A Final Contribution
TO
THE STUDY OF SHELL SHOCK.[1]

BEING A CONSIDERATION OF UNSETTLED POINTS NEEDING INVESTIGATION.

BY CHARLES S. MYERS, M.D., SC.D., F.R.S.,
LIEUTENANT-COLONEL, R.A.M.C. (T.C.).

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 generally out of the question. But now, perhaps, this tension may be relieved; and inasmuch as, even at this late hour, it is still possible to investigate various problems which have arisen during the past four years, I have endeavoured in this paper to draw attention to those which seem to me of the greatest importance. If, perchance, there be any who have relevant data which are too scanty to be published separately and would otherwise lie hidden away in note-books, I shall be happy to receive them, and will, of course, be careful to acknowledge their source in any compilation which can be usefully made from them.

ETIOLOGY.

There is a general agreement that the war neuroses are to be regarded as the result of functional dissociation arising from the loss of the highest controlling mental functions. Yet considerable controversy exists as to how those controlling functions are lost, and precisely what occurs when they are lost. Some, for example, consider that functional nervous disorders are dependent on increased suggestibility arising from fear, horror, or other emotional or fatiguing conditions; while others maintain that, quite apart from suggestion, emotional conflict or excitement is capable of producing functional disorders. Some have distinguished a so-called commotional from an emotional syndrome; others have insisted that whether a man has been buried in a trench or has seen his best friend's brains scattered before him the functional symptoms are identical. All now agree that mere concussion or the poisonous action of carbon monoxide or other noxious gases does not necessarily give rise to functional nervous disturbance.

Many neurologists hold that the effects of suggestion and of functional disturbance are limited to phenomena which can be imitated voluntarily by the patient; they accordingly limit functional disturbances to those which can as well be produced by malingering. Hence local or general sweating, vaso-motor disturbances, changes in the reflexes or in muscular tone, and any disorders of movement which do not disappear during sleep or under an anæsthetic 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[2]; so do, more seldom, cases of spasmodic movement and of incoördination. The persistence of contracture or of spasmodic movement is likewise inimitable 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 must have seen contractures and spasmodic movements persisting during sleep and during at least the first stages of chloroform anæsthesia. We may recall the case of persistent contracture described by G. Ballet,[3] which was carefully tested during sleep by means of stamp-paper gummed to the affected region.

It has, however, been objected that in such exceptional cases of contracture the possibility of joint adhesions has not been considered, or that the contractures are due to peripheral causes and are therefore to be placed in a special group of "reflex contractures." In this country, at least, I think it difficult to exaggerate the harm that has arisen from an uncritical acceptance of Babinski's hypothesis of "reflex" paralysis or contracture. I have met with expert neurologists who, on diagnosing a case as belonging to the "reflex" group, have at once regarded it as "organic" and have refused it admission to one of the special hospitals for functional disorders. For my part, I have never seen such a case in which the paralysis or contracture has not been cured by psycho-therapeutic measures (aided, sometimes, by manipulation under an anæsthetic), and the other so-called reflex symptoms (loss of muscular tone, coldness, sweating, &c.) have not disappeared *pari passu* with the regain of normal voluntary movement.

Chief Topics for Investigation.

There are, then, three main topics for investigation: (1) the existence of distinct commotional and emotional syndromes; (2) the justification for limiting the effects of suggestion to volitionally 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, hyperæsthesia, and spasmodic movements are commoner than in those whose disorder has a purely mental origin. If these differences are confirmed by others their explanation would not be difficult, but at the present moment would be out of place. So, too, it would be inopportune here to consider whether a special kind of commotion—e.g., a fine "molecular" commotion, such as might be produced by moderately short waves of the disturbed air—may ever be directly responsible for functional disorder, producing dissociation through its exhaustive effect on the higher "intellectual" regions or through its excessively stimulant effect on the lower "emotional" regions. In passing, we may note that emotion alone can give rise to increase of pressure 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 blushing? 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[4]) 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 advanced as 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 higher motives of conscience, social sanction, &c. Particular stress has been laid on the conflict of "wishes," on maladaptation 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 heads—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 and passing to those which show more and more clearly the need for other explanations.

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 hyperæsthesia or paralysis. The hyperæsthesia gives place to anæsthesia, or with recovery of movement a condition of extreme incoördination ensues. The influence of suggestion

[1] Four previous communications on this subject appeared in THE LANCET of Feb. 13th, 1915 (p. 316), Jan. 8th (p. 65), March 18th (p. 608), Sept. 9th, 1916 (p. 461).

[2] Cf. Roussy: Rev. Neurol., 1918, xxv., p. 204.

[3] Ibid., 1915, xxii., p. 767.

[4] THE LANCET, Nov. 3rd, 1917, p. 678.

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 hyperæsthesia has been converted into anæsthesia by suggestion or that the incoördination can be imitated volitionally?

3. In childhood certain spasmodic 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 origin 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 clearer insight into the condition by regarding the 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 fugue), 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 during confusion or stupor may often 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 in revealing the presence of such past conflict or inhibition. It cannot be said that mutism and amnesia are obvious measures of escape from the firing line; and amnesia can only be called a defence mechanism in the sense that, like stupor, it safeguards the patient from suffering further emotion. In such cases, may we not suppose that the shock of an excessive emotion (or ? commotion) is adequate to produce an abnormal, stuporose, or confused personality, on emergence from which the memories of events relating thereto are necessarily lost, mutism persisting as a piece of dissociated behaviour expressive of the mental disturbance?

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 contracture or paralysis. There is no evidence of suggestion here. The patient is usually quite unable to account for the onset of his condition, but more careful mental exploration [5] 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.

6. A soldier has 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's arm is slightly injured, 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, symbolic of ridding himself 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 avenging 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 exploration of their origin, their explanation to the patient, and his 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, there still 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 spasmodic movements, but also by a marked change in the entire facies 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 "ultra-emotional" personality which held sway owing to dissociation of the normal personality.

In the third of these contributions I suggested the general resemblance of certain cases of functional hyperæsthesia to the features of disordered sensibility described in cases of thalamic over-action, where the optic thalamus has been cut off from the normal control exercised by the cerebral cortex. Can the effects of loss of higher control in the war neuroses be similarly manifested in disorder of the sympathetic and reflex systems?

As a rule, 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 disappears when the patient's attention is distracted from the fear of falling. But everyone with sufficient experience must have occasionally seen cases where these disturbances in a clearly functional case are indistinguishable from truly organic disorders, just as a so-called hysterical convulsion may occasionally be indistinguishable from one due to so-called idiopathic epilepsy.

It is a question of what neural levels may be involved as the result of functional dissociation and loss of control. In his zeal to limit the manifestations of "pithiatism" to the sphere of volitional activity Babinski refuses to believe that the patellar reflex can ever be exaggerated in the functional neuroses; and neurologists holding such views delude themselves by using the epithet "brisk" in place of "exaggerated." But will any dispassionate observer deny that in the war neuroses the knee-jerk can be as exaggerated as in disseminated sclerosis, at the outset of which, by the way, we may recall the appearance of various "functional" disturbances?

The Plantar Reflex.

Let us consider in similar fashion the plantar reflex. In many cases of war neurosis no response is obtainable, or an extension of the toes may result from plantar stimulation, especially when there is well-marked hypertonus of the extensor muscles. Often this extensor response is clearly of a voluntary character, and is associated with strong flexion at the ankle; but in some cases, especially, of course, where the disturbance of consciousness has been severe after burial, a temporary extensor response may be obtained which is indistinguishable from one resulting from organic interference with the pyramidal tract.

The appearance of the extensor response at the close of an epileptic convulsion can only be due to a temporary loss of higher control arising from exhaustion of the inhibiting paths. May not such loss of control sometimes as well arise through functional dissociation? A case has been recently reported to me where the emotional excitement consequent on the revival, during hypnosis, of terrifying repressed incidents of trench warfare, produced a temporary extensor plantar response.

[5] 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 reflex are also weaker than on the opposite side, and the cutaneous sensibility is also diminished.[6] Sometimes this association is reversed. These were all purely "functional" cases. Here, again, we need further observations.

Hypothesis of "Reflex" Origin of Certain Disorders.

It is easy to hold to the clear diagrammatic view that all functional neuroses are confined to disturbances of volitional activity, and that where disorders of the reflexes or of the vaso-motor system occur, or where sweating, muscular hypotonus, hyperexcitability, &c., arise, they stamp the case to be one of Babinski's "reflex" cases. Such a simple view, like the old conception of aphasia, overlooks many difficulties. 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 contraction 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 "reflex" cases, are closely associated with hypothermia. Warming the affected limb abolishes these abnormal conditions. But this is no proof that they are of "reflex" 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 epicritic system was depressed, leaving the more primitive protopathic system alone in activity. That is to say, higher and more recently acquired systems of sensibility and reaction are prone to be inhibited or dissociated by cold and to be redintegrated by warmth.

Babinski and Froment have also observed[8] that in their "reflex" cases of paralysis and contracture chloroform anæsthesia 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 anæsthesia, 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 "reflex" causes.

Theory of Loss of Some Higher Control or Endocrinic Disturbance.

If we discard the hypothesis of the "reflex" origin of these disorders what explanation can we offer in its stead? 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 certain cases of "reflex" disorder in which a smaller pulse was observed on the affected side. But d'Oelsnitz and Boisseau[10] find that the pulse is small in such cases on the unaffected side also, and they regard the inequality as merely the accentuation of a constitutional or acquired disposition. Boisseau[11] observes that after cure the previously smaller pulse (on the affected side) may become larger than that on the opposite side, as the limb becomes warmer and less cyanosed. Clearly further investigations are needed on this subject.

But in either event, whether the so-called "reflex" phenomena are due to loss of higher control or to endocrinic disturbance, 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 any disorder in internal secretion would seem to consist in ascertaining if the patient is unduly susceptible or insensitive to doses of the various glandular extracts, the normal effects of which have been observed by control experiments on healthy persons.

I recall two cases of "shell shock" lying side by side in a clearing station in Flanders. I drew a cross with my finger on the abdomen of each, and obtained in the first a vivid *tache cérébrale*, bright red in colour, while the second yielded an equally vivid image of a cross in white—a phenomenon now recognised to be due to arterial hypotension, 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-adrenalism.

In a series of cases examined by me within a few hours after the onset of "shell shock," I could find no sphygmomanometric 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 psycho-galvanic 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 war neuroses.[12] That it can control the tone of voluntary muscles and affect the steadiness of their contraction there is little doubt. Can it also produce the osteoporosis and muscular atrophy which is observed in many so-called "reflex" cases? Every experienced physician must have occasionally met with a surprising degree of atrophy, alike in cases where there has been some local 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 disordered muscles.

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 experience, for example, leads me to think that a feeble or absent plantar response is usually associated with a sluggish reaction of the pupils to light and with a tendency to clonus and catatonia, while an unusually brisk flexor plantar response is associated with an extra-active pupil reaction. Rigidity of the limbs often seems to go with hyperæsthesia, weakness with anæsthesia. But much more information is needed on this subject.

A more careful study is also needed of the mental and physical changes occurring during recovery. A most promising subject of investigation would be the changes that terrifying dreams undergo as the patient improves—victory, perhaps, replacing defeat in his dream battles, and civil elements gradually intruding into the dreams of warfare.[13]

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

[6] Cf. Dejerine: Rev. Neur., 1915, xxii., No. 19.
[7] Hysteria or Pithiatism (Eng. trans.), 1918, pp. 137, 148, 243, 254 ff.
[8] Op. cit., pp. 97, 152, 253. [9] Op. cit , pp 126, 261 ff.
[10] Rev. Neur., 1918, xxv., pp. 202 ff. [11] Ibid., 1917, xxiv.. 269.

[12] In agreement with Pighini (Riv. sperim. di Freniat., 1917, xlii., 298), Orr and Rows have pointed out (Brain, 1918 xli., 19) how intimately the sensori-motor and psychic areas of the cerebral cortex are associated with the sympathetic system, and hence how disordered functional activity of the former may spread through the latter to lower centres in the mid-brain, bulb, and cord, causing dilatation of the pupils and cardio-vascular and other disturbances.
[13] Cf. D. E. Core: THE LANCET, August 10th, 1918, p. 169.

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 send a patient to employment or amusement in 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 adoption of the policy of sending mentally uncured neurasthenic 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 disturbance. 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 psychic 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 connexion I would point out how prone the enthusiastic devotees to one 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," whereas to a 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, mutism, tremor, incoördination, or spasmodic movement, so commonly observed in cases 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 principal 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,[14] 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 clearly a series of carefully controlled investigations is required, in which equal numbers of patients are exhorted to restrain and to express their emotions, and the resulting 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 mutism. 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 methods which free it most completely from danger.

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 because the reputation of his unit would suffer thereby. 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 towards a physician who wrote in condemnation of a 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 what an urgent need there is for a dispassionate investigation of its merits and defects, of its uses and abuses! It has been claimed that hypnosis makes the patient for ever dependent on the hypnotiser. We may ask, Must it do so, any more than exploration of the mind in the waking state need make him dependent on the explorer? We need to inquire into the different results in this respect arising according to the different modes 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 method of its use.

Here, too, we need careful inquiry into the comparative values of hypnosis as a method of mental redintegration (unearthing repressed complexes) and as a method of somatic redintegration (restoring bodily disabilities by direct suggestion). And, above all, we need an inquiry into the subsequent permanence of cure of those patients who have been treated by either of these two methods with and without hypnotism.

Is it too late to hope that systematic inquiry may yet be begun, at least along 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.

[14] THE LANCET, August 17th, 1918, pp. 198, 199.

INCIDENCE OF *ENTAMŒBA HISTOLYTICA*

AND OTHER INTESTINAL PROTOZOA AMONG 400 HEALTHY NEW ENTRIES TO THE ROYAL NAVY.

BY H. A. BAYLIS, M.A.,

ASSISTANT, DEPARTMENT OF ZOOLOGY, BRITISH MUSEUM (NATURAL HISTORY); PROTOZOOLOGIST (TEMPORARY), ROYAL NAVAL HOSPITAL, HASLAR.

THE large amount of work that has been done in connexion with amœbic dysentery during the last three years has opened up a number of questions, not the least interesting of which is to what extent carriers of *Entamœba 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, who have been engaged primarily in the protozoological investigation of the stools of soldiers invalided from the various fronts.

A summary of the results originally published in their earlier papers,[1 2 3 4] together with more recent data, was presented by Professor Warrington Yorke[5] before the Society of Tropical Medicine and Hygiene in June, 1918. An instructive table is there given, in which the results of the examination of various classes of civilians and young recruits are compared with those obtained in the course of routine examinations of convalescent soldiers, both dysenteric and non-dysenteric. Among 450 civilian patients in the Liverpool Royal Infirmary it was found that 1·5 per cent. were carriers of *E. histolytica*, while the examination of 246 children under 12 years old in the Liverpool Children's Infirmary revealed 0·8 per cent. "positive."

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.). This may be partly accounted for by the fact that there were also in the camp some men who had returned from the Mediterranean area, and from whom the recruits might have acquired their infections. This hypothesis, however, as the author states, would not altogether account for the facts, since it was proved that many of the recruits had almost certainly been infected before going into the camp.

From these results it appears therefore that in some sections of the civil community in England there may be carriers of amœbic dysentery to the extent of from 1 to 5 per cent. of the apparently healthy population. If this is the case, questions naturally arise as to the wisdom or necessity of spending much time and trouble in discovering and attempting to cure such carriers, as has been done to a great extent among the naval and military forces during the war.

On the publication of the statistics above referred to, it was suggested to the Admiralty by Surgeon Captain P. W. Bassett-Smith, C.B., R.N., that the protozoologist at Haslar