

**Series of clinical cases (with observations) illustrating the views recently put forward by Dr. Brown-Séguard, as regards certain points connected with the physiology of the nervous system / by John W. Ogle, M.D.**

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Ogle, John W. 1824-1905.  
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**Publication/Creation**

[London] : [Savill and Edwards, Printers], [©1859?]

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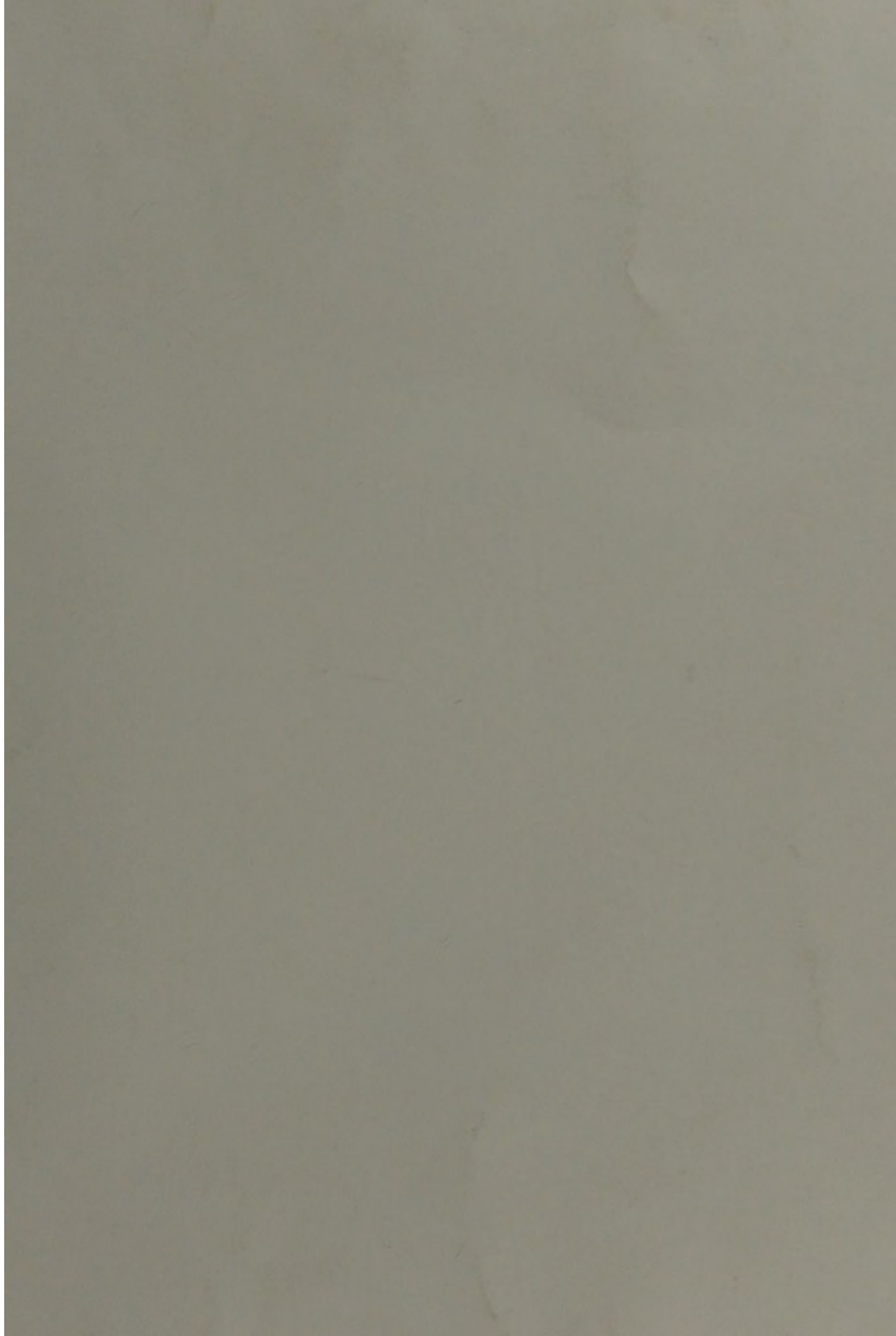
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*Series of Clinical Cases (with Observations) illustrating the Views recently put forward by Dr. Brown-Séguard, as regards certain points connected with the Physiology of the Nervous System.* By JOHN W. OGLE, M.D. Oxon, F.R.C.P., Assistant-Physician to St. George's Hospital, Secretary to the Pathological Society of London.

I DESIGN by the relation of the following clinical cases, which, with one exception, are selected from the records of medical experience in St. George's Hospital, to assist in rendering human pathology instrumental in elucidating the truthfulness of some of the ingenious and profound generalizations based mainly on experiment, and brought forward of late years by Dr. Brown-Séguard.

The members of the medical profession in England are now fully conversant with, and fully appreciate, most of the special researches of that dexterous experimental physiologist respecting the blood, muscle, animal heat, and the nervous system in general; and therefore any formal enunciation of his varied deductions would here be quite superfluous and misplaced. I will consequently, by way of premise to the cases which I shall detail, merely content myself with bringing before the mind of the reader, in a manner as concise as the intentions of this communication permit, those conclusions from facts observed by Brown-Séguard connected with the minute organization of the nervous system, the certainty of which I purpose to illustrate by the cases which I shall adduce, and which are in direct opposition to the conclusions arrived at by other physiologists, French, German, or English.

These cases will, I think, tend most materially to corroborate the following deductions ascertained by Dr. Brown-Séguard :—

(a) That the posterior columns of the spinal cord do "NOT" form, as was thought by Longet and many other observers, the means for the entire (*en totalité*) conduction of sensitive impressions to the brain; but

(b) That these columns form a medium to a slight extent only for the passage of sensitive impressions; such conduction along the spinal cord chiefly occurring in the central or grey matter of the cord, into which part the fibres of the posterior sensitive roots of the nerves, by means of transverse, ascending, and chiefly descending fibres, find their way almost immediately after gaining the cord, *viâ* the posterior columns, the posterior grey cornua, and, in part, the lateral columns. And that if there be any fibres conducting sensitive impressions ascending

from the trunk or limbs along the entire length of the cord, their number must be very inconsiderable.

(c) That the fibres conveying sensitive impressions to the brain do not at any rate decussate at a point higher up in the cerebro-spinal axis than the pons Varolii.

(d) That the decussation of fibres conveying sensitive impressions must be of necessity not only at a part below the level of the upper margin or central part of the pons Varolii, but even for the most part, if not entirely, below the medulla oblongata itself. That is to say, this crossing or interlacement of sensory nerves must take place in the spinal cord itself, and that not in any particular spot, but in *every* portion of the cord almost immediately after the entrance therein of the afferent fibres.

(e) That all the motor or efferent fibres decussate at a distinct point immediately below the pons Varolii—that is to say, at the anterior pyramids and the neighbouring parts, contrary to the views of Valentin, Cruveilhier, Longet, Foville, &c.

Having thus enumerated in a succinct manner the various physiological positions which I purpose to illustrate and strengthen in this pathological communication, I will, without further circumstance or digression, proceed to narrate my cases, the true interpretation of which at the time of their occurrence, and upon the old theories then commonly in acceptance, could obviously not have been apparent.

CASE I.—*Dislocation of some of the vertebræ, and projection of bone into the anterior surface of the spinal cord, the posterior columns remaining entire; perfect loss of sensibility and power of movement in the lower limbs.*

*History.*—P. S—, aged sixty-two, was brought into St. George's Hospital, having fallen a height of eleven feet, and received a scalp wound. He was for ten minutes stunned by the fall, but after admission walked into the ward, complaining only of pain at the neck. He had a slight cough. Nothing fresh was complained of until three days afterwards, when he felt numbness in the legs and tottered in walking. Sensibility of the skin to pinching and pricking was everywhere perfect. Seven days after the accident he had to such a degree lost power in the legs, that he scarcely was able to move them; still, sensibility of the skin remained as before. The bowels were constipated, and the catheter had to be used, the urine, too, becoming purulent. Stiffness also of the arms came on, and nine days after the accident he could with difficulty move them; they were also much flexed. All power also of voluntary movement below the diaphragm had disappeared. Eleven days after the accident the soft parts over the larger trochanter of the right femur began to slough, and two days later his cough was attended by dyspnoea. On the thirty-second day after the accident all sensibility of the skin, as well as all power of movement in the legs, was found to be lost: the respiration was chiefly abdominal. After some difficulty in swallowing, the patient died.

*Post-mortem examination.*—Dislocation forwards of the sixth cervical vertebra was found to exist, so that the body of the seventh vertebra projected for at least half an inch into the spinal canal behind. The dura mater opposite the sixth and seventh cervical vertebræ was thickened, and a slight amount of recently-formed soft fibrin existed at this spot between the bone and the theca

vertebralis. The anterior part of the spinal cord at this part was "pressed on by the body of the seventh cervical vertebra, and was slightly softened," but there was no laceration of, or extravasation of blood into, its substance, nor was the cord more than usually vascular or otherwise affected. The lungs were congested, and the bronchial tubes filled with frothy serous fluid. The kidneys were also cysted and otherwise diseased, and the lining of their pelves, as well as that of the bladder, was highly inflamed and covered with soft fibrin. Abscess also of the prostate gland existed.

*Remarks.*—The most noteworthy point in this case is the fact that, along with loss of motility in the limbs, owing no doubt to injury of the anterior columns, there was loss of certain forms of sensibility of the skin, whilst *the posterior columns of the spinal cord were uninjured*. From the nature of the accident—viz., the projection of the seventh cervical vertebra to the distance of half an inch into the spinal canal, &c.—the anterior columns, and very possibly the middle grey matter also, must have been greatly injured. This would account of course for the loss of motility, and also, according to Brown-Séquard's views respecting the functions and uses of the central grey matter, for the loss of sensibility as to certain tactile impressions of the surface of the body. This latter symptom of anæsthesia, it will be remembered, came on at a later period than the affection of the voluntary motor power, and no doubt the grey centre of the cord, being at the onset less affected by the direct injury than the anterior columns which were more exposed to the influence of the accident, became secondarily involved in such softening as one might expect, and as was found to have occurred in the immediate vicinity of the directly injured part of the cord.

One or two points there are in the above case apart from the object of this paper, which, in connexion with the injury of the spinal cord, are deserving of a passing notice, such as the persistent flexing of the muscles of the arms. The congestion of the lungs found after death might well be considered to correspond with the loss of action of the chest-moving muscles (for the respiration was mainly effected by the diaphragm); but the question may plausibly be entertained, to what extent the accumulation of the fluid in the pericardium was fairly attributable to any paralysis of vasculo-motor influence, as respects the nerves accredited to that covering, owing to injury of the cervical part of the spinal cord.

CASE II.—*Carcinomatous disease of the dura-mater at the edge of the foramen magnum, encroaching greatly on the outer or white parts of the spinal cord: absence of any anæsthesia of the skin as to tactile impressions.*

A woman, aged forty-nine, when brought into St. George's Hospital, could neither walk, stand, nor feed herself without assistance. She could, however, move both of her legs when in bed, although slowly; and the left arm and leg could be much more easily moved than those on the right side. She was frequently subject to sensations of numbness over the entire body, but she never experienced actual pain or had any convulsive attacks; and there was complete absence of anæsthesia as regards pinching or pricking of any part of the integument, as was particularly noticed only six or seven days before death. It was stated that the patient originally had a "fit" of some kind or other, and

that she had been for some time in a state of unconsciousness, and subsequently that she was found to have quite lost the power of movement on the *left* side of the body. Of this want of power she had partially recovered, but latterly the *right* side of the body had fallen into a state similar to that of the left. Whilst under observation within the hospital, she was unable, on trying to draw up the legs in bed, to pull them up simultaneously, but first one and then the other slowly yielded to her efforts. As before said, there was no anæsthesia as regards pinching of the skin, and this was the case to the last;

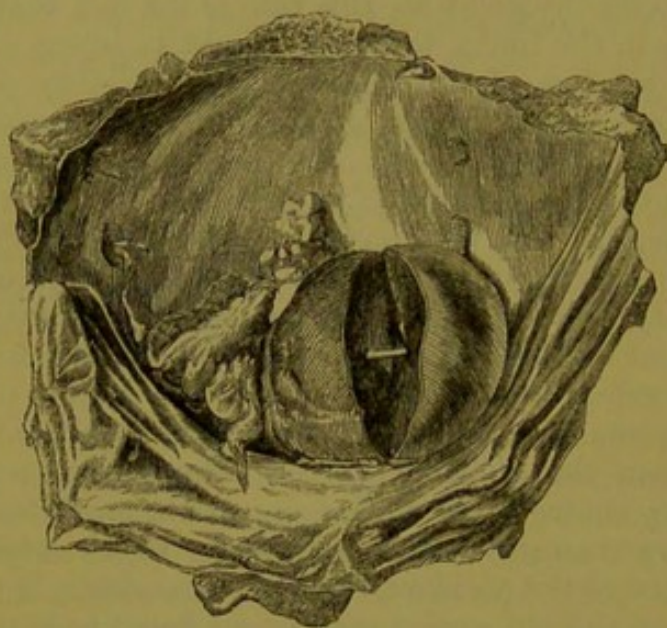


Fig. 1. This illustration exhibits a large rounded mass of carcinomatous material (of which a section has been made), in connexion with the dura mater at the right and anterior part of the edge of the foramen magnum (seen from above), encroaching considerably upon the nervous substance passing through that opening. A similar but much smaller mass is seen to the left of the larger one.

but strange sensations of numbness were complained of. Her power over the muscles became yet weaker, and the patient gradually sank and died, considerable dyspnœa and cough, with abundant secretion of mucus into the bronchial tubes, having occurred.

*Post-mortem examination.*—A vascular but very firm encephaloïd tumour, of the size of a small walnut, was found attached to the dura-mater, connected with the right and anterior border of the foramen magnum. This tumour (see fig. 1) indented the cerebellum and encroached greatly on the foramen magnum and the parts which passed through; having, moreover, hooked around it the seventh and eighth pair of cranial nerves. A small mass of a similar character was also found attached to the dura-mater at the opposite (the anterior) border of the foramen magnum, and these two encephaloïd growths interfered to such a degree with the aperture for the passage of the spinal cord, as to reduce it to a triangularly-shaped space, so small as barely to allow the tip of the little finger to enter.\* Two other and like growths were found to be connected with the falx cerebri and dura-mater near the optic commissure. Some softening also there was of the dorsal region of the spinal cord, and considerable evidence of congestion of the lungs existed.

*Remarks.*—In this case the chief point of interest is found in the fact that sensibility to pinching and pricking of all portions of the skin's surface remained undiminished, and this certainly to within a few days of death, whilst at the same time there existed so considerable an encroachment upon the external or superficial portions (the anterior and posterior parts, &c.) of the spinal cord as it passed through the aperture, that this organ did not exceed the tip of the little finger in magnitude at this spot. In such a case it could not be otherwise than that those columns, generally hitherto supposed to be the medium for the conveyance of sensibility, were very considerably pressed upon.

\* This specimen is now in the St. George's Hospital Pathological Museum, as Preparation No. 1 b, Sub-series vii., Series xxi.

These external parts of the cord receiving directly and immediately the pressure (in this instance slowly exercised), would to a considerable degree, as it were, shield the enclosed or grey central portions, which consequently would be less injured. Hence it came to pass, as we may from Dr. Brown-Séguard's theory conjecture, that the original sensibility of the skin persisted.

The softening of the upper part of the dorsal region of the spinal cord came on, doubtless, during the last week of life, and with it, in all probability, corresponded the extreme dyspnœa, the cough, and the excessive outpouring of mucus into the bronchial tubes. Before quitting the consideration of this case, the peculiarity regarding the voluntary muscles must receive a passing notice; for although there is a distinct mention of impairment of their power, first on one side and then on the other, yet when the patient was within the hospital there was indeed not so much a deficiency of actual motor ability, as of promptness on the part of the muscles in replying to the mandates of the will.

*CASE III.—Fracture of the dorsal vertebræ and sternum. Softening of the anterior and central parts of the spinal cord; the posterior column, entire. Loss of power in moving the lower limbs. Considerable anæsthesia as regards pinching and pricking of the surface (but incomplete) of the integument of the lower limbs.*

J. H., aged thirty-one, a carter, was thrown out of his cart backwards, and pitched on to the ground, alighting chiefly upon the lower part of his neck and shoulders. He was at the time quite sober, and was raised from the ground perfectly sensible. When brought home it was ascertained that he had almost, but not entirely, lost all voluntary power of moving the muscles of the lower limbs. On the day following, the bowels acted thrice from medicine without any loss of power over the sphincters of the rectum; the bladder was emptied naturally. Two days after the accident the respiration became oppressed, and large crepitations with gurgling were heard in the bronchial tubes; and the bladder could not be emptied without the aid of the catheter. Slight power of moving the lower limbs still existed as before, and the sensibility of the skin of these parts as to pinching or pricking was much blunted but not actually destroyed. Numbness of the legs was complained of. As to the arms, it was ascertained that he could voluntarily raise the right one to the head, but not so the left one, as its movement was restricted, although this really appeared to be contingent rather upon the external contusions than upon the loss of central nervous power. The respiration was entirely diaphragmatic, the abdomen being tense and tympanitic; and there was a sense of constriction around the body on a level with the umbilicus. On the third day after the accident all power of moving the lower limbs was found to be lost, and more numbness of the limbs was complained of, but still sensibility of the skin to such tactile impressions as were tested was found to be not annihilated. The bowels became constipated, the urine also still requiring the catheter for its removal. The patient remained in the same state until death, excepting that the bronchial tubes became more clogged up, and consequently the breathing more laborious, the phlegm being expectorated with the utmost difficulty. Prior to death the evacuations were several times passed involuntarily.

*Post-mortem examination.*—In addition to the extravasation of blood, &c., amongst the muscles of the neck and back, the following structural changes



were met with. The veins of the spinal membranes were very distended with blood, and a slight amount of dark coagulated blood was seen extravasated between the laminæ of the vertebræ and the membranes, at a point corresponding to the bodies of the two last cervical and first dorsal vertebræ. The spinal cord itself, opposite to the effusion of blood just mentioned, was in parts very soft for the distance of about one inch, the softening not involving the whole cylinder of the cord, but being limited to its anterior half and to the grey matter in the middle of the cord, which also contained numerous minute ecchymosed spots. *The posterior columns of the spinal cord were quite entire.* A transverse fracture of the body of the first dorsal vertebra, but without displacement, existed, and the anterior and posterior common ligaments of the neighbourhood were uninjured. There was also fracture of the sternum. The lungs were in part only congested, and in part quite hepatized.

*Remarks.*—In this case it must be noticed that integrity of the posterior columns—those (formerly) supposed conductors of sensation—was found after death, whilst during life the sensibility of the skin of the lower limbs was greatly impaired, whether as regards pinching or pricking of the surface. These symptoms accord well with the textural changes discovered after death—viz., the softening and the ecchymosis of the central grey, and of the posterior white parts of the spinal cord. The oppression of the breathing, the loss of thoracic respiration, along with the bronchial effusion and râles, and, finally, the pulmonary hepatization, may be considered as coinciding with the destruction of the upper portion of the dorsal division of the cord. Another point of interest not to be overlooked in the history of this case, is the distended and tympanitic state of the abdomen, and the feeling of constriction around the umbilical region—symptoms most probably referrible to a paralysed and yielding condition of certain portions of the muscles forming the parietes of the abdomen.

CASE IV.—*Cyst of considerable dimensions in the right portion of the pons Varolii. Great loss of power of motion and of sensibility to pricking and pinching in the "left" arm and leg, and side of the trunk. Also numbness and diminished sensibility of the skin of the "right" side of the face and nose, and of the "right" temple, with increased vascularity of the conjunctiva of the "right" eye.*

The patient, a girl, aged eighteen, was brought into St. George's Hospital in the following condition. There was greatly impaired power of motion in the left leg, arm, and hand, and there was great numbness and loss of sensibility of the skin, as regards pinching and pricking, of the whole of the left side of the body, as high up as the middle of the neck. The condition of the right arm and leg was natural, both as regards power of motion and sensibility of the skin. Numbness also, and contactile anæsthesia of the integument of the right side of the face and nose and right temple, existed, along with very great vascularity of the conjunctiva of the right eye and much lachrymation. The right eyeball was drawn inwards, and could not be abducted, and the right pupil was "constricted," the left one being "dilated." The right eyelids could not be approximated, and some difficulty was found respecting the power of opening the mouth and of swallowing. Subsequently, vomiting and constipation came on, along with greater vascularity of the conjunctiva of the right eye, and great dulness of the cornea. Death was preceded by coma, with lividity of the face, immediately following what was termed by the nurse a "fainting fit."

*Post-mortem examination.*—A large cyst, of the capacity of a bantam's egg, was met with, situated in the right portion of the pons Varolii (fig. 2). The parietes of this cyst, which consisted of attenuated nervous structure,

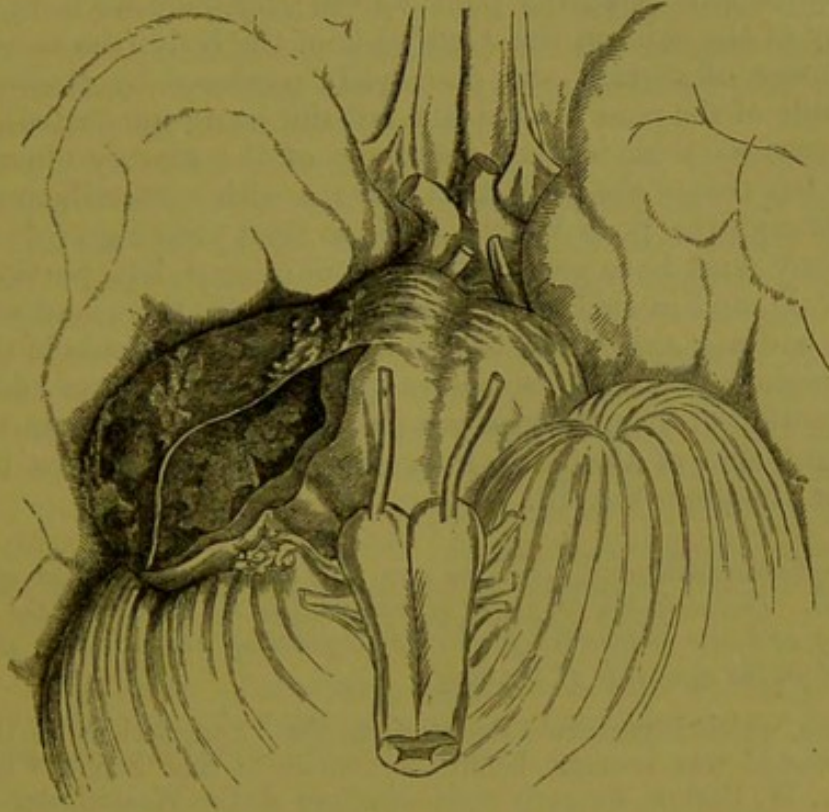


Fig 2. This illustration exhibits a cyst in the substance of the right portion of the pons Varolii, which has been freely opened to show the interior.

had given way at the thinnest part during the removal of the brain, owing to the firm adhesion which had formed between the cyst-wall and the dura-mater lining the base of the cranium; and the interior of the cyst was seen to have been occupied by a quantity of light coloured and glairy albuminous fluid, containing a number of white albuminous particles, being also lined by a thin film of albumino-fibrinous material. Its outer surface in one or two places had recent shreddy fibrinous material connected with it.\* By means of the cyst, the anterior part of the under surface of the right side of the cerebellum was much indented, the whole cerebellum having been, as it were, slightly twisted, and somewhat pushed over to the left side. The under surface of the middle cerebral lobe on the same side was also indented. Moreover, the cyst, owing to its position, interfered with the fourth, fifth, and seventh pair of cranial nerves on the right side. Excepting thickening of the arachnoid membrane around the cyst, and distension of the lateral cerebral ventricles with clear fluid, the other parts of the brain were healthy.

*Remarks.*—This cyst was no doubt the result of softening of some scrofulous deposit within the pons Varolii. Besides the symptoms clearly referrible to interference with the fourth, fifth, and seventh cranial nerves above mentioned, and which for my purpose require in this place no comment or further enumeration, this case shows

\* This preparation is now in the St. George's Hospital Pathological Museum, as Preparation No. 11 a, Sub-series iv., Series xx.

decisively that the decussation of nerve-fibres (at least of the majority of them) devoted to the conduction of sensory impressions, does not at any rate take place, as some have held, at a point higher up in the cerebro-spinal axis than the pons Varolii; for here we have a loss of sensibility of the skin on the "left" side of the body (the same side on which power of motion was destroyed) produced by disease on the "right" side of the pons Varolii (the left side being unaffected). Had it been otherwise—that is, had the bulk of the sensory fibres coming from the left side of the body (that affected with contactile anæsthesia) passed through the pons Varolii prior to their crossing or decussation—then they must have penetrated the uninjured left portion of the pons Varolii, and in this way escaped all implication; and we should not have had any anæsthesia of the limbs on the left side of the body. In like manner, this case also shows that the nerve-fibres addicted to the conduction of voluntary power passing downwards from the brain to the right side of the body, inter-cross at a point below the lower margin of the pons Varolii.

CASE V.—*Extravasation of blood on one side of the median line of the pons Varolii. Complete loss of power of movement in the muscles of the right arm and leg, and also of sensibility, as regards pinching and pricking, of the integument on the same side of the body.*

This case, which I venture to quote from the 'Transactions of the Pathological Society,' was brought before the notice of that Society\* by my late friend, Mr. W. Barlow, formerly resident officer at the Westminster Hospital. It was that of a woman, aged thirty-four, who, after falling down suddenly, was found to have lost all power of motion in the right arm and leg, and also to have anæsthesia, as regards the impressions of pricking or pinching, of the paralysed limbs. There was, moreover, paralysis of the muscles of the left side of the face, the left eyelids not being capable of closure, and the mouth being greatly drawn to the right. Reflex action of the affected limbs could easily be excited. Consciousness was unimpaired, and even intelligence remained until within a few hours of death, which occurred five days after the accident.

*Post-mortem examination.*—A coagulum of blood as large as a filbert, which had ruptured into the fourth ventricle, was found so situated in the pons Varolii that a section of this organ in the mesial line passed almost, "*but not quite,*" through the centre of the effused blood. The brain and cerebellum were otherwise natural.

*Remarks.*—Here I would premise, that if the description of this case by Mr. Barlow had been somewhat more precise and fuller of detail, it would have been, for the purpose to which I am applying it, more available; but it is nevertheless most useful. The post-mortem record certainly implies that blood-clot was located more on one side than the other of the pons Varolii, but fails to state on which side it preponderated. The probabilities are, and I think it must, from the symptoms, be assumed, that the blood-clot was situated more on the *left* side of the median line than on the right, and that it involved the left part of the pons more especially—along, no doubt, with a considerable portion of the right part of this organ. Thus we have

\* Transactions of the Pathological Society of London, 1852-3, p. 28.

loss of power of motion, and loss of a certain form of sensibility, on the right side especially, of the body; although, considering that the lesion was not confined to one side of the pons, there may have been, in addition, a certain degree of, or even very considerable interference with, the power of motion or sensibility on the opposite side. This latter might have been comparatively so insignificant that the right side attracted by far the most attention.

The assumption just entertained as to the left side of the pons Varolii being chiefly the seat of the effused blood, becomes materially fortified, and the gap in the documentary evidence greatly filled up, by the fact of the existence of facial paralysis (so termed) on the "left" side, and absence of it on the right side. The blood-clot was no doubt altogether out of the way of the source of the portio dura of the seventh pair on the right side, but was evidently placed so much on the opposite (the "left" side) as to involve the portio dura on that side. Had the clot been quite central, and not more on one side than the other, we should either have had *no facial paralysis* at all, or have had it on the two sides to an equal degree. Again, had it been quite central, we should doubtless have had an equal degree of loss of voluntary power and sensibility on both the sides of the body.

CASE VI.—*Large masses of scrofulous deposit in the right portion of the pons Varolii and medulla oblongata; general loss of muscular power; great numbness and "coldness" of the left arm and hand.*

The patient, a girl, aged eighteen years, was brought into St. George's Hospital with headache, and great numbness and "COLDNESS" of the left arm and hand, which she had experienced for about a year. There was also a peculiar oscillating movement of both eyeballs, but especially of the right one. The patient for two or three years had been subject to double vision. General loss of voluntary muscular power and semi-stupor, with a difficulty in swallowing and articulating her words, preceded death.

*Post-mortem examination.*—Two large rounded masses of firm scrofulous material were found occupying, one the centre and posterior part of the right portion of the medulla oblongata, and projecting into the fourth cerebral ventricle, the other the upper and right portion of the pons Varolii (fig. 3).\* The posterior parts of the crura cerebri were also softened, and one or two small scrofulous deposits were met with in the posterior parts of the cerebral hemispheres.

*Remarks.*—The particulars of immediate interest in this case, as regards the question for which I here introduce it, are the following:—

\* This specimen is now in the St. George's Hospital Pathological Museum, as Preparation No. 10 a, Sub-series iv., Series xx.

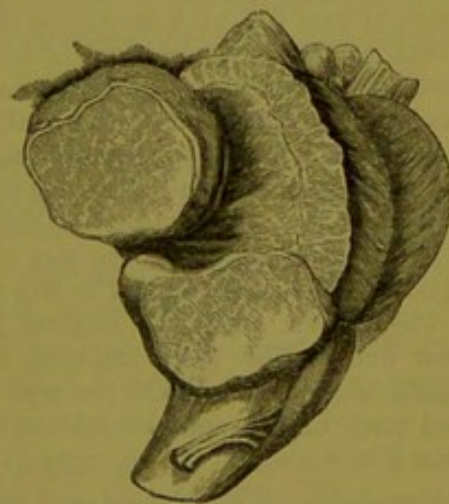


Fig. 3. The illustration exhibits masses of scrofulous deposit in the right portions of the medulla oblongata and pons Varolii, partly dislodged from their natural position.

(a) The conjunction of the disease of the "right" part of the pons Varolii and medulla oblongata with the disorder of sensibility on the "left" (the opposite) side of the body.

(b) The fact that sensibility on one side was affected, whilst the serofulous deposit was situated so low down as it proved to be on the opposite (the right) part of the medulla oblongata, demonstrating that the decussation of such up-going or centripetal nerve-fibres as form the medium of communication for sensory impressions, decussate, to a great extent at least, at some part or parts below the medulla oblongata.

(c) The complaint of "coldness" of the arm and hand (of long duration) on the side *opposite* to the lesion of the pons Varolii, &c. This point is of great interest in connexion with the subject of the conduction of reflex phenomena (as regards bloodvessels) in the pons Varolii—a subject treated of by Dr. Brown-Séquard at p. 525 of vol. i. of his 'Journal de la Physiologie.'

CASE VII.—*Laceration of the cervical part of the spinal cord, the left side being mainly affected, in connexion with dislocation of the vertebræ; contactile sensibility of the skin interfered with, chiefly on the opposite (the right) part of the body.*

*History.*—The case was that of a man, aged twenty-eight, who was brought into St. George's Hospital in a state of collapse, but conscious, after a fall and blow. At the first he was quite able to move his legs, but not his arms, and two hours subsequently he lost all power over both his legs. At a later period the lower part of the body and the legs, as well as the lower part of the right arm (as high up as the elbow), were found to have completely lost sensibility to the impressions of touch or pinching; the upper part of the right arm still, however, perfectly retaining sensibility to these tactile impressions. The legs and arms continued immovable, and the triceps muscle of the left arm became affected by repeated spasms. Priapism also existed. The patient died seventy-two hours after the injury.

*Post-mortem examination.*—Dislocation of the fourth and fifth cervical vertebræ was found. There was considerable laceration of the corresponding portion of the spinal cord, the left part of its substance being chiefly implicated in the injury, and the central parts being much more affected than the outer ones. The parts injured were greatly softened, and infiltrated with effused blood. The anterior root also of one of the nerves near the mutilated part of the spinal cord was torn off, with the exception of a few of its lower fibres.

*Remarks.*—The above case seems to illustrate the fact that afferent sensory fibres actually decussate in the spinal cord, and that also in various parts. This is exemplified by the circumstance that whilst we have injury chiefly to the "left side" of the cord at the lower part of the cervical region, we have the contactile sensibility of the skin mainly affected on the "right" (the opposite) side, the whole of the right arm below the elbow being totally deprived of this form of sensibility. If decussation of such sensory fibres as pertain to the lower parts of the arms had not existed at some part below the injury of the spinal cord, this injury, so much the more extensive as it was on the left side of the cord, would of course have been followed by greater loss of sensibility on the same or corresponding side of the body.

Such are the clinical cases, obtained (with one exception) from the experience supplied by St. George's Hospital, which I would adduce as bearing upon several important propositions newly advanced by Dr. Brown-Séguard touching the functions of the spinal cord, and indicative especially of the anatomical routes along which communication is established between the central nervous masses and the peripheric portions of the frame.

I might have proffered other cases also from the same source, but as none appeared to afford such manifest illustrations, or to be so free from subordinate phenomena calculated perhaps in the minds of some to cloud or complicate the main subject which those clinical cases are intended to elucidate, I have desisted from any multiplication of their number. Had all the instances of disease or injury of the cerebral and spinal centres been, at the time of their occurrence, carefully examined with reference to the special views promulgated by Dr. Brown-Séguard, there can, I think, be no doubt that the pathological experience of a field so wide as that which a hospital like St. George's presents (whether furnished by facts accumulated under the "curatorship" of so many accurate and scientific observers as were my predecessors, or during the period—one of between six and seven years—in which the charge of the pathological department fell to my lot), would have afforded a vastly additional number of cases which would have proved highly available for such an occasion as the present one.

But it is universally felt that in matters of scientific research rich and important details may be brought together indicating most praiseworthy diligence and to a considerable extent philosophical precision, and nevertheless they may be deficient when called into requisition in aid of any special general question, and this merely from the want of the existence of some paramount intention or guiding purpose in the mind of the investigator at the moment of observation. The mind's eye not being illumined from any particular source, the experimenter or observer very frequently not only fails to a certain extent in constructing or giving unity and coherence to the edifice for which each individual fact might be most fitted, but also records the phenomena presented to his notice in such a way that when employed by future artificers, they are found to be just wanting in that single element or characteristic which alone is required to render them fully useful for his specific purpose. This must, I imagine, have been found to be the case with all who in any department of the intellect have set themselves with a particular or newly-acquired insight to utilize disjointed material, whether amassed by themselves on any previous occasion, or by others; and in like manner I have found it to obtain with regard to the varied subject-matter which our hospital has at its disposal (the valuable aggregate of a period now extending over nearly twenty years),\* in reference to Dr. Brown-Séguard's theories on the nervous system.

\* This appears to be a fitting opportunity for making known the fact that we are originally indebted to the energy and practical industry of my friend Professor Hewett (whom as curator at a long interval I had the honour of succeeding), for the superior arrangements at St. George's Hospital which we possess as respects the systematic recording of post-

As their consideration may in a measure explain past deficiencies, and also prove in some degree serviceable for future guidance, I will here venture to enumerate some of the particulars which, had they been in past years attended to by observers in our profession in the registration of clinical histories and in the record of post-mortem appearances, would have greatly heightened the intrinsic value of such recorded facts as are to be met with in many of our medical publications.

These particulars naturally arrange themselves under the separate headings of Clinical or Life Histories and Post-mortem Pathological Appearances.

As regards the Life Histories, in the first place, an oversight with respect to the following items may frequently be noticed as having occurred—an oversight which, let it be remembered, was in many cases positively quite inevitable at the time, owing to defect in our then existing physiological knowledge, resting upon which alone as a basis, pathological statements or speculations can possess any true or constructive philosophical character.

*Firstly.* The frequent observations as respects any diminution or loss of power recorded baldly as “paralysis,” without any qualification whatever—that is to say, without any approximative statement as to the degree of deficiency of muscular power, or as to the method of its access, whether gradual or rapid; whether the paralysis followed a so-called “fit” or not, and if so, whether it was attended by pain at the onset (i.e., at the exact period when the supposed lesion of the nervous structures took place). Again, it is noticeable that “hemiplegia” is often stated to have occurred, whilst very frequently, indeed, no mention is made as to the existence or absence of any degree of facial paralysis, or of divergence in the movements or alteration in the form and appearance of the tongue; or if such mention does exist, there is not infrequently a total want of allusion to the side of the face or tongue affected. Still further, in connexion with this subject, there is, judging from the mention of certain collateral symptoms, a frequent want of diagnosis between the opposite states of “paralysis” and “spasm” of the facial muscles (two conditions which, it is important to notice, may pass into each other, and which if only slightly marked, may without difficulty be mistaken for each other).

*Secondly.* We often find reference made to diminution, or entire loss of power of voluntary movement, along with evident and total omission as to whether or not the condition of the muscular or various forms of tactile cutaneous sensibility were in any manner implicated.

*Thirdly.* There is often a mention of diminution or loss of cutaneous sensibility, but no accompanying particularization of the special form of anæsthesia which exists—whether, that is to say, it was an interference with the perception of mere contactile impressions, or an insensibility to the various other cutaneous impressions, as of differences in temperature, of pinching, pricking, &c.

mortem observations accompanied by their clinical life-symptoms. The excellency of the plan to which I allude, will be, I trust, more widely made known ere long, as we are about to print and publish the Catalogue of the Hospital Pathological Collection, revised and remodelled by Mr. Gray and myself, under the sanction of the Medical School Committee.

*Fourthly.* Great numbers of clinical records evidently display considerable research into the question of anæsthesia in one form or another; but there is obvious neglect of attendant observation (and this also to a great extent) as respects "hyperæsthesia" or the exaltation of the various forms of sensibility.

*Fifthly.* We have in very numerous instances an entire want of evidence, and in many a deficiency, at least, of evidence, as to the temperature of the skin or mucous membrane of the affected parts of the body (the thermometer being in only few instances resorted to). In many cases the subjective sensations of the patients are all that is alluded to,

*Sixthly.* We frequently have observations, obviously rigid and complete, as to all needful particulars respective of the side or portion of the body mainly affected and therefore pre-eminently attracting the attention of the observer, whereas there has been at the same time a total neglect of any mention of the "opposite side" as to the existence of any affection of sensibility or voluntary power of motion (although, of course, such may have been present to a very subordinate extent).

*Seventhly.* We often find vague mention made of such symptoms as "strabismus," "distortion of the eyes," &c., but no indication as to which form of squinting existed, or even as to which eye was affected, and we are in consequence utterly ignorant as to what sets of muscles or what nerves have been implicated. Also the pupils are oftentimes spoken of as being "dilated" or "contracted," but it is manifest that sufficient care has not been taken to observe whether the pupils harmonized with each other or not, or whether they deviated from their natural condition as to size or form; or whether they were constant or variable in size. Again, with regard to the special senses, or the faculties of deglutition or swallowing, symptoms are very often quite unmentioned, or when at all alluded to, the statement is often omitted as to the particular side on which the sight, or smell, or taste, or hearing, &c., was subjected to interference.\*

*Eighthly.* Constant omissions exist as regards the powers of reflex nervous action enjoyed by various affected parts of the body; or if they at all attracted attention, their presence or abeyance have only been studied in the case of the soles of the feet. Again, touching the determination of the degree of excito-motory power enjoyed, very often, perhaps most frequently, this has only been effected by means of tickling the skin (the use of heat or cold, or galvanic stimuli, being not at all resorted to).

*Ninthly.* Symptoms, precise and extensive enough, are often noted, either wholly without reference to date, or without relative dates of their occurrence as regards the exact time of death, so that the reader is often at a loss to conjecture with any degree of accuracy as to the

\* Dr. Brown-Séquard shows that when deglutition is impaired, indicating an affection of the nerves of the pharynx, it may be diagnostic of the exact part of the nervous system interfered with, for in cases of alteration of the pons Varolii, this symptom is observed to exist unaccompanied by loss of speech; whilst, if the latter co-exists, the lesion is probably situated in the medulla oblongata or the "vagi" nerves.



connexion between such and such a symptom on the one hand, and the morbid lesion observed after death on the other hand.

Of this kind are the numerous omissions as regards Clinical histories, especially as concerns injuries and diseases of the nervous system, often encountered in our attempts to connect varied and isolated cases in support of any dominant view or theory—omissions which obviously quite prevent that accuracy of diagnosis which it is so desirable to possess, and which is at the present time to a very great degree attainable, considering the multifarious results of recent experimental and pathological researches.

I will now proceed briefly to delineate some of the defects frequently experienced in our attempts to systematize and, so to say, co-ordinate the Post-mortem Pathological appearances detailed in many records. They may be conveniently disposed as follows :

*Firstly.* In post-mortem statements as to affections of the brain and spinal cord, such phrases as the following are pretty constantly met with: the cord or brain “softened,” “harder than usual,” “lacerated,” “containing extravasated blood,” “ecchymosed,” “discoloured,” and the like; and this very frequently unattended by any mention as to which precise portion of the brain or spinal cord was affected, or to what extent the given lesion extended. Omissions on these latter points are especially disastrous (considering the important interests of diagnosis and physiology), in the case of disease or injury of the pons Varolii or medulla oblongata, in which parts the disposition of nerve-fibres allotted to different actions is more complex than in the spinal cord proper.

*Secondly.* Pathological observers have too often rested satisfied with the examination of one only of the large central nervous organs; at one time the spinal cord alone having been examined, whilst at another time, and this of course much more frequently, the brain has been subject to scrutiny, to the neglect of the spinal cord. The nerves, and especially the origin and the roots of the spinal nerves, have frequently altogether escaped examination; and at times, only that part itself of the spinal cord which was previously supposed to have been affected, has been submitted to examination, the remaining portion of the cord, and especially the “cauda equina,” having been quite overlooked.

*Thirdly.* Clinical observation, with a view to the establishment of physiological questions, has been, as a rule, more addressed to instances of “primary disease” of the nervous centres; whereas, perhaps, more information (especially after the early effects of shock, loss of blood, injury by contusion of muscles, &c. have quite passed away\*) relative

\* I may here opportunely draw attention to the precaution (forcibly pointed out by Dr. Brown-Séguard as being so imperative) not to be misled in our estimate of the effects of injury to nervous structures by the results almost always attendant on the division and laceration of powerful muscles, entailed in the act of obtaining access to central nervous structures, lesion of which would obviously give the appearance at first sight of nerve-paralysis. He of course alludes to experiments on the lower animals, but the hint may be taken also in respect of injuries in man, as it no doubt often happens that injury (such as laceration and contusion) of muscles from extensive accidents involving the spinal region, produces a semblance of serious lesion of some of the spinal nerves or even of the spinal cord itself.

to the healthy functions of certain parts of the nervous centres, would have been elicited by the study of cases of "surgical injuries" of those textures, or of such rapid diseases of the spinal or cranial bones as affect those subjacent nervous textures in a secondary manner as by pressure. This latter kind of cases is particularly serviceable in the study of the physiology and properties of the nervous centres, inasmuch as we have therein a probability of a quicker fatality, and in consequence less chance of such extensive structural changes taking place as would go far to complicate and obscure the phenomena chiefly regarded; whether such textural alterations be indeed pathological, having occurred before death, or are essentially of post-mortem origin, and attributable in the main to chemical decomposition, which will be the more complete in proportion to ante-mortem pathological disintegration.

In drawing to a close the above enumeration of omissions noticeable in many recorded cases of injury and disease, bearing upon the invaluable propositions advanced of late years in the field of our studies of the nervous system, I am anxious emphatically to repeat, that many of the shortcomings of observation which I have commented upon are such as were in past years quite inevitable by reason of the uninformed state of our pathology and physiology, as regards multifarious points connected with the nervous system. Not a few of them have been the natural consequence of the absence of any pervading and regulating theory, in support and under the influence of which, observation should have been conducted.

Convincing, but yet fully capable of more extended proof, especially by means of clinical cases sedulously and minutely observed, as are the demonstrations of Dr. Brown-Séguard in regard to the interesting physiological questions, of which the foregoing cases are illustrative, it is to me a subject of regret that these cases which I have just cited are so scanty in number. I was anxious, and thought I should be able in some way to show why so large a mass of material as that at my disposal has, comparatively speaking, yielded so little product, and that was my reason for bringing forward the various points of omission to which I have alluded, as occurring to one's mind in supervising clinical records in various quarters.

I also felt assured that in our future investigations connected with disease and injury of the nervous system, greater care and precision of observation will be called for than hitherto we have been in the habit of bestowing in the matter.

For this reason, therefore, having the hope and expectation that from their consideration a few practical suggestions may occur to the reader's mind for future use and guidance in the prosecution of researches connected with the multiform and too often embarrassing lesions of the nervous system, I have taken this opportunity of noticing such defects in our methods of examination as rise into prominence on reflection upon the ends which in such examination we must ever keep in view.

LONDON:  
SAVILL AND EDWARDS, PRINTERS, CHANDOS STREET,  
COVENT GARDEN.



