indicate disease of cerebral or coronary vessels, which may or may not be affected later in the long course of the disease.

Treatment

Antispasmodic treatment should be administered to patients seen a short time after the onset of retinal artery obstruction. Among the measures used the following have been found the most successful: subconjunctival injections of acetylcholine, combined with hypodermic injections of the same drug; amyl nitrite inhalations and nitroglycerin tablets may also be useful. In addition, the eye should be massaged at frequent intervals to reduce intraocular pressure. In grave cases not responding to the above treatment, paracentesis of the eye is carried out with a view to reducing intraocular pressure, and thus allowing a dilatation of the retinal vessels. Reports of success following these measures—spasm of the artery subsiding and the vision returning—are often found in ophthalmic literature. The following recent case is instructive.

A man aged 54 suddenly noticed the loss of vision of the right eye when getting out of bed. He applied for treatment six hours later. He had had in the past several attacks of temporary blindness, which never lasted longer than five to ten minutes. On examination the following was found: Vision of the right eye was shadows only. Fundus: disk pale, constricted retinal arteries, and pallor of the retina. With the left eye vision was 6/9, and the fundus presented a typical picture of advanced retinal arteriosclerosis. The patient's blood pressure was 180/100.

Treatment.—Amyl nitrite inhalations were ordered, and the eye was massaged. This had no effect. A subconjunctival injection of acetylcholine (5 minims) was given; this was followed within half an hour by a gradual return of sight. The patient began to discern objects, and after three hours read 6/36. A second subconjunctival injection of acetylcholine (5 minims) was then given. On the following day the patient read 6/18, but had an inferior nasal sector-shaped defect of the field of vision, which became permanent. In this case the prolonged anaemia of the retina had caused partial damage to the central region and the superior temporal quadrant of the retina, supplied by the superior temporal branch of the retinal artery. The patient later received general treatment for arteriosclerosis.

Conclusions

Attacks of transient blindness should be regarded as a warning of vascular disease. In the diagnosis and prognosis of this disease the study and correct interpretation of the accompanying retinal changes are essential.

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NEUROSES AMONG COMBATANT TROOPS IN THE GREAT WAR*

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Recent events would make it appear that we may be called upon to use the experience obtained during the great war. It seems advisable, therefore, to refresh our knowledge of the disorders associated with warfare and of the methods of dealing with them. A series of six lectures on the war neuroses has recently been delivered at the Tavistock Clinic, and the following account, which has not before been published, of experience in the treatment of these conditions in France from 1916 onwards may, I hope, prove also to be helpful.

Functional Nervous Disorders

The functional nervous disorders comprised a considerable proportion of the total casualties. From the statistics given in the *Official Medical History of the Great War*,¹ which are admittedly incomplete, it is not possible to obtain an accurate idea of the comparative wastage from this source. But an estimate was made shortly after the war had ended that one-third of the unwounded and one-seventh of those discharged from the British Army were permanently unfit on account of functional neuroses and mental disorders. For the first two years of the war all cases of this kind were evacuated to England and treated there. This was partly due to the erroneous opinion, widely accepted at that time, that these conditions, to which the misleading name "shell-shock" had been applied, were largely or wholly brought about by damage to the nervous system as the result of shell explosions and similar agents. It was commonly held that a shell exploding near an individual must inevitably produce injury to the nervous system, from the liberation of the tremendous forces of compression and decompression. Cases were described of death following an explosion in which no external marks were visible on the body but in which punctate haemorrhages and evidences of violence to the nervous system were found on post-mortem examination. It was only gradually realized that these were exceptional cases and that every day, in and near the trenches, men were blown up and buried who showed no sign of any injury to the nervous system and who were able to continue on duty without being sent to hospital. There was, further, the increasing evidence that conditions precisely similar to "shell-shock" occurred in men who had never been subject to the action of an explosive. Results of treatment in England had proved very disappointing; the tendency to fixation of the symptoms and the development of an attitude of chronicity had been only too apparent, and a great many of these men had been discharged from the Army and pensioned.

It was in the attempt to stem the loss from this source that the advanced centres in France were established towards the end of 1916. The experiment had previously been tried in the French Army and had met with encouraging success. I was appointed "shell-shock" specialist to the 3rd Army in December, 1916, and sent from an infantry regiment to a stationary hospital on the lines of communication. There I found three or four cases with functional nervous symptoms in an ordinary medical ward. There was no clinical room in the hut which formed the ward, and no place where the patients could be examined

* The facts on which this article is based are taken from a thesis presented for the M.D. at Edinburgh University. Permission has been obtained for publication.

¹ *Official History of the Great War: Medical Services*, 1931, Final Volume, p. 116.

and interrogated in private. I applied for and obtained, after some time, a hut, built for about thirty beds, with two clinical rooms and two cubicles in which treatment by seclusion could be carried out. Later, another hut of similar size was obtained, and as the number of patients increased they had to be accommodated in tents beside the huts. Owing to the changing vicissitudes in the military situation the centre was moved on four occasions to different hospitals. The numbers of patients fluctuated according to the intensity of the fighting, and on at least one occasion there were over 500 patients in the centre, with two medical officers to deal with them.

In twenty-two months, to October, 1918, 4,235 cases, apart from officers, were treated at the centre. The problem was essentially a practical one—to evolve a method of dealing in a rapid and effective way with men whose adaptation to active war conditions had broken down, and to restore the adaptation. The emphasis was on treatment and results, and not on research into the mental pathology of the cases. From previous experience I had already come to the conclusion that psychologically the central factor in the loss of adaptation was connected with the fear mechanism of the mind, and this was borne out by the further insight obtained in the study of cases at the centre and by the results of treatment. I do not think it is helpful under conditions of this kind to attempt to stress the distinction between fear, anxiety, apprehension, and similar terms. The current conflict could best be explained in words which the soldier was familiar with, such as “wind-up,” “funk,” or “fear,” and the most important psychotherapeutic step was that he should understand the nature of it. No doubt it is true that internal as well as external factors played a part, and that on deeper analysis further sources of anxiety could have been elicited. But the current conflict, dependent on the special environment, was obviously the important one, and all practical indications showed that it was the one to which the main attention should be given.

Types of Case

Experience led me to classify the cases into five types:

1. A direct anxiety or fear state characterized by generalized shaking, nervousness, “jumpiness,” and sometimes dizziness and headache.
2. A type in which mental confusion or stuporous phenomena formed the central feature. These conditions were generally of short duration, and I looked upon them as more intense and severe instances of the first type.
3. Cases in which conversion symptoms, such as mutism and paralysis, were the most important elements. These were similar to the hysterical manifestations met with in civilians.
4. Conditions in which amnesia or a fugue state constituted the main phenomenon.
5. Combined types of cases in which a war neurosis developed in conjunction with an organic disorder or with a previous neurosis.

By far the largest group was that which displayed direct fear or anxiety symptoms (Type 1); this comprised 70 per cent. of the total. Next came the cases with conversion symptoms (Type 3), which made up 20 per cent. of the total. The other three classes accounted for the remaining 10 per cent. It is not suggested that an absolute or fundamental difference existed between these categories. They shaded into one another, and were separated mainly for practical convenience. True obsessional states were rare, and comparatively few psychotic cases were received at the centre. As Dr. G. W. B. James¹ has pointed out, there is no evidence that the strain of war increased the incidence of insanity among the troops.

Type 1 Cases

The war neuroses could actually be observed in their development, and the following account gives a typical

¹ Report of lecture at the Tavistock Clinic, *British Medical Journal*, 1939, 1, 234.

instance of the circumstances in which they occurred. On December 5, 1916, a raid was attempted by about 80 men of the battalion to which I was medical officer, and took place in a sector of the line occupied by another regiment. After the party had gone over the top the sky cleared and the light from the moon gave the situation away. The men were accordingly ordered back into the trench, which, being held by other troops, was now crowded. The enemy thereupon began a bombardment by trench mortars, one of which fell and exploded directly in a bay filled with troops. An officer and four men were killed, three men were wounded, and eleven men reported to me shortly afterwards with “shell-shock,” having in the interval been ordered into a dug-out. I saw them in the support trench by the light of the moon; all of them were considerably “shaken up,” nervy, jumpy, and tremulous, and one man was suffering from aphonia. As the raiding party were due for forty-eight hours’ rest, none of these patients were sent to hospital. It was intended to see them the following morning; but this was rendered impracticable by the battalion being moved again into the front line, and it was two or three days before the cases were seen individually. By that time two of them had reported sick to a field ambulance and had been sent to hospital. The following is a brief account of four typical cases.

A private aged 26 stated that he was in the bay in which the minnenwerfer exploded. It made him so shaky and tremulous that he could not keep still. He was set to digging the buried men out, but he became so sick that he had to be sent back. He stated that he thought it was fright that made him sick. There was no amnesia. Particulars regarding him were: service in the Army, ten months; with the battalion, five months; occupation before the war, labourer. He stated that he had had slight sun-stroke about three years before. His family history was negative as regards nervous or mental disease. He reported at the interview that he was much better, but got somewhat shaky and sick at times. He was, however, quite able to continue with his company.

A private aged 29 stated that he was moving along the trench when the trench mortar exploded. He saw the flash and, in addition to being rendered shaky and nervous, he became blind for a little while. About ten minutes later, when ordered to the dug-out, he found that he could not speak above a whisper. There was no amnesia. He had served in the Army about fifteen months and with the battalion for four months. His occupation before the war was that of a gardener. There was no previous history of nervous or mental disease, and the family history was negative. When seen his shakiness had passed off, and the aphonia, though present to a slight extent, was better and was improving. He was able to carry on quite well with his company.

Private J., aged 25, stated that he was in the adjoining bay when the trench mortar exploded. He saw the flash and heard the noise of the explosion, and was blown against the trench. After that he remembered no more until he “came to” and found himself in the dug-out. Possibly an hour had elapsed, and he was feeling shaky and somewhat faint. The completion of the history of this case from the evidence of another soldier is of very considerable interest. This soldier stated that he was with Private J. in the dug-out. J. went “straight off” and lay stiff for about five or ten minutes. A stretcher-bearer came and gave him water; then the patient began to mumble, and shortly afterwards began struggling and shouting, “Kill all men with white faces to-night” (the faces of the raiding party were blackened). He gave the impression that he saw Germans running away, for he kept struggling and shouting, “Bomb them, bomb them! Don’t let them get away!” He also attempted to strangle a man next to him. As his pockets were full of bombs he had to be held down. For all this the patient had a complete amnesia. His service in the Army was nine months, and with the battalion seven months. He was an engineer before the war. There was no personal history of previous nervous or mental disease, but two uncles had committed suicide; one of them, an alcoholic, had hanged himself, the other died after cutting his throat during an attack of depression. At the interview J. reported that he was well except that he felt somewhat faint occasionally. He was “carrying on” in the usual way with his company.

The next case is similar to the last described. A private aged 33 stated that he was in the bay in which the trench

mortar exploded. He was thrown down and buried, and remembers someone pulling him out. After that he had no further recollection until he came to himself about half an hour afterwards, in the dug-out, shaking all over so that he could not keep still. Another soldier stated that he was on the steps of the dug-out with the patient. The latter seemed to be very excited and not to know what he was saying. He kept shouting that he wanted to get at the Germans and throw bombs at them. He was struggling so much that he had to be held down, but gradually became quieter. Of this delirium the patient himself had no recollection. He had served in the Army for seven months, and had been with the battalion two and a half months. His occupation before the war was as a labourer. There was a history of a previous nervous breakdown four years earlier, after an accident in which he was nearly run over by an engine on the railway. His mother had had two paralytic strokes, a brother had St. Vitus's dance, and an aunt had "nervous debility." When seen the patient stated that he still felt somewhat shaky when shells went off, and somewhat weak. He was, however, carrying out his ordinary duties in his company. There was no sign of organic derangement of the nervous system in any of the cases.

The remaining five cases were similar to the first one described.

Several interesting points are brought out from a consideration of these nine cases. The first, and most striking, is the fact that the men were all able to return to duty after about forty-eight hours' rest, a fact especially impressive in the case of the two with delirium. None of them asked or expected to be sent to hospital. Secondly, none of these men had any special form of treatment. All of them showed general tremulousness, nervousness, and "jumpiness" varying in degree. This was the commonest form of "shell-shock," the symptoms of which, in my view, constitute the basic features of all the forms of the war neuroses. It was found that when the symptoms of the other types had cleared up—when, for example, confusion, or stupor, or conversion phenomena had disappeared, or an amnesia had been resolved—the residual state was always of this form (Type 1). The condition occurred with every degree of severity, from those who showed mainly "loss of nerve" and slight external symptoms and those with marked generalized shaking, excitability, dryness of the mouth and throat, excessive perspiration, and occasionally incontinence of urine, to a semi-convulsive form in which phases of delirium and stupor sometimes developed, as in two of the instances mentioned.

Comments on the Other Types

Descriptions of further cases of Type 1, although of great interest, would take up too much space, and brief comments on the other types are all that can be given. When confusion was the main feature and lasted beyond the period of initial mental shock the condition was more serious. It cleared up as a rule, however, after a few days, under general treatment, although the symptoms of the residual state were apt to be more persistent.

Cases with conversion symptoms formed a varied group, but clinically the manifestations were similar to those found in civil life. They differed in the ease with which they could be cured when dealt with promptly. Treatment by the faradic brush or seclusion seldom failed to restore the disordered function to normal, and the condition then became similar to those characteristic of Type 1. This class, with conversion phenomena, formed a considerable proportion of the chronic category in England, and the rule at the centre was that no patient was evacuated to the base with a symptom of this kind. If we except a number of cases of stammer, which does not respond to the same treatment, the rule was consistently carried out.

Instances of the next type, that with complete amnesia and fugues, formed a small but important group. Localized amnesia was a frequent symptom in the war neuroses, but cases in which complete or general loss of memory and somnambulism occurred were comparatively rare. They were conditions not uncommonly simulated

by the malingerer, and, apart from this, from the circumstances of military life they were of much graver import than the other types. A man who wandered away from his unit committed a crime against military law. Consequently the unfortunate victim of a fugue often found himself under arrest, or even under the extreme sentence of a court-martial. It was of the utmost importance, therefore, to endeavour to obtain a clear and adequate insight into the patient's state of mind. This was often no easy matter, as the available evidence frequently consisted, for the most part, of the statements of the patients themselves. My experience was that in cases of complete or systematized amnesia of an extensive nature the memory began spontaneously to return at the end of four or five weeks.

The fifth class, of combined neuroses, need only briefly be referred to. They formed a small group in which a war neurosis developed upon a pre-existing disorder, either physical or mental. Thus cases were seen in which a neurosis arose in conjunction with conditions of pituitary disease, disseminated sclerosis, early general paralysis, and others. On the other hand, the opportunity occurred of analysing patients in whom the features of a neurosis which had arisen in civil life developed after the occurrence of a war neurosis and greatly complicated the clinical picture. It has to be borne in mind that there were certain forms of neuroses which never passed through the centre. These were the more slowly developing cases expressing themselves in obscure disorders of different systems, such as the gastro-intestinal, the D.A.H.s, and N.Y.D.s. From our cursory methods of recruiting it happened not infrequently that many individuals with neurotic, to say nothing of mental, symptoms found their way into the Army. Indeed, it was remarkable what numbers of men of this type volunteered. It was inevitable that most of these would prove incapable of adapting themselves to the strain of active warfare. From time to time, consequently, even complicated cases of chronic neurosis of many years' duration were admitted into the centre with the superaddition of a war neurosis, after vainly struggling to adjust themselves to the war environment. It is an interesting fact, however, that not all of these individuals broke down. Many adapted themselves quite effectively to active war conditions, and only broke down after the war was over.

Differential Diagnosis

In regard to differential diagnosis the chief conditions to be distinguished were concussion, pathological fatigue states, and malingering. Concussion occurred with surprising infrequency. At any rate, if it supervened after such traumata as being blown up or buried, it did so in the majority of cases in a slight form, which passed off so quickly as to be in practice negligible. It might have been expected to show itself in the cases seen after the raid, but there was no discernible evidence of it; and, certainly so far as the cases admitted to the centre are concerned, in only very few were indications of concussion evident. *A priori* considerations of the alleged inevitable effects of a bursting shell within a certain radius were found in practice not to be accurate. Most men who served in the trenches for any length of time, and certainly most men who went "over the top" in the later stages of the war, when the practice of the barrage had reached its height, came necessarily into close proximity to exploding shells. Very few of them, however, developed concussion.

Fatigue was present in most cases, but was generally of the physical type, which cleared up after a few days' rest in bed. Instances of true neurasthenia in which fatigue was the central and important feature of the condition occurred mainly in men employed in the administrative branches of the Army, who were subject to prolonged periods of intensive routine work; but sometimes it occurred in those who had had too long a spell of active service and too little leave.

Malingering was the most important condition to distinguish from the war neuroses, and in a busy centre one had constantly to be on the alert. Conversion symptoms were not common as forms of simulation and, in any case, were unimportant from the ease with which they could be cured. The most frequent—and most natural—manifestation was an exaggeration and prolongation of the symptoms, and a tendency to the development of a hypochondriacal attitude. This was combated not only by the brief psychotherapeutic talks but by the psychological atmosphere of the centre. Among other things arranged for the convalescent cases a concert party, recruited from among the patients, was maintained, and it was interesting to note the humour and tolerance with which satire on the subject of "shell-shock" was received. From time to time, however, creations of a more elaborate nature were seen which required careful investigation and caused no small difficulty in diagnosis. Records of these cases may be published later.

Results of Treatment

The results of treatment were surprisingly good, and proved the value of the advanced centres in dealing with these conditions. Of the total number of 4,235 cases treated, 63.5 per cent. were made fit to return to duty—that is, mainly to fighting units. The direct tremulous type, and the more definitely hysterical type with conversion symptoms, were by far the most hopeful. The acute tremulous apprehensive symptoms of Type 1 subsided generally in the course of three or four days in the atmosphere of the hospital. The conversion symptoms—mutism, aphonia, deafness, and the others—were so easily and rapidly amenable to treatment as to be practically an indifferent factor in the estimation of the case. Once the conversion symptom was cured the case became similar to those of Type 1. In regard to relapses, there were 5 per cent. of readmissions from this cause, but it was impossible to form an accurate estimate owing to the movement of troops from one army area to another, and unfortunately there was no linking up of the different centres. The average period of residence in hospital for the cases successfully treated was eighteen days. Treatment was directed in the first place to ensuring rest and sleep. Every patient admitted to hospital was kept in bed for three or four days, seldom longer. This was sufficient to do away with the physical fatigue. Sleeplessness was not common, but if for any reason, such as marked tremulousness or apprehension, a patient was unable to sleep he was given paraldehyde, 3 drachms. This was practically the only sedative used, with the exception of hyoscine, occasionally given for violent "crises," and was almost invariably effective. During this period treatment of conversion symptoms was carried out. There were simple methods available for dealing with these conditions, such as persuasion and exhortation and also hypnosis, which were generally successful. But as, in treating large numbers of patients, saving of time and energy was essential, seclusion or faradism was commonly employed. These procedures were carried out with due regard to the patient's feelings and, as I have already mentioned, seldom failed.

In general, the sooner the cases were dealt with the better the outlook, and the patients were received at the centre within, as a rule, twenty-four to forty-eight hours after becoming casualties. The evidence of the earlier years of the war was that, if neglected, these conditions rapidly became complicated and a process of demoralization set in, which led in most instances to discharge from the Army and a pension. At the centre every effort was made to keep a stringent control over demoralizing influences, and to help to key the patient up to the adaptation standard, which meant developing a degree of stability which enabled him to return to the environment that had caused his breakdown. This did not imply the abolition of conflict in his mind, for that was impossible, but the building up of a state of controlled adjustment to active

war conditions which, in itself, at basis, was actually a state of conflict. "To be feared of a thing and yet to do it is what makes the prettiest kind of a man," as Stevenson put into the mouth of Alan Breck Stewart, and this formed an epitome of the psychotherapeutic aim. The condition being due essentially to a current conflict, no prolonged or elaborate analysis was necessary. In fact, for obvious reasons, such measures of treatment were contraindicated in the great majority of cases. The essential fact was that the patient should be made aware of the nature of the neurosis—of the breakdown of the fear-controlling mechanism. In the severer cases and when, after the patient had been invalided to England, the condition had become more or less chronic, different measures of treatment were necessary, and all the resources of psychotherapy had to be called into effect. Those who had experience in dealing with pensioners discharged with "shell-shock" after the war were made aware of the difficulties in treatment that existed.

The endeavour to estimate predisposition as an aid to prognosis was far from an easy problem. Cases commonly occurred with a clear personal and family record and yet with which no return to active war conditions was possible. On the other hand, many men with histories indicating predisposition recovered rapidly and returned to their units after a period of treatment. In this regard the history of the nine cases from the raid may be recalled. Four of the men had a definite family or personal history of nervous disorder; two of these, in addition, had had an apparently severe though brief attack of delirium. Yet all returned voluntarily to the trenches after only about forty-eight hours' rest. A captain in a famous regiment who, after two years' distinguished service in the field, found himself in hospital with a typical attack of war neurosis of Type 1, stated that from childhood he had always been timid. Noises, he said, especially affected him, so that when in the line he always wore ear protectors. Until a few years before, if he were at a railway station when an express train passed through, he stated that he became so nervous that he had to clench his teeth and shut his eyes. Yet in the course of over two years' hard fighting on the Western Front this officer obtained the D.S.O. and the M.C. In several instances that have come under my observation decorations for bravery have been won after the occurrence of an attack of "shell-shock." I am unable to discover how the incidence of the war neuroses in the British Army compared with that in the carefully chosen American Expeditionary Force, but it appears that the 3,647 cases of "shell-shock" which occurred in the U.S. Army during the great war corresponded to a ratio of 0.98 per thousand admissions to hospital.¹

In the light of increased knowledge and experience I do not think that the forms of neuroses likely to occur in the next war will be different from those met with in the last. Fear-inspiring conditions will be similar but more intense. They will act on human beings with the same instincts, the same kinds of defence mechanisms, and similar neurotic proclivities. It was an impressive fact in the great war to note the extent to which the ordinary man was capable of adapting himself to active war conditions. This power of adaptation will probably be put to a greater test in the next war, and if it is realized in official circles that there is a breaking-point for every individual, arrangements may be made to give more frequent relief from the continued strain that such adjustment implies. The fact that civilians will be involved will make the whole question a much larger and more complex one. States of panic may occur at first, before the general population has been able to adapt itself to the new circumstances in which life will have to be lived, and we can only hope that those in authority are taking adequate steps to deal in advance with what is likely to prove a problem of considerable magnitude.

¹ *Med. Dept. of the U.S. Army in the World War, 1925, 15, pt. 2, 577.*