impossible to say whether this condition is one of neurasthenia or hysteria.

In other cases the *cardio-vascular* symptoms are the most distressing, and may occur with only slight disturbance of the cerebro-spinal functions, though the conditions may be combined. Palpitation of the heart, irregular and very rapid action, and pains in the cardiac region are the most common symptoms. The slightest excitement may be followed by increased action of the heart, and the patients frequently have the idea that they suffer from serious disease of this organ.

Vaso-motor disturbances constitute a special feature of many cases. Flushes of heat and transient hyperæmia of the skin may be very distressing symptoms. Profuse sweating may occur, either local or general, and sometimes nocturnal. The pulse may show interesting features, owing to the extreme relaxation of the peripheral arterioles. The arterial throbbing may be everywhere visible, almost as much as in aortic insufficiency. The pulse, too, may under these circumstances have a somewhat water-hammer quality. The capillary pulse may be seen in the nails, on the lips, or on the margins of a line drawn upon the forehead, and I have on several occasions seen pulsation in the veins of the back of the hand. A characteristic symptom in some cases is the *throbbing aorta.* The epigastric pulsation may be extremely forcible and suggest the existence of abdominal aneurism. The subjective sensations associated with it may be very unpleasant, particularly when the stomach is empty.

The general features of gastro-intestinal neurasthenia have been dealt with under the section of nervous dyspepsia. The connection of these cases with dilatation of the stomach, floating kidney, and the condition which Glénard calls *enteroptosis* has already been mentioned.

Sexual neurasthenia is a condition in which there is an irritable weakness of the sexual organs manifested by nocturnal emissions, unusual depression after intercourse, and often by a distressing dread of impotence. The mental condition of these patients is most pitiable, and they fall an easy prey to quacks and charlatans of all kinds.

In all forms of neurasthenia the condition of the urine is important. Many cases are complicated with the symptoms of the condition known as lithæmia, and so marked may this be that some have indeed made a special form of lithæmic neurasthenia. Polyuria may be present, but is more common in hysteria. With disturbed digestion the urates and oxalates may be in excess.

The *diagnosis* is readily made. It is sometimes difficult to distinguish the cases from hysteria, and this is not surprising, as we cannot always differentiate the two conditions. Neurasthenia occurs chiefly in men; in fact, it is in many ways in them the equivalent of hysteria.

XIII. THE TRAUMATIC NEUROSES

(Railway Brain and Railway Spine; Traumatic Hysteria).

Definition.—A morbid condition following shock which presents the symptoms of neurasthenia or hysteria or of both. The condition is known as "railway brain" and "railway spine."

Erichsen regarded the condition as the result of inflammation of the meninges and cord, and gave it the name railway spine. Walton and J. J. Putnam, of Boston, were the first to recognize the hysterical nature of many of the cases,* and to Westphal's pupils we owe the name traumatic neurosis.

Etiology.—The condition follows an accident, often in a railway train, in which injury has been sustained, or succeeds a shock or concussion, from which the patient may apparently not have suffered in his body. A man may appear perfectly well for several days, or even a week or more, and then develop marked symptoms of the neurosis. Bodily shock or concussion is not necessary. The affection may follow a profound mental impression; thus, an engine driver ran over a child, and received thereby a very severe shock, subsequent to which the most pronounced symptoms of neurasthenia developed. Severe mental strain combined with bodily exposure may cause it, as in a case of a naval officer who was wrecked in a violent storm and exposed for more than a day in the rigging before he was rescued. A slight blow, a fall from a carriage or on the stairs may suffice.

Symptoms.—The cases may be divided into three groups: simple neurasthenia, cases with marked hysterical manifestations, and cases with severe symptoms indicating or simulating organic disease.

(*a*) *Simple Traumatic Neurasthenia.*—The first symptoms usually develop a few weeks after the accident, which may or may not have been associated with an actual trauma. The patient complains of headache and tired feelings. He is sleepless and finds himself unable to concentrate his attention properly upon his work. A condition of nervous irritability develops, which may have a host of trivial manifestations, and the entire mental attitude of the person may for a time be changed. He dwells constantly upon his condition, gets very despondent and low-spirited, and in extreme cases melancholia may develop. He may complain of numbness and tingling in the extremities, and in some cases of much pain in the back. The bodily functions may be well performed, though such patients usually have, for a time at least, disturbed digestion and loss in weight. The physical examination may be entirely negative. The reflexes are slightly increased, as in ordinary neurasthenia. The pupils may be unequal; the cardio-vascular changes already described in neurasthenia may be present in a marked degree. According as the symptoms are more

* See La Neurasthénie, par L. Bouveret, Paris, 1891.

spinal or more cerebral, the condition is known as railway brain or railway spine.

(2) *Cases with Marked Hysterical Features.*—Following an injury of any sort, neurasthenic symptoms, like those described above, may develop, and in addition symptoms regarded as characteristic of hysteria. The emotional element is prominent, and there is but slight control over the feelings. The patients have headache, backache, and vertigo. A violent tremor may be present, and indeed constitutes the most striking feature of the case. I have recently seen an engineer who developed subsequent to an accident a series of nervous phenomena, but the most marked feature was an excessive tremor of the entire body, which was specially manifest during emotional excitement. The most pronounced hysterical symptoms are the sensory disturbances. As first noted by Putnam and Walton, hemianæsthesia may occur as a sequence of traumatism. This is a common symptom in France, but rare in England and in this country. In a considerable number of cases of traumatic neuroses which I have seen only one presented typical hemianæsthesia. A second, more common, manifestation is limitation of the field of vision.

Remarkable disturbances may develop in some of these cases. A few months ago I saw a man who had been struck by an electric car, whose chief symptom was an extraordinary increase in the number of respirations. He was a stout, powerfully built man, and presented practically no other symptom than dyspnœa of the most extreme grade. At the time of observation his respirations were over 130 per minute, and he stated that they had been counted at over 150.

(3) *Cases in which the Symptoms suggest Organic Disease of the Brain and Cord.*—As a result of spinal concussion, without fracture or external injury, there may subsequently develop symptoms suggestive of organic disease, which may come on rapidly or at a late date. In a case reported by Leyden the symptoms following the concussion were at first slight and the patient was regarded as a simulator, but finally the condition became aggravated and death resulted. The post-mortem showed a chronic pachymeningitis, which had doubtless resulted from the accident. The cases in this group about which there is so much discussion are those which display marked sensory and motor changes. Following an accident in which the patient has not received external injury a condition of excitement may develop within a week or ten days; he complains of headache and backache, and on examination sensory disturbances are found, either hemianæsthesia or areas on the skin in which the sensation is much benumbed; or painful and tactile impressions may be distinctly felt in certain regions, and the temperature sense is absent. The distribution may be bilateral and symmetrical in limited regions or hemiplegic in type. Limitation of the field of vision is usually marked in these cases, and there may be disturbance of the senses of taste and smell. The superficial reflexes may be diminished; usually the deep reflexes are exaggerated. The

pupils may be unequal; the motor disturbances are variable. The French writers describe cases of monoplegia with or without contracture, symptoms upon which Charcot lays great stress as a manifestation of profound hysteria. The combination of sensory disturbances—anæsthesia or hyperæsthesia—with paralysis, particularly if monoplegic, and the occurrence of contractures without atrophy and with normal electrical reactions, may be regarded as distinctive of hysteria.

In rare cases following trauma and succeeding to symptoms which may have been regarded as neurasthenic or hysterical, there are organic changes which may prove fatal. That this sequence occurs is demonstrated clearly by recent post-mortem examinations. The features upon which the greatest reliance can be placed as indicating definite organic change are optic atrophy, bladder symptoms, particularly in combination with tremor, paresis, and exaggerated reflexes.

The anatomical changes in this condition have not been very definite. When death follows spinal concussion within a few days there may be no apparent lesion, but in some instances the brain or cord has shown punctiform hæmorrhages. Edes has reported four cases in which a gradual degeneration in the pyramidal tracts followed concussion or injury of the spine; but in all these cases there was marked tremor and the spinal symptoms developed early or followed immediately upon the accident. Post-mortems upon cases in which organic lesions have supervened upon a traumatic neurosis are extremely rare. Bernhardt reports an instance of a man, aged thirty-three, who in 1886 received a kick from a horse on the epigastrium and subsequently developed the symptom-complex of neurasthenia and hysteria with attacks of vertigo and great psychical depression. He afterward had more marked mental symptoms and attacks of unconsciousness. He committed suicide and the brain and cord showed a beginning multiple sclerosis in the white matter, which was possibly associated with an advanced grade of arterio-sclerosis. In a second case a man, aged forty-two, received a shock in a railway accident in July, 1884. He was rendered unconscious and had a slight injury in the buttock region. In a few weeks symptoms of traumatic neurosis developed, particularly great depression of spirits, with headache and sensory disturbances in the feet and hands. Tremor and great weakness were complained of when he attempted to work. There was no increase in the reflexes. The case was regarded as an instance of simulation and a defect in objective symptoms favored this view. Subsequently this judgment was reversed, but he did not improve. He died in January, 1889, with symptoms of cardiac dyspnœa. Macroscopically the brain and cord appeared normal. There was extreme arterio-sclerosis, particularly of the vessels of the brain and cord. In the latter there were scattered areas of degeneration in the white substance, and degeneration in the sympathetic ganglia.

I have entered somewhat fully into this question because of its extreme

importance and on account of the paucity of the observations upon cases which have subsequently developed symptoms of organic disease. Examples of it are extremely rare. So far as I know no case with autopsy has been reported in this country, nor have I seen an instance in which the clinical features pointed to an organic disease which had followed upon a traumatic neurosis.

Diagnosis.—A condition of fright and excitement following an accident may persist for days or even weeks, and then gradually pass away. The symptoms of neurasthenia or of hysteria which subsequently develop present nothing peculiar and are identical with those which occur under other circumstances. Care must be taken to avoid simulation, and, as in these cases the condition is largely subjective, this is sometimes extremely difficult. In a careful examination a simulator will often reveal himself by exaggeration of certain symptoms, particularly sensitiveness of the spine, and by increasing voluntarily the reflexes. It may require a careful study of the case to determine whether the individual is honestly suffering from the symptoms of which he complains. A still more important question in these cases is, Has the patient organic disease? The symptoms given under the first two groups of cases may exist in a marked degree and may persist for several years without the slightest evidence of organic change. It must be noted that in the two autopsies above referred to the patients were the subjects of extreme arterio-sclerosis, with which, in all probability, the areas of multiple sclerosis were associated. Hemianæsthesia, limitation of the field of vision, monoplegia with contracture, may all be present as hysterical manifestations, from which recovery may be complete. In our present knowledge the diagnosis of an organic lesion should be limited to those cases in which optic atrophy, bladder troubles, and signs of sclerosis of the cord are well marked—indications either of degeneration of the lateral columns or of multiple sclerosis.

Prognosis.—A majority of patients with traumatic hysteria recover. In railway cases, so long as litigation is pending and the patient is in the hands of lawyers the symptoms usually persist. Settlement is often the starting point of a speedy and perfect recovery. I have known return to health after the persistence of the most aggravated symptoms with complete disability of from three to five years' duration. On the other hand, there are a few cases in which the symptoms persist even after the litigation has been closed; the patient goes from bad to worse and psychoses develop, such as melancholia, dementia, or occasionally progressive paresis. And, lastly, in extremely rare cases, organic lesions may develop as a sequence of the traumatic neurosis.

The function of the physician acting as medical expert in these cases consists in determining (*a*) the existence of actual disease, and (*b*) its character, whether simple neurasthenia, severe hysteria, or an organic lesion. The outlook for ultimate recovery is good except in cases which present the more serious symptoms above mentioned. Nevertheless, it must be borne

in mind that traumatic hysteria is one of the most intractable affections which we are called upon to treat.

Treatment of Neurasthenia.—Many patients come under our care a generation too late for satisfactory treatment, and it may be impossible to restore the exhausted capital. In other instances, the recovery takes place rapidly, the patient remains well for a few months or a year, and then overwork, or even the ordinary wear and tear of life, again prostrates him. Other persons drift into a condition of chronic invalidism or become slaves to morphia or chloral. In the case of business or professional men, in whom the condition develops as a result of overwork or overstudy, it may be sufficient to enjoin absolute rest with change of scene and diet. A trip abroad, with a residence for a month or two in Switzerland, or, if there are symptoms of nervous dyspepsia, a residence at one of the Spas, will usually prove sufficient. The excitement of the large cities abroad should be avoided. Better still for these cases, if they carry it out, is a life in the woods or on the plains. Three months of tent-life in the Adirondacks or the same length of time in the Rocky Mountains will sometimes cure the most marked cases of this kind. Such a plan is not, however, within the circumstances of all. In a much larger class, including a large proportion of neurasthenic women, a systematic Weir Mitchell treatment rigidly carried out should be tried (see hysteria). For obstinate and protracted cases, particularly if combined with the chloral or morphia habit, no other plan is so satisfactory. The treatment of the gastric and intestinal symptoms so important in this condition has already been considered. In milder grades of the condition massage alone will be found very useful. For the irregular pains, particularly in the back and neck, the thermo-cautery is invaluable. Medicines are of little avail. Strychnia in full doses is often beneficial. For the relief of sleeplessness all possible measures should be resorted to before the employment of drugs.

XIV. OTHER FORMS OF FUNCTIONAL PARALYSIS.

I. Periodical Paralysis.

I have already referred to the remarkable periodical paralysis of the ocular muscles, which may recur at intervals for many years. There is a form of periodical paralysis involving the general muscles, which may recur with great regularity, and which is also a "family" affection. In Westphal's case, a boy of twelve, the attacks began in the eighth year, and at first recurred every four or six weeks, and lasted from a few hours to two days. Goldflam* has described a family in which twelve members were affected with this disease, the heredity being through the mother.

* Zeitschrift für klinische Medicin, Bd. xix, 1891.