inculcation, so far as we have the dynamic force, and he the capacity for response, of the necessity for personal effort.

And, where there is little or no hope that we may evoke such helpful response, in devoted care of the straggler from our ranks, there is a duty, not lightly to be evaded, which, if accomplished, will bring with it a rich burthen of racial reward, but, if neglected, will entail an inevitable Nemesis.

Traumatic Neurasthenia. By H. CAMPBELL THOMSON, M.D., F.R.C.P., Physician to the Department for Nervous Diseases, Middlesex Hospital, and to the Hospital for Epilepsy and Paralysis, Maida Vale.

IN spite of attempts at classification, most observers will agree that the disease known as neurasthenia has no definite boundary line. However strict an attempt is made to define its limitations, everyone who has to do with these cases must admit that the symptoms frequently merge into those associated with other conditions, such as those known as psychasthenia, melancholia, hypochondriasis, anxiety neuroses, obsessions and others. Even hysteria in its less pronounced forms is not always easy to separate from neurasthenia, and in not a few instances some of the salient features of both diseases may be present at the same time, and that this close association is recognised is shown by arguments that have occasionally been put forward for placing the disease known as traumatic neurasthenia into the category of traumatic hysteria. All classification is artificial and provisional, but useful and necessary as it is for studying the general group aspects of disease, there is the danger of overestimating its importance, and of being tempted to feel the necessity of labelling a disease and then treating it according to such rules as are applicable to the label which has been placed upon it.

One has always to remember that disease is modified by the individuality of the person in whom it exists, and nowhere is the influence of individuality of more importance than in diseases complicated by mental disturbance—a fact which has been especially emphasised by some of the more recent psychological

work. It is the individuality of every case that must be worked out regardless of the particular name given to it.

In any case, whether one considers it desirable or not, it is quite obvious that the term "neurasthenia" is coming to be used in a more general sense to cover many of the psycho-neuroses of lesser degree, and when writers of repute agree in saying that neurasthenia may be caused by such different conditions as septic absorption, arterio-sclerosis, pulmonary tuberculosis, carcinoma, intestinal intoxication, diabetes, and organic nervous diseases, it is clear that the term must be used in a wide sense, since it is impossible to imagine the symptoms from such different causes corresponding to one another in anything more than a general way.

The first point, then, I wish to emphasise is that the term "neurasthenia" is becoming used as a group designation. In dealing with traumatic neurasthenia, I have for some time advocated its use in that sense (1), and have referred to the difficulty which one meets with in medico-legal cases, where one witness may use the term in a restricted sense, and maintain, for instance, that a patient is suffering from hypochondriasis, while another will be equally certain that the case is one of traumatic neurasthenia. I have therefore suggested that the position would be clearer for all parties if they could start on common ground, by saying that a patient is suffering from traumatic neurosis or neurasthenia, using the term in its wide sense, and then proceed to bring forward evidence to show on what particular lines the somatic and mental symptoms have developed.

The term "traumatic neurosis" or "neurasthenia," then, I understand to indicate a group of functional nervous and mental symptoms that may occur as the result of a shock to the mind in connection with an accident, and I wish to emphasise the fact that it is the trauma of the mind that is the essential factor of the neurosis, for in some of the worst cases of nerve disturbance the physical injury to the body has been either absent or of such slight degree as to warrant it being disregarded.

It is the emotion, especially that connected with fear, that gives rise to the nervous disturbance, and in this respect the cause is identical with that of other cases of neurasthenia which have arisen after an emotional disturbance, and beyond the

frequent complication of definite somatic injuries, especially those of the head, there is not, I consider, any essential difference between the neurasthenia produced by the mental shock of an accident and that produced by the mental shocks in other experiences of life.

In order better to understand the severer symptoms, it is well to take the more simple cases that are met with in every-day life, *e.g.*, where mental shocks occur as the result of some unpleasant news.

In such instances the rhythmical actions of the essential organs of life are disturbed, and palpitation, dryness of the mouth and distaste for food are among the more immediate symptoms which everyone must have experienced at some time or other. In some circumstances a person may faint from hearing bad news, which is a psychical effect somewhat comparable to the concussion produced by a physical blow.

The symptoms of great fright are too well known to need detailed description. The eyes become prominent, the heart beats violently, the skin grows cold and sweat breaks out. The whole body trembles, and in extreme cases the hair may stand on end, while the after-effects are characterised by prostration. All these signs show the intensity of the nervous disturbance that takes place, and one can easily understand how, in some instances, the effects may be lasting, and how in others the symptoms may arise without necessarily having been preceded by the classical symptoms of the acute stage. It is indisputable, therefore, that the mechanism of the mind and body is liable to be disturbed by the reception of sights, sounds or ideas which are outside the scope of those usually received. Probably the circumstances in which the shock occurs are often more important than the nature of the shock, for whether the mind is prepared or not makes a great difference—a fact of common knowledge, as shown in the efforts that are generally made to break bad news gently.

Moreover, the amount of fright or shock is often disproportionate to the degree of danger experienced. In some circumstances an intense shock occurs where the danger to life and limbs has been slight, while in others again, the narrowest escape from death produces little or no shock.

The latent period which frequently occurs between the time of the shock and the onset of symptoms is easily explained by

the energy of the mind being kept up by the excitement, and then failing after all energy is exhausted.

The occurrence of a latent period, however, sometimes becomes a matter of legal importance, and it is a subject which I think requires some consideration, and on which I should like to have your views.

While every case must be judged on its own merits, I have, from careful observation, formed a general opinion that the latent period in a genuine case of traumatic neurasthenia does not usually cover a longer time than, say, a few days or a week or two. It frequently happens in the hearing of legal cases that the symptoms relied upon have begun some months after the original accident. As might be expected, a man who has been out of work some time, and who has genuine doubts as to whether he is fit to go back, is very likely to become worried by the repeated medical examinations, the cessation of his compensation, and the subsequent suspense as to the results of litigation, and it is not unlikely he will be neurasthenic in the general sense of the term, but it is difficult to see how, in such a case, the nervous symptoms can be attributed to the accident. Moreover, so far as I have been able to observe, it is this particular class of case in which recovery rapidly takes place after the litigation is over, which is what one would expect; but the general statement that is sometimes indiscriminately made by medical witnesses that cases always recover when their litigation is over is, I am quite convinced, not true.

It may be quite fair to say that a man will be likely to improve, since it is obvious that the worries of litigation must tend to make anyone worse, but I have no hesitation in saying that some of the longest standing traumatic neuroses that I have seen have been in men who have been generously provided for, and for whom there was no anxiety as to the future. I think the time of onset of the first symptoms is a matter well worth studying as an aid towards establishing the justice or otherwise of a claim.

The principal bodily symptoms occurring through an emotion such as we have been considering to-day appear to be produced through the agency of the sympathetic system.

The voluntary system is disordered also, but largely on the mental side in the direction of difficulties of concentrating the attention, of orderly association of ideas, or further, through

the development of distinctly abnormal views, but it is through the unstriped muscular system that the somatic changes mainly occur, *e. g.* palpitation, sweating, diarrhœa, polyuria, loss of appetite, and general digestive disturbances.

The sympathetic system consists of two main divisions:

(1) The vertebral sympathetic, which comprises the well-known chain of ganglia, situated alongside the spinal column, and (2) the autonomic system of Langley (2) which arises in three areas, which are situated in the mid-brain, the bulb and the sacral region. The distribution of the efferent fibres of these two systems is mainly to unstriped muscle-fibres, *viz.*, of vessels, glands, skin and viscera. It will be seen that most of the structures thus receive a double nerve supply—one from the sympathetic proper, and one from the autonomic system—and there is some reason to think that the results of the two supplies tend to be antagonistic to one another. This, however, is a matter which need not now be considered.

The pyramidal system is unaffected except through the mind, and, beyond some exaggeration in tendon reflexes, nothing of note is likely to be found. The ingoing peripheral system is likewise unaffected, and the absence, therefore, of Romberg's test, which is often made so much of in medico-legal cases, proves nothing so far as neurasthenia is concerned, since one would not expect in any case to find it in an uncomplicated case.

Giddiness, of course, is often complained of, and when present is due to vasomotor disturbances, and should not be confused with ataxy, such as can be demonstrated by Romberg's test.

It is an entirely different matter and is brought about by lack of control of the vasomotor system, which lack of control is especially liable to be demonstrated on changes of position.

It is very desirable, if possible, to demonstrate the condition of the vasomotor system by graphic records of pulse-tracings and pressure curves taken under different conditions, so that we may have more scientific evidence to deal with than the rough and ready statement of the patient that he is giddy when he laces up his boots, and the doctor's denial that this can be possible because the man stooped down while dressing to search for his collar-stud on the floor without any apparent distress. Other complaints likewise, such as want of concentrating

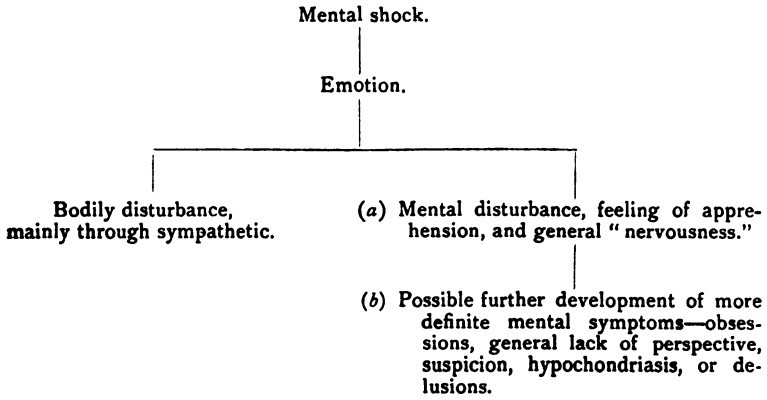
power, loss of memory, and so forth, must be tested and recorded in a scientific manner.

In fact the examination of the neurasthenic patient, both for diagnostic and prognostic purposes, requires systematic elaboration, and should be proceeded with in two different directions, *viz.*, mental and bodily.

The various functions of the mind should be tested and recorded in a manner similar to that carried out in many institutions for mental disorder, while those of the body should be carefully observed and recorded in a similar manner, regard being especially paid to vascular variations, as shown by pulse and blood-pressure tracings.

I am at present investigating cases on these lines, and by them I believe that both the diagnosis and the course the disease is running will be more clearly defined.

The accompanying diagram indicates the lines of development of traumatic neurasthenia as I have endeavoured to put them before you.



We cannot expect to establish the existence of a morbid anatomical condition in neurasthenia, whether of traumatic or other origin, for any changes that occur are not of such a nature as can be identified, and, moreover, the uncomplicated cases under consideration happily do not end in death. While, therefore, we must continue to regard neurasthenia as a functional disorder, it is, nevertheless, highly desirable to try to form some idea of the changes that take place, and of the paths along which the impulses that give rise to the morbid symptoms travel.

An anatomical conception of the disease would not only make

it more clear how symptoms are produced, but would also give some indication of the directions along which search should be made for objective signs of bodily disorder thus brought about, and might help to bridge over the unsatisfactory space which now exists between the subjective complaints of the patient and the absence of all objective symptoms as observed by the medical man.

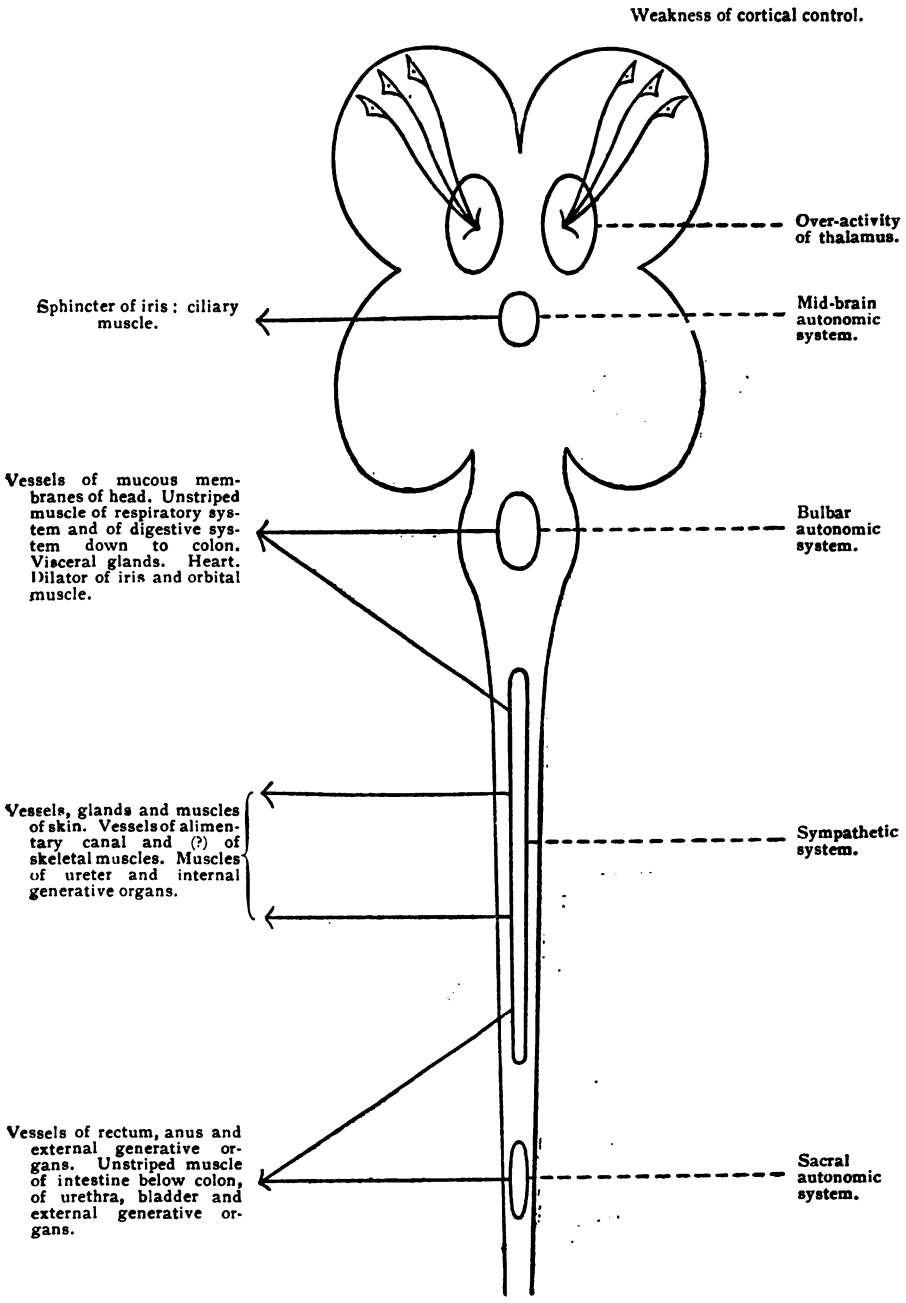
Henry Head and Gordon Holmes (3) have shown that the functions of the optic thalamus are intimately related to the emotions. They state that in lesions of one thalamus, not only do the two halves of the body respond differently to affective stimuli, but that states of emotion may evoke different manifestations on the two sides, and among other instances, music is mentioned as being liable to evoke a different reaction on each half of the body.

The view of these authorities is that the cortex normally controls the activity of the thalamic centre by means of paths which pass from the cortex to the lateral zone of the thalamus, and when this control is taken off by organic disease the over-activity of the thalamus comes into evidence.

There is evidence that I have already put before you that many of the final results are brought about through the sympathetic system, so that I think one may fairly suggest that the first result of a mental shock is to inhibit the action of cortical cells and thereby remove control over the thalamic centres. Emotional disturbances, being devoid of full cortical control, will produce excessive effects, which effects will be mainly produced through the sympathetic system.

In this connection it is interesting to note that Crile, in his recently published article on "The Kinetic Theory of Shock" (4), states that in his view "the essential lesions of shock are in the brain-cells, and are caused by the conversion of potential energy in the brain-cells into kinetic energy at the expense of certain chemical compounds stored in the cells." He further considers that "stimulation of the distance ceptors (special senses) is as potent as stimulation of the contact ceptors in producing a discharge of energy"; and finally he brings forwards clinical and experimental evidence to show that shock can be caused by fear alone.

I would therefore sum up these suggestions by means of the accompanying diagram.



Diagrammatic representation of suggested combination of cortex, thalamus and sympathetic system in the production of symptoms of neurasthenia from mental shock.

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I would also point out that acceptance of this theory would seem to carry with it an adequate explanation of the manifold ways in which neurasthenia can be produced. When the cortical control is congenitally weak we have examples of the person who is continually more or less neurasthenic in all the ordinary circumstances of life. In the person of average mental stability there may be a temporary weakness of cortical control as the effect of overwork, strain or worry, which soon disappears as the result of a holiday, and between these two extremes there may be symptoms of different intensity and duration, according to the stability of the individual and the troubles that assail him. Then there is the large group of cases where neurasthenia is for a time the principal symptom of some general bodily disease, such as one of those already enumerated at the beginning of the paper. In these the symptoms are produced through the disease lowering the general nutrition and so the stability of the nervous system, or it may be in some cases directly through the sympathetic system, more especially in cases of disorder of the ductless glands, with which the sympathetic is thought to be closely connected.

If we are correct in assuming that the essential causes of traumatic neurasthenia are lack of cortical control, together with an alteration in nutrition of cortical cells, and that these changes have been caused by emotional states of mind, then the methods of treatment that should be followed are those that tend to protect the individual against further emotional disturbance, and which also tend to improve the general nutrition. These two principles are complied with by change of surroundings, regulation of mental and bodily exercise, with plenty of good food and air. If these principles are accepted, the stringency with which they are applied must depend upon the requirements of the particular case, for which the possibilities range between such extremes as taking a holiday and undergoing a "rest cure."

In the cases where strict treatment is required, the isolation, separation from friends, and absence of letter-writing is usually a preliminary necessity, for by this means all the outside influences which would be likely to cause association of ideas that would keep up the excessive emotion are cut off. In very many cases this is sufficient to restore the mental balance, but if, on the top of this "neurasthenic state," there is a definite

growth of morbid ideas, these may be dealt with by such mental methods as those of "persuasion," "suggestion," or "psycho-analysis," or a combination of these according to the physician's judgment.

As soon as the nervous system appears to have recovered its stability the patient should be allowed up and encouraged to begin physical and mental exercises. The physical exercises are important in nearly all cases, and in the case of working men it is essential they shall, if possible, be sent out of hospital in such a fit condition of health as to enable them to begin by doing a fair day's work.

It is practically a physical impossibility for any working man to go straight back to full work when his muscles have got soft and flabby, and nothing can be more discouraging to a man than to go through a course of treatment, and then find himself better mentally, but physically still too feeble to earn a living. Unable to do heavy work, and unable to find light work, he becomes discouraged, depressed, and probably rapidly relapses into a condition of hypochondriasis. Therefore, whenever possible, every effort should be made to send him out fit both in mind and body.

There are points concerning prognosis that I should have liked to put before you, but time does not permit, and I will therefore content myself with saying that, while the earlier the cases are treated, the better is the chance, yet one need never despair, since in several instances men have returned to work after being on the compensation list for a very long time.

In conclusion, I will give the results of a consecutive series of sixty-two cases of neurasthenia which have been placed under my care at the Maida Vale Hospital for Nervous Diseases. They are unpicked cases, and comprise all kinds of occupations, such as sailors, firemen, tram-drivers, teachers, water-board men, etc. The value of this series lies largely in the fact that, through the courtesy of Sir John Collie, I have been able to obtain particulars of the patients' histories after completing treatment, for without such knowledge statistics of this kind are apt to be very misleading.

Of this series of sixty-two, one, in addition to other troubles, was found to be suffering from malignant disease, and another had organic disease of the cord, so that there are sixty cases of apparently uncomplicated neurosis. These included patients

of both sexes. Some of them were cases of traumatic neurasthenia, in others trauma was not a causative factor, but the same principles of treatment were applied to all. Of these sixty cases, thirty-nine ultimately resumed work, nine are classed as permanently disabled, three developed mental disorder of a definite type which was sufficiently severe to prevent resumption of work, and the records of the remaining nine are somewhat uncertain, though there is reason to think that some of them, at any rate, were eventually able to work.

(1) "Traumatic Neurasthenia," *Clinical Journal*, June 12th, 1912.—(2) "The Autonomic Nervous System," *Brain*, vol. xxvi.—(3) *Brain*, vol. xxxiv, 1911.—(4) *Lancet*, July 5th, 1913.

Discussion,

At the Annual Meeting in London, July 16th, 1913.

Sir George Savage said he always approached the subject of neurasthenia with doubt. He had watched waves of feeling during the last forty years. At one time, almost fifty years ago, nearly everything was considered to be hysteria. Later, everything was described as hypochondriasis; and now a great deal of the illness one saw was ascribed to neurasthenia. He was obliged to admit that there were careful discriminations and differences now detected which were not formerly appreciated. He thought it probable that neurasthenia, as a group of symptoms, scarcely existed fifty years ago, and that it was associated with the increasing difficulties of environment. At all events, one was constantly being brought into contact with cases which were not hysteria, which were not hypochondriasis, and yet which were functional disorders. These traumatic cases which the paper dealt with, resulting from either physical shock or from mental shock, had interested him for a long time. He referred to a paper by his friend, the late Mr. Clinton Dent, in which was pointed out the important fact that injury might produce anomalous symptoms. He did not think Mr. Dent made use in that connection of the term neurasthenia, but he described groups of symptoms of great interest as occurring in members of the police force consequent on injuries, and these occurred in cases in which the characters of the men were thoroughly well known; they were not men likely to malinger, and they were men who would have no interest in making the worst of their symptoms. Mr. Dent found that a policeman knocked on the head when he was not in a state of excitement did not suffer much, but if there was a riot, or the man was greatly disturbed emotionally at the time he received a hard blow, it was a much more serious matter than a similar blow on the head in a time of emotional quietude. He had himself noticed the same thing, that if there was an injury to an organ which at the time was in active function, that organ seemed to suffer more than at other times. He had long recognised that there were many people who had received an injury to their head when they had been drunk, and they had suffered more severely from it, despite the proverb that the child and the drunken man might fall with impunity. The drunken man not infrequently, as a result of a comparatively small accident, suffered permanent brain damage. The interest of the "latent period" was very great, and he agreed with the author that it opened a vast field for fraud, *e.g.*, the cases of so-called "railway spine," some of which were genuine, but many of which were developed long after one thought such a result could have followed the accident. That disturbance of the highest control gave rise to these emotional disorders and that these disorders should be displayed after traumatic injuries of this kind seemed to explain many of the symptoms of neurasthenia. It was very satisfactory to have Dr. Campbell Thomson's cases reviewed by that arch-investigator, Sir John Collie, for if malingering was detectable it would be detected by him. He had sometimes regarded a tendency to relapse as one of the characteristics of grave neurasthenia.

There were a number of cases of people with grave neurasthenia who appeared to get quite well. The emotional side of the disability had gone, and the higher self-control seemed to be present, but with very little strain, even with overwork, the person broke down. Therefore he agreed with Dr. Campbell Thomson that one should insist not only on improvement, but that if one was dealing with a genuine case of traumatic neurasthenia it was necessary that there should be very prolonged rest. He was sure that all present would learn much from this most instructive paper.

Dr. PASSMORE said he had no intention of speaking on the paper when he entered the room, but he found it so fascinating that he would like to say a few words. He thought the explanation of the pathology of neurasthenia would be found more in the realms of psychology than in the realms of clinical medicine. Any sudden shock caused our stream of consciousness, in a way, to stop; just as a river in its natural course was dammed up and the stream in consequence diverted, so it was with the mind. And if the obstruction were taken away at some future time the river seldom returned to its natural course. The phenomena which Dr. Campbell Thomson described, he, the speaker, considered that psychology alone could explain. It was a persistent condition, and those who had had experience in this connection of traumatic neurasthenia saw that some of these patients never recovered. He thought the explanation of that was, that consciousness, by which, in the natural course of our lives, we checked our ordinary actions, was never restored, and that the effect of the shock the man experienced remained persistent. Whether in the future some explanation would be found in damage to the brain-cells, or whether it was an altered chemical condition of the brain, it must remain for a future histologist to say, but he felt sure that the true explanation was one of psychology.

Dr. ROBERT JONES desired to ask Dr. Campbell Thomson what relationship he considered neurasthenia might bear to general paralysis of the insane. He had had experience of some cases which had come to Claybury with symptoms of general paralysis after they had had a definite latent period and apparently following some accident, not necessarily to the head. In one of these cases, a man had fallen down the hold of a ship. For a time there were very few symptoms (apart from surgical wounds) beyond the immediate shock, but later he became totally blind, and developed symptoms suggestive of general paralysis for which he was admitted to the asylum. The Shipping Federation were now considering the case from the standpoint of permanent compensation to the man and provision for the wife and family. He was much interested in Sir George Savage's remarks concerning the later period raised in addition by the author, and which his own experience further confirmed of neurasthenia, also in regard to general paralysis coming on in members of the London Police force after serious struggles. He, the speaker, had been accustomed to regard neurasthenia as more or less of hysterical origin, but he now conceded after longer experience that it was a definite organic entity with definite symptoms sometimes terminating in definite insanity and associated with general paralysis. Dr. Campbell Thomson's description of these cases had interested him much, but he was somewhat exercised in his mind as to when the emotional storm referred to actually began. It was described by Dr. Thomson as the initiating factor. His own view was that the emotional element was secondary to the physical shock. After the physical or bodily shock, emotion irradiated and flushed the whole cerebral cortex; and further secondary physical symptoms sometimes ensued and these again created an affective tone which irradiated further. In the neurasthenic cases which had eventually come into the asylum, the difficulty had been the delay to translate the stimuli from without which came into the cortex (and were fully apprehended without trouble) into the consequent and resulting muscular action. He suggested that the dissociation might be a cortical one and in the synapse between afferent and efferent neurones rather than, as Dr. Thomson suggested, in the optic thalamus itself, which was deeper and more protected than the cortex. The optic thalamus was probably the first receiving centre of all sensory stimuli, and it was the first station at which incoming stimuli were received. They moved thence by means of the intercalary neurons into the granular area, or the small stellate cells area, which cells contained very little cytoplasm but much nucleus, and from these they passed into the pyramids. There was a neuro-fibrillar anastomosis or connection

between the stellate cells and the pyramids, and the pathological explanation of neurasthenia seemed to him (Dr. Jones) to lie in the synapses of these neurodendrons. He saw only extreme cases in the asylum, but Dr. Thomson would necessarily meet them earlier. He dissociated himself from the opinions expressed by Dr. Pasmore; one had to do here with physical conditions, as for every mental manifestation there was a definite material underlying condition. He looked for little help therefore from the pure psychologist, who was more concerned with an analysis of mental symptoms from introspection or from inferences drawn from the examination of his own mental state than from pathological or histological research, and, indeed, he gathered that Dr. Pasmore himself expected more definite results from histology in these cases.

Dr. MENZIES said he was sure all would feel much obliged to Dr. Campbell Thomson for the interesting realms of thought which he had opened up. It was most interesting to try and speculate a step further and to know how the cortical cells were affected. About twenty years ago a great vogue arose for operating on all cases of insanity which were supposed to have originated from trauma of the skull. People tried the effect of cutting out the brain scar, and the result was said to have been that the patients got better. The next stage was abstention from cutting out the scar, and in the next, the dura mater was not opened at all. Yet the cases still got better. He requested the local surgeons to try another step, namely, trephine another part of the brain altogether, not in the region of the alleged injury to the brain. And still the cases got better; wherever the hole was made in the skull the patient got better. On thinking over the matter he could not avoid the conclusion that the benefit accrued from changing of the skull from a rigid box into one which permitted of some elasticity. One case he saw was that of a patient who had lost his nerve for hunting. This case was a slight one, and of course operation was not considered, although the trend of pathology lay in this direction. At the other end of the line were probably cases which had fractured their skull and developed permanent insanity, and so had to reside in an asylum. In all there seemed to be one common cause, namely, disorganisation of the serum circulation within the skull. He suggested that the cause of the first affection of the cortical cells occurring, as Dr. Thomson suggested, before those of the thalamus, was an actual poisoning by the serum. The serum circulation became disordered first, and the cortical cells, being the most exposed, *i.e.*, on the surface of the brain, were among the first to go: first at the base, as was seen in ordinary cases, and later, all over the cortex. The latent period certainly varied. He narrated a case at Cheddleton Asylum, in which the occipital bone had been fractured into eight or ten fragments twenty-three years before. The patient as a boy had fallen on to his back, and at thirty developed melancholia. Mr. Charles Ballance operated on him, and in eight months he recovered after three years' severe melancholia and refusal of food. As that operation was done eight years ago, and the man was still working, and could sometimes be seen riding a bicycle, the result had been most satisfactory—indeed, he regarded it as the most satisfactory case he had had consequent on operative interference. The address given by the late Mr. Clinton Dent, to which Sir George Savage referred, was at the Medical Society of London, and Mr. Ballance invited him, the speaker, to go and hear it. He believed that many of the cases which did not recover could be much benefited if surgical measures were resorted to. Naturally, it would be best to open the skull in an area which would be least susceptible to injury afterwards.

Dr. MACRAE asked how many of the cases dealt with by the author represented gross physical trauma, and in what proportion psychical trauma was the cause of the symptoms.

Dr. CARSWELL said he probably would not have intervened in the discussion of this paper but for the fact that at one time he was an unbeliever and a sceptic; he had now become a believer in the existence of nerve symptoms following upon physical injuries, symptoms of a real and substantial nature to the patient, but having little or no objective evidence for the eye of the physician. And probably he had the best of all reasons for his conversion, namely, that he had the misfortune to suffer from those symptoms after a somewhat serious injury. So far as he had grasped the course of the present discussion, there seemed to be an apprehension that the trauma referred to was a trauma directly applied to the nervous

system, *i.e.*, to the cord or to the brain. He was not aware that he personally had any injury to the cord or the brain, and he asked the meeting to excuse the personal note, which, after all, was the most direct kind of evidence. There was probably a slight injury to the lower part of the spine. But from his own experience he could absolutely confirm the very important point that, after the injury and after the emotional shock, there might be—as there certainly was in his case—an apparent disappearance of any evidence whatever of injury to the nervous system. About four months afterwards, when he was able to get about and do his work with at any rate some degree of comfort, he had a very distinct recurrence of undoubted symptoms referable to the central nervous system—he had very distinct spinal pain on effort, even very slight effort; there was also distinct pain referred to the back and to the vertex of the head, this being brought on even by the effort to write a letter. The most delicate indication of incapacity for co-ordinated intellectual action was the affection of the ability to compose an ordinary letter. To think out and compose an ordinary business letter became a difficult and painful process; words were omitted, and other words were badly spelled. Altogether there was a loss of that facility which a man displayed when writing an ordinary letter. To continue and write two or three letters at a sitting became absolutely impossible. These symptoms came on in his case very definitely four months after the injury, which was at a date after he had apparently recovered his nervous tone, and for this recurrence there seemed to have been no direct cause. And in the years which had intervened there had been occasional recurrences of similar symptoms, but less marked. He had therefore become a believer in the statements made by patients which formerly he had been sceptical about. He thought that probably the history of such a condition might be interesting, inasmuch as he had nothing to gain by suffering from neuræsthenia. He had no morbid desire to see a physician, and he had no anxiety whatever to see a lawyer; he had none of the conditions which were usually set down as morbid proclivities belonging to certain people, or, in less charitable views, manifestations of malingering. He not only had nothing to ventilate, but his chief business was to keep all these things to himself and be able to answer the inquiries of his friends to the effect that he was quite well; because, apart from the pain, discomfort, and the inability to get well, the most distressful experience he had was the constant answering of the inquiries of his friends and looking cheerful meanwhile. Thus he was impelled to take the precisely opposite line of that adopted by the malingerer. Yet he could have no possible doubt that his symptoms were very real and solid ones, and no physical examination could reveal whether he was suffering from those symptoms or not. When it came to a question of injuries suddenly inflicted, involving emotional strain, or injuries affecting the central nervous system, such as a knock on the head or a fall from a height on to the back producing more grave disorders, such as general paralysis, then he thought there was great room for discussion. He considered that probably the right attitude to adopt was a sceptical one in such cases. But he felt some hesitation about adopting that attitude even with reference to alleged graver results, in so far as his personal experience led him to be a believer in the main in the statements made about themselves by patients as to the minor nervous effects following upon shock and injury.

Dr. CAMPBELL THOMSON, in reply, thanked members for the manner in which they had discussed the paper. He feared that he had brought forward his views crudely, but he had learned much from the opinions which had been expressed in the discussion. He did not feel that he could answer very fully the points which had been raised. The cases which he had recorded would probably include some to which the term "psychasthenia" could be applied; he found it difficult to distinguish the latter from neurasthenia; and, moreover, he had used the term "neurasthenia" in its wider sense. In dealing with the theoretical aspect, he had taken cases as far as he could as examples in which only the psychical trauma occurred, because he thought that as soon as there was a direct injury to the nervous system, such as a shaking-up of the spinal cord or concussion of the brain, there might be complications which would add to the difficulties of rightly comprehending the cases. Two of the worst cases he had ever seen, which had never recovered, were the result of a railway accident. Neither of them received any considerable physical injury—one was crushed on the leg, and the other on the

nose—both were well provided for, and yet month after month of treatment brought about no improvement. It was the horror of the whole accident which seemed to have been responsible for their illness. Although he had taken cases of this class as examples, there were a good many in the series in whom there was some physical injury as well. One speaker had asked him what was the percentage in the cases quoted in which there was gross injury. He had not worked that out, but he had with him a list of the cases with the injuries suffered, which he would be pleased to show to any of the members. With regard to the remark concerning poisoning of the cells, that was true, but that introduced another class of case, because neurasthenia arose from many causes, one of which was certainly toxic. But one could not very well attribute a toxic cause, at any rate, as the primary factor in a case where the man got nothing but a mental shock. In regard to Dr. Robert Jones's remarks, he, Dr. Thomson, feared he had stated his views somew hat clumsily, but he really agreed with what Dr. Jones had said.

The Bacteriological Examination of the Urine in some Cases of General Paralysis.

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THE occurrence of micro-organisms in the urine is well known to be associated with a variety of pathological conditions, among which mental diseases have been included. A definite connection between urinary bacteria and insanity, however, does not seem to have been made out, the subject being even more obscure than the relation of the intestinal flora to mental disease, which has been much more frequently investigated.

In collecting a large number of samples of urine from the insane under strictly sterile conditions for another purpose, I have been struck by the frequency with which bacteria occurred in them, chiefly in the case of general paralytics; and this circumstance has led me to investigate the urine of patients suffering from general paralysis somewhat more fully.

After the first investigation of the urine in each case, hexamethylenetetramine was given internally, and after a course of this drug, a second bacteriological examination of the urine was made, after an interval during which no hexamethylenetetramine was administered. The results of these experiments are described in the present paper.

The patient in each case was put to bed, and the glans washed thoroughly, first with soap and water and then with either a 1–1,000 solution of mercury perchoride, or 1–40 carbolic

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