I Final Contribution
TO
THE STUDY OF SHELL SHOCK.1
BEING A CONSIDERATION OF UNSPELT POINTS NEEDING INVESTIGATION.

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No medical officers have felt the strain of war more severely than those engaged in the treatment of functional nervous disorders. Both in this country and overseas their time and energies have been so fully occupied that any systematic research in their special sphere of work has been regarded as the result of functional dissociation arising from fear, horror, or other emotional or fatiguing conditions; while others maintain that, quite apart from cause, functional disturbances are limited to phenomena which can be imitated voluntarily; so do, more seldom, cases of functional disturbance occur which clearly cannot be produced by malingering. Hence local or general sweating, vasomotor disturbances, changes in the reflexes or in muscular tone, and any disorders of movement which do not disappear during sleep or under an anaesthetic cannot, according to this view, be due to suggestion and cannot be classed as functional disorders.

But cases of contracture occur which clearly cannot be imitated voluntarily; so do, more seldom, cases of spasmatic movement or of inco-ordination. The persistence of contracture or of spasmodic movement is likewise imitable by volition. Moreover, every physician of experience must have met with patients suffering from functional deafness, whose sleep has not been in the least disturbed by the loudest noises, and they have seen contractures and spasmodic movements persisting during sleep and during at least the first stages of chloroform anaesthesia. We may recall the case of persistent contracture described by "G. Bullet," which was carefully tested during sleep by means of stamp-paper gummed to the affected region. The entire limb becomes functionally paralysed. Here the justification for limiting the effects of suggestion to voluntary imitable phenomena; (3) the sufficiency of suggestion as an explanation of all functional dissociation.

Of these the first merely requires the collection of observations. My own experience is that in patients who have been exposed to physical violence (i.e., having been buried, knocked over, or lifted in the air), stupor, hyperesthesia, and spasmodic movements are commoner than in those exposed to emotional violence. In passing, we may note that emotion alone can give rise to increased of blood and of albumin content, and even, according to some, to leucocytosis in the cerebro-spinal fluid. But fuller observations are needed on this matter.

The second topic suggests a variety of investigations. Can suggestion produce local pallor or flushing? Most experts in hypnosis maintain that local disturbances in blood-supply can be induced by hypnotic suggestion. Some claim even to have produced blisters, but further work under the careful conditions adopted by Captain J. A. Hadfield, R.A.M.C. (then a naval surgeon) is urgently needed. Similarly in regard to local sweating, &c.

The third topic involves the consideration of the other causes, besides suggestion which have been held responsible for functional dissociation. Some have thought that an excessive emotional experience may suffice to bring it about. Others have laid stress on the repression of an emotion or instinctive action arising from its conflict with other antagonistic processes, especially with the motives of conscience, social sanction, &c. Particular stress has been laid on the conflict of "wishes," on mal-adaptation to environment, on the fear of death, and on defence mechanisms before an intolerable situation; the object being to bring all the war neuroses under two classes, the "conversion hysterias" and the "anxiety neuroses."

Classification of Main Types of War Neuroses.

With a view to determining the sufficiency of suggestibility as a cause of functional nervous disorders, let us endeavour to classify the main types of the war neuroses, beginning with obviously hysterical, "suggested," cases in which the suggestion has brought about the functional symptoms. Here we have a clear case of suggestion acting under the influence of fear.

1. A highly "nervous" soldier is hit on the forearm by a piece of shell. His arm drops to his side, and the thought at once occurs to him that he has lost the use of it. The entire limb becomes functionally paralysed. Here we have a clear case of suggestion acting under the influence of fear.

2. After an accident in civil life a man had long ago suffered pain or impaired mobility. A slight bruise in the same region on the battle-field produces functional hyperesthesia or paralysis. The hyperesthesia gives place to anesthetic, or with recovery of movement a condition of extreme inco-ordination ensues. The influence of suggestion...
is here fairly obvious. The soldier may even admit that the bruise revived the memory of his former accident. But is it necessarily and always true that hyperesthesia has been converted into anesthesia by suggestion or that the incoordination can be imitated volitionally?

2. A soldier is temporarily paralysed, his movements were temporarily induced by a severe fright. Of this the soldier has lost all memory. Sudden fear in the trenches revives this disordered movement, which persists for many weeks. The influence of suggestion is here less sure. But even if suggestion can explain the onset of the patients it cannot account for the long persistence of the movement, which may even continue during sleep. But if (as is usual) it ceases during sleep can it be supposed that each morning on waking the patient receives a fresh suggestion? Do we not gain a clearest explanation by the condition of the patient, regarded not as a movement as a dissociated emotional expression inherent in the waking personality of the patient, especially when this view leads us to cure the disorder by reviving in the patient the memory of the original trouble, and thus helping to restore his normal personality?

4. A soldier in previous good health is buried owing to a shell explosion. After a period of stupor or confusion (perhaps preceding, accompanying, or following excitement, depression, or fatigue), he "comes round" mute and amnesic, but he has clearly not quite returned to his normal self. Here there is no evidence of suggestion, but it is possible that suggestion may have influenced the patient when the state of confusion or stupor was passing away. By means of hypnosis memories of a patient's thoughts or environment of proceedings in the trenchoter, patient may be recovered. Hypnotic investigation may therefore serve to clear up this point. Yet even if loss of speech had been suggested during recovery from confusion or stupor, suggestion is impotent to explain such a patient's loss of memory. The soldier may confess to having felt some previous fear, but what man has not at some time had that experience in the trenches? There is often no evidence of any mental conflict before or after burial. But he may have been unconsciously repressing some tendency to action. Here hypnosis may again prove of use, for the presence of any suggestion during recovery can be discovered easily. It cannot be said that mutism and amnesia are obvious measures of escape from the firing line; and amnesia can often no evidence of any mental conflict before or after burial. The nystagmus, clonus, and Rombergism observed in functional disorders are clearly distinguishable from those occurring in organic cases. The nystagmus is rather of the nature of an unsteadiness, the clonus is only obtained at a particular angle of flexion or degree of tension, the Rombergism can be imitated volitionally. The patient can be similarly manifested in disorder of the sympathetic and reflex systems.

5. A soldier suffers pain in one or more limbs consequent on burial or a wound; or the application of a splint to his wounded limb results in prolonged immobility. He gradually develops a functional condition of muscular contraction, especially when there is well-marked hypertonus of the pithiatism to be considered here. The patient is usually quite unable to account for the onset of his condition, but more careful mental exploration in the waking or hypnotic state is likely to throw light on the matter. Without this exploration all such facile explanations as the wish to escape from an unpleasant situation, the habitual persistence of immobility, the desire for a pension or for discharge from the Army, are scientifically worthless.

A soldier for several months been suffering from self-reproach, owing to some act he has committed; subsequently he develops a functional disorder. For instance, he has shot at the uplifted arm of a surrendering enemy, whose arm drops helpless as he falls to the ground; later the patient is slightly paralysed and it becomes completely paralysed. Or he has long worried over past sexual abuse; and on breaking down from the strain of warfare he develops washing-like movements of the hands, symbol of the abiding of his impurity. Or he has reproached himself with causing the death of a comrade; and on breaking down he begins to suffer from visual hallucinations of seeing an accusing finger pointing at him, or from auditory hallucinations of hearing an accusing voice, or from the conviction that he has sinned unpardonably, &c. Suggestion is powerless to account for these various examples of loss of control over bodily or mental processes. They are clearly the result of imperfectly solved conflicts, the more or less repressed, dissociated complex finding expression in motor, sensory, or ideational disorder. For with the explanation of their origin, their susceptibility to the suggestion, and their increasingly successful efforts to face and to solve the conflict his troubles come to an end.

But even if we admit that suggestion may act on the involuntary nervous system, that suggestion plays but a small part in the causation of the war neuroses, and that extreme emotion and conflicting complexes are by far their most important determinants, still there remains for consideration to what neural level functional dissociation may extend.

LIMITS OF DISSOCIATION.

Cases frequently occur in which the sudden recovery of lost memory is accompanied not merely by the restoration of speech, not merely by the cessation of spasmatic movements, but also by a marked change in the entire face of the patient. He not only (as he states) feels, but he also looks, another person. His pupils, pulse-rate, and skin-colour regain their normal condition. We may consider their previous abnormal state as due to the persistence of emotional expression, either uncontrolled by, because dissociated from, the normal personality, or belonging to an "epiphenomenon" which was held over owing to dissociation of the normal personality.

In the third of these contributions I suggested the general resemblance of certain cases of functional hyperesthesia to the features of disordered sensibility described in cases of the war neuroses. The one explanation to the other obtains if suggestion can explain the origin it cannot account for the extent.

I prefer the term " exploration " to " analysis," alike because it is more exact, and because it does not imply adhesion to any special school.
Clearly, further investigation of the plantar response under these and other conditions is urgently needed. In many cases of asymmetric plantar reflex I have found that on the side on which the flexor response is weaker or absent, the knee-jerk and the abdominal reflexes also are weaker on the uninvolved side, and the cutaneous sensibility is also diminished. Sometimes this association is reversed. These were all purely "functional" cases. Here, again, we need further observations.

**Hypothesis of "Reflux" Origin of Certain Disorders.**

It is easy to hold to the clear diagrammatic view that all functional disorders are due to disturbances of volitional activity, and that whereas disorders of the reflexes or of the vaso-motor system occur, or where sweating, muscular hypotonie, hypertonie excitability, &c., arise, they stamp the case to be one of Babinski's "reflux" cases. Such a simple view, like the view of the vegetative system, seeks many details. For instance, the so-called reflex phenomena are usually limited to the hands or feet, whatever the site of the wound; they may occur in patients who have not received any wound at all; they are very rare in wounded patients who show no signs of paralysis or contracture; the contracture or paralysis is always amenable to psycho-therapeutic methods. That the vaso-motor and other disturbances do not disappear as rapidly as the paralysis or contracture is no proof that they are produced by reflex causes.

Babinski and Froment have observed 7 that the abolition of the plantar reflex, the muscular and nervous hyperexcitability, and the slowness of contraction, characteristic of their "reflux" cases, are closely associated with hypothermia. Warming the affected limb abolishes these abnormal conditions. But this is no proof that they are of "reflux" origin. It will be recalled that after the division of afferent nerve fibres in his arm, Head found that a cold day would throw its state back several weeks; the just-reacquired sympathetic system was depressed, leaving the more primitive physiologise system also inactivity. That is, the higher, more recently acquired systems of sensibility and reaction are prone to be inhibited or dissociated by cold and to be re-integrated by warmth.

Babinski and Froment have also observed 8 that in these "reflux" cases paralysy and contractures chloroform anesthesia often causes at a certain stage an exaggeration of the tendon reflexes and a well-marked clonus on the affected side, while in healthy people they fail to get any similar appreciable effect. But these observations on the effect of chloroform anesthesia, as well as those on the effect of warmth on the reflexes, need to be carried out on purely functional cases where there can be no question of "reflux" causes.

**Theory of Loss of Some Higher Control or Endocrine Disturbance.**

If we discard the hypothesis of the "reflux" origin of these disorders, what explanation can we find for the disappearance of the "reflex" elements gradually intruding into the dreams of warfare.11

On the one hand, we may regard them as consequent on the loss of some higher control, due to emotional disturbance, in which case their limitation to a single region is due to the same cause as the limitation of the voluntary muscular paralysis or contracture. Or, on the other, we may regard them as immediately due to some disorder of the internal secretions, in which case their localised manifestation may be attributed to a local nervous predisposition, either congenital or acquired. Thus, Babinski and Froment 9 have described cases of "reflux" in which a smaller pulse was observed on the affected side. But d'Oelsnitz and Boisseau 10 find that the pulse is small in the mid-brain, bulb, and cord, causing dilatation of the pupils and a well-marked clonus on the affected side, while in healthy people they fail to get any such appreciable effect. But these observations on the effect of chloroform anesthesia, as well as those on the effect of warmth on the reflexes, need to be carried out on purely functional cases where there can be no question of "reflux" causes.

To ascertain if these phenomena are due to loss of higher control or to endocrine disturbances, emotional disorders are fundamentally responsible for the condition. It only remains to determine by investigation whether these neural disturbances are produced directly by the emotion or indirectly through the action of the "emotional centres" on the endocrine glands. The one reliable method of determining whether there is a connection is to be discovered by arterio-venous tension, such as may arise from adrenal insufficiency. Here, then, conceivably we have two patients respectively suffering from an increased and a diminished tone of the sympathetic system, associated with hyper- and hypo-adrenalinism. In a series of cases examined by me within a few hours after the onset of "shell shock," I could find no sphygmo-manometric evidence of increased blood pressure, nor by Fehling's fluid could I detect (save in one case) the slightest trace of sugar even in the first urine passed by these patients since they left the trenches. But sympathetic (or vagal?) neuroses may be associated with glandular exhaustion, as well as with glandular over-action.

We need a careful record of the effects of glandular extracts on the emotional condition of cases of war neuroses, and of their effect on the psychical reactions and on the reaction times of such patients in association tests.

We are as yet uncertain of the range of action of the sympathetic system, and hence of the extent of its influence in the neuroses. It can control the tone of some muscles and apparatus, but it is uncertain whether there is a definite one of Babinski's "reflux" cases? Every experienced physician must have occasionally met with a surprising degree of absence of endocrine symptoms even in cases of wound or central concussion and in cases where there has not. This atrophy is often very slow to disappear and in the experience of some is intensified by the returning use of the affected muscles. In certain cases it may arise from vaso-motor disturbances in the cord, induced by the sympathetic system. In addition to the collection of data bearing on this obscure subject we need a series of investigations by modern methods on the electrical reactions of functionally disturbed muscles.

11. In this country, at least, we have been paying so much attention to the mental aspect of the war neuroses that a detailed examination of the accompanying bodily symptoms has been generally neglected. We have yet to ascertain what symptoms usually occur in combination. My own experiments on healthy persons. On the other hand, we may regard them as immediately due to some disorder of the internal secretions, in which case their localised manifestation may be attributed to a local nervous predisposition, either congenital or acquired. Thus, Babinski and Froment have described cases of "reflux" in which a smaller pulse was observed on the affected side. But d'Oelsnitz and Boisseau find that the pulse is small in the mid-brain, bulb, and cord, causing dilatation of the pupils and a well-marked clonus on the affected side, while in healthy people they fail to get any such appreciable effect. But these observations on the effect of chloroform anesthesia, as well as those on the effect of warmth on the reflexes, need to be carried out on purely functional cases where there can be no question of "reflux" causes.

**Treatment.**

Those who have had most experience in war neuroses are generally agreed that different physicians attain different degrees of success according to their particular mode of use of the same treatment, and that there is hardly any form of treatment recommended that has not its value in appropriate cases.

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cases. Nearly all of us have learned to ban the routine use of hypnotic drugs; yet in some cases they are unquestionably valuable. An unbiased record is needed of such successes and failures. So, too, we have learned that it is usually disastrous to patient to stopped or attempted to listened to the hope that he may forget all his worries and solve his conflicts by neglecting them. Yet in some cases this treatment is successful. Again, therefore, we require a careful record of the special determinants which should guide our advocacy of sedative treatment, particularly in cases of anesthetic cases out of hospital for work or golf.

Experience has also shown that a certain class of patient on recovery of the use of a functionally disabled limb regains his normal mentality and is able to throw off all his psychic disabilities. We need a record of the particular class of case in which this treatment is successful. We need to follow up the cases where the psychiatric disturbances have been thus neglected or where they have been indirectly treated, and to record, not only the speed, but also the permanence of the cure. When the psychic disturbance is allowed to persist behind the scenes, a showy lightning removal of some bodily functional disability is no true cure at all; the same (or some other) disability will later develop on the slightest provocation. In this confusion I wonder if we do not often lose the path of mental development. The special mode of treatment are to self-deception. I have repeatedly had some method demonstrated to me by its advocate, who has said to me: "See what a marked improvement (say) in stammering has been effected by my treatment." To the dispassionate observer the benefit is, almost, if not quite, imperceptible.

In my early experience of shell shock I came to lay great stress on disturbances of personality, and I regarded the amnesia and the bodily disorder, autism, tremor, incoordination, or apathy, in personality completely obtunded in case seen soon after their onset, as the expression of this change of personality, due, like it, to some functional dissociation. Accordingly, I adopted the therapeutic principle of restoring the amnesia with or without the aid of hypnosis; and with the restoration of the amnesia came a restoration of the speech and a resumed control of the bodily movement. Brown, who pursued the same method, came to the conclusion that its efficacy was due not so much to the redintegration of the normal personality as to the working off (abreaction) of the repressed emotion. On the other hand, I appeared to produce as good results by discouraging the patient from giving rein to his emotions during treatment. But clearer a series of carefully controlled investigations is required, in which equal numbers of patients are exhorted to a discharge of emotions, and the resulting therapeutic effects compared. Later I began to treat the bodily disabilities first and the mental disturbances after. We have yet to discover which order of treatment should be adopted in different cases.

**Electrotherapy and Hypnosis.**

Lastly, there remain for consideration and unbiased investigation the debated values of electrotherapy and hypnosis. Each, if improperly used, has its dangers. I have seen vast numbers of stammerers whose condition, I am convinced, has been produced by the alarm they experienced during the electrical treatment of their previous autism. I have observed similar results from the application of faradism to other functional motor disorders. Yet I should err in recommending that electrotherapy should never be employed. What we need is an inquiry into the special conditions in which it is beneficial and the particular method in which it is most effectual. Instead, we are asked to dispose of the question without further inquiry.

Perhaps against no method of treatment has there been greater prejudice than against hypnosis. Early in the war I remember the commandant of one military hospital telling me that he would not in any circumstances countenance its employment as this was undesirable in any case. I have read pages of vituperation against hypnosis written during the war by medical men who had had no personal experience of its use. Imagine what would be our attitude if in the case of some particular drug which he had never tried. There is, however, an instinctive aversion from the practice of hypnosis which seems to justify almost any attack against it. I recognised it for a long time in myself. Hypnotism savours of the uncanny, mysterious, and unknown. One's first attempts at hypnotism demand even more self-mastery than one's first sight of an operation.

In these circumstances it is not the rôle of the medical man or the patient to decide whether hypnotism is a device for the treatment of hypnosis in itself or for the treatment of some other disease. Various methods have been employed to test the value of hypnotism as a method of mental redintegration (unearthed repressed complexes) and as a method of somatic redintegration (restoring bodily disabilities by direct suggestion). I believe that a dispassionate inquiry into the different methods of hypnotic treatment adopted. It has been urged that hypnotism gives the patient a temporary relief, like a hypnotic drug or a brandy-and-soda. That, again, must depend on the use.

Here, too, we need careful inquiry into the comparative values of hypnosis as a method of mental redintegration (unearthed repressed complexes) and as a method of somatic redintegration (restoring bodily disabilities by direct suggestions). An inquiry into the sub-sequent permanence of cure of those patients who have been treated by either of these two methods with and without hypnosis.

Is it too late to hope that systematic inquiry may yet be begun on at least some of the lines which I have indicated in this paper? Up to now the field has been almost wholly neglected. Far from being barren, it is rich with the possibilities of valuable results.

### INCIDENCE OF ENTAMOEBA HISTOLYTICA AND OTHER INTESTINAL PROTOZOA AMONG 400 HEALTHY NEW ENTRIES TO THE ROYAL NAVY.

**By H. A. BAYLIS, M.A.,**

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The large amount of work that has been done in connection with amobic dysentery during the last three years has opened up a number of questions, not the least interesting of which is a recent inquiry into the question of whether Entamoeba histolytica exist among the civil population in countries with a temperate climate. Some inquiries on this point have already been made in this country, more particularly by the energetic group of workers at the Liverpool School of Tropical Medicine, and it has been the object of the present inquiry to study the protozoological investigation of the stools of soldiers invalided from the various fronts.

A summary of the results originally published in their earlier papers, together with more recent data, was presented by Professor Harrington Yorke at the Society of Tropical Medicine and Hygiene in June, 1918. An instructive table is there given, in which the results of the examination of a large class of cases of dysentery and non-dysentery are presented. The incidence of carriers is one of the results of the investigation of the stools of soldiers invalided from the various fronts.

The incidence among recruits, 18 to 19 years of age, who had been in a training camp for various periods not exceeding three months, was considerably higher (5'2 per cent.) than among those of whom 1'5 per cent. were carriers of E. histolytica exist among the civil population in countries with a temperate climate. Some inquiries on this point have already been made in this country, more particularly by the energetic group of workers at the Liverpool School of Tropical Medicine, and they have been borne out by the results of the present inquiry into the protozoological investigation of the stools of soldiers invalided from the various fronts.

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