Observations

ON

THE ELEMENTS OF THE PSYCHO-NEUROSES.

A PAPER ADDRESSED TO THE SOCIETY OF MEDICAL
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By HENRY HEAD, M.D., F.R.S.

It would be an impertinence on my part to talk to you of the treatment of war pensioners, for each of you is more practised than I am in this class of work. But I venture to approach you to-day because I believe your experience will be of inestimable advantage in the more difficult task of understanding the psycho-neuroses of civilian life.

The conditions which evoked these morbid states in soldiers on active service were essentially simple. A man who had never engaged in any warlike or strenuous pursuit was called upon to undergo violent preparation under most unpleasant conditions to fit him to take part in disagreeable and dangerous operations calculated to arouse fear even in the bravest. The fundamental instincts of civilized man were outraged. What wonder that the not infrequent consequences were an anxiety neurosis, an obsessional state, or hysterical manifestations?

Now the war is over, the factors responsible for the continuance of these morbid states have altered. The active forces are still fear and a desire to avoid discomfort, but the objective of these emotions is changed. The patient has no longer to brave the horrors of the trenches, but the conscientious pensioner is still oppressed by dread that he may be unable to face his job, whilst the more obviously self-seeking recognizes that he is better off on a pension of a pound a week than when earning twice that sum by fatiguing toil. The first of these suffers from an anxiety neurosis, whilst the second remains firmly entrenched behind his hysterical symptoms.

No new morbid phenomena have been evoked by the war. The disordered functions of the human mind were manifested in exactly the same forms as under the stress and strain of peace-time civilization. But the task to be faced by every man in the army was a simple one. The one test of his conduct was "Can he fight?" and the only reality to which he was compelled to adapt himself was a state of war. On the other hand, in civilian life the factors underlying a psycho-neurosis are far more complex; they may lie in many different fields—thwarted ambition, business worry, or family anxieties, apart altogether from the disaccord between individual sexual desires and social convention.

In all attempts to solve a complicated problem it is important to choose examples which show the smallest number of variable factors. The functional neuroses of war have been of inestimable benefit in showing us these morbid states under the simplest causal conditions. We have been able to observe the various forms they assume under pressure of the same external forces, and could watch the diverse results which followed changes in the mental and physical environment.

Your task is to deal with these patients, who continue to need your care although the war is over, and you have the opportunity of watching their behaviour, when subjected to the more complicated conditions of civilian life. You can note the effect of disappointment on anxiety neurosis, originally due to fear and fatigue, or observe the return of obsessions and nightmares under the depressing effect of illness of wife or child. Let us then consider some of the chief processes at work in the production of the psycho-neuroses in the hope that we may be guided to some simple rules of prophylaxis and curative treatment.

In the past, psychology dealt mainly with the intellectual factors of mental activity; the instinctive and emotional aspects of the mind were disregarded and the unconscious entirely neglected. But we have learnt to recognize that, outside the limits of the experiences which can be recalled into consciousness by an effort of the will, lie impressions capable of producing an active effect upon mental life.

Throughout the vital activities of the nervous system, from the lowest reflexes to the highest neuro-psychical activities, functions of a lower order are controlled by

those higher in the scale. Thus, for example, the activity of the optic thalamus is normally controlled by that of the cerebral cortex. The thalamus is the centre for the more affective aspects of sensation; it is peculiarly associated with the pleasure or discomfort induced by afferent impulses, and is responsible for almost the whole of our sensibility to pain. When this centre is released from cortical control, the patient becomes more susceptible on the affected half of his body to any stimulus capable of exciting either pleasant or unpleasant sensations. The prick of a pin causes intense discomfort and immediate withdrawal, whilst contact with such a stimulus as warmth evokes exquisite pleasure. Moreover, general states of emotion can be produced more easily by stimuli applied to the abnormal parts; thus, an elderly man, one of my patients, fell in love on the affected half of his body, and had no desire to touch the beloved object, except with his affected hand. Gross organic disease may free the activities of the optic thalamus from the active control normally exerted over them by the cortex. The response from the affected parts becomes in consequence more vehement and impulsive. The patient can no longer deliberate whether or no to remove his hand when pricked; the reaction is an immediate defensive withdrawal.

The object of this control, exercised by higher centres over those of a more primitive activity, is to endow the animal with the power of choice between alternative courses. It can be demonstrated at every level of neural activity, from the simplest reflexes to the highest neuro-psychical functions. It consists, on the part of the higher centre, of a positive exercise of inhibiting energy over the reactions of those lower in the neural hierarchy. With the gradual evolution of its functions, the nervous system thus gains ever-increasing control over the reaction to painful and disagreeable stimuli. We acquire the power of choosing our actions, and cease to be the slaves to an impulsive and inevitable response.

From the psychical point of view, the reactions which civilized man must bring under control are those founded on the primitive instincts; of these, the most powerful are the pleasure of sexual gratification and the urgent desire to avoid pain and discomfort. They are therefore controlled by the more discriminative and logical aspects of the mind, exactly as the activity of the thalamus is subjected to that of the cortex. So long as there is harmony the mind exercises its functions in an orderly manner. The instincts are permitted to manifest themselves in an orderly manner on suitable occasions, and at other times are relegated to a subservient position. But any want of unison between the more impulsive and more discriminative activities of the mind becomes manifested in mental conflict.

Normal control is an automatic and not a voluntary act. The focus of interest changes, as attention moves over the varied objects presented to consciousness. Some point in the field arouses vivid mental activity, and then becomes submerged again with all its attendant psychical processes, as attention moves on to some other centre of interest. In order that the mind can function in a normal manner, attention must be free to range widely, and within certain limits we must be able to choose the mode of response.

Should this control cease to be automatic, the mind adopts several different methods of curbing the desires to which it has determined not to yield. Of all instincts, that of self-preservation is the most deeply innate; but the war has shown how completely it may be curbed by the forces of social tradition or implanted *esprit de corps*. A soldier recalls to himself that if he runs away he will certainly be shot at dawn, and dominates an instinctive wish by a terrifying concept. But this intermediate conflict is certain sooner or later to lead to morbid consequences. The private develops a conversion hysteria, and is carried from the danger zone paralysed from the waist downwards. The officer becomes the victim of an anxiety neurosis, and may resolve the conflict by suicide.

Such conflict may assume morbid proportions in several different ways. It may be that an attempt has been made by the sufferer to repress the desire it is inexpedient to gratify, and the emotional energy with which it is charged reappears in some other form, most commonly as a disturbance of some physiological function. Or the affective intensity of the experience may be so great that the normal powers of adaptation are inadequate to resist its impact.

Lastly, the patient may fall back on some previous and less efficient mode of reaction.

REPRESSION.

The importance of the mental conflict arising from the failure of automatic control was not recognized until Freud formulated his conception of the process of repression, and its bearing on the genesis of the psycho-neuroses. He laid down that forgetting was not a negative procedure, but was a positive act. Unpleasant experiences did not simply fade away, but were thrust out of consciousness as incompatible with its more intellectual content.

These instinctive desires or unpleasant impressions pass into oblivion in consequence of the positive inhibition exerted by the dominating influence of conscious activities of the mind, but are still capable of exerting a subterranean influence on the mental and physical life of the individual. It is this act of expulsion without facing the problem that is so dangerous to the harmonious working of the mind. If I have received an unpleasant letter and neglect to answer it because I am reluctant to deal with its contents, I may forget it for a time; but I shall probably be haunted by a sense of impending ill, my appetite may fail and sleep be troubled. For I have thrust into unconsciousness a highly affective process, which should have led to action, without discharging the energy with which it was loaded. This energy, forbidden the normal method of expression, finds some other outlet. It appears as a dyspepsia, headache, insomnia, or analogous disturbances of function. It is a significant fact that this suppressed energy often manifests itself on the physiological level when denied psychical expression.

This repression, under the influence of reluctance to face disagreeable memories, reaches its acme in the cases of amnesia, which were not uncommon during the war. Many patients could not remember that they had ever been in France, and one young officer under my care could recollect nothing after his seventeenth year. He lost all knowledge of his profession as an engineer, and knew nothing of music in which he had become unusually expert. An able pilot in the R.A.F., when returned to duty after a crash, was ignorant of the construction of an aeroplane, and denied that he had ever been in the air. Asked why he was wearing wings on his tunic, he was entirely at a loss to explain how they came to be there.

DEFECTIVE ADAPTATION.

It is a beneficent provision of Nature that a stimulus of uniform intensity cannot continue to produce a reaction of constant strength. Adaptation is one of the fundamental factors in the mode of response of the nervous system to the forces of the external world. Soak the right hand for a time in cold and the left in warm water; then plunge both of them into a vessel containing water at a temperature which, before the experiment, seemed neither hot nor cold—the neutral medium will now seem hot to the right hand and cold to the left. Each has become adapted to the temperature to which it was exposed, and the change is manifested in the different sensation produced in the two hands by the same, previously neutral, environment.

One of the most salutary results of this power of adaptation possessed by the central nervous system is the capacity to dominate pain and discomfort. This applies not only to the normal physiological processes of the individual, but also to those of his mental life. An apparently overwhelming sorrow loses its poignancy with time; a sound mind and healthy body become adapted to the environment. But any failure of physical health, or lack of that instinctive vital energy which lies behind the processes of consciousness may lead to failure of adaptation. The patient becomes easily fatigued, anxious, and depressed, finally passing into a condition spoken of by the old physicians as "irritable weakness." Should sleep be disturbed this process of exhaustion—physical and mental—is aggravated. The power of adaptation to the conditions produced by bodily fatigue or psychical discomfort is diminished, and the patient is said to be suffering from an exhaustion psycho-neurosis.

But some minds have a subtle method of side-tracking this want of adaptation by constructing fantastic conceptions of the external world. No better example could be given than the story of Cinderella. The despised youngest sister, sitting in rags amongst the pots and pans of the kitchen, imagines a coach and six horses, a footman and gorgeous robes; she too is present at the ball,

but she alone attracts the attention of the Prince. Such fantasies have been the comfort of many a Cinderella, and have served to make it possible to exist under otherwise impossible surroundings.

Such fantasy building has its dangers. Just as a repressed fear may come to the surface as a physical symptom, so such imaginings that have no connexion with reality may lead to curious aberrations of conduct. Privates masquerade as officers of high rank. A lieutenant, who was brought to me for an opinion about loss of power in his arm, was covered with ribbons of non-existent orders, one of which was said to be the "Serbian Victoria Cross." No one doubted his story that he had penetrated to Austrian head quarters disguised as an Austrian officer and had obtained information of vast importance; and yet it was easy to ascertain that this young cockney could not understand a word of German.

I believe that this fantastic method of thinking is responsible for some of the inexplicable disappearances known as "*fugues*." A lieutenant in the R.F.A. was wounded in France, but the injury was not severe. Whilst in hospital in England he obtained leave to spend a week-end with his parents. On Sunday afternoon he mounted his motor bicycle prepared to return to hospital, and disappeared. He subsequently confessed that during the ride he began to think with pleasure of the farm where he worked before the war; from that time he had only a hazy recollection of what happened, until he was discovered by his brother three weeks later. It appears that he turned up at the farm on Monday morning, occupied his old quarters, and set to work at once. When after some days the surprised farmer asked how long he intended to stop, he said he had been discharged from the army.

An airman who had returned from France was attached to an aerodrome to fly machines he particularly disliked. He was lunching alone in the neighbouring town at a restaurant where some of his colleagues were entertaining a merry party. He began to think how pleasant it would be to be free, and what a happy time he had spent with a friend and his wife who kept an hotel in the West of England. He went to the station feeling lonely and unhappy, intending to return to the aerodrome. A train came in going to the West; he got in and disappeared. Several weeks later he returned without explanation, having spent the whole time quietly with his friends. He had made no attempt to hide himself, nor had he offered any reason to his hosts for his presence.

These "*fugues*" are commonly attributed to amnesia, and the patient is said to remember nothing that happened. This is true in some instances; but I am certain that there are others in which memory is not completely lost, and sometimes a fairly coherent account can be obtained from the patient himself of how he spent his time. He may lose all sense of the cogency of the reasons against the line of conduct he adopts; but, as in the case of the airman just mentioned, he may not only remember the mental conflict, but also be able to give an account of his period of absence. Such fantasy building was responsible for many inexplicable aberrations of conduct in young officers during the war. It also lies at the bottom of some of those curious cases met with in civilian life, when a woman for a time leads a purely fantastic existence.

REGRESSION.

When Jung first described regression he intended the term to signify a falling back of psychical life to a more infantile or primitive mode of behaviour. This useful conception is, however, capable of far wider application.

An unexpected return to some previous habit is one of the commonest errors in all human mechanical activities. Innumerable instances can be gathered from games and from daily life. For example, an aviator slowly acquires complete facility in manipulating his machine. At first he laboriously flies by rule, and has to memorize the steps by which each evolution is induced. As he becomes more expert, he has but to desire some movement and it occurs; for a good pilot flies automatically and not by formula.

This power over the machine has been gained by conscious effort, during which a series of functional adaptations become engulfed in the automatic activities of the central nervous system. Movements laboriously learnt become unconscious reactions. But this supreme control can only be maintained by constant exercise and perfect

physiological efficiency. Any influence which tends to diminish the power of concentration, or to disturb the acquired mastery over sensory and motor impulses, will lower ability to fly. The pilot begins to be aware that he has lost his certainty in the air, and especially in the art of landing, but does not know why he is no longer master of his actions. In the same way a golf player, who is "off his game," discovers he has fallen back to some long conquered faults. This might be called mechanical regression; for some action, which has been acquired in perfection and become automatic, is executed in a more primitive and less efficient manner. An even more evident regression was responsible for some of the accidents which occurred to pilots flying rapid scouts. They had been trained on relatively stable machines, which, if they fell into a spin, would right themselves, provided the pilot centralized all his controls. But the fighting scouts were not only much more sensitive, but required a definite action to bring them out of a spin. Should the pilot inadvertently regress to his old habits, adapted to more stable machines, he would certainly get into trouble. The attempt to fly a fast scout by the manipulative actions, suitable to a more stable type of machine, ended inevitably in disaster.

Regression may also be manifested in a failure to control automatically impulses from the sense organs. Those of you who happen to have overcome a childish tendency to sea-sickness may have had the ignominious experience of falling back to the earlier mode of reaction, under the influence of some temporary malaise. In the same way, a tendency to giddiness and vomiting in the air passes away with the acquisition of ability to fly. If, however, the pilot's physiological resistance is subsequently lowered, or his power of mental concentration is diminished, he may regress to the form of reaction which troubled him when he first went into the air.

Mental regression is an exactly analogous phenomenon. Most soldiers suffering from the stress of fighting complained of nightmares, which assumed the most diverse and individual forms; after suitable treatment these terrors ceased, and ultimately the sufferer was able to sleep quietly, and undertake some form of light work. But suddenly all the old horrors returned, in consequence of some private anxiety or trouble. He did not dream of the cause of his recent worry: his nightmares were those of the trenches. He had fallen back on an earlier mode of reaction.

When dealing with the psycho-neuroses of airmen, I frequently had the opportunity of seeing all these aspects of regression in the same individual. A clever pilot would discover that he was no longer flying with certainty; he was obliged to think what he was doing, instead of carrying out the manoeuvre automatically. At the same time the tendency to become giddy, which he experienced when he first went into the air, began to show signs of returning. He slept badly, and nightmares occurred, which went back to some long-forgotten accident, or to his period of service in the trenches. In such a case regression had occurred in all forms of neuro-psychical activity, and was manifested in want of mechanical aptitude, defective sensory adaptation, and uncontrolled resurgence of unpleasant mental experiences.

Throughout this exposition I have spoken of the psycho-neuroses in terms of processes common both to the mind and to the physiological functions of the nervous system. The lower reflexes are controlled by the higher centres, exactly as the more discriminative aspects of the normal mind dominate those which are more instinctive and primeval. But the success of this relation is based on a harmonious give and take. When I tread on a sharp stone, the result is a complicated act of walking, which removes my whole body from the site of the disagreeable experience; if, however, the sole of my foot is pricked when I am prone in bed, all that is necessary is a simple act of flexion, withdrawing the stimulated limb.

Control, in as far as it is a harmonious automatic process, is an expression of the dominance exercised by higher over lower neuro-psychical activities. Abnormal consequences arise when there is declared conflict between the suppressed experiences and the repressing forces. Such emotional repression of some idea or feeling, on account of the dread or repulsion it excites, uniformly leads to harmful consequences.

Adaptation is the power possessed by the normal nervous system of responding to a stimulus of constant intensity, with a steadily decreasing reaction. If this faculty is diminished, we can no longer accustom ourselves to our surroundings, and fail to carry out automatically the functions necessary for such adaptation. Unpleasant mental experiences, or bodily discomfort, tend to be unduly prolonged and lead to exhaustion.

Regression is the act of falling back to a more primitive mode of reaction. Facilities which have been acquired by practice come to be exercised automatically, as the reactions of the child are transformed by increasing experience into those of the man. Any failure of this automatic control may lead to the phenomenon of regression, and the victim becomes subject to some disability he had previously overcome completely.

Face to face with the patient, it is futile to waste time in considering whether he is a case of neurasthenia, psychasthenia, anxiety neurosis, or hysteria. The war has unfortunately increased the universal love of labels. Medicine is popularly thought to be based on the principles of a penny-in-the-slot machine. Make a so-called "diagnosis" and the rest follows mechanically. Hysteria is treated with electricity and massage; an anxiety neurosis needs a "rest cure"; obsessions require fresh air and cheery companions. Nothing is more pitiful than the condition of the medical man who finds that these rules of practice break under him. He is filled with mingled anger and despair, which frequently lead him to vent his impotence on the patient; he expresses his opinion that "the fellow is a rotter," and he "would like to see all his sort shot on the parade ground." He has made no attempt to investigate the forces at work that produce the condition he does not understand. His "diagnoses" are but camouflaged ignorance. The only diagnosis that is of the slightest value, or is worthy of the dignity of our profession, is the laying bare of the forces which underlie the morbid state and the discovery of the mental experiences which have set them in action. Diagnosis of the psycho-neuroses is an individual investigation; they are not "diseases," but morbid activities of a personality which demand to be understood. The form they assume depends on the mental and physiological life of the patient, his habits, and constitution. That is why the psycho-neuroses of war were so much simpler than are those of civilian life. Moreover, in daily practice, the causes of much defective mental harmony are not only more complex, but are more difficult to elicit. A married woman is not likely to confess to her doctor that she is in love with another man, when the doctor's wife may any day drop in to tea with her. She may have absolute confidence in the discretion of her medical attendant, but the presence of his wife would instinctively remind her of her unpleasant conflict. On the other hand, she has no reluctance to confess what she knows in her heart to be the cause of her want of sleep and digestive troubles to a man living at a distance, whom she will in all probability never see again, after her morbid condition has passed away.

Provided we can determine the processes at work in the production of the psycho-neuroses, the causal factors underlying a large number of the phenomena can be discovered without elaborate technique. In many cases, especially during the war, the patient was conscious of the experience which was at the bottom of his trouble, but, because of the horror it engendered, he refused to face it. This was particularly evident in cases of obsession. A man who had seen some horrible or filthy sight naturally repressed it whenever it appeared in consciousness. In this he was encouraged by his medical attendants, who advised him to "go away and forget the war." "Don't think of anything you saw in France, but play games and be with cheery fellows." The evil of this advice has been wonderfully expressed by Siegfried Sassoon in his poem called "Repression of War Experience."

Now light the candles; one; two; there's a moth;
What silly beggars they are to blunder in
And scorch their wings with glory, liquid flame—
No, no, not that—it's bad to think of war,
When thoughts you've gagged all day come back to
scare you.

And it's been proved that soldiers don't go mad
Unless they lose control of ugly thoughts
That drive them out to jabber among the trees,

If the morbid state is accompanied by physical symptoms, such as loss of speech, deafness, or paralysis, these must be removed. The patient is first carefully examined so as to be certain that there is no structural cause for his loss of power. Then he is told that his disability is not based on any serious bodily condition, and that he can be cured without difficulty.

The majority of hysterical patients, like children, are unduly suggestible. But, in most instances, it is unnecessary to employ hypnotic suggestion. Provided the examination has been carried out carefully and sympathetically and nothing has been said or done to confirm the patient's belief in the severity of his disease, the physician will have acquired sufficient suggestive power to remove such physical disabilities as paralysis or loss of speech. Sometimes this suffices to produce a permanent cure; but it must not be forgotten that behind these obvious manifestations may lie a state of anxiety. This must be dealt with seriously and systematically, or the patient will relapse on the first occasion that his conflict is reawakened.

The number of lightning cures that were possible during the war was a measure of the ignorance of the bulk of the medical profession as to the nature of these maladies. Paralysis of mental origin were mistaken or neglected, and the patient was not subjected to systematic psychical treatment.

All such loss of function can be easily recognized by its character. It follows a conceptual and not a physiological or anatomical distribution. A patient with hysterical loss of speech can write and read fluently, and one with complete aphonia can cough loudly. When all power of recognizing the position of one upper extremity appears to be lost, the patient has no difficulty in finding the tip of his affected forefinger with that of the normal hand; but he carries out the reverse operation with difficulty, because it seems natural to him to do badly with the "bad" hand and well with the "good" one. But, when the sense of position is disturbed from an organic lesion of the cortex, the condition is usually the exact opposite. The normal forefinger cannot be brought into contact with that of the affected hand because its position is not known, whereas the reverse movement can be carried out without difficulty, because the situation of the normal hand is accurately recognized. It is easy to make fair shooting with a bad rifle if we know the position of the target; but the best rifle in the world is useless if we are ignorant of the direction of our aim.

The following difference between two apparently allied signs is equally significant. When a patient with tabes dorsalis or any disturbance of the functions of the posterior columns is made to stand with his eyes closed, he tends to sway or fall. In many psychopathic states he also becomes unsteady under similar conditions; this has been called by the outrageous name of "pseudo-Romberg." But the true nature of this sign is evident from the following procedure: Let the patient stand on both feet and tell him to close his eyes; he tends to fall. Then tell him you are going to examine his eyes; stand him facing the light, and close first one eye with your hand and then the other; he will remain steady on his feet. By the first method of examination, attention was attracted to his power of standing with his eyes closed, but, on the second occasion, he was told that his eyes were under examination and no question of equilibrium arose in his mind. All these conditions may be classed together as "paralysis by idea."

Most of these defects of function arising during the war have long ago been removed by treatment, and the few patients of this class who remain are of a poor mental type. The large bulk of the functional neuroses which now demand attention are those consisting of states of anxiety and obsessions. This corresponds to the normal experience of civilian life. An ex-soldier is troubled about his work or is anxious about the illness of his wife and the difficulty of obtaining a lodging. Officers returning to their pre-war employment find it uninteresting and badly paid. Moreover, they have not the mental stamina to work long hours, and then return home in an intolerably overfilled train. Old nightmares recur and sleep is troubled; their general efficiency goes down, and they are in real danger of finding themselves without employment.

It is the business of the physician to investigate these conditions with the greatest care. An unfavourable environment must, if possible, be changed. The sleep of

one of my patients improved enormously as soon as quarters were found for him in London, so that the railway journey at the beginning and end of the day's work became unnecessary. Abnormal mental experiences must be brought into the main stream of the individual personality, and, if possible, the patient must be induced to regard them from a more favourable point of view. A terrifying object, that can be logically examined, tends to lose its fearful aspect. We dread the unknown; and to drag these half-appreciated horrors into the light may discharge the greater part of their emotional energy. If possible, a sorrow must be sublimed; the loss of some dearly loved person should not be repressed, but be brought up to form an integral part of the sacrifice at the altar.

Obsessional states are the hardest to remove permanently; for any want of physiological or mental fitness is liable to lead to regression. If, however, the patient can be taught to recognize the significance of this reappearance, its explosive force can be greatly lessened.

I have entered a plea for regarding the psycho-neuroses as a disturbance of functions, common both to the nervous system and to the mind. The form they assume depends on the personality of the patient, and the nature of the emotions and ideas with which he has had to deal; it has nothing to do directly with the effect of external physical forces. Such expressions as "shell shock" and "neurasthenia" do not correspond categorically to the manifestations of the functional neuroses, which are in reality the forms assumed by the reaction of the patient to his individual mental experiences.

THE NATURE, PREVENTION, AND TREATMENT OF HEAT HYPERPYREXIA.*

THE CLINICAL ASPECT.

BY

W. H. WILLCOX, C.B., C.M.G., M.D., F.R.C.P.,

PHYSICIAN TO ST. MARY'S HOSPITAL, LONDON; LATELY CONSULTING
PHYSICIAN TO THE MESOPOTAMIAN EXPEDITIONARY FORCE.

The three summers of 1916, 1917, and 1918 spent on active service in Mesopotamia as Consulting Physician to the Mesopotamian Expeditionary Force gave me the opportunity of seeing a very large number of cases of illness due to exposure to high atmospheric temperature, and I made a careful study of the clinical manifestations of the different types of disease due to this cause.

Heat hyperpyrexia was the most striking and most dangerous form of illness met with, and as this was likely at any period to occur as a complication in the milder types of these effects of heat, it was chosen as the title of the paper.

ETIOLOGICAL FACTORS.

Climate.

Mesopotamia and the country round the Persian Gulf have been well known for many years as having an unenviable reputation for danger from "heat-stroke." The sun's rays seem to have a peculiar deadly power in this part of the world, and the risk of heat-stroke appears to be much greater than in countries like India, where the temperature is equally high.

Probably the explanation is to be found in the extreme flatness of the country, and the absence of trees and vegetation except in the small cultivated areas. The clearness of the atmosphere also and the absence of dust and moisture in the upper strata undoubtedly contribute, so that the full force of the sun's rays was encountered, with scarcely any absorption from dust or moisture in the air and unrelieved by shade.

The soil of Mesopotamia is really the dried alluvial mud deposited by the river floods, and this forms a light brown dry barren deposit, which radiates and reflects to a great extent the sun's rays, so that one is exposed not only to the direct rays of the sun but to those reflected and radiated from the surrounding soil.

* Papers read in introducing a discussion on heat hyperpyrexia at a meeting of the Medical Society of London on March 8th.