

position, the white columns are not at all comparable to the nerves. Experiments in fact, reveal, in the latter, properties which are not to be found in the former, and *vice versa*. Anatomy also shows that the nerve-tubes which constitute the nerves are but to a very small extent the direct continuation of those which, by their union, form the white substance of the cord. These fasciculi appear to be almost entirely composed of fibres which, arising either in the encephalon or in the cord itself, establish, after the manner of commissures, communications between the spinal cord and the brain, or between different points of the gray spinal axis. It was to be anticipated, from this, that, in many respects, the white fasciculi of the cord would, under the influence of irritative lesions, behave differently from the peripheral nerves.

When I formed the idea of laying before you, gentlemen, the principal facts relating to the nutritive disorders which make their appearance consecutively on affections of the nervous system, I hoped that my task might be brought fairly to an end, in the course of two lectures. But, according as I advance in this exposition, the importance and extent of the question display themselves in all their distinctness. Notwithstanding the details which I have already given, I am far from having exhausted the subject, and I dare to hope that you will not have cause to regret the time that yet remains to be dedicated to its study.

## LECTURE III.

## DISORDERS OF NUTRITION CONSECUTIVE ON LESIONS OF THE SPINAL CORD AND BRAIN.

SUMMARY.—Cutaneous affections in sclerosis of the posterior columns: papular or lichenoid eruptions, urticaria, zona, pustular eruptions; their relations with the fulgurant pains; the former appear to arise from the same organic cause as the latter.

Eschars of rapid development (acute bed-sores) in diseases of the brain and spinal cord. Mode of evolution of this skin-affection: erythema, bullæ, mortification of the derma, accidents consecutive on the formation of eschars: *a*, putrid infection, purulent infection, gangrenous emboli; *b*, simple purulent ascending meningitis, ichorous ascending meningitis. Acute bed-sore in apoplexy symptomatic of circumscribed cerebral lesions. It appears principally in the gluteal region of paralyzed extremities; its importance in prognosis. Acute bed-sore in diseases of the spinal cord; it generally occupies the sacral region.

Arthropathies depending on a lesion of the brain or spinal cord. *A*. Acute or subacute forms; they appear in cases of traumatic lesion of the spinal cord; in myelitis occasioned by compression (tumours, Pott's disease), in primary myelitis, in recent hemiplegia, connected with cerebral softening. These arthropathies occupy the joints of paralyzed limbs. *B*. Chronic forms; they seem to depend, like amyotrophies of spinal origin, on a lesion of the anterior cornua of the gray axis; observed in posterior sclerosis (locomotor ataxia) and in certain cases of progressive muscular atrophy.

GENTLEMEN: In treating of the nutritive disorders determined by lesions of the peripheral nerves, I gave you to expect that these consecutive affections would, for the most part, be represented in cases of lesions of the spinal axis. It is true, we shall not always find here a servile imitation; indeed, as a general rule, the trophic disorders of cerebral or spinal origin, as we shall often have occasion to note, bear with them the distinctive stamp of their cause. But there are circumstances in which the resemblance between affections of central origin and those which depend on a lesion of the peripheral nerves is so striking that discrimination may be a most difficult task. We will cite, as examples of this class, certain cutaneous eruptions which sometimes supervene in the course of ataxia.

## I.

The *cutaneous affections*, to which we have just alluded, may be classified as follows: *a*, papular or lichenoid eruptions; *b*, urticaria; *c*, zona; *d*, pustular eruptions, analogous to ecthyma.

The following, in a few words, are the results of my observations on this subject. It is not rare to see the skin of the legs and thighs become temporarily covered with a more or less confluent papular or lichenoid eruption, consequent on paroxysms of the fulgurant or shooting pains, characteristic of locomotor ataxy. In the case of a woman, at present under treatment at La Salpêtrière, enormous patches of urticaria are produced, at every paroxysm, over the parts where the keenest pains are felt. In another case, the skin of the right gluteal region becomes covered with an herpetic eruption, limited however to the course of the nervous filaments which convey the pain. Finally, a third patient presented, under analogous circumstances, still more remarkable phenomena. This woman, aged sixty-one years, was received into the hospital on account of blindness (sclerous atrophy of the optic nerves) about eight years ago; she is now suffering from well-marked locomotor ataxia. In her case, the evolution of the disease has been very rapid, for the first paroxysms of shooting pains date from the month of March, 1865, and in July, 1866, the incoördination was so far advanced as to render walking difficult. One of these fits, which happened in June, 1867, was of exceptional intensity. The pains which were really horrible, seemed fixed, during several days, along the course of the cutaneous branches of the right lesser ischiatic nerve, and of that supplying the levator ani.<sup>1</sup>

During this time, the corresponding parts of the skin became covered with a great number of pustules, analogous to ecthyma, some of which proved the starting points of deep ulcerations. Besides this, a rounded eschar of about two inches in diameter, which involved the derm nearly throughout its whole thickness, developed in the right sacral region, a few inches from the median line immediately under the extremity of the coccyx. The sore persisting after the elimination of the sphacelated parts, cicatrization was not complete until two months had elapsed. In another paroxysm, the flashing pains followed the direction of the vertical portion of the left internal saphenous nerve, and a pustular eruption was soon thrown out on the skin of the regions to which this nerve is distributed.

There is one character common to all these eruptions, and it is of a kind to show that we have not here to deal with common disorders,—they all make their appearance concurrently with certain intense and persistent exacerbations of the specific pains, which are in some sort pathognomonic of fasciculated sclerosis of the posterior columns, which it is customary to call fulgurant or flashing pains.

Let me add, as another character, that the eruptions in question

<sup>1</sup> The nerve called "releveur de l'anús" by French anatomists, is a branch of the fourth anterior sacral nerve, although the muscle, bearing the same name, receives twigs from the superficial perineal nerve (S.).

habitually show themselves along the course of the nerves invaded by the fulgurating pain.

From what precedes you will observe that the existence of those cutaneous eruptions seems closely connected with that of the fulgurant pains: hence it becomes at least very probable that one and the same organic cause presides over the development of both the former and the latter.

What, then, is the reason of the presence of fulgurant pains among the symptoms of sclerosis of the posterior columns? I do not desire to enter to-day upon a long discussion of this question which will meet us again; it will suffice, at present, to tell you that, in all probability, these pains depend upon the irritation set up, during their intra-spinal course, in those of the nerve-tubes emanating from the posterior roots which, under the name of internal radicular fasciculi (*internal fibrous masses of the posterior roots* in the nomenclature of Kölliker),<sup>1</sup> pass, for a certain extent, through the area of the posterior columns before penetrating the posterior cornua of the gray matter.

It appears but little possible to connect the fulgurant pains with any one of the following lesions: 1st, atrophy of posterior roots, before entering the cord; 2d, posterior spinal meningitis; 3d, sclerosis of the posterior cornua of the gray matter; 4th, irritative lesions of the spinal ganglia or of the peripheral nerves,—for these pains have been met with in a certain number of ataxic cases in which post-mortem examinations have demonstrated the absence of all lesions of the kinds enumerated.

In support of this proposition allow me, gentlemen, to recall the results of the autopsy which Dr. Bouchard and I made, in the case of a woman who died in this hospital, during the first period of progressive locomotor ataxia.<sup>2</sup> This patient had experienced the special paroxysmal pains, in a high degree, lasting for some fifteen years, until the epoch of her death caused by an adventitious disease. No sign of motor incoördination had ever shown itself. The patient walked with ease, without throwing forward the leg, or stamping with the heel, nor did closing the eyes affect her certainty of movement. On post-mortem examination, we saw that the posterior roots had preserved their normal characters, and beyond some equivocal traces of meningitis, the only perceptible lesions met with occupied the posterior columns, and consisted of a multiplication of neuroglia-nuclei with thickening of the meshes of reticulum, but without concomitant alteration of the nerve-tubes. To complete the demonstration, I could cite many cases of the same kind where the fulgurant pains had been likewise very

<sup>1</sup> Kölliker, 'Histologie Humaine,' P. i, pp. 345, 346.

<sup>2</sup> "Douleurs fulgurantes de l'ataxie, sans incoördination des mouvements, sclérose commençante des cordons postérieurs de la moëlle épinière," in 'Comptes Rendus des Séances et Mémoires de la Société de Biologie,' 1866.

intense, and where, on a post-mortem examination, I was unable to discover the existence of any alteration whatever, either in the posterior gray cornua, or in the peripheral nerves, or in the spinal meninges.

From this it would appear necessary that we should seek, in the irritative alteration of the posterior columns of the spinal cord, the starting point of the fulgurant pains of ataxic patients. But it seems scarcely probable that all parts of these fasciculi ought to be indiscriminately arraigned on this count: everything, on the contrary, induces us to believe that the sensitive fibres, issuing from the posterior roots, which compose a portion of the *internal radicular fasciculi* should alone be incriminated. These fibres would participate, from time to time, periodically, in the irritation whose permanent seat is in the columns themselves; and thus would be produced those paroxysms of shooting or flashing pains which, in accordance with a well-known physiological law are referred to the periphery, although in reality due to a central cause.

How are we to understand the appearance of the cutaneous eruptions sometimes observed in ataxic patients, at the very time of the occurrence of fulgurant paroxysms of abnormal intensity? It is certain that the nerve fibres which form the internal radicular fasciculi are not all sensitive; there are, for instance, at least some amongst them which assist in the accomplishment of reflex actions; there are others also, no doubt, at least it is what these cutaneous eruptions tend to demonstrate, which belong to the system of centrifugal nerves and which possess a more or less direct influence over the exercise of the nutritive functions of the skin. The irritation of the latter class of fibres, an irritation more difficult to set up than that of the sensitive fibres, should be invoked to explain, in the cases I have above alluded to, the production of papular affections at one time, and at another, of vesicular, pustular, or gangrenous disorder.

Are the posterior fasciculi the only departments of the spinal cord, the irritation of which is capable of determining such affections? This is a question which must remain unanswered for the present. All that can be said is that such eruptions have not yet been observed, except where there was some complication, in cases of irritative lesions confined to the antero-lateral columns, or to the anterior cornua of the gray matter; and as to the part which the posterior cornua may play, in this respect, we are in the most complete ignorance upon that subject.

On the other hand, some facts have been collected which tend to establish that zona is sometimes developed under the direct influence of partial lesions of the encephalon. Thus, in the case of an aged woman attacked with hemiplegia, whose history has been recorded by Dr. Duncan, an eruption of zona appeared on the thigh of the paralyzed side; motor paralysis had supervened almost simulta-

neously with the eruption, and both passed away nearly at the same time.<sup>1</sup>

In the case of a child, recorded by Dr. Payne, the zona, which marked out the course of superficial branches of the anterior crural nerve, showed itself three days after the development of a hemiplegia occupying the same side of the body as the eruption.<sup>2</sup> These cases, which can be multiplied, are undoubtedly very interesting; unfortunately, they have been related in a very summary manner only, and caution is needed, I think, in drawing conclusions from them, which may prove premature. I can, in fact, cite a case in many respects analogous to the preceding, which I recently observed at La Salpêtrière, and where the cause of the zona was most probably the irritation of a peripheral nerve. Here, again, the seat of the vesicular eruption was in the inferior extremity of the paralyzed side, where it followed the distribution of the superficial twigs of the cutaneous perineal nerve. It showed itself also, simultaneously with the hemiplegia which, making an abrupt appearance, was correlated to the formation in one of the cerebral hemispheres of a focus of ramollissement, itself being determined by the embolic obliteration of a posterior cerebral artery. As to the zona, it was produced, I believe, after the following mechanism, a spinal arterial branch,<sup>3</sup> arising, no doubt, from one of the lateral sacral arteries was, on a post-mortem examination, found to be obstructed by a blood-clot, and to form a comparatively voluminous cord, adhering to one of the posterior spinal roots of the cauda equina. It is probable that, on its passage through the sacral foramen, this arteriole, exceedingly distended by the thrombus, had compressed either the spinal ganglion, or an initial branch of the ischiatic nerve, so as to set up irritation in it. A vegetating ulceration, which was noticed on one of the sigmoid valves of the aorta, appears to have been the starting point of all the accidents which we have just described.<sup>4</sup>

<sup>1</sup> 'Journal of Cutaneous Medicine,' &c., 69. Erasmus Wilson, October, 1868.

<sup>2</sup> 'British Medical Journal,' August, 1871.

<sup>3</sup> One of the *rami medullæ spinalis*, see N. Rudinger, "Arterienverzweigung, in dem Wirbelcanal, &c.," in 'Verbreitung des Sympathicus,' p. 2, München, 1863.

<sup>4</sup> The following are the principal details of this case which presents a fine example of ulcerous endocarditis, with multiple emboli and a typhoid condition.

The patient Lacq, . . . . . aged 22 years, a soldier, was admitted on the 28th December, 1870, to the Salpêtrière ambulance (fever ward). He had been suffering, it seems, from an intense fever for two or three days. On the day of admission the following symptoms were noted: severe cephalalgia, pains in the loins, diarrhœa. The patient cannot swallow the smallest quantity of liquid without being taken with nausea and vomiting. Skin hot, pulse very frequent. It was regarded as a case of typhoid fever. Noisy delirium during the night. Next day, 29th December, was noticed the existence of an almost complete hemiplegia of the left side. The paralyzed members were not rigid; incomplete facial paralysis, on the left side, likewise existed. The eyes are constantly directed to the right side, and there is nystagmus. Pulse 120; rectal temperature 40.5° Cent. On the breast, forearms, and thighs, the skin shows a great number of little echy-

You will observe that, in this case, the coexistence of the hemiplegia and of the vesicular eruption resulted to a certain extent from a fortuitous coincidence. However it be, in default of zona, there are other trophic disorders of the skin, the existence of which may sometimes be attributed to the influence of an encephalic lesion. This is a fact which, I hope at least, will soon be placed beyond doubt.

## II.

*Eschars of rapid development. Decubitus acutus: acute bed-sore.*<sup>1</sup>—I hasten to leave the questions of eruptions occurring in locomotor ataxia, which, on the whole, have but a secondary importance, in order to draw your attention, in a very special manner, to another affection of the skin which holds a most important position in the clinical history of a considerable number of the diseases of the brain and spinal cord.

The cutaneous affection, which I am about to discuss, shows

moses, somewhat resembling flea-bites,—frequent respirations, sibilant râles.—Tympanites. On the antero-external surface of the left paralyzed leg, there exists an eruption of zona which answers exactly to the distribution of the superficial twigs of the cutaneous perineal branch of the musculo-cutaneous nerve. The first group of vesicles is seen above and below the patella; a larger group is disposed in a vertical straight line which descends to the middle third of the leg; the third group occupies the neck of the foot before and inside of the external malleolus. The eruption is tolerably developed. It is remarked that some traces of it existed the day before, that is to say, previous to the hemiplegia. On the 30th, the eruption is in full vigour. The patient succumbs at 4 o'clock in the afternoon.

*Autopsy.*—One of the sigmoid valves of the aorta is ulcerated and covered with vegetations, fibrinous, soft, and reddish in appearance. The mesenteric glands are somewhat red and swollen, but there exists no trace of dothienenterical eruptions or ulcerations in the small or large intestines. Numerous ecchymoses are observed on the visceral and parietal pleuræ, in the pericardium, and in the peritoneum. The spleen and kidneys present infarcti in different stages of development. Right cerebral hemisphere; on many points of the occipital lobe the pia mater, which is much injected, presents large patches of sanguine suffusion. The lobe itself is softened throughout nearly its whole extent; the cerebral matter there assumes a grayish colour, and at one point in the midst of the softened parts we note an effusion of blood, as big as an almond. The posterior cerebral artery of the same side is completely obliterated by a thrombus. The spinal cord, prepared with chromic acid, and examined in thin sections, presents no perceptible alterations. At the cauda equina, on the left side, we found adhering to one of the posterior spinal roots which give origin to the sacral plexus, an arteriole (spinal branch, arising from the lateral sacral artery) distended by a blood-clot. The obliterated artery, equal in size to a crow-quill, may be followed from the point where the root has been cut not far from the corresponding sacral foramen, to the spinal cord; upon this it can still further be followed the whole length of the lumbar enlargement, where it ascends along the posterior median fissure, contrary to the usual arrangement of the posterior spinal arterial plexus.

<sup>1</sup> *Decubitus* (when qualified by the adjectives *acutus*, *chronicus*, *ominosus*) signifies, not the position of the patient in bed, but the bed-sores supposed to result from such position. This term, though etymologically objectionable, is generally employed in foreign hospitals. As its adoption in this translation might confuse, and appears to be unnecessary, the term "bed-sore" has been substituted (S.).

itself at first under the form of an erythematous patch, on which vesiculæ and bullæ are rapidly developed; it terminates very often in mortification of the skin and subjacent tissues.

Usually it occupies the sacro-gluteal regions; but it may also appear almost indifferently on all parts of the trunk or members subjected, in the decubitus, to a somewhat continuous pressure. Even a very slight and very short pressure suffices to make it appear in certain cases. Finally, there are other cases still, though these indeed are very exceptional, in which it seems to be produced without the intervention of the least pressure or of any other occasional cause of the same kind.<sup>1</sup>

This is a very different affection from all those various eruptions which are so commonly remarked over the sacrum in patients condemned by different disorders to long maintain a recumbent position in bed. These eruptions which are sometimes erythematous and lichenoid, sometimes pustular and ulcerous, sometimes papular, having a deceptive resemblance to syphilitic sores (*plaques muqueuses*), are generally occasioned by repeated and prolonged contact with irritating substances, such as urine or fecal matters. They, as well as acute bed-sore, may become the starting points of genuine eschars; but the acute bed-sore is distinguished from the former by important characters, namely: firstly, by appearing shortly after the commencement of the primary disease, or following on a sudden exacerbation; and, secondly, by a very rapid evolution.

On account of the peculiar interest belonging to it, the affection, in question, certainly deserves to be designated by an appellation proper to itself. One of the few authors who have made it a special study, Herr Samuel, has proposed to characterize it by the name of *decubitus acutus* or eschar of rapid formation. He desires thus to distinguish it from *decubitus chronicus*, that is, from the dermal necrosis which appears long after the invasion of the disease which occasions its existence. We propose to accept this appellation, whilst reminding you, however, that the mortification of the skin is not everything in *decubitus acutus*.<sup>2</sup> It answers, on the whole, to the most advanced phases of the morbid process. It may happen, indeed, that the vesiculæ or bullæ will dry up and disappear without that portion of the derm, on which they were seated, presenting the least trace of necrosis. This is principally observed when they are produced on parts where the pressure has only been of short duration, of little intensity, and, so to speak, accidental, as over the ankles, on the inner surface of the knees, the legs, or the thighs. Now, it behooves you to be able to recognize the signifi-

<sup>1</sup> Brown-Séguard, 'Lectures on the Central Nervous System,' Philadelphia, 1868, p. 248. Conyba, 'Des Troubles Trophiques,' &c., Thèse de Paris, 1871, p. 43.

<sup>2</sup> See note 1, p. 56.