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FATIGUE: A CLINICAL STUDY.

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INTRODUCTION.

There is no satisfactory definition of fatigue. It has been defined as a "diminished capacity for work." But there are objections to this, for it postulates a knowledge of previously existing capacity; and, further, a diminished capacity is not always synonymous with fatigue, there being other causes of such diminution. Again, one may be fatigued and the capacity for work diminished, and yet as long as activity is in abeyance, as in lying recumbent, fatigue may not be felt. Moreover, a person subjectively fatigued may be apparently capable of normal output per unit time, for example, on an ergometer.

If the time in hours is represented by the abscissa and the work in kilogrammetres by the ordinate, and if the total work of which the organism is capable is represented by OBY when work is commenced from complete rest, while OA represents the time for which the organism can work if it starts with a certain amount of fatigue, then it sometimes happens that for a time OM the output will be normal:—

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Fatigue may have been previously felt, but becomes apparent only with prolongation of the work beyond M, when a falling off in output occurs earlier than if the subject had not been fatigued in the beginning. The difference in the two areas OYB and OYA represents the amount of fatigue with which the subject started (supposing OYB to represent the amount of work of which the same subject, unfatigued, is capable).

It is evident that the definition of fatigue as a diminished capacity for work has the disadvantage of being *a priori*, since only by working to the point of exhaustion can the fatigue be fully demonstrated.

CLINICAL DEFINITION.

As we are concerned only with the clinical side at present, the following formula is convenient :—

A person is fatigued when he is capable of less general activity than is usual with him, or when he is capable of less activity than would be expected from his general mental and physical equipment ; and when the diminution in activity is accompanied by a sensation of fatigue, or of exhaustion, or of weakness.

A succinct behaviouristic but evasive definition given by Janet¹ is as follows :—

Fatigue is the behaviour of a man at rest. The sensation of fatigue is the desire for that behaviour.

METHODS OF INVESTIGATION.

Fatigue manifests itself subjectively and objectively, and as an objective phenomenon it lends itself to clinical and presumably also to laboratory investigation. In each of these ways, two broadly differentiated methods are available, the method of performance of the whole organism or a part of it, and the method of observation of isolated phenomena, such as tremor, or the reaction of the blood.

Clinically, performance is simply what the individual does in his daily life. From the laboratory viewpoint, performance may be gauged from the output of work under controlled conditions (*e.g.* in factories), or by using an ergograph (to record contractions of individual muscles or by adding sets of figures). It is claimed by some (*e.g.* Creuze²) that in fatigued subjects the ergographic curve of the finger flexors falls off more rapidly than is normal, and that in adding figures certain fatigued persons diminish rapidly in their performance from the start.

CLINICAL VARIETIES.

Three clinical varieties of fatigue are recognisable. The first is the so-called 'constitutional' type. The second group we shall deal with later. The third group consists of those who are fatigued as the result of organic disease ; the asthenia of cerebellar disease is a well-known example (however

it may be caused; by lack of support from the cerebellar arc with its 'avalanche' properties?). An early sign of disseminated sclerosis may be excessive fatiguability of the lower limbs.

The best general description of the non-organic clinical types in which fatigue is an outstanding feature is 'irritable weakness,' not infrequently designated 'neurasthenia.' The cases belonging strictly to this group are comparatively few in number, and there are many other clinical settings in which fatigue appears, as we shall see. It is round 'neurasthenia,' however, that most discussions of the causes of fatigue as it occurs clinically have centred.

The credit of first describing in detail and naming the disorder 'neurasthenia' belongs to an American, Beard,³ who wrote considerably on the subject from 1880 onwards. For a time neurasthenia was known as the "American disease" (as indeed Beard himself appears to have named it). But it was not long before European physicians began to describe it, and by 1894, just 14 years after Beard first drew attention to the syndrome, a diligent German⁴ was able to collect 15 closely-printed pages of bibliography. The credit of first describing the condition as a clinical entity, although he did not name it, belongs to Robert Whyte⁵, of Edinburgh, who in 1765 distinguished it from "hysteria" and "hypochondria." This is probably a proper distinction, which many of his successors have failed to observe. Frequently in modern writings such disorders as anxiety neurosis, hysteria and psychasthenia are included under the heading 'neurasthenia.' Some authors do not admit any fundamental distinction. For Janet¹⁰ 'neurasthenia' is frequently an early stage of psychasthenia, and his case descriptions of 'neurasthenia' include many psychasthenic symptoms. The following table, modified from Cobb,⁶ shows how the classification has changed:—

<i>Symptoms.</i>	<i>Beard.</i>	<i>Early French School.</i>	<i>Modern French School.</i>	<i>Psychopathology of Freud, etc.</i>
Physical fatigue ('irritable weakness') ..	Neurasthenia	Neurasthenia.	Neurasthenia.	Neurasthenia.
Gastrointestinal disturbances			Indefinite disturbances.	Anxiety neurosis.
Headache				
Vague pains		Many terms used for many different symptom groups, e.g., 'folie de doute.'	Psychasthenia.	Obsessive compulsive psychoneurosis.
Obsessions				
Phobias				
Anxiety				

According to Burr,⁷ in Osler and McCrae's *System*, neurasthenia is a "really existing thing," a condition of pathological weakness without discoverable lesion, showing itself by too rapid and too great fatigue, physical or mental, or both; emotional imbalance; and undue irritability (too great response to stimuli) of the nervous system,

ETIOLOGY OF FATIGUE SYNDROMES.

The theories advanced for the etiology of fatigue syndromes can be conveniently classed in five divisions: constitution, autointoxication, excessive effort, emotion, and the psychoanalytic theories.

I. *Constitution*.—There are individuals who from a very early age show signs of 'irritable weakness.' What this depends on, is unknown. But as there are certain individuals with metabolic disorder, e.g. alkaptonuria, and others who at an early age show gross defects in the motor system, for example the myotonias and muscular dystrophies, it is not unreasonable to suppose that there may be other inborn defects of function showing themselves only in their remote effects of early fatigue and of irritability.

With inborn deficiencies, there arises the question of inheritance. According to some authors, heredity plays no part, while others state that heredity is the essential factor in a certain class of case—"Primary neurasthenia" as described by Osler and McCrae.

Alcoholism and tuberculosis are said to predispose to neurasthenia in the offspring (Tredgold⁸) by those who believe in the vitiation of the germ-plasm by parental toxic influence (cf. Stockard⁹). Our own observations show that persons prone to fatigue have, in a high proportion of cases, nervous or mental disorders in their immediate ancestry.

There is some evidence that physical constitution plays a rôle. The so-called asthenic type, with long narrow thorax, long neck and limbs, small muscles and visceroptosis, is traditionally predisposed to show irritable weakness.

II. *Autointoxication*.—This hypothesis is apparently supported by the frequency of gastrointestinal troubles in fatigued subjects. "Crises of fatigue" (Janet¹⁰) may be preceded by considerable disturbance of this kind, but it is more plausible to regard the fatigue and these disturbances as of common origin. No one has succeeded in demonstrating an endogenous toxin in so-called autointoxication of any kind, except in complete gastrointestinal obstruction (Gerard¹¹ and Felty¹²).

III. *Excessive effort* ('overwork'). (1) *Theoretical views*.—Formerly this theory was widely held, and on it a well-known method of treatment (Weir Mitchell's) was based. The theory was founded very largely on the statements of the patients themselves, who usually complained of overwork. Deschamps,¹³ an exponent of this hypothesis, defined fatigued subjects as those who tire easily and take abnormally long to recover. He regarded the cerebrum and medulla as "accumulators of energy," and attributed to the vagosympathetic a "sthenogenic" function. To derangement of this sthenogenic function, or to a disproportion between the needs and the quantity of energy directly available, asthenia is to be attributed, according to Deschamps. All this is obviously a matter of mere words.

Janet¹ would have it that in fatigued subjects there is insufficient energy to produce the tension or potential which he supposes necessary for the highest, *i.e.* most integrated, functions.

Views of the type above described have been widely contested. Dubois,¹⁵ for example, remarks, "You will find only a trace of true fatigue, amid a huge mass of autosuggestion of fatigue." For him, evidently, it is a matter of conviction of fatigue and weakness following on some slight actual sensation. But Babinski¹⁶ and Dagnan Bouveret point out that the essential symptoms of 'irritable weakness' do not disappear on suggestion. Münsterburg¹⁷ thought there was an enormous exaggeration in the language of neuropaths who considered themselves overworked. Dejerine¹⁸ admits that a few cases may be as Deschamps claims, but that the majority suffer from an *idée fixe*—a constant autosuggestion. "The patient has it in his head that he cannot walk without fatigue for more than ten minutes and he awaits the end of the ten minutes with anxiety." (But if there is an admixture of anxiety, it is not 'neurasthenia' in pure culture.)

As contributory factors in the production of fatigue (but not as essential ones, presumably) Janet¹ suggests certain exaggerations of movement, *e.g.*, walking too quickly without regulation of breathing, or holding oneself too rigidly, which gives a feeling of effort and evokes the idea of fatigue. Such disharmonies of action bring on more or less real fatigue, by attention to activities which would go on better automatically.

(2) *Experimental evidence.*—Experimental evidence of the production of prolonged irritable weakness by work alone, is lacking. It is rarely that conditions are created in which only overwork and nothing else is present. Nevertheless there is some evidence that excessive effort may temporarily release symptoms of various kinds. Thus Tissier¹⁹ observed that certain bicycle riders after a six-day ride developed phobias and other psychasthenic phenomena. But the irritable weakness type of symptom is not mentioned in the record. Féré¹⁴ stated that fatigue often provoked ideas of persecution. During the late war, airmen after prolonged flying were apt to show irritability and various fatigue symptoms²⁰. This was associated with flying at high altitudes and consequently with oxygen deficiency.

The general conclusion is, that while it may produce transitory symptoms, excessive effort alone does not lead to a prolonged state of irritable weakness. Overwork in the non-predisposed subject tends to limit itself, the sensation of fatigue being a factor of safety which warns the subject to conserve his energy—a warning to which the normal being probably responds more readily than the anxious person. This is in accord with Janet's conclusion, who believes that in psychopaths fatigue animates symptoms; but this is different from supposing that fatigue is the cause of such symptoms.

IV. *Emotion.* (1) *Theoretical views.*—A close relation between emotion and fatigue has long been suspected. For Dejerine, the real cause of fatigue

lies in the emotional equipment. Creuze speaks of an "emotive constitution." Janet says that there is symptomatically little difference between emotion and fatigue, both being in his opinion psychological states of depression.

That profound emotions tend to be followed by fatigue or exhaustion is a matter of observation. Some hold that fatigue may be followed by a depressive emotion as a direct consequence. "Tristesse" for Creuze² "is simply the perception of external things through a temperament which suffers from a diminution of the various organic processes which constitute life—the 'tristesse' of the neurasthenic is a phenomenon of coenæsthesia." This is, of course, a reminiscence of the James-Lange theory.

Sollier²¹ believes that 'tristesse' is a feeling that the quantity of energy available is inferior to the normal average. A case of Janet's contradicts this, in that periods of extreme fatigue were accompanied by a feeling of well-being (in contrast to the patient's usual condition).

(2) *Clinical evidence*.—Much more important than theory is the evidence that may be obtained from clinical observation.

A. Meyer²² points out the possibility of irritable weakness as a disappointment or failure reaction, and the connection with manic-depressive reaction-types, in which fatigue appears sometimes to replace depression. Some clinical evidence will be submitted below.

(3) *Experimental evidence*.—The theory of the etiological rôle of the emotions in the production of fatigue syndromes has now some experimental basis. It is fairly generally accepted that certain emotions, such as anger and fear, in animals, are associated with an increased output into the bloodstream of adrenalin. It is also known that adrenalin has a powerful effect in restoring contractile activity to muscle that is already fatigued.

An interesting illustration of the probable emotional basis of certain fatigue states occurred recently under conditions that were unusually well controlled. Two patients, male, of the same age (23), were subjected to an association experiment with the galvanometer. In this experiment 100 words, many of them of obvious emotional significance, were read to the patients and the galvanometer readings recorded. The same words were used with each patient, who had been living under the same conditions, in the same ward, for a number of weeks. Both were previously ignorant of the nature of the test. After it was over, one of them, after a latent period (of an hour or so) of rumination, lay down in bed, refused to get up, was irritable and threw his hat at the nurse. He remained silent when the physician saw him, but afterwards confessed that he had been much annoyed by the words of the test, and had concluded that his difficulties had been noised abroad. The other also lay down in bed, but complained only of being extremely fatigued, talked readily, and said that the test words had not troubled him, but that the strain of sitting still during the test had been far too great for him.

V. *Psychoanalytic theories.*—These are presumptively related to the theory of the emotional origins of fatigue, but they display a disconcerting and even contradictory diversity. Neurasthenia was held at one time by certain analysts, including Freud, to be the physical effect of excessive masturbation. Ferenczi²³ illustrates and seeks to support this thesis by instancing the effect of a single act of masturbation as a “one-day neurasthenia.” But Ernest Jones²⁴ finds it necessary to add a moral conflict as an accessory factor. “Neurasthenia is only an exaggeration and fixation of the lassitude, fatigue and general slackness that supervene on a single act of masturbation performed after a moral conflict.” Even this is not enough. Another stress is added. “There is always an underlying conflict against buried desires relating to sexual perversions, or incestuous thoughts.” Thus Jones finds two conflicts necessary, one conscious and the other unconscious, as well as physical depletion, to account for ‘neurasthenia.’ Stoddart²⁵ is bolder, beginning where Jones left off; finding the physical part of the hypothesis unnecessary, he declares that neurasthenia is of entirely psychical origin, and is always due to completely or partially repressed autoerotism. For Stoddart, neurasthenia dates from the renunciation of masturbation. All these theories leave a difficulty which Stoddart faces by creating another group of “chronic nervous exhaustion” which is a “disease of middle life,” usually traceable to some exhausting influence on the nervous system.

SYMPTOMATOLOGY.

The fatigue syndrome to which the name ‘neurasthenia’ has been characteristically applied included the following symptoms and physical signs: ‘brain-fag’ with sensations of pressure in the head; poor memory, lack of concentration, irritability of temper, increased reflexes, poor sleep, anorexia and various aches and pains (A. Meyer²²). This syndrome is rarely met with alone, and the cases appended illustrate the occurrence of fatigue and its significance in a wide variety of conditions.

An examination of these cases shows that fatigue can occupy a very varying place, both in importance and in the chronological development of symptoms, in many different disorders. The cases have been divided into groups according to the symptomatic importance of the fatigue complained of, but in all of them the connection of fatigue with emotional disturbance is very close.

The cases seem to fall naturally into five groups.

(1) In this group fatigue is the direct expression of a conflict. The psychogenesis is fairly clear and fatigue is a principal, often the most important, symptom. (Cases 1 to 10.)

(2) Fatigue is here a prodromal symptom of serious mental illness. Even in these cases the fatigue can be referred to certain factors producing

a conflict. In them the conflict has not only produced fatigue (as is the case in the first group from which this one is not sharply to be distinguished), but has gone on to the production of psychotic symptoms. (Cases 11 to 14.)

(3) Fatigue simply accompanies other symptoms which together make a picture of a depression or of a schizophrenic psychosis. (Cases 15 to 19.)

(4) In one case the recurrent attacks of fatigue and their association with certain other symptoms suggested that here fatigue was a symptomatic equivalent to a recurrent depression. (Case 20.)

(5) Fatigue may be a sequel of a variety of mental disorders. (Cases 21 to 24).

GROUP I.—(Fatigue as a leading symptom.)

In the first group fatigue developed in a variety of settings and its meaning lay deeper in some cases than in others; but it was always the consequence of conflict, the significance of the symptom varying in importance with the depth of the conflict. Thus the conflict may involve a simple recent or contemporary situation as in Case 1, or result from a profound personality defect as in Case 2. In some instances fatigue represents disappointment—the reaction to failure following a long struggle for success, as in Case 5, which illustrates also the problem of overwork. It is another example of fatigue following not simply excessive work, but unsuccessful work. The supposed physical nature of the stress in this case (long hours without holidays) probably helped to condition psychologically the nature of the subsequent symptom, viz. fatigue, which is commonly considered to arise from physical causes. In Case 8, fatigue resulted from dissatisfaction, and in it also the position of fatigue as a leading symptom probably depended on the fact that the patient had found her chief outlet in physical exercise. In other words, the symptom occurred in the sphere in which sublimation had chiefly occurred and failed.

In other instances fatigue in one direction indicates diversion of interest into another. The lack of energy for farm-work shown in Case 3, was accompanied by absorption of the patient's interest in the erotic sphere.

The purpose which complaints of fatigue may have (unwittingly) is seen clearly enough in Case 4, where exhaustion enabled the patient to escape for the time being from a distasteful situation. In behaviouristic terms the fatigue was an avoidance reaction.

Sometimes fatigue is largely iatrogenic, as in Case 10. This patient was informed that she had heart-disease and pernicious anæmia. She consequently believed that she could do nothing with safety and slight sensations of fatigue assumed great significance, limiting her activity to an extreme degree.

In only two of these patients was there a special connection with masturbation (Cases 6 and 7) and in each of them it is the conflict that seems important.

GROUP II.—(Fatigue as a prodromal symptom.)

In four instances, the complaint of fatigue was important clinically to an unusual degree; for it was for a time the only symptom and the only overt expression of an acute conflict, and was the precursor of a serious type of mental disorder. In all four cases the apparently simple complaint of fatigue was followed by illnesses which, although none of them exhibited a clearly defined disease-picture, nevertheless had a very definite schizophrenic colouring. One case (13) is given for the sake of example.

GROUP III.

In this group fatigue was of secondary import. It accompanied affective depression or a schizophrenic psychosis. Fatigue and depression are so commonly associated that it seems reasonable to suppose that there is a close connection between the two. Of the five patients in the group, case 16 is given as an example.

GROUP IV.

Only one case is available to illustrate the point already suggested, viz. that fatigue may so dominate the symptom-complex as to eliminate altogether complaints of depression in what from other indications is in all probability a depressive psychosis. (Case 20.)

GROUP V.

In this group of four patients fatigue was the sequel of long-continued disturbances in which emotional causes played a prominent part. The cases support the general contention that where fatigue is complained of, emotional factors should be excluded before an entirely physical cause is assigned. Case 21 is quoted as an example.

In a previous study, the majority of these cases were examined in detail from the physical side, on the principles enunciated in a previous paper²⁶. The following is a summary of the results obtained²⁷:—

In a majority, there were inadequate postural response of blood-pressure and diminished exercise-tolerance. In a proportion of cases only the blood-pressure was lower and the pulse-rate more rapid at rest than in normal. The red-cell count, hæmoglobin and PH of the blood were always within normal limits. The vital capacity was below normal in 11 subjects, and breath-holding time diminished in 18. In one-third the fall in blood-sugar was abnormally delayed after glucose. The basal metabolic rate was abnormal in 6 of 9 subjects. Visceroptosis occurred in 4 out of 14. In two subjects the parasympathetic predominated, and in one the sympathetic was over-active. The irritability to pilocarpin, adrenalin and atropine was striking, most subjects being abnormally sensitive to one or other of them, and some to all three.

It is evident that to some extent the weakness and irritability which present themselves clinically are accompanied by functional weakness and irritability in the various organic systems—in the vagosympathetic, as shown by the irritability to drugs; in the cardiovascular system, as seen in the diminished cardiac reserve and the lability of the pulse-rate; in the anomalies of general and carbohydrate metabolism; and (more doubtfully) in the respiratory irritability (inability to hold breath) and lowered vital capacity.

TREATMENT.

From the above findings, several methods of treatment can be used, with some confidence in their foundations.

1. From the large part played by emotional reactions, it is evident that the principal rôle must be assigned to psychotherapy. This was used as the principal measure with success in a number of the above cases.

2. Exercise tolerance can be increased by graded exercises (cf. treatment of D.A.H. cases).

3. Hydrotherapy is useful in increasing the vasomotor tone and so helping the postural response of blood-pressure.

4. Exercises can be used to increase the vital capacity. The sugar tolerance is also raised by any form of exercise (as is known to be the case, within narrow limits, even in diabetics).

5. A traditional method of treatment by the administration of phosphates fell into disrepute because of its apparently faulty rationale, but, like a number of other empirical methods, it has now been shown to have a sound basis. German soldiers during the war were found to have their power of muscular endurance increased by the administration of phosphates²⁸. Phosphate is built up into the muscle molecule as a glucose-phosphate, and the working power of the muscle prolonged.

These are the chief methods of treatment, but each case must in the first place be thoroughly examined physically and mentally. The methods that are best suited for the individual case can then be selected.

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CLINICAL HISTORIES.

CASE 1. Female, single, age 34; occupation, none.

Complaint: Ready fatigue with exacerbations ("exhaustion-attacks"); breathlessness, faintness and pain in the side; fear of going out; irritability and "nervousness", frequency of micturition.

Family history: She is the elder of two children. Her father is of a shy, nervous, dependent type and all his brothers and sisters are described as nervous. Her mother is of a worrying disposition.

Personal history: She was a premature infant and for a long time delicate. She had measles and scarlet fever at 15, followed by sore throat. She left school at 18, and studied for a civil service clerkship, passing well up in the list only to be rejected as medically unfit because of a cardiac murmur, of which she had been unaware. Accordingly she entered a bank. For the first year she liked the work and soon gained promotion, ultimately reaching the highest post open to her. This she held till 1921 when she resigned on account of ill-health. She has not worked since.

Present illness: At 19 at her first dance she felt faint and so ill that she was afraid. After being informed of her cardiac murmur she climbed hills in Wales without ill effect. In 1918 she began to feel weak and to have præcordial pain at the end of the day's work. In 1919 she moved to a quiet branch bank and her weakness and præcordial pain improved, but she became depressed and had a pain in her head. Her brother had just returned from war service and she had been looking forward to his taking her about; but to her surprise and disgust he married almost immediately a woman of inferior social standing whom the patient loathed. Work seemed to her to become increasingly difficult and in 1921 "everything seemed to go against" her. She focussed her attention on a distasteful pursuit by an elderly man who repeatedly endeavoured to speak to her in the train. His attentions, which she repelled, continued for about two months. She was very much afraid of him and during this time, morning nausea and vomiting, which she had suffered from at school, returned. On altering her time of travelling she escaped the unwelcome attentions of her pursuer, but shortly afterwards she had her first exhaustion-attack—she sneezed one afternoon, felt her legs shake and said, "What's going wrong with me?" Next day she felt very queer, and had pains all over, and the doctor diagnosed influenza, although she had no pyrexia. She had a week's sick leave but afterwards felt exhausted every afternoon. She resigned her position. Three months after the first attack, a second attack of exhaustion occurred similar to the first. She woke up one morning feeling hot, took her temperature (which was normal) felt weak

and tired and remained in bed for three weeks. This attack occurred immediately after she found herself obliged to do housework, which she disliked.

She has since had repeated "exhaustion-attacks"—"one really bad attack each spring," lasting for about two months. All outdoor games have been dropped and she has remained in bed in the mornings and played the invalid. On reflection at the recurrence of her attacks she herself connected the first one with the fear of the pursuit described above.

Personality : She has always been shy, but has usually had one close girl friend. Since childhood she has been excitable and nervous—afraid of the dark and of "everything." She was ambitious, studious, and conscientious and of a worrying disposition "like her mother." Trivial circumstances have readily depressed or elated her. Until 1918 she did not appear to be unduly concerned about her health.

Physical status : She is a tall thin woman of asthenic habitus. There is a faint systolic murmur at the apex and pulmonic area, but no evidence of cardiac enlargement. Examination is otherwise negative.

Mental status on admission : She answered questions intelligently and eagerly. Her mood was one of slight and variable depression, usually greater in the mornings, and tears came readily to her eyes. The depression came over her in waves and she felt utterly miserable for several days at a time. Her principal concerns were her health, her lack of aim and prospects, and her brother's marriage.

Course in hospital : She displayed a very obvious desire to get well. With detailed examination of the setting of each symptom, realization of the interconnections of her symptoms with events in her life, some simple explanation, *e.g.*, as to the relation between emotion and stomach symptoms, reassurance, encouragement and the adoption of a gradually more strenuous physical routine, she improved greatly till her day was fully occupied. Each increase in the daily programme was approached with anxiety, which became gradually less with each succeeding instance. Occasional feelings of fatigue were treated lightly till she came largely to disregard them. On her own initiative she made arrangements to stay away from home, as she felt that the latter was in an uninteresting and distasteful environment.

Etiology : In this case also there are family traits which suggest emotional instability. Further, the actual environment in which she was brought up is anxious. It is accordingly not surprising that the characteristics described above appeared in her personality at an early age. Whether inheritance or parental example was the greater factor is a moot question.

Her physical habitus—the "asthenic" or "visceroptotic"—is one that is commonly associated with symptoms of fatigue, but in the absence of organic disease (her heart condition must be discounted) the occurrence of the exhaustion in attacks at the same season each year and for about the same length of time, is suggestive of a non-physical origin. The setting of the first attack is important. She herself had recognised its relation to the unwelcome attentions of her railway admirer, but she did not recognise until it was pointed to her, how much she had played with this topic—she discussed such experiences with her girl friends, informed the bank manager and the police (but not her parents), read literature on the 'White Slave Traffic' and recalled that she had been previously accosted. Her first exhaustion-attack followed very quickly on the withdrawal of active interest when the persecution ceased.

At the same time she was harbouring a grievance against her brother for marrying a fat uneducated woman from whom she had a revulsion, physical and intellectual. Both these topics have an obvious connection with what she always regarded as the "beastly side of life"; but there was also disappointment that her brother's marriage left her with no one to take her out, as she had no men friends. These subjects possessed her mind,

producing anger, disgust and jealousy at a time when her interest in her work was failing—she could attain no further promotion—and (what was very striking) they were as lively an interest at the time of her admission to hospital, as when they first occurred four years previously. The exhaustion-attacks were always ushered in by acute anxiety, the bodily symptoms of anxiety having a strong suggestive value on account of her previous experience. The intervals between attacks are characterised by a minor degree of anxiety, which may be said to be always present, since it can be observed to appear on the slightest provocation.

In conclusion, she has symptoms originally provoked by a complicated emotional situation and sustained by the suggestive effect of experience and lack of understanding of their real value on a personality of an anxious mental habit which has existed since childhood.

CASE 2. Female, single, age 42; occupation, none.

Complaint: Excessive fatigability, inability to do as much as other people; indigestion, breathlessness, palpitation, headaches, giddiness, malaise at menstrual periods; insomnia, and paraldehyde addiction.

Family history: Her father suffered from insomnia. He died of rheumatoid arthritis. Her mother is alive, age 71, and is "nervous" and "excitable." A paternal uncle is "nervous about himself" and sleeps badly. Patient is the youngest of three children. Of her sister's two children, one is a Mongolian idiot.

Personal history: Her mother's health during gestation was poor and she was a weakly undernourished infant. She was sturdy enough later. Menstruation began at 14. She was educated chiefly by governesses. At school from 11 to 14 years of age, she "liked it," but "did no work." She has never done any whole-time work. Jaundice, rubella and herpes zoster are the only illnesses she has had.

Present illness: Her parents noted no unusual fatigue in her childhood, but she now states that she was always more easily tired than other children. She dates an increase in fatigability from the attacks of rubella and jaundice at 21. Some years ago she was informed that the exhaustion of which she complained was due to "nervous bankruptcy" and she was placed in a nursing home, where, from her own statement, she was "too lively to rest," lost weight, but became less easily tired. In the last few years she has become increasingly engrossed in her health, and has been gradually getting into invalid ways, being too much indoors, and complaining of exhaustion when urged to take exercise. She herself claims that she is a great comfort to her old mother, whereas she is a source of great concern and difficulty.

She began to take paraldehyde for her insomnia at the time of the first anniversary of her father's death, which occurred more than two years ago. She says that she "dreaded the anniversary for her mother's sake" and felt that she "must have sleep at that time." Her sister's illness a year ago filled her with "great anxiety." She feared her sister would die. She has always been envious of her sister's superior health, appearance, and accomplishments. During the past winter the patient fancied that her doctor was in love with her, and she followed him to his new location in another town, on the pretence of requiring a holiday away from home.

Mental status on admission: She was very vivacious in manner and extremely talkative. There was no disorder of behaviour or of the stream of talk, but she was very circumstantial and displayed unusual frankness at the first interview in discussing her affairs, including her menstrual function, which she introduced unasked. Her principal topics were her health, her desire to be useful, and her doctor's supposed infatuation for her. Orientation and memory were intact. Attention was good for short periods. Her intelligence rating on the Binet-Simon scale was 12 years. She had no insight of any kind, attributing her exhaustion to family troubles.

Physical status : She is of diminutive stature (4 ft. 8 ins.) and unprepossessing appearance. The secondary sex characteristics are poorly developed. There is a systolic murmur at the apex, partially replacing the first sound, but no thrill and no enlargement of the heart. Examination was otherwise negative.

Course in hospital : She was able to dispense with hypnotics entirely after three nights of medinal gr. 5. She was already convinced that her heart was sound, and was very active, yet she declared herself too easily tired to do much. When the discrepancy between her statement of fatigue and the amount of her activity was pointed out, she refused to see it. In the penultimate week of her residence she complained of malaise, which she associated with her menstrual period, saying that the latter was unusually prolonged. She lost two pounds in weight, and was very anxious to remain, writing home pessimistic accounts of her health. She admitted to other patients that she was refusing food in order to lose weight. The purpose of all these complaints was to give her the opportunity to pursue a male patient to whom she was making unblushing advances.

Comment : The patient was a woman of unprepossessing appearance and poor intellectual endowments (mental age of 12), who tried to compensate for her deficiencies by social activity and "cultural" striving (e.g., reading with a purpose). Her complaints of malaise and exhaustion were the excuses for the failure in compensation which inevitably resulted. Her lack of insight and the ill-restraint of her amatory activities were partly dependent on her intellectual deficiency.

- CASE 3. Case 3 was that of a farmer, unmarried, who complained of lack of energy of about two years' duration. He was inactive, lay in bed a good deal, but showed no retardation. His chief topics were sexual and occupied his mind to the exclusion of business. Heredity and home environment were alike unfavourable, and neurotic traits (phobias) early appeared. A depressive tendency appeared even at school. His application to reality was disturbed by his excessive day-dreaming, and his career did not at all correspond with his ambitions—he fancied himself as the idol of sporting crowds, instead of which he was an unsuccessful farmer. Further, he was thwarted in his marital ambitions, and his feeling of inferiority in this direction was associated with the idea that he was impotent. His impotence he explained to himself as due to his general lack of energy. When it was pointed out to him that the latter was an expression of disappointment and dissatisfaction with his work and with himself (he was sensitive about his appearance and his failures) and that it represented a partial withdrawal from reality into his phantasies, he gradually accepted the explanation; and on putting it into practice, he improved considerably.

- CASE 4. Male, age 34, married; teacher.

Complaint : Generalised fatigue, "nervousness," eructations, headaches, weakness in left side, and præcordial pain.

Family history : A paternal and a maternal grandparent died of a paralytic stroke.

Personal history : He had enuresis until the age of 14. He graduated from college and afterwards frequently changed his occupation, finally becoming a teacher "to do something good for the world." At 31 he married, and his wife died six months later. At 33 he married again, although in debt at the time. He was usually sociable, but was occasionally slightly depressed and diffident.

Present illness : Immediately after his second marriage (Sept. 1923) he discovered that he disliked his wife. She became pregnant in November although he had used means (coitus interruptus) to avoid this, and he developed frontal headaches and became irritable. Finally he felt so weak that he gave up work (December). Insomnia, eructations and vomiting, lumbar pain and loss of weight (14 lbs.) followed. In the two weeks preceding admission he was moody and discouraged.

Mental status : He was apprehensive of physical examination. His mood he described as "bitter" but not sad. Hypersensitiveness to noises was marked. He talked slowly and dramatised his symptoms. There was some subjective difficulty in thinking.

Orientation, retention, and calculation were accurate. In remote memory he showed some uncertainty about dates. He had no insight into the etiology of his condition.

Physical status: On admission he walked limply with the aid of two sticks. There were paresis and hypalgesia of the left arm and leg. The reflexes were bilaterally equal and not exaggerated. Sugar tolerance in the blood was diminished. Hunt and Pembrey's exercise tolerance test showed him to be only 40 per cent. fit.

Course in clinic: From being very inactive and listless, he began to move about readily, but still complained of fatigue after exercise. He realised to some extent the relation of his mental difficulties to the onset of his symptoms. The question of discharge from hospital elicited symptoms of a relapse, but finally all his complaints disappeared, with the exception of fatigability, which he protested was still present in a minor degree.

Etiology: His symptoms, of which fatigue was most prominently dramatised, developed in response to a difficult situation, dislike for his wife, her unwanted pregnancy, and his own financial indebtedness. They provided a temporary escape from his home environment. His reluctance to go back was shown by the recurrence of symptoms when the question of his discharge from hospital came up.

CASE 5. Case 5 was that of a business man of 49, who complained of fatigue, physical and mental, of one year's duration. He was ambitious out of all proportion to his financial resources and his actual status as a business man (his undertakings were numerous and involved millions of pounds). He had no interests other than his business and had taken no holiday for 19 years. His schemes were already going wrong when a frontal sinusitis acted as precipitant for a group of symptoms, and gave a physical colouring to them all, which made the patient, who was reluctant to admit discouragement and defeat, unable to see that his symptoms were based on, and sustained by, his business difficulties. This view is confirmed by the fact that when the sinusitis had been efficiently dealt with his symptoms became worse because his affairs became more involved.

The chief physical signs were a diminished exercise tolerance and a diminished basal metabolic rate. The latter suggested that the symptoms might be in part due to thyroid deficiency (thyroid exhaustion from the previous sinus toxæmia?) but administration of thyroid, while it restored the B.M.R. to normal limits, produced no amelioration in the symptoms.

In this series, Cases 6 and 7 were those in which masturbation figured prominently in the anamnesis.

CASE 6. Case 6 was that of a single woman of 38, who had developed anxiety symptoms following the renunciation of masturbation at 23. Fatigue developed only at 38, soon after the marriage of a favourite brother and during the pregnancy of his wife.

The fatigue signalled the development of a more acute conflict provoked by the immediate situation, and involving to her great distress a death-wish to her sister-in-law and her child. Jealousy of her sister-in-law's place in her brother's affections, as well as simple resentment at the increased burden of work she had to sustain, was the principal factor.

In Case 7, fatigue developed in direct relation to the renunciation of onanism.

CASE 7. Male, age 24, single; clerk.

Complaint: Easily tired, depressed, and afraid of insanity.

Family history: Paternal grandfather alcoholic, father "nervous," maternal grandfather and great-grandfather and uncle alcoholic; mother's family all "pessimistic."

Personal history: As a child he was in the habit of biting his nails and he suffered much from "colic." He was always shy and bashful and played little. He attended school from six to 16, when he went to a military academy where he disliked the discipline and the "roughness" of his fellows, and became home-sick. At the end of a year he entered a university and did fairly well in his first year, but in the following session he disliked it, failing in one subject. He did not go about socially, finding refuge at home instead,

In February 1920 he left the university, having again failed in his examinations. He had no marital ambitions. He had masturbated from the age of 12, and had desisted in favour of heterosexual relations from the age of 15.

Present illness : In January 1919 he resumed masturbation and felt tired and depressed after it. He worried about it and abandoned it in June 1919. In the autumn of 1919, on returning to the university, he became depressed, continuing to worry about the effects of masturbation. After five months' idleness, he worked in his father's shop but was dissatisfied with his remuneration and his insignificant status. He developed peculiar feelings round his mouth and complained of indigestion and constipation. On a few occasions he took alcohol to "steady his nerves."

Mental status : His posture was slouching and his speech hesitant, and he was depressed and concerned over masturbation. Formerly he had felt that people might read his mind or in some other way know why he was depressed. There was some anxiety about possible insanity. He complained of difficulty in concentrating. There was moderate insight.

Physical status : He was tall, of asthenic habitus, and undernourished. There was no evidence of infection or of organic disease.

Course in hospital : He shewed an increasing amount of interest and activity and endeavoured to accept the psychological explanations offered him. His initiative increased, but waves of depression of brief period occurred from time to time and were accompanied by disinclination for activity.

Comment : This case is of interest because it is the only example in the series where the fatigue followed principally on masturbation. But it was not simply this practice, but the conflict over it, that existed in this case, which is therefore in close correspondence with the others in that this patient also fell ill from emotional and not from physical causes. The case is also of symptomatic interest since the connection between ideas of mind-reading and feelings of guilt, which is present but hidden in full-blown schizophrenic psychoses, is clear to the patient.

CASE 8. Female, age 45, unmarried ; book-keeper.

She complained continually of "exhaustion" which often prevented her leaving her bed. It was accompanied by "dizziness" (rocking of floor) and by feelings in the head and pains in the body. At times of greater depression she emphasised her bodily condition.

Exhaustion was the leading complaint, but it was found to have developed as part of a chain of symptoms, which occurred in an abnormal personality with a tainted inheritance. These symptoms were precipitated by business difficulties which had only a remote connection with her, but which may have served to evoke guilt-feelings in another more personal connection. Rumination of a sexual kind was prominent, and brought dissatisfaction and probably increased her tendency to stay in bed, *i.e.*, her "exhaustion." The exhaustion developed in the sphere in which she had been accustomed to take most active interest (athletics) and represented a failure of this sublimation.

CASE 9. Female, age 30, unmarried ; no occupation.

The relation of exhaustion, which was her leading complaint, to emotional conditions was clear enough. It first appeared after an operation which took place at a time when she was dissatisfied and seeking solace in ruminations, and which was intended to relieve a condition of which the emotional origins were sufficiently obvious (relation of dyspepsia to scenes at meals, and her attachment to her father who caused these scenes). The fatigue underwent an exacerbation when her father died, her only sympathiser being thus removed. As she had no resources for readjustment such as occupation, the fatigue continued unrelieved. The case is another example of the ill-success of operations performed for the relief of conditions of unrecognised emotional origin.

CASE 10. Female, age 37, unmarried; schoolmistress.

The patient had (erroneously) been informed 10 years before admission that she had cardiac disease. To this information she reacted with anxiety and excessive caution. Five years later she had a mild secondary anaemia, which she was told was pernicious anaemia. (Her father had died of pernicious anaemia.) She then began to suffer from sudden weakness, numbness and breathlessness. As she had had menorrhagia for some time, hysterectomy was performed two months before she came under treatment for exhaustion, which had persisted after the operation to such an extent that a five-minute walk "exhausted" her.

That the origin of the exhaustion was partly emotional was evident from its close connection with anxiety. Her exhaustion and anxiety were probably both in part iatrogenic, the result of the announcement that she had a heart lesion and pernicious anaemia—of neither of which was there any convincing evidence at the time her symptoms came under notice. Her very rapid response to reassurance and encouragement bore out the hypothesis that her physical symptoms were largely dependent on anxiety. The foundations of her anxiety lay in her inheritance (perhaps) and family environment, and in her dissatisfaction with her work and her social relations.

CASE 13. Male, age 38; journalist.

Complaint: He was excessively fatigued for the two months preceding admission, and latterly he had been sleepless and afraid.

Family history: He is of Irish descent. His father was "difficult" and his mother had anxiety symptoms. His only brother is alcoholic and a sister is a chronic invalid.

Personal history: He left school at 11 years of age, his father sending him to work. At 15 he ran away from home, having quarrelled with his father. He worked to keep himself at school for two years, and then returned to work at home to support his family. Two years later he went into the newspaper business, and he has remained there as reporter, editor, etc. The death of his father three years before admission made him depressed and afraid, and the death of his mother four months later was a still greater shock. In April 1922 he went abroad to edit a newspaper, but returned in September as he could not get on with his associates. On his return he worked for two months as a copy-reader, but found his superior "unsympathetic." He then (1923) went abroad as a press correspondent, but remained only eight days, as he thought he was being pursued. On again returning home he acted as a reporter, with long and uncertain hours. He has always been a timid, dependent, shy, conscientious person, with a strong attachment to his mother and a strong religious bent.

Present illness: Two months before admission he began to complain of extreme fatigue and loss of appetite, and to have violent nightmares. His work made him so "nervous" and gave him such irregular hours that he resigned. He began to reproach himself for accepting certain money and he became much afraid of pursuit by detectives.

Mental status: His facial expression and bodily posture were strained. His mood was usually one of depression and apprehension, with occasional episodes described by him as "exhilarated." At nights the apprehension sometimes culminated in panic. A feeling of guilt and self-accusation coloured his preoccupations, which were chiefly with religious and sexual topics. Ideas of reference were frequent. He had feelings of influence and an actual desire for them ("salvation" attitude). Orientation, memory, attention, and general information and intelligence were intact.

Physical status: He was of asthenic habitus and undernourished, but without organic disease of any kind.

Course in hospital: He became on the whole less depressed, but his mood varied, and along with this variation in mood the amount of insight fluctuated, but never approached completeness. He involved the hospital in a poorly systematised delusional scheme, which finally made it advisable that he should leave to be in his wife's care at home.

Comment : He had the disadvantages of a morbid inheritance and of an unhealthy and difficult home environment which may have been partly accountable for the difficulties he had later in getting on with others. His personality on a whole was of the shut-in type and with his strictly religious upbringing was ill-adapted to meet the self-reproaches resulting from sexual irregularities and from the receipt of moneys for reporting in the interests of a group of people who were afterwards proved to be corrupt. It was while in conflict with himself over the latter affair that he became so fatigued. His fatigue was increased by the irregularity of hours at a time when he was in a particularly unstable emotional condition. The fatigue presaged an illness of a schizophrenic paranoid type.

CASE 16. Male, age 38 ; school teacher.

Complaint : Constant fatigue, constipation, palpitation after meals, "soreness over liver," "lightheadedness," and "shakiness" at intervals, anorexia, and morning nausea.

Family history : There was no outspoken mental disorder, but many neurotic traits among his progenitors and fraternity.

Personal history : He was a timid child, afraid of the dark, much attached to his mother, and with neurotic habits such as nose-picking. At four years of age he had a right temporal abscess and three years later "bilious remittent fever." At 13 he had chorea. He had measles (date unknown) with subsequent hemiplegia. At 20 he was operated on for chronic appendicitis. He went to school at 11, and left college at 21 after a distinguished career there. He was always a very hard worker, with few friends, shy with women, fond of music, but not of outdoor games. As a child he was ashamed of his puny physique, and in his illness he still blames his mother for this (although he is now well developed) and for his subsequent poor health.

Present illness : His first mental illness occurred at the age of 17, when he was depressed and sleepless for three months after a failure to reach the honours level in college. At 24 after an incident of illicit intercourse he developed an excitement. At 25 another attack of excitement occurred, and since then similar attacks have occurred every two years on the average. The excited phases last for about three months, and the intervals are marked by brief periods of depression with retardation and with some ideas of persecution, hallucinations (auditory) and self-accusations. In at least one excitement there was ecstasy with ideas of universal well-being. An occasional antagonism to his brother in the excited periods is based on the patient's having learned masturbation from him. His insight in the intervals is only of moderate degree and he insists that a physical basis is likely, in view of the symptoms enumerated above.

Mental status on admission : He was subdued in manner and slow in speech and action. His mood was mildly depressed, with morning and evening remissions. He was principally concerned over his physical health, and with the relation of his illness to his ambitions (marriage and career) and of his religious beliefs to his early sexual practices. A failure of emancipation from his mother was very evident. There were no sensorial or intellectual defects.

Physical status : He was a heavily-built man of athletic physical type. Very careful examination of every system failed to reveal physical disease of any kind.

Course in hospital : He became more depressed, slept less, was irritable and jealous and showed some bizarre behaviour and mannerisms. This may have been in part the result of the physician's statement that no physical disease was present to account for his symptoms (as he had hoped). Preoccupation was very marked and he was very uncommunicative. He distributed tracts and assumed at times a mildly superior attitude. His condition (especially as to co-operation) improved slightly before discharge. His mood latterly was not distinctly depressed ; there was a great deal of preoccupation, much irritability and sulkiness rather than depression.

Comment : Here fatigue was a leading physical symptom in what was essentially a condition of affective depression. Its importance arose from the prominence given to it

by the patient, as evidence of the physical basis which he assumed to explain his illnesses and his failures to attain his ambitions or even to fulfil his duties. In the etiology of the condition, hereditary factors and defects in personality are very apparent and in more immediate relation to the earlier attacks lay disappointment and conflict. Symptomatically the case is very interesting from the point of view of the great admixtures—of schizophrenic symptoms (projections) in an affective setting and of the numerous modifications of the affective disturbances themselves.

CASE 20. Male, age 25; medical student.

Complaint: Exhausted languid feeling, "smoky" vision, feelings in head, worry over condition, inability to concentrate, insomnia.

Family history: His father was periodically alcoholic and died after an alcoholic bout.

Personal history: He had measles, mumps, chickenpox, scarlet fever, and pneumonia before he was 10. He did well at school and college and was sociable and lively. In November and December 1918 he suffered from weakness and some depression following an influenzal attack of gastrointestinal type. His recovery was slow. In the autumn of 1920 after a severe coryza he felt weak and dizzy, and mildly depressed, and had difficulty in vision which passed off in two weeks. In November 1921 he had a recurrence of these symptoms following an illness diagnosed as influenza.

Present illness: In December 1923 after a coryza he felt weak, became fatigued on the slightest exertion and was unable to concentrate. He had difficulty in making decisions and was slightly irritable. There was "smokiness" of vision.

Physical status: He was a well-developed and fairly well-nourished youth of athletic type, without signs of infection or of organic disease.

Mental status: His facies was serious but not sad. Thinking was subjectively difficult, but there was no objective evidence of slowing of thought. There was no motor retardation. He admitted occasional topical depression (especially the interference of his illness with his curriculum). Orientation, memory and general information and intelligence were unimpaired. He explained his condition as due to "nervous exhaustion." Later he divulged that he was married and that his marriage was proving a hindrance to his career.

Course in hospital: He improved gradually in all his symptoms and was discharged not entirely recovered.

Comment: This is an example of repeated attacks of exhaustion following infection, which was sometimes very mild. The symptoms persisted long after the signs of infection had disappeared and this persistence in the latest attack was probably due in part to the marriage-situation.

CASE 21. Female, age 17; schoolgirl.

Complaint: Overactivity, followed by fatigue.

Family history: Her father died of aortic aneurysm at 45. A paternal uncle is alcoholic. Her mother was moody and sensitive as a girl. The patient is the fourth of eight children, all living. The third child is "highly-strung."

Personal history: In childhood she was considered delicate. She had measles in infancy, diphtheria at six, and influenza at 12. She began school at six and left high school in 1923. Her school work was good and she had latterly been a pupil teacher. Menstruation began at 13. For the year before admission she was much interested in a school-fellow and talked of marrying in four years. She has always been active, planning and working busily, and was ambitious, conscientious, sensitive and reserved.

Present illness: In April 1923 the patient attended religious revival meetings, was regarded by the minister as "promising," and at one meeting was "hysterical" in her behaviour. In the last week in April she was much more active and talkative than usual. On April 30 she became restless, said she was pregnant and that she had seen her father (who is dead). Insomnia, spatial disorientation, destructiveness and carelessness with

excreta developed. After June 1 she was quieter, would not talk for long periods, and often ate with her fingers. Mocking and causeless laughter occurred. Occasionally she seemed elated. Some insight was present from the beginning—she felt “kind of unsettled.”

Mental status on admission : She was restless, smiled occasionally and grimaced. The only mood statement was that she “felt good.” Her attention was poor, and there was some distractability. Preoccupation sometimes led to delay in answering, or to breaking off in conversation. She spoke little, with some stereotyped repetition of “Who are you?” “Where am I?” Hallucinations may have been present. Orientation was approximately correct in all spheres. Formal examination was impracticable (lack of co-operation). She was destructive and untidy with food, clothes, and excreta.

Physical status : She was of small stature, stout and of pyknic habitus. There was no evidence of organic disease or of infections.

Course in clinic : She spoke of having had several babies recently and gave other evidence of sex phantasies. There were occasionally evidences of flight. Once she was much terrified, saying she saw a snake on a tree. In August 1923 she began to improve, taking more interest. On August 19 and September 2 she had transient attacks of nausea, abdominal pain and vomiting, with temperature of 100.4 and a leucocytosis of 10,200. These conditions subsided and she was mischievous, ate ravenously and slept much. When awake she was active and boisterous, but did not give the impression of elation. She swore and was generally impolite. Discussion of her condition was refused. As her improvement continued some elation and playfulness became evident. Her interests were superficial and there was some mild erotic behaviour. Gradually she became normal, displayed some recollection (with insight) of her early symptoms, and complained of being easily tired and of being easily made breathless.

Comment : The fatigue in this case was the aftermath of an emotional crisis in an adolescent girl. The crisis had the form of an excitement of a mixed type, best described probably as manic with some schizophrenic symptoms. The prodromata included religious enthusiasm.