traumatic changes in the cord on the one hand, or with functional nervous disorders on the other hand, in view of the very different prognosis and treatment needed by these diverse spinal syndromes.

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CONTRIBUTION TO THE STUDY OF THE MANIFESTATIONS OF EMOTIONAL SHOCK ON THE BATTLEFIELD.

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Many observations have been published dealing with mental disorders or nervous troubles following on the emotions experienced on the battlefield. In nearly all these cases the connexion between the mental and nervous troubles observed and the emotional shock which has produced them has been established on the evidence of the patient. But experience has shown us that in most cases the man has given no account of the first manifestations of his emotion. We are also aware how rapidly in the light of reflection—either spontaneous or produced by systematic questioning—the ideas which the man has about what has occurred to him become changed. If we add that in many cases the man declares that he lost consciousness it will be readily understood how difficult it is to establish the origin of mental and nervous troubles following on emotion, especially emotional shock.

The observations which recount the phenomena presented by soldiers from the moment at which the emotion occurred until their return to the normal state have, in my opinion, an entirely different value. These observations show, in the first place, that many of the disorders attributed to concussion are really manifestations of emotion; and, on the other hand, they establish the relationship between phenomena observed in certain soldiers behind the lines and at army depôts, and the quasi-instantaneous manifestations of emotional shock to which men on the battlefield have been subjected. Consequently they help, to some extent, in unravelling the nervous and mental troubles seen during the days which follow the emotion, and which are difficult of interpretation when their origin is unknown. The same observations also explain, in a measure, the differing values placed by neurologists on phenomena of the same origin, to be explained by the fact that they have seen their patient on the battlefield only and have not followed the development of the first phenomena shown; or else their observations have been made behind the lines or at depôts where they have only seen secondary and late phenomena and not the initial stage. These neurologists are talking of two consecutive and differing aspects of phenomena having the same origin.

Account of Case.

In the account which follows it has been possible to watch the man from the moment of infliction of the emotional shock to the instant at which the phenomena following the emotion disappeared. The physical and mental disturbance lasted about a fortnight. All phases have been noted.¹

¹ In France various regimental medical officers (Volvenel: *Progrès Médical*, 1918; Oberthür et Duroselle: *Revue Neurologique*, 1916; Dide: *Emotions*, Alcan éditeur, 1918) have published observations made actually on the field of battle.

A—, 11th Comp., 98th R.I., aged 23 years. On active service for two years. Not alcoholic. Had not been overworked. The regiment had just had a long rest. Had never suffered from concussion.

On August 20th, 1917, at 4.35 A.M., while his company was advancing to take A— Wood, a shell of medium calibre fell on the edge of the trench whence they were starting. It slightly wounded some of them and affected another without touching him, without even throwing him to the ground, but in such a way that he was unable to follow his comrades to the assault. I was a few dozen metres away, and being warned at once ran to him, less than 5 minutes elapsing from the fall of the projectile to the moment at which I reached the man. He was sitting at the bottom of the trench, some yards from where the shell had fallen. He was trembling all over. It was impossible to get a word from him except, "Oh, my ears!" I tried to help him, but he paid no attention. I tried to make him stand up, but he remained inert. But it was "the hour H—". The men were attacking. Some had already fallen and I could not remain with A—. I said to him, "Go to the aid-post of the battalion as quickly as you can."

When I returned to the aid-post at about 10.45 A.M. my man was there. The orderly said to me, "He came in 5 hours ago." But from the trench where he had been affected to my regimental aid-post in the ravine of C— was at least 1200 metres. Besides, he had to pass the battalion aid-post. It had not, therefore, taken him long to come.

Examination on August 20th at 11 o'clock—that is to say, 6½ hours after the shock. I put a certain number of questions to him; he answered slowly after reflection, but precisely. He gave the following information: "It was 4.30 A.M. when the shell fell. I believe it was a '105.' It fell half a metre from me on the edge of the trench. Two of my comrades were wounded. One was wounded in the face. They are gone; I do not know what has become of them. I lost consciousness, but not for long. I do not know exactly for how long. When I came to myself I was trembling. Some men were passing who accompanied me to the aid-post of the battalion. I did not know where I was. I followed the stretcher-bearers in order to get here—i.e., the regimental aid-post."

Condition at the moment of observation.—Appearance dull and tearful. Pulse 110, respiration 36, although he had been lying down for some time. There was a fine tremor of the hands, but sufficiently coarse to be seen at a distance. His body did not tremble. He complained of a deep pain in his ears. He was conscious of whistling and buzzing. Auditory acuity diminished; he could hear the speaking voice at half a metre. Tendon, cutaneous, and pupil reflexes normal. Sensation normal. No contraction of the visual field.

I escorted him to the regimental aid-post, where he lay on a hanging stretcher covered by a blanket. The rest of the day of August 20th, the night of the 20th–21st, the day of the 21st, he did not stir either to eat or drink (refusing what was offered to him) or to urinate.

August 21st: Still trembling; still dull. He only answers slowly, as if with great effort, the questions put to him. Pulse 120, respiration 42. Blood-pressure: Systolic 135, diastolic 90. Same state of auricular apparatus. As he had not passed water since the morning of the 20th the hypogastric region was percussed out. A suprapubic dullness was present. He was asked to pass water. Micturition took some time. He succeeded in passing some grammes of urine, which examination showed to be normal. Lumbar puncture; cerebro spinal fluid normal. (The lumbar puncture was carried out after retention of urine was discovered.)

August 24th: Has completely emptied his bladder this morning—about 1000 g. of urine. Trembling much less. Pulse 110; respiration 42. Bars in the same condition. Appearance less dull. It was easier to make him answer, although it still took a long time to get anything out of him.

In order to estimate his intellectual activity, we asked whether he had written home. He said that he had not, because, in the first place, he was trembling too much, and also it was not long since he had written. Usually he wrote every three days, and he had written before going into the line. When we said to him: "But that is five days ago, you should have written," he answered: "I did not think that we had been so long in the line."

He had lost count of time. He thought that it was July, whereas we were in the month of August. We gave him the paper to read. He read with difficulty, without fluency, and very differently from the way in which he read afterwards. After reading a few lines we asked him what he had read, but he was unable to say. We made him count up to 20, which he did slowly and with difficulty. We made him count from 100 to 120, which he did still more slowly. Sometimes two or three seconds elapsed between two consecutive figures. We gave him some sums to do, addition, subtraction, and multiplication, which latter he did correctly, or nearly so. These he now took a long time to do and all were incorrect, even addition and subtraction. In these the results of the first two columns of addition and subtraction were correct, but those of the other columns were wrong. The results were wrong when he attempted addition and subtraction of more complicated figures. Also they were wrong because each time he had forgotten to carry. He was unable to fix his attention.

August 26th: Reading more freely than on the 24th. Counts without stopping between the numbers. Knows which month it is. Cannot remember the meaning and the words of a sentence which he has been made to copy. We again made him do the same sums he had done before. He did them very slowly. All were wrong.

August 30th: Respiration 25. Still trembled slightly, especially in the right hand. Was, however, able to write home on August 28th. The condition of the ears was improved, even though the whistling and buzzing persisted, especially in the right ear. He is fully aware that it is the month of August and that the attack was carried out on August 20th. He counts up to 20 in 7 seconds. It takes him 15 minutes to do the sums. They are still wrong, but the mistakes are fewer.

Sept. 4th: Respiration 26. Blood-pressure: Systolic 105, diastolic 70. The trembling has disappeared even in the right hand. The ear condition is still better. He suffers no longer; he is still a little annoyed at times by the buzzing, and auditory acuity is not normal. He has recovered his appearance. He no longer has the dull air which he had. He writes home every day and occupies himself in one way or another. When he was told to come in to be examined he was looking for wood to make a door to the aid-post. He did the sums in 5 minutes 25 seconds. The addition was right. There was one mistake in the subtraction and one in the multiplication. Returned to duty.

Oct. 16th, 1917: Has been on duty since the day he joined his company. Intellectual activity normal. Did the sums as described above in 6½ minutes. The addition was correct; there was one mistake

in subtraction and two in multiplication. The ear condition was not yet quite normal. He complained of buzzing in the ears, especially in the evening. He could not hear the watch ticking at more than 20 cm. from the right ear. Pulse 72. Respiration 24. The trembling had disappeared.

Discussion of Causation.

Before going further, the following question at once arises. To what cause are we to attribute the troubles which developed in A— immediately after the explosion of the projectile which fell on the edge of the trench where he was awaiting the assault?

There can be no doubt that A— was the victim of a labyrinthine concussion. It is to this that we must attribute the disturbances of hearing, the deep and diffuse auricular pain. But are we to regard the other phenomena as evidence of cerebral concussion or of emotion?

In my opinion this man is suffering from emotion and not from cerebral concussion. He did not lose consciousness or, at least, entire consciousness for a moment after the shock due to the explosion, and was far removed from the state of consciousness of a man struck down by apoplexy or by cerebral concussion.² I saw him a few minutes after the explosion of the shell. He was sitting, not lying, in the trench, trembling, and his expression was at the same time dull and lacrymose. He was groaning: "Oh, my ear!" On the other hand, questioned six hours after the shock, he showed that he remembered the circumstances of the occurrence. He said to me: "It was a '105,' which fell on the edge of the trench and slightly wounded two of my comrades." And what is more, he had understood the order which I gave him: "Go to the aid-post at C—," and half an hour afterwards he was there. It was 1200 metres from the trench to this aid-post, and the ground was incredibly cut up by the shells. A man suffering from concussion, who has lost consciousness, who is "knocked out," who is in transient or prolonged coma, does not behave like this.

Here, on the other hand, are some details of the observation of a man suffering from slight concussion whom I had the opportunity of seeing about 20 minutes after the shock. He was struck on August 19th in a trench at W—, about 200 yards from my aid-post. He arrived escorted by two comrades. His face was black with smoke. In giving an account of himself he said to me: "I came out of the dug-out and sat down on a windlass. Then, without knowing why or wherefore, I found myself on the ground. There I had to remain for a while. When I began to come to myself I was surrounded by smoke. I thought it was gas."³

Now, although this man had lost consciousness for a very short time, he was totally unable to give an account of what had happened to him. Loss of consciousness in the man suffering from concussion was totally different from the loss of consciousness which occurred in the case we are discussing immediately after the explosion of the shell. Therefore it is not admissible to say that A— is suffering from concussion, whilst at the same time he exhibits phenomena which, taken as a whole, are characteristic of emotional shock—viz., trembling, tachycardia, and tachypnoea.

Nevertheless, two objections can be made to this point of view: (1) our man showed evidence of labyrinthine concussion; (2) he himself described the state in which he was immediately after the shock as loss of consciousness.

Let us now discuss these two objections.

(1) The fact that a man suffers from labyrinthine concussion by no means implies that he is suffering from cerebral

concussion. Cerebral concussion is one thing, labyrinthine concussion another. One or other may exist alone. Cases of labyrinthine concussion without cerebral concussion occur frequently. Here is one which I saw from the very moment at which it was produced. A sentry and my assistant medical officer F— were looking through a loop-hole at an advanced post, their heads close together. The sentry saw a boche at a loop-hole opposite about 30 metres away. He brought his rifle to his shoulder, pointed it in the direction of the enemy and fired. F— turned away quickly, putting his hand to his left ear. At the report he felt a severe pain in his left ear, after which he heard nothing more in this ear. A moment afterwards he perceived a very sharp whistling. All that day and the next the whistling remained, and the deafness persisted. It was nearly a week before the trouble disappeared. There was in this case auricular concussion without cerebral concussion. I may add, also, without emotion.

(2) As to the statement of the patient that he had lost consciousness, it is not enough to justify the doctor in concluding that the man lost consciousness in the same sense as a patient suffering from cerebral concussion. I saw the man at the time he declared that he had lost consciousness, I enquired in what his loss of consciousness consisted, and I can only repeat that this man did not lose consciousness in the same sense as a man suffering from cerebral concussion. Without doubt he had passed through a violent mental disturbance; later I shall endeavour to analyse this mental disturbance, but there was no loss of consciousness. A— is above all suffering from emotion, he is not suffering from cerebral concussion. The disturbances exhibited by him must be attributed to emotion, and not to concussion.

Sequence of Phenomena following the Emotional Shock.

I do not insist on the manifestations which determined the emotional shock in this man. I only wish to draw attention to the manner in which they unfolded themselves.

In the case of A— in the space of a moment a violent emotion has disturbed his physical and mental equilibrium; nearly instantaneously he was overcome by an intense trembling; his heart beats and his respiration became extremely rapid. His mental state was changed; his face took on a lacrymose and mournful expression; it was impossible to obtain from him an answer or gesture to show that he understood what was said to him. The reaction to emotional shock was therefore immediate.

Six hours after the shock some of the phenomena still persisted—tachycardia and tachypnoea. Others had become less and been modified. The trembling had diminished but not disappeared. His appearance was still stupid, but one could get into communication with him. He answered questions slowly as if it was an effort to do so, but he answered correctly, and he gave details spontaneously. Thus after six hours, and although he was under cover, the disturbance produced in my patient's organism by the emotional shock had not yet calmed down. Certain of the physical phenomena by which emotion shows itself persisted unchanged; others were present but in less degree. The mental state appeared to approach the normal.

But this improvement of mental state was but a truce. Indeed, on the third and fourth days after the shock the state of A— was as follows: tachycardia and tachypnoea persisted; trembling had become less and was localised to the right hand. But the mental state was more disturbed than it was six hours after the shock. A condition of stupor and pronounced mental confusion existed, which amounted to refusal of food and retention of urine. Thus, in the case of A— the primary period of psychic inhibition had been followed by a period in which a certain psychic activity was apparent; then this period of relative improvement gave place to a period of mental confusion with stupor.

At the end of about a week all the phenomena had begun to get less, and 14 days after the onset A— had recovered.

In A—'s case, then, emotional shock produced an immediate perturbation of the organism, the effects of which were felt for two weeks in the form of tachycardia, trembling, mental troubles in different keys and aspects, hence lasting long after the cause which had produced the shock was removed. So in certain cases the disorders following emotion on the battlefield which have been observed behind the lines or at the dépôts are only the primary or secondary phenomena by which emotional shock manifests itself, and which last after the cause which has disturbed the organism no longer exists.

² Some cases of cerebral concussion without loss of consciousness have been published (Guillain), but they are the exception. As a rule the concussed man loses consciousness under the shock which has struck him down.

³ This man also showed the presence of auricular concussion. Blood was running from his left ear, and with this ear he could only hear sounds with difficulty. Volatile vertigo (right unilateral inclination) was affected. When he arrived his pulse was 110 and his respiration 26. He was not trembling. An hour and a half later the pulse was 68 and respirations 20. This man spoke to me quietly, but at times he could not find certain words, so said one word instead of another. This slight aphasia decided me to do a lumbar puncture. This proved easy, and the cerebro-spinal fluid was found to contain a little blood. There appeared to be no head wound. Shortly after the examination my attention was drawn to the patient's helmet. The left half of the helmet was indented over a circular area about 2 cm. across. A projectile had struck it here. When the helmet was replaced on the man's head the depression was found to correspond with a small region which, on parting the hair, showed bruising and was painful on pressure. This area was adjacent to the point which surgeons regard as corresponding to the inferior extremity of the fissure of Rolando. In short, the cranium via the helmet had transmitted to Broca's area a shock which at once explained alike the slight aphasia and the meningeal hemorrhage. This man was evacuated and recovered without sequel of his cerebral concussion. He had a left otitis media, and had to undergo a mastoid operation.

THE LANCET.

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The Neuroses of the War.

THE war, now happily, and finally we trust, come to a victorious end, will not be characterised in the histories of the future by any such limiting territorial epithets as have been assigned to all previous wars. Unique in its designation as the Great War, or even simply *The War*, it has also been unique, militarily speaking, in its air and sea, under-sea, land and even under-land aspects. From the point of view of medical science, further, it has certainly provided the stimulus for more sustained, more concentrated, more widespread and more fertile medical research than any previous event in the world's history. At its close we may now perhaps take the opportunity of passing in review the stages in the development of our knowledge of the neuroses of war, a subject which has been productive of clinical investigation to a quite unusual degree. Before the war the categories covered by the clinically descriptive terms of neurasthenia, psychasthenia, and hysteria were well recognised and more or less well differentiated and accepted, in this country at least. Into this time-honoured scheme came with upsetting suddenness and momentum the new conception of "shell shock" as a clinical entity; old terms were given up, and "shell shock" represented the latest and all-embracing idea in the neuroses or psychoneuroses. Men came home with "shell shock" on their labels, and soon both the medical and the lay mind were permeated with it; it was the cause of every functional disturbance, mental or nervous, and special hospitals were rapidly organised for the reception of the "shell-shocked." Ere long, however, calmer consideration and more painstaking research showed that under the term was included a multiplicity of clinical conditions, most, if not all, of which seemed familiar enough. Somehow there was at first a disinclination to think of the soldier—the "old contemptible," the volunteer, the patriot—as a possible subject of ordinary traumatic hysteria; but that war hysterics, and malingerers, too, were appearing at base hospitals and in military hospitals at home could not be gainsaid. Gradually it came to be felt that "shell shock" was confusing by reason of its indefiniteness, and traumatic hysteria, traumatic neurasthenia, psychasthenia, and the rest seemed to come into their own again. If we mistake not, there is now appearing a tendency to group the war neuroses after the Freudian fashion, and to force them into the pigeon-holes labelled "conversion hysteria," "anxiety hysteria," and "anxiety neurosis."

But poor indeed would be the advance in our knowledge of the neuroses as the result of war experience were "shell shock" as a psychogenic or neurogenic factor to be minimised, or a sexual element in their genesis to be necessarily implied, by the adoption of a Freudian nomenclature. In our English fashion we have essayed a compromise between the old and the new, and many have come to regard the war neuroses as essentially identical with those of civil life, except in so far as the events of the battlefield are novel excitant factors and the instinct of self-preservation more potent than the instinct for the propagation of the species. The French, perhaps less apt than we to be influenced by precedent, less conservative, less bound by preconceived ideas, have divided the neuroses of war origin into "commotional" and "emotional" syndromes.¹ With that facility for new word-formations to which their language lends itself, they speak of the "commotionné," the "émotionné" and the "contusionné"; we have in the translation of our French Supplement followed tradition in rendering "commotionné" as "concussed," but have done so with regret. The *contusionné*, the patient with signs of local or general cerebral irritation and probably a somewhat blood-stained cerebro-spinal fluid, is, of course, clearly enough defined. The *commotionné* is the man who, after loss of consciousness from a shell explosion in his immediate vicinity, remains in a state of subcoma or obnubilation, with a variable degree of physical and mental inertia and of cerebral inhibition; his pupils are usually dilated, his pulse slow, and his reflexes diminished. The *émotionné*, on the other hand, does not as a rule lose consciousness in the strict sense (as Dr. C. VINCENT shows in his interesting paper published in our French Supplement); he has a quick pulse, moderate reflexes, and a pale, haggard or frightened visage; he trembles, and sweats; concentrated on his own *angoisse*, he is indifferent and inattentive to what goes on around except as it bears on his own safety and security. Such descriptions refer to the patients' states on their arrival at a C.C.S.; in the base hospitals the clinical appearances have changed to some extent. The *émotionné* has become a case of "emotion-neurosis"—like the anxiety-neurosis more or less; he is a pantophobe, with familiar psychical and physical symptoms. Or he may develop into an "emotion-neurasthenic" with physical and psychical overstrain, asthenia, and fatigability as the most prominent features. Or again, he may, ere he reaches the base, for that matter, have developed one or more of the pleomorphic manifestations of hysteria. Emotion-hysteria is common enough, but it should be clearly understood that hysterical phenomena do not form a constant and integral part of the emotion-syndrome, and may arise independently of emotional stimuli. It is comparatively rarely that the *commotionné* shows subsequent signs of hysteria; he remains, as a rule, an "inhibé," it may be, for months.

A schematisation of this sort may be perhaps rather cut-and-dry, and naturally cases presenting

¹ See in particular A. Léri, *Commotions et Emotions de Guerre* (Paris, Masson et Cie, 1918).