self-knowledge, I would like to call the method which I used that of *autognosis*. The patient made a complete recovery, and was discharged within three months. Of course there is the possible objection to this, as to every other case of recovery from mental trouble, that rest and mere lapse of time were the efficient factors leading to recovery, and that my argument is an instance of *post hoc ergo propter hoc*. To this I would reply that it *may* be so, but that actual experience of the individual cases as one analyses them gives rise to a compelling feeling of causal connexion. There is always collateral evidence of a confirmatory nature which helps to pin one down to a single hypothesis.

My other example is that of a sergeant who was in the firing line during the retirement from Mons. He was admitted to Maghull suffering from the delusion that people thought he had himself given the signal for the retirement on a silver whistle which he had won for good shooting, and which he had used for giving signals instead of his nickel-plated whistle. He had noticed that the German officers used silver whistles which gave a note similar to that of his own. Further investigation showed that he had other delusions of a similar nature, one being that people thought him responsible for the railway accident near Edinburgh last May, because his troop train was due to go by that spot about the same time, and he had mentioned this to friends. He thought possibly a German spy had heard this and brought about the wrecking of the train, thinking it to be the troop train. Mental analysis revealed the memory that at the age of 12 the patient had been falsely accused of stealing pork-pies from a shop, and had been brought up before the magistrate for this offence. He succeeded in proving an alibi, but the incident made a deep impression on his mind and worried him for some years. Analysis of his dreams and of outstanding events

in his life tended to show that this incident of the false accusation was the beginning of that tendency towards delusions of being falsely accused which culminated in the mental breakdown at Mons. After a two months' analysis the patient began himself to see the connexion between the mental effects of the various events of his past life, and the autognostic method produced a remarkable improvement in his mental condition. When I left him last month he was quite free from delusions, and showed a great improvement in his general mental grip.

Finally, I should like to draw attention to the curious fact that very few cases of mental breakdown seem to have occurred among the troops at Gallipoli at the time of the first landing, in spite of the awful slaughter. During the first two or three weeks after this landing I only saw about half a dozen cases of nervous breakdown in the Seventeenth General Hospital at Alexandria. One might attribute this partly to the protective influence of the sthenic emotions which actuated almost all the men at the time. The prolonged strain of trench fighting under high explosive shell fire is the chief cause of nerve shock, and this factor was absent at the beginning of the Gallipoli campaign.

DR. STANSFIELD.

The psychic effects which have been found accompanying shell shock are such as are ordinarily met with in the practice of psychiatry, and are then usually the outcome of stress producing exhaustion in a subject with poor resistance, owing to inherent or acquired defect.

The sustained mental tension necessarily associated with life in the firing line and its vicinity, kept up without intermission for two and sometimes three days at a time, with little or no sleep, is sufficient in itself to produce marked psychic disturbance in the most robust—varying with the individual—from dullness, retardation, and lethargy to severe depression with illusions and hallucinations, particularly of sight and hearing. In the case of the psychopathic it is therefore to be expected that the more profound lesions will be developed.

One is struck by the similarity of symptoms, in some cases labelled "shell shock," to those frequently found in dementia præcox—apathy, retardation, amnesia, and aphonia—so much so as to cause one to wonder if the primary and essential causes of this condition had not already been at work, and whether the stress in the trenches and under shell fire had only expedited the attack.

The most instructive and interesting cases to work out will be those in which there was no previous psychopathic tendency.

I have two cases of special interest to bring before you. One a case of amnesia following projected suicide, and one of protracted mutism :—

Case I.—P. M. M., aged 30, single, born in the West of Scotland, of a Scottish mother and an Irish father. Infancy and early life spent in very poor surroundings, and very suggestive of the scenes depicted in "Children of the Dead End." Enlisted at the age of 18½; served in South Africa and afterwards in India. Whilst in India he frequently became unduly tired after gymnastics, and he developed the idea that he was physically unfit, and on reading a book, "The Open Question," by Robbins, in which suicide is freely discussed, he decided that, without means, life for him was not worth living. He decided to complete his twelve years' service in the Army; then to have a real good time with the money he would have accumulated, and then to commit suicide. This idea he kept up for approximately five years. On completing his service he carried out his programme, taking about a month to get through the money he had accumulated. He then removed all evidence of identity from his clothing, &c.; left his bag with a man at the Union Jack Club; put a razor in his pocket, and walked out of London till he came to a common, intending to commit suicide. He was found on the common, taken in charge, and handed over to the parish authorities, being unable to speak or account for himself. The aphonia had passed off when he was brought to the hospital, but he had completely lost all memory of his past life. He was unable to give his name or any account of himself. He could perform all actions which were automatic, but otherwise was like a child. He could not name simple things such as pen, key, &c., but when told remembered their names. He had forgotten how to read and write, and even the letters of the alphabet were unknown to him. This condition obtained for seven weeks. He retired to bed one night in the condition described, and he awoke next morning to find his memory had returned. He was immediately able to give a very full detailed account of himself and his past life. He has, however, no recollection of the interval between lying down on the common outside London and finding himself in bed in the hospital here on the morning when his memory returned to him seven weeks later. In other words, there is a complete blank in his memory of seven weeks.

Case II.—The second case, W. G. W., aged 36, served in the Boer War and afterwards in India. Was invalided from India to Netley Hospital, and afterwards sent on to me. When admitted to Bexley he could not be induced to speak, but would answer simple questions by writing on paper, and would, by movements of his head, indicate "Yes" or "No." He did not appear to understand where he was, and would point and gesticulate when interviewed, smiling somewhat inanely. He remained in this condition for just over twelve months, when one day, when at the dinner table, he suddenly asked for a drink of water. He was then able to give a full account of himself. Before leaving for the Boer War he used to hear voices speaking to him, and saw all kinds of objects before his eyes, but could not be induced to tell the nature of these objects. He said that he would not go sick as he feared the other men would

think he funked the War. When at the Front he felt well for some considerable time; then he began to hear people saying things against him. When he asked them why they made certain statements they denied having done so. He complained of pains in his head at that time—things "pecking" at his head, which he thought was caused by men about him. When he left South Africa for India he thought people on the boat were chasing him to get his money. In Lucknow he heard himself accused of theft, and heard it said that he was going to be hanged. He told these things to the doctors, and as they did not believe him and made him out "in the wrong," he decided not to answer any questions in future but to suffer silently. He made slow but steady improvement, and was ultimately discharged recovered.

Both these men were very good musicians, and for some time were valuable members of the Institution band.

The matter-of-fact way in which the functions of speech and memory were resumed rather tends to exclude any suggestion of hysteria; and it is in keeping with numerous instances which I have observed after prolonged aphonia, where in one case the patient suddenly spoke when he accidentally dropped a big bundle of garments he had been struggling to hold, and in another instance the man, when practising in the cricket field at the net, shouted "Damn" when his middle stump was taken—the barrier in each instance, when broken down, not having been put up again.

The prognosis, even in the most severe cases, is, I believe, distinctly good, provided there is no neuropathic or psychopathic basis; but if the latter obtain, it varies with the extent of the lesion—in the severe cases being distinctly bad.

The treatment should be based on rational lines—absolute rest and quietness, with all the sleep possible, preferably with agreeable surroundings in the country; a nourishing, easily assimilated diet; appetite stimulated, if necessary, by simple tonics; little or no alcohol, and a watchful eye being kept on the excretory functions.

From my experience, I do not place faith in hypnosis or auto-suggestion, particularly in the early stages of treatment. Duration of treatment necessary varies from a few weeks to a few months.

I believe a great deal could be done towards reducing the number of these cases, and the severity of the attack, in those which do occur if commanders in the field could be induced to impress upon their men the importance and necessity of taking rest and sleep whenever possible; rest in the horizontal position being of great value by reducing the blood-pressure and thus relieving tension, even if absolute sleep is not obtainable. They should certainly make up their sleep account directly they are brought out of the firing line.

Note.—This Discussion was adjourned to the meeting of the Section of Neurology, held on January 27, 1916.

Sections of Psychiatry and Neurology.

Section of Neurology.

President—Dr. JAMES TAYLOR.

(*January* 27, 1916.)

ADJOURNED SPECIAL DISCUSSION ON SHELL SHOCK WITHOUT VISIBLE SIGNS OF INJURY.[1]

Captain WILFRED HARRIS, M.D.

THERE are different varieties of shell shock. These affect naturally phlegmatic as well as congenitally neurotic individuals. It proves that prolonged mental strain and hard work may break down the nervous stability of even the hardiest individual, especially if much under shell fire. Broken sleep, irritability to noise, forgetfulness of appointments and engagements, and inability to concentrate attention on reading or writing, are prominent features of most cases of shell shock, and the recovery from them is apt to be slow. In one case, after slow and continuous improvement for some months, the man became as bad as ever after experiencing a vivid dream of the battle he had been through. In another patient, who had previously been in perfect health, the characteristic symptoms of disseminated sclerosis followed immediately after the bursting of a shell some few feet above his head a month ago. Coarse nystagmus, intention tremors, syllabic articulation, incontinence of urine, and extensor-plantar reflexes were still present, though his mental condition, which was somewhat emotional, was said to have

[1] The first part of this Discussion is reported in the Proceedings of the Section of Psychiatry for January 25, 1916.

improved considerably. The possibility of numerous small lesions throughout the cerebrum as the result of the intense atmospheric disturbance following the explosion must be considered as a likely event. The patient had not been rendered unconscious by the explosion, and he is quite certain that he did not suffer in any way from being gassed as the result of it.[1]

Dr. COLLIER.

I consider that the conscious realization of the explosion and of its results, the severe sensory stimulation, and the remembrance of these, are the essential factors in the production of the train of functional symptoms under consideration, and that cerebral concussion stands in an antagonistic position to the psychical trauma. For if severe concussion produces immediate unconsciousness at the moment of the explosion, there can be no psychical trauma, and there is no remembrance of the event. In my experience, those cases in which an immediate loss of consciousness occurs suffer with the symptoms of cerebral concussion only and do not develop the functional symptoms. The investigation of this matter is difficult, since the patients always refer to the commonly occurring amnesia from psychical trauma as "unconsciousness."

I do not think that psychopathic and neuropathic antecedents are of importance as determinants of functional manifestations following shell shock. What seem more important are the proximity of the explosion and the violence of the sensory effect, provided consciousness be retained. Major Mott has referred to epilepsy as occurring only in those who have previously had fits, or in whom there is a family history of this disease. So far as epilepsy has resulted from shell shock, I am convinced that there are many cases in which no previous taint is present. This is probable from the important causal relation of fright to epilepsy, and it is important from the point of view of allotting compensation. "Fugues," or "wandering attacks with loss of memory," have occurred in some of my patients; there is a remarkable regularity of occurrence in the initial symptom of these attacks—a bursting feeling in the head, which increases until the loss of memory takes place.

The very low blood-pressure that obtains in cases of shell shock is remarkable. In only a very few cases has a high tension been noted, and such cases seem to be longer lasting and more resistant to treatment. Functional blindness has been very rare in my experience.

[1] He is now (February 20) practically quite recovered.

Complete functional deafness has occurred in one case. This patient had a similar attack some years ago when, as the result of an emotional shock, he became completely deaf for some months, and learnt to be a skilful lip-reader during his period of deafness, from which he recovered spontaneously. As the result of shell shock his symptoms have recurred. This patient converses so perfectly that it is difficult to believe that he is deaf. He cannot, however, be aroused by sound, and he can read perfectly the lips of anyone who speaks silently at a distance of 20 yards.

There have been a large number of cases of deafness, with mutism or lesser degrees of aphonia. These patients have been all alike with regard to the disappearance of the deafness prior to that of the aphonia, and as regards their ready facility in reading and exteriorizing written speech. One patient is worthy of a record as demonstrating the functional disregard of sound. He is a very intelligent man and was completely mute, and paid no attention to sounds. In the course of a written conversation he was asked if he heard anything when he was spoken to. In reply he wrote: "I can hear your voice quite well, Sir, but I cannot gather anything from it." This patient recovered spontaneously. He first began to recognize the last word of a sentence addressed to him and to repeat it audibly, and soon recovered his faculties of hearing and speech.

In the treatment of aphonia I have tried the effect of light etherization, which was suggested and used with success by Dr. Bastian many years ago. This has been successful in a few cases, but in the more severe cases it seems powerless to remove the resistance, and the patients go under the anæsthetic without any vocal excitation. The method, moreover, has the disadvantage that it may produce resentful emotions and loss of confidence on the patient's part if not successful. The most remarkable success in the treatment of the aphonic patients under my care has been brought about by another patient—an Irishman whom Nature has endowed with such a face and personality as make a perfect jester. He has also the faculty of moving his ears as a mule does. He would stand in front of the dumb patient and perform such comicalities of facial expression as in every case to force the patient into fits of laughter, with immediate restoration of speech.

I regard Major Mott's denunciation of massage and electrical treatment of the functional manifestations of shell shock as of too sweeping a nature, for, while the long continuance of such treatment in cases which do not soon show improvement is to be deprecated, there are undoubtedly cases in which these measures have greatly aided in recovery.

Mr. Walter H. Jessop.

I have had under my care numerous cases of temporary blindness following the explosion of shells; these cases were more often met with at the beginning of the War. The blindness, which was as a rule nearly complete—in some cases not even the flash of a match could be seen—lasted under a week, and generally about two or three days. Both eyes were always affected, the pupils were active to light, and the ophthalmoscopic appearances normal. The fields of vision were sometimes contracted, but more often normal; in only two cases did I find a spiral field. Two curious cases of fields of vision may be mentioned. The first showed complete bitemporal fields, which lasted for two days, when the fields became normal. The other was a case of complete homonymous hemianopsia, which persisted for some weeks, but turned out to be true and very clever malingering. Blepharospasm and photophobia were often present. In all my cases the recovery of vision was complete after some time; the treatment was by kindness, commiseration, and suggestion. The best results followed wearing dark glasses for a fixed and accurate time—say three days, six hours, and twenty-nine minutes. One case did not yield to the glass treatment, but responded on the night nurse waking him up suddenly at 2 a.m. with the remark, "Now you can see," by the answer, "Yes, as well as I ever did in my life." These shell shock cases can be fairly easily distinguished from the true malingerer by both eyes always being affected and by their not being caught out by the usual vision tests for malingering. I have generally used the words "subconscious malingering" for the condition, feeling sure from tests, &c., that the patients are not conscious of their true condition. These cases may be explained by von Monakow's diaschisis theory. The windage of the shell, or in some cases the actual blows from falling down or violence, affecting the cortex cerebri, produces unconsciousness as the "initial" shock. As this passes off, loss of sight becomes the "regressive" phase, followed by complete recovery as the "residual" phase.

Dr. Campbell Thomson.

I am interested in Major Mott's observation that the return of memory for music frequently takes place before that of other memories, as this is in accordance with a case that has come under my own observation. In my case certain experiences of the man's life were lost—e.g., recognition of relatives, places, and animals; while others

(e.g., reading, writing, and music) remained. It thus seems that the memories which one would expect to be the more deeply impressed on the mind were lost in this instance; while those acquired later by educational processes were retained. Does Major Mott consider it likely that a functional type of cleavage of memory can be recognized, as opposed to a loss of memory from progressive organic disease, just as the anæsthesias and paralyses of the neuroses differ from those produced by anatomical lesions?

Dr. DUNDAS GRANT.

In view of the limitation of time I shall confine myself to a few remarks concerning mutism, stammering, and deafness resulting from shell shock and similar incidents of warfare.

In the treatment of *mutism* I deprecate the employment of violent measures during the period of exhaustion, as the use of strong faradaic currents has been known to be detrimental. When the exhaustion has passed off, I think their use quite justifiable. In the earlier stage I advocate the mildest measures. I look upon these patients as having, in a manner of speaking, forgotten how to speak. Being familiar with the method of teaching the subjects of deaf-mutism, my opinion is that it may be applicable to these cases. The first step is to place the back of the patient's hand under the teacher's larynx, so that he may feel the vibrations produced by the utterance of voice; the hand is then transferred to the patient's own larynx and he is encouraged to produce the same feelings, and ultimately the same sort of sound, in the larynx. From this he is gradually led to alter the shape of the mouth cavities for the production of vowels and, later, of consonants. In some cases of concussion-mutism the voice is restored at one sitting, but in others it is a gradual process. There is no simulation about the inability to speak; the patient's anxiety to do so is unmistakable, and his delight at the gradual acquisition of words and phrases quite confirmatory. In two cases I have observed that the voice returns before the hearing, and I think that the act of uttering sound has helped to arouse the hearing faculty. In one very well-marked, long-standing case at the West End Hospital for Nervous Diseases, I put these measures into practice, and fortunately with such excellent result that the house surgeon has adopted the method with great enthusiasm, and by its means has restored the function in five or six cases.

With regard to *stammering*, which seems to be due to a complex

of inhibitions and exaggerated effort, the anxiety of the patient to overcome it is unmistakable, but the more he strives the less he is able to succeed. The efforts are often accompanied by the utmost fatigue. It is therefore necessary in these cases to proceed gently and gradually. It is well known that the so-called curers of stammering teach patients to practise little tricks such as twirling a button, or snapping the fingers, or making some muscular movement before beginning to speak. These are generally totally unconnected with phonation, but there is one muscular action which serves the same purpose of diverting some of the patient's anxiety, and which is, in point of fact, part of the mechanism of speech—namely, the expansion of the lower part of the chest; and in several cases recovery has been greatly hastened by the practice of this little manœuvre before speaking. The Behnke method consists to a large extent in the practice of breathing exercises, and I attribute a great deal of its success to the fact that its practice diverts the patient's attention from his impediment.

In regard to *psychical* deafness there are some points in the diagnosis to which I shall refer. Of its genuineness there is, as a rule, no question, and this is proved to my mind by the fact that the patients sometimes acquire lip-reading with considerable rapidity. I am of opinion that the acquisition of lip-reading is unquestionable evidence of a high degree of deafness. The diagnosis from simulation can generally be made by means of various checks, well known to aural surgeons and "compensation" experts. As compared with deafness due to labyrinthine causes, the psychical deafness is to all appearances more absolute. Again, in labyrinthine deafness, hearing is especially bad for the highest pitched tones. Further, there is often a simultaneous involvement of the vestibular labyrinth, as indicated by loss, or diminution, of reaction to Bárány's test, though frequently the acoustic labyrinth suffers without the vestibular apparatus being involved. In several instances I have tried another reflex which I think will prove of value, although more experience will be necessary to decide this. It is the dilatation of the pupil which follows the sudden blowing of a whistle without the patient being aware of it; in several cases of labyrinthine deafness this was absent, but in others which seemed to be of psychical origin the reflex was present, although the deafness was absolute or nearly so. In the dullness of hearing due to exhaustion, which shows the tuning-fork indications of nerve-deafness, there is usually preservation of hearing for the highest pitched tones. Labyrinthine and psychical deafness may be combined, but the labyrinthine factor is generally unilateral.

Dr. FEARNSIDES.

During recent times shell shock without visible injury has been a diagnosis used loosely, and frequently applied to label any functional nervous affection manifesting itself in a patient who has been subject over a period of weeks or months to the strains and stresses of active foreign service. In order, therefore, to collect together some definite figures bearing upon the ætiology of the cases so described, I have analysed a series of seventy consecutive admissions to the Hospital for Epilepsy, Paralysis and other Diseases of the Nervous System, Maida Vale, of patients suffering from "functional nervous diseases" arriving directly from France with "special" tickets.

In twenty-three of these seventy cases the actual shell shock has been preceded by a period of nervous instability with a complaint of general weakness, tremulousness, inability to sleep, night starts or other symptoms of mild nervous derangements, and then acute collapse following upon the explosion of a shell in the near vicinity, burial in a dug-out, or some one or other of the various modes of onset detailed by Major Mott. Of these twenty-three cases seven, or 10 per cent. of the whole number of admissions, had previously suffered from "traumatic neurasthenia," which in six cases had been the subject of litigation, and four others gave either a history of persistent "nervous debility" in youth or of a previous "breakdown." In four of these patients where no history of a previous "breakdown" was obtained a bad neuropathic or psychopathic family history was detailed. The average age at the time of admission to hospital of those giving a history of previous traumatic neurosis was just over 31, the youngest being 25; whilst of those giving a bad personal or familial history the average age was under 26, the youngest being 19. Only in eight of these twenty-three cases was no history of previous neuropathic tendencies obtained in answer to queries, and it is noteworthy that of these eight cases, five occurred in non-commissioned officers who had been at the Front on the average for more than twelve months, and had apparently broken down through lack of adequate rest; the ages of these eight cases averaged 34.

Four patients, examples of shell shock, detailed how their general health went wrong after an "influenzal" or "diarrhœic" attack, and then a shell burst near them and they broke down completely, whilst one had suffered for ten days from a recurring toothache before he "became nervous during a bombardment." In three of these five cases

the dilatation and irregularity of the heart, accompanied by subjective symptoms of breathlessness and palpitation, were noteworthy, and a study of these cases brought forcibly to my mind the close relationships which exist between shell shock and soldier's heart.

In six cases many of the manifestations could be related to an infection with the *Spirochæta pallida*, for in them the Wassermann reaction was found to be positive at least in the serum, and in several also in the cerebrospinal fluid. The complaints and histories of the patients in these cases differed in no marked way from those obtained in straightforward examples of true shell shock, and I would like to suggest that in all cases of shell shock the Wassermann reaction in the serum should be tested; for in my experience cases of shell shock giving a positive Wassermann reaction which have held fire when treated symptomatically often improve in a most extraordinarily rapid manner when treated with antisyphilitic remedies. In this respect cases of shell shock differ in no gross way from cases of "syphilitic neurasthenia" seen in civil practice. In addition to these six cases two examples of dementia paralytica and one of tabes dorsalis were admitted to hospital with "green tickets," having developed signs and symptoms whilst on active service. Thus in nine cases out of seventy admissions syphilitic disease of the nervous system accounted for some at least of the manifestations alleged to be consequent upon shell shock.

Three patients exhibiting manifestations which closely resembled those of shell shock had suffered from gunshot wounds of the trunk or extremities, and I have seen several examples of patients suffering from gunshot wounds of the head, in whom the dura mater had suffered no grave visible injury, complaining of so-called functional nervous disturbances.

In twenty-five cases symptoms had come on suddenly after, as far as could be ascertained, a period of good health; of these twelve showed gross disturbances of motor functions—hysterical postures, paralyses, and the like, usually accompanied by hysterical anæsthesia—and thirteen exhibited more purely psychical manifestations; in one a rupture of the drum of the right ear at the time of the explosion complicated the psychical phenomena. The average age of the patients in these twenty-five cases was 24.

A point of psychological interest, I think, is the relation of the causative accident to the immediate previous history of the patient. Most of the cases in whom symptoms have come on acutely occurred at a time when the men were going to trenches from their billets, or when

shells were arriving spasmodically and occasionally rather than in rapid succession. When a man's "wind is up" he is more receptive of a psychical trauma. Dr. Mott spoke of the relations of gas poisoning to the development of shell shock, but the cases which I have had under care did not seem to me to bear out any intimate relationship between gas poisoning in gas attacks and shell shock, nor could I get any definite clinical evidence to suggest that the gas from the poison-gas shells was a serious factor. Speaking of gas attacks, when the men in April, May and June, 1915, were expecting such an attack, regimental medical officers with whom I have talked have told me that a chance shot at these times more frequently broke the men down than did such shots under ordinary circumstances.

Dr. LEONARD GUTHRIE.

There are various modes of treatment of functional neuroses, and of hysteria in particular. I believe that all forms of treatment involve the employment of either suggestion and persuasion or of some novel and unexpected emotional or physical shock. The latter method is known as "taking the patient by surprise," and is chiefly successful in cases of hysteria.

Major MOTT (in reply).

I am very interested in the remarks of Major McDougall and Captain Brown on the value of hypnosis in the treatment of cases of functional neurosis and psychosis. I am of opinion that a careful selection of cases is necessary, and I should only be inclined to try it on cases that did not yield to suggestion and other modes of treatment, the most important being diversion of the mind by games, amusements, and occupations in the open air. I agree with Major McDougall that cases of shell shock without visible injury may be associated with severe retrograde amnesia. But unless there was definite evidence of no other factor than the physical force generated by the explosion, I would rather attribute it to the patient having been "sandbagged" or, while buried beneath the blown-down parapet or roof of a dug-out for some time, having been exposed to enforced inhalation of noxious gases, notably CO.

I am very interested in the case of Captain Wilfred Harris, in which there were signs of disseminated sclerosis. A brain was sent to me taken from a man who had been buried by shell-fire, and throughout

there were multiple punctate hæmorrhages in the white matter. Had he lived there would have been islands of sclerosis.

I am glad to hear Dr. Head's remarks emphasizing the importance of fear in the production of what is termed "shell shock," and I agree with him that the term is not correct; for it covers a number of factors in the production of functional neuroses and psychoses observed in soldiers. I am convinced that an individual with a timorous disposition is more likely to suffer from a rapid breakdown than others, and I cite the following case, which has been under my care, as showing the importance of emotional shock in the production of unconsciousness and a subsequent nervous breakdown:—

A corporal in a Highland regiment was sent out with a company to repair the barbed wire in front of their trench. While engaged in this operation a big shell burst, blowing him some distance into a hole. He scrambled out and then saw his comrades lying dead and wounded around; he lost consciousness, and did not know any more till a fortnight later he found himself in Boulogne. He was admitted to the Fourth London General Hospital; he presented the appearance of abject terror, and moved his arms in a way suggesting that he still saw the dead lying all round. He muttered continually: "No send back," "Dead all round." The loss of consciousness did not occur till he saw the terrifying sight. Of this he dreamed continuously, and only when the dreams passed away and normal sleep returned did this patient lose the expression of terror.

In reply to Dr. Collier—who has evidently misunderstood me when he asserts that I said "*only*," whereas I said "nearly always" in epilepsy a previous condition or predisposition existed—careful inquiry in my cases regarding family history and personal history leads me to believe that in the great majority of cases of epilepsy there has been a history of epilepsy, *petit mal*, or neuropathic predisposition, and that the shell shock aggravates a pre-existing condition. In support of this statement I find that, out of twenty-five cases of epilepsy, in twenty there was evidence of either a former epileptic condition or of a predisposition; of the remaining five there was a history of head injury in two prior to joining the Army. I am indebted to Dr. Cicely Peaké's very careful notes for this information. I do not wish for one moment to imply that a predisposition to neurosis is necessarily present in the individual prior to active service in these cases of shell shock. Indeed, I have remarked that cases occur in men who are neuro-potentially sound, and these are usually men who have gone through months of active service at the Front before the breakdown occurs. Even the

strongest nervous system cannot withstand a prolonged cumulative effect of shell-fire and trench warfare without nervous exhaustion.

Again, Dr. Collier stated that my denunciation of massage and electricity was of too sweeping a nature, "for while the long continuance of such treatment in cases which do not soon show improvement is to be deprecated, there are undoubtedly cases in which these measures have greatly aided in recovery." But what did I say? These are the words, which are not a sweeping denunciation: "Prolonged massage and electricity of all forms are better avoided, *as a rule*, unless as a means of suggestion of cure by their use," and of the truth of this I am absolutely certain.

Dr. Collier remarked I referred to defects of vision and blindness along with other sensory troubles as if that were a common condition. In my opinion it is a rare condition of functional neurosis. I did not knowingly imply that I had seen many cases; there have been two or three. Naturally such cases would come under the notice of ophthalmic specialists, and I am much interested in hearing Mr. Jessop's remarks, which indicate that these conditions are not rare. However, comparatively to deafness and hyperacusis they are undoubtedly uncommon.

In reply to Dr. Campbell Thomson, I am much interested in hearing he has had a case in which the musical memory had returned before other memories, and his explanation of cleavage of memory is worthy of careful thought and consideration.

In reply to several speakers, regarding the value of suggestion and hypnosis, I am of opinion that strong suggestion, by giving the assurance that there is no organic disease, is very necessary. A careful physical examination of the patient, followed by an emphatic statement that he will get quite well, gives assurance, and will often serve to uproot a "fixed idea." The difficulty comes, however, with patients who have a "fixed idea" that they do not want to get well. A patient who was said to be suffering with paraplegia, and who was treated for months by massage and electricity, was immediately cured by strong suggestion, also another who had had violent tremors for months. In another case the patient was told by the panel doctor that he was paralysed in his left arm, and for weeks he had refused to move it. But on being informed that electrical examination had proved there was no paralysis and if he did not move it the next visit he would be court-martialled, he was seen buttoning up his trousers with it five minutes later.

Dr. Fearnsides remarked that he had not obtained evidence showing that "gas" had any effect in producing symptoms, but I was not

referring to the irritating effects of noxious gases—e.g., Cl.—but to the effects of carbon monoxide caused by imperfect detonation of high explosives in closed spaces such as trenches and dug-outs, in which soldiers may lie for some time buried, and which, being inodorous, would not be recognized.