

This case is quoted to illustrate the anxieties in the diagnosis of some of these cases, the difficulties of the morbid histologist, and the value of impaired mobility, when present, in helping the diagnosis.

Valuable in Prognosis.

As to its value in prognosis:—Of the 27 cases with a mobile cord 21 are alive and free from local recurrence. Two have had local recurrence, 1 is dead from cancer in another part of the body, and 3 have died from other causes.

But of the 17 cases with impaired movement only 7 are alive and free from recurrence. Five have died of local recurrence; 1 died of recurrence in the glands; 1 from hæmorrhage following operation; and 3 have died from other causes. It is evident that when a case of intrinsic laryngeal cancer presents itself the prognosis is decidedly less satisfactory—so far as regards the ultimate result of a laryngo-fissure—if the cord is paretic or fixed. In such cases it would be well to consider carefully whether the usual laryngo-fissure is adequate, or whether some more extensive removal should not be initiated at once.

Conclusions.

1. Impaired mobility of a cord is not a necessary or frequent symptom of intrinsic cancer of the larynx.

2. It is, in fact, only met with in a minority of cases presenting themselves for diagnosis.

3. It is more apt to be met with in an early case when the growth is embedded in the cord or growing into it than in a distinctly sessile or even pedunculated tumour. It is also more usual with growths situated on the inner surface or the subglottic area, than with those seated on the upper surface of the cord. Otherwise, fixation indicates an advanced case.

4. When present it is a very valuable symptom in distinguishing a malignant from an innocent tumour. It is of little value, and may even be misleading, in diagnosing a malignant growth from a tuberculous or syphilitic deposit.

5. While in some cases it may be necessary to postpone a diagnosis in the absence of this symptom, yet, as it is desirable to avoid any delay, we may have to rely on inspection, the age, sex, history, and progress of the case, and the exclusion of other possibilities. The help of microscopic examination of a removed portion is only available in a small number of cases (10 out of 44).

6. As regards prognosis, it is an unfavourable symptom.⁷

THE PSYCHOLOGICAL ASPECT OF THE EFFORT SYNDROME.

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ON taking a general view of the war psychoneuroses we find that they reproduced all the symptoms ascribed to functional nervous disorders in civil life; very few symptoms were observed that had not been seen before, and conversely, what had been previously described could be illustrated. We find the usual bodily manifestations of hysteria: paralyses, contractures, incoördinate gaits, tremors, aphonia, mutism, blindness, deafness, fits, fugues, and somnambulisms; and on the purely mental side we find depression, irritability, anxiety, loss of volition, and psychasthenic symptoms such as phobias and obsessions.

The apparent absence of any well-known symptom group calls for explanation, and the following extracts from Osler's text-book on "The Principles and Practice of Medicine" (fourth edition, 1901) refer to conditions which are not found, prominently at any rate, in accounts of the war psychoneuroses. On p. 1118 we read, under the heading of hysteria:—

"Rapid action of the heart on the slightest emotion, with or without the subjective sensation of palpitation, is often a source

of great distress. A slow pulse is less frequent. Pains about the heart may simulate angina, the so-called hysterical or pseudo-angina, which has already been considered. Flushes in various parts are among the most common symptoms. Sweating occasionally occurs."

On p. 1126 we read, concerning neurasthenia:—

"In other cases the *cardio-vascular* symptoms are the most distressing and may occur with only slight disturbance of the cerebro-spinal functions, though the conditions are nearly always combined. Palpitation of the heart, irregular and very rapid action (neurasthenic tachycardia), and pains and oppressive feelings in the cardiac region are the most common symptoms. The slightest excitement may be followed by increased action of the heart, sometimes associated with sensations of dizziness and anxiety, and the patients frequently have the idea that they suffer from serious disease of the organ. Attacks of pseudo-angina may occur."

Vaso-motor disturbances constitute a special feature of many cases. Flushes of heat, especially in the head, and transient hyperæmia of the skin may be very distressing symptoms. Profuse sweating may occur, either local or general and sometimes nocturnal.

Cardiac Patients with Psycho-neuroses.

If we look for symptoms corresponding to these descriptions we find them recorded, not among the psychoneuroses of war, but among those cases known as soldier's heart, the effort syndrome, or disordered action of the heart (D.A.H.).

Some quotations from the Report to the Medical Research Committee¹ on the subject will show this correspondence of symptoms.

P. 5.—"*Pain* is an inconstant but frequent symptom and one which, when present, varies in degree from precordial discomfort to pain of anginal distribution; it is especially associated with exercise....." "*Giddiness* is almost constant, and is associated with change of posture and with effort. Attacks of fainting are less common, and their associations are less clearly defined." "*Palpitation*..... is very frequent, especially during and after effort." "*Coldness* of the hands and feet, *sweating* of the hands and feet, or excessive sweating of the body generally are very common."

P. 6.—"It is the custom to find relatively rapid heart action in all circumstances, but the chief difference between the patients and healthy subjects in this respect is an exaggerated response of the heart-rate to emotion, exercise, and posture." "*Intermittence* of the heart, or an irregularity which clearly accompanies respiration when this is deepened by request, is not uncommon."

P. 25.—"In many of the patients flushing is easily provoked by relatively slight causes."

The similarity of the symptoms is insufficient to do more than suggest a resemblance between "nervous" and "D.A.H." cases. Osler obviously regarded the troubles he described as only a part of the more important nervous condition, and if we search the Report we find that nervous symptoms are in no wise lacking, for throughout it are scattered observations on the nervous aspect of the cases which only need a little emphasis to carry the resemblance to the point of identity. Some of these observations are:—

P. 5.—"*Exhaustion* is an almost constant symptom; it is usually provoked by sustained effort, but in a degree far in excess of that due to fatigue in healthy men. In severe cases it is a continuous symptom, and is not only physical but is equally mental." "*Head-ache*, which is almost constant, frontal or throbbing in type, often severe, and usually an after-symptom of exercise." "*Irritability* of temper, sleeplessness, inability to fix attention, shakiness, flushing, are common, especially the last three named." (P. 7.) "Many of the patients acquire the diagnosis of *neurasthenia* from time to time qualified by the phrase 'of the vaso-motor type'; especially is this so when brisk reflexes are associated with mental irritability or exhaustion."

(P. 59).—"Though emotional disturbances are more common than in healthy people, being exhibited in rare cases to a very abnormal degree, and though irritability of temper, lack of concentration, apathy, and depression are frequent symptoms, yet these disturbances are less pronounced than in patients who are commonly classed as neurasthenics."

It may be assumed that these observations were made without any deliberate psychological investigation. Nervous patients have a tendency, unrecognised by themselves, to stress their bodily symptoms and to remain silent about their painful thoughts and emotions; for this reason the deeper troubles associated with the effort syndrome may escape notice; the dyspnoea, faintings, palpitation, and heart pains become essential symptoms, and when accompanied by a rapid pulse form a picture which is regarded as complete. If the patient is asked about nervous symptoms he may, especially if he is of a temperament inclined to hysteria, deny anything except his heart trouble; but as a rule he will relate symptoms ranging from nervousness in traffic, ready starting at noises, depression, irritability, or insomnia, up to those of a deep-rooted psychasthenia, with phobias, obsessions, unreasonable feelings of

⁷ Six patients were shown on whom laryngo-fissure had been performed at varying dates up to seven years ago. One case had presented himself with complete fixation of the infiltrated cord, but was free of recurrence three years after laryngo-fissure.

¹ Special Report Series, No. 8. H.M. Stationery Office. 1918.

incompetence or uncertainty, or even that sensation of the strangeness of the world which is described as a "loss of the function of the real."

At this stage of investigation it is easy to convince the patient that his symptoms are not due to heart disease but are only part of a nervous condition; the explanation is likely to be rejected if one tries to assure him that his heart is healthy without this preliminary inquiry into his mental state.

Psycho-neurotics with Associated Cardiac Symptoms.

Approaching the subject from the other end of the scale of symptoms, we find that men whose nervous state has been regarded as of primary importance—for instance, those diagnosed "shell shock"—show in a large proportion the rapid pulse of the effort syndrome, and if the disabilities allow of exertion the patients complain of the symptoms associated with that diagnosis; it is very common to obtain a history of previous admissions to hospital for some kind of heart trouble. (This view must be compared with that quoted above from p. 59 of the Report.)

Sensations are described in terms of heart or emotion, according to the way in which the man has been led to regard them. There are medical men who think of phobias as text-book curiosities and fail to recognise the significance of such complaints as faintness and palpitation, generally accompanied by shakiness, when the patient is in a train or a crowd, though if the man is questioned he will often describe a feeling of anxiety or fear, of which the cardiac symptoms are only the manifestations. The fainting attacks of the sufferers from the effort syndrome are really attacks of anxiety and primarily of emotional origin, being identical with the "nervous" attacks of the sufferer from an anxiety condition. There is no line to be drawn between those attacks and others, usually called hysterical, in which emotion finds expression in motor activity.

I cannot agree with the view given on p. 7 of the Report, where we read on the subject of terminology:—

"From the standpoint of military service it is a matter of indifference what term is employed providing that the method of dealing with the patients is not thereby influenced. But the diagnosis of neurasthenia has this defect, and the latter is not counterbalanced by an appreciable insight into the pathology of the condition."

It is essential that the man should recognise his condition; he is suffering from something, and until he realises what it is he will insist upon fixing his attention on the heart symptoms. It follows that I do not regard a diagnosis of D.A.H. as responsible for the symptoms in any large number of cases; if the man's attention had not been directed to his heart he would have found some other point of fixation for his troubles. I would illustrate this by reference to a recent inquest upon an ex-soldier who, discharged for valvular disease of the heart, had worried about his condition, and eventually committed suicide. Post-mortem examination showed a healthy heart, and the coroner, according to a newspaper report, said the poor man had been condemned to death by an ignorant army doctor. This judgment was not well founded; suicides of ex-soldiers suffering from depression are too common, and this man's nervous condition both produced the heart symptoms—probably the effort syndrome—and led to the suicide. A healthy young man does not commit suicide because he is told he has heart disease, and if this man had been diagnosed as suffering from neurasthenia or shell shock the end would probably have been the same, and no one would have been blamed for it.

I have met a few men without anxiety symptoms who had been told they had heart disease, perhaps on account of a functional murmur. Their attitude is usually quite reasonable, and although they logically attach value to the diagnosis it is possible to alter their belief by ordinary argument. In pensioners of a certain temperament, however, there are obvious reasons why a diagnosis of "heart trouble" aids a resistance against any view but that of organic disease, and if a man is tending towards an anxiety state it is plainly unwise to provide him with a diagnosis which will serve as a further source of anxiety.

Treatment must be directed towards the nervous condition and not to the heart symptoms. One method

to this end was used in special heart hospitals when the "heart" condition was attacked by reassurance and persuasion combined with exercise; this method is a very old one as applied to the psychoneuroses.

The Psychological Processes.

A few words about the psychological processes concerned and the way in which they influence symptoms will aid in understanding the question of treatment. In war cases the processes are more easily revealed than in cases arising in civil life, and opinion is now crystallising round the view that the psychoneurotic symptoms depend upon a repression, or loss of memory, of incidents of a strongly emotional content. Though lost to consciousness these memories produce and maintain symptoms; they may produce stammers or tremors, hysterical fits, or paralyses and contractures. These bodily symptoms may also serve to gain an end otherwise unattainable by the patient—such as avoiding military service or some difficulty of adaptation—and the knowledge of this end may be the repression chiefly concerned; this "secondary function" is characteristic of the hysterical type of patient, in whom the emotional content of the repression may be so well fixed by the symptom that he shows no other signs so long as he is allowed to retain his bodily disability. This type passes gradually into that in which no secondary function is conceivable, and the disturbances are supported only by the emotional content of the repression, which shows itself in an anxiety state, accompanied or not by bodily symptoms.

In this latter group are men whose repressions find vent in phobias, anxiety attacks on slight or no provocation, fainting spells, or apparently causeless fear and apprehension. The patients are in a permanent emotional state.

The Connexion Explained.

So far I have presented conclusions supported by a considerable weight of experience and based upon psychological investigations carried out by many workers. Their application to explain the associated cardiac symptoms contains a speculative element. Certain signs, such as fine tremors of the hands and closed eyelids, together with a nystagmoid twitching of the eyes when lateral movements are tested, are associated with that muscular lassitude of which so many complain, and suggest a lack of tone dependent upon interference with the endocrine glands. Terror is accompanied by an increase of the adrenalin content of the blood; a continued state of emotion may, by affecting the ductless glands, produce the muscular signs above described, as well as the symptoms of the effort syndrome which accompany them. Whatever their cause, these symptoms differ from the purely hysterical ones in being unrelated to volitional control.

We can picture disturbance taking place at different levels of the nervous system; interference with the cortical centres gives us motor and sensory changes, generally called hysterical, as well as purely psychical ones. These we may call psychoneuroses, the more suitable word "psychosis" being already appropriated to indicate insanity. When the thalamic centres are involved—whether by over-stimulation or by loss of cortical control—excessive response is shown by ready starting at ordinary noises or by exaggerated reflexes, as when a tap upon the patellar tendon is followed by a general muscular reaction of the whole body. At a lower level the autonomic functions are disturbed; this is shown by increased sweating and other altered skin reactions, and by interferences with digestion. Here we may place the altered endocrine functions that affect muscular tone and maintain some of the symptoms and signs of the effort syndrome. The word "neurosis" may perhaps be properly applied to these changes at the lower levels of the nervous system, though they cannot be separated from the psychoneuroses as regards either cause or treatment.

If the psychoneuroses are accepted as due to repressions, then treatment should be directed to bringing the repressed memories into consciousness. It is beyond my present purpose to discuss how this can be done, but the effect upon the heart of treatment

directed towards the underlying condition is illustrated by a man who suffered from a severe anxiety state and had a pulse-rate of 160 (taken, it is true, during an examination by a pensions board) with the usual symptoms of the effort syndrome. He had a loss of memory for almost every emotional experience during two and a half years of fighting, and as the memories were revived with due emotional expression his pulse became less frequent and after nine interviews reached and remained at the rate of 76 per minute; his other symptoms showed a corresponding improvement.

On p. 23 of the Report is described a severe fainting fit in a young man who presented "the characteristic signs of toxic debility." The fit resembled closely those in a patient of mine whose frequent "heart attacks" were so alarming that he was placed upon the "dangerously ill" list; the attacks ceased after the revival of the one incident which they symbolised and which had been completely forgotten. Syncopal attacks in patients with repressed war experiences (and these patients include most of those who were subjected to the stress of actual warfare) can often be traced to definite repressions, as in the last example, and are benefited by their revival. Long-standing conditions, aggravated or not by army experience, present greater difficulties, and it is not practicable to treat by methods of mental exploration any large number of them. Even in these a recognition and explanation of the real condition is preferable to allowing the patient to go through life with a belief in the organic cause of his symptoms.

The question may be raised whether the symptoms in valvular cases are sometimes due to an anxiety condition; such a hypothesis would satisfy the problem raised in the Report in regard to the onset of symptoms after shell shock in patients with pre-existing valvular lesions. The existence of a symptomless and unsuspected organic lesion would not protect a man from a psychoneurosis, and the cardiac symptoms that arise would be attributed to the lesion, though they may be in no way related to it.

The possibility of other combinations must be considered. There may be a group of cases in which dyspnoea, cardiac pain, and palpitation persist indefinitely and depend upon physical causes, although no signs of heart or lung disease ever become manifest; there are certainly cases in which those symptoms are the first indications of organic disease; an anxiety state may exist in addition, just as it may in combination with other diseases. But the majority of cases found amongst pensioners and diagnosed D.A.H. are entirely of psychogenetic origin. If this fact could be generally recognised it would aid in the restoration to social usefulness of some of the men who now regard themselves as permanent invalids.

SYMBIOTIC GROWTH OF *B. PROTEUS* AND *B. TUBERCULOSIS*.

APPEARANCE OF AN ACNE-LIKE ORGANISM.

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(With a Note by R. A. O'BRIEN, M.D.)

SOME years ago I commenced a series of experiments bearing on the symbiotic growth of organisms in the mass of bacterial growth in the intestine. A five months' glycerine-veal broth culture of *B. tuberculosis* (bovine) was inoculated with a laboratory strain of *B. proteus vulgaris*. The proteus grew quite luxuriantly and no change in the morphological characters of the organisms could be observed on the seventh day. On the twelfth day a marked yeast-like odour was noticed on opening the incubator, and, on microscopical examination of the mixture, it was found to be crowded with a diphtheroid organism. Nothing further was done with this mixture as I presumed that the presence of this third organism was possibly the result of a contamination.

A repeat experiment was performed, using every precaution against contamination. Four strains of *B. tuberculosis hominis* and one strain of *B. tuberculosis* (bovine) were grown on large tubes of glycerine-brain

agar for one month, after which time sufficient glycerine-veal broth was added to cover the growth, and inoculated with *B. proteus*. In all the mixtures the diphtheroid organism described in the first experiment was observed at the end of ten days. The yeast-like odour is apparently characteristic of this remarkable phenomenon, as it was noticed in all the tubes. Furthermore, the dense turbidity due to the growth of *B. proteus* had disappeared on the formation of this new organism. Subcultures made on surface agar showed no growth at the end of seven days, the proteus having died out. In stab glucose-agar, inoculated from the mixture, a growth was observed at the end of three days, which was strictly anaerobic. The growth was a compact one, starting about half way from the surface of the glucose-agar. On microscopic examination it was found to be the diphtheroid organism observed in the mixtures.

Morphologically and culturally this organism is identical with the acne bacillus.

With subsequent experiment it was found that the evolution of this organism was not constant, and up to the beginning of 1914 97 experiments with tubercle had been performed under varying conditions in order to determine the most suitable conditions under which the phenomenon occurred. 62 per cent. of the experiments were positive and the most favourable conditions seemed to be glycerine-veal brain agar cultures of tubercle to which 5 per cent. glycerine-peptone water to cover growth had been added. Temperature 37° C. The evolution of this organism has occurred in every strain of tubercle which has been subjected to this treatment at different times both in culture and in tissue—i.e., seven strains of human, six strains of bovine, one strain of avian, and one strain of piscine *B. tuberculosis* in culture. Three experiments were performed with tuberculous tissue; two were positive and one suspicious.

Experiments were carried out on organisms more or less allied to *B. tuberculosis* with positive results—i.e., *Streptothrix actinomyces*, *Str. birt* and *leishman*, the bacillus of Johne, and one of three strains of acid-fast bacilli isolated by Tobler.

A few animals (guinea-pigs and mice) were inoculated by Dr. O'Brien with living cultures of the new organism isolated from the tubercle + proteus mixtures, but the results were variable. The animals were killed and a diphtheroid was generally found in some of the organs. Exhaustive controls were carried out on all the organisms under experimentation in order to eliminate, as far as possible, any suspicious members of the group. The cultures were observed under aerobic and anaerobic conditions with and without the addition of glycerine-peptone water.

The work had not proceeded far when the proteus was started from a single organism by the capillary tube method. Many organisms remote from the tubercle group were grown in symbiosis with proteus, but in none of these, or other controls, did the evolution of this diphtheroid occur. The morphological characters of the organism varied from the almost coccoid diphtheroid to the long, club-shaped forms one sees in old broth cultures of *B. diphtheriae*; this was especially noticeable with the organism isolated from the actinomyces + proteus mixture.

Repeated Experiments.

At this time several factors over which I had no control, and later the outbreak of war, prevented further work in connexion with the subject until quite recently, when I determined to repeat some of the experiments with the cultures to hand in my own laboratory. All the cultures in this later experiment were from other sources than those used at the Wellcome Physiological Research Laboratories. One strain each of *B. tuberculosis*, human and bovine, actinomyces bovine, a streptothrix isolated from a case at Westminster Hospital, and *B. smegmatis* were grown on glycerine-brain agar, the growth, covered with 5 per cent. glycerine-peptone water, and inoculated with *B. proteus*. In every tube the diphtheroid organism was observed in from 7 to 14 days.

The object of this paper is simply to place on record the work which has been done, together with the