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Contributors

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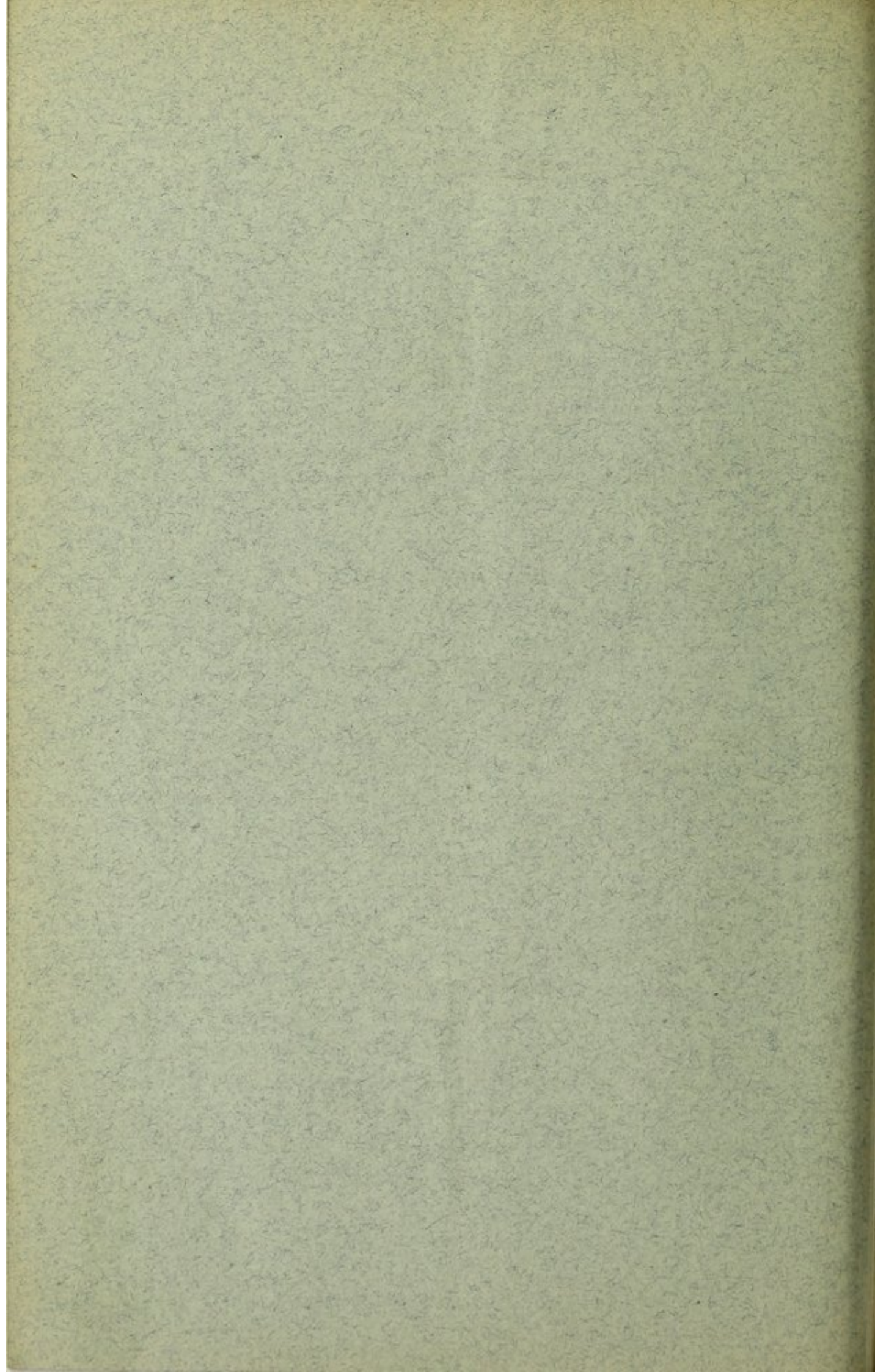
WITH THE COMPLIMENTS OF THE AUTHOR.

SO-CALLED
"CONCUSSION OF THE SPINE"
IN RAILWAY INJURIES.

BY JOHN G. JOHNSON, M. D.,

SURGEON TO THE UNION FERRY CO., BROOKLYN—PROSPECT PARK AND CONEY
ISLAND RAILROAD CO.—BROOKLYN, FLATBUSH AND CONEY ISLAND
RAILROAD CO.—BROOKLYN CITY RAILROAD CO.—
NEW YORK AND BROOKLYN BRIDGE,
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CONCUSSION OF THE SPINE IN RAILWAY INJURIES.*

BY JOHN G. JOHNSON, M. D.,

Surgeon to the Union Ferry Co., Brooklyn—Prospect Park and Coney Island Railroad
Co.—Brooklyn, Flatbush and Coney Island Railroad Co.—Brooklyn City
Railroad Co.—New York and Brooklyn Bridge, etc., etc.

IN 1866 an able and rising surgeon of England published a book of his triumphs in a new specialty he had worked up for himself, as a personal damage surgeon against railroad corporations, in a new disease that he had discovered, resulting from the mighty power of steam in railway concussions upon the nervous system of human beings. The ingenuity and plausibility with which his book was written spoke more for his skill as a partisan than did the contents appear as that of a searcher after truth. Case after case is quoted, with the enormous verdicts that he had won, though the most eminent men in the profession were arrayed against him. The particulars of the cases are summed up, and the points made by him in these cases, and the doubts and uncertainties that these parties would ever be able to discharge their duties to their families or society were fully insisted on; while the strong probability that they might pass the remainder of their days as days of misery and nights as nights of agony, until the grave should take to itself these blighted lives, were portrayed in vividness of language that well might excite the

* Read before the Medico-Legal Society, December 6, 1883.

envy of counsel whose duty it was to press their claims upon the attention of a jury.

In the short limits of a paper like this, but few of the cases can be quoted from the first edition of Erichsen's *Railway Spine*. Before reading these cases, I would request that you see how few of the symptoms are of his own independent knowledge, but are the statements of the patient himself, who is a plaintiff in a civil suit for damages, the value of those statements depending on the truthfulness of the patient, which point Mr. Erichsen seems to have made no effort to verify, page 58, case 11 :

"Mr. C. W. E., about fifty years of age, naturally a stout, very healthy man, weighing nearly 17 stone, a widower, of very active habits, mentally and bodily, was in a railway collision on February 3, 1865. He was violently shaken to and fro, but *received no bruise or any sign whatever of external injury*. He was necessarily much alarmed at the time, but was able to proceed on his journey to London, a distance of seventy or eighty miles. On his arrival in town he felt shaken and confused, but went about some business, and did not lay up for a day or two afterwards. He was then obliged to seek medical advice and felt himself unable to attend to his business. He slowly got worse and more out of health ; was obliged to have change of air and scene, and gradually, but not uninterruptedly, continued to get worse, till I saw him, on the 20th of March, 1866, nearly fourteen months after the accident. During this long period he had been under the care of various medical men in different parts of the country, and had been most attentively and assiduously treated by Dr. Elkington, of Birmingham, and by several others, as Dr. Bell Fletcher, Dr. Gilchrist, Mr. Gamgre, Mr.

Martin, etc. He had been most anxious to resume his business, which was of an important official character, and had made many attempts to do so, but invariably found himself quite unfit for it and was most reluctantly constrained to relinquish it. When I saw him at this time he was in the following state: He has lost about twenty pounds in weight, is weak, unable to walk a quarter of a mile, or to attend to any business. His friends and family stated that he is in all respects an altered man. His digestion is impaired and his pulse is never below 96. He complains of loss of memory, so that he is often obliged to break off in the middle of a sentence, not being able to complete it or to recollect what he had commenced saying. His thoughts are confused, and he cannot concentrate his attention beyond a few minutes upon any one subject. If he attempts to read, he is obliged to lay aside the paper or book in a few minutes, as the letters become blurred and confused. If he tries to write, he often misspells the commonest words, but he has no difficulty about figures. He is troubled with horrible dreams and wakes up frightened and confused. His head is habitually hot and often flushed; he complains of a dull, confused sensation within it, and of loud voices, which are constant. The hearing of the right ear is very dull; he cannot hear the tick of an ordinary watch at a distance of six inches from it. The hearing of the left ear is normal; he can hear the tick at a distance of about twenty inches. Noises, especially of a loud, sudden and clattering character, distress him greatly. He cannot bear the noise of his own children at play. The vision of his left eye has been weak from childhood; that of the right, which has always been good, has become seriously impaired since the accident. He suffers from *muscae volitan-*

tes, and sees a fixed line or bar, vertical in direction, across the field of vision. He complains also of flashes, stars and colored rings. Light, even of ordinary day, is especially distressing to him. In fact, the eye is so irritable that he has an abhorrence of light. He habitually sits in a darkened room and cannot bear to look at artificial light, as of gas, candles, or of fire. This intolerance of light gives a peculiar frowning expression to his countenance. He knits and depresses his brows in order to shade his eyes. The senses of smell and taste seem to be somewhat perverted. He often thinks he smells foetid odors, which are not appreciable to others, and has lost his sense of taste in a great degree. He complains of a degree of numbness, and of pins and needles in the left arm and leg; also, of pains in the left leg and a feeling of tightness and constriction. All of these symptoms are worse on first rising in the morning. He walks with great difficulty, and seldom without the aid of a stick. Whilst going about a room he supports himself by taking hold of the articles of furniture that come in his way. He does not bring his feet together, straddles in his gait, draws the left leg slowly behind the right, moves it stiffly, and keeps the foot flat in walking, so that the heel catches the ground and the limb appears to drag. He has much difficulty in going up and down stairs; cannot do so without support. He can stand on the right leg, but if he attempts to do so on the left, it immediately bends and gives away under him, so that he would fall. The spine is tender on pressure and on percussion of these points, viz., at the lower cervical, the middle dorsal, and in lumbar regions. The pain in these situations is increased in moving the body in any direction, but especially the antero-posterior. There is a degree of unnatural

rigidity, of want of flexibility about the spine, so that he cannot bend the body. He cannot stoop without falling forward. On testing the irritability by galvanism, it was found to be very markedly less in the left than in the right leg. The genito urinary organs are not affected. The urine is acid, and the bladder neither atonic or unduly irritable. The opinion that I gave in the case was that the patient had suffered from concussion of the spine; that secondary inflammatory action of a chronic character had been set up in the meninges of the cord; that there was a partial paralysis of the left leg, probably dependent on structural disease of the cord itself; and the presence of cerebral symptoms indicated the existence of an irritability of the brain and its membranes. The patient brought an action for damages at the Gloucester Spring Assizes, April, 1866, against the company on whose line he had been injured, and, notwithstanding powerful adverse medical testimony, recovered £3,500 damages, or \$17,500."

I will not detain you with reading the details of the other cases, as a sameness of symptoms runs through them all, but in each he ends up with the verdicts obtained, varying in cases settled out of court for £2,500, or \$12,500, to those before a jury, when as high as £6,000, or \$30,000, was recovered. In one, a young lady, whose case he describes with his usual vividness of language to the jury, did not evidently come up to his ideas of what they should have done, for he finishes up his description of her case as follows:

"The lady brought an action for damages against the Railway Company at Guildhall, in the spring of 1866. But as she had sustained no pecuniary loss by the accident, she was only awarded the wretched compensation of £1,350, or \$6,750.

Mental sufferings, bodily pain and disability, and complete annihilation of the prospects of a life weigh lightly in the scales of justice, which are only made to kick the beam by the burden of the actual money loss entailed by the accident," is Mr. Erichsen's comment on this case.

As might be expected, so partisan a course as adopted by Mr. Erichsen would provoke the censure of the respectable medical journals, and we find a very able but moderate review of his work by the *British Medical Journal*, summed up as follows : We seriously object to such specializing railway injuries. "No doubt the public may readily be brought to believe that there is a specialty in the injuries produced by railway accidents, and, therefore, that one surgeon has more special knowledge of their surgery than other surgeons have. This, it is true, may lead to the benefit of the individual, but clearly is not to the benefit of the profession at large, or of the art of medicine and surgery. The belief on the part of the public in the existence of such *individual superiority*, in the present case at least, would clearly be based upon a delusion, and must necessarily tend to the unfair depreciation of general surgery and of surgeons in general."

Prof. Syme, the sturdy old Scotch Professor of Surgery, in the Edinburgh College of Surgeons, comes out bluntly and shows up Mr. Erichsen's falsifications in the *London Lancet* for 1867, page 2 :

"Since the passing of Lord Campbell's Act, a most unjust piece of legislation, as it has always seemed to me, which established the principle of regulating the amount of damages for personal injuries in accordance with the value of individuals to society and to their families. Claims of this kind have become very frequent under circumstances which

seriously call for consideration. For instance, at this time last year, a trial took place at Guild Hall, in the Court of Common Pleas, on the part of a commercial traveler, who prosecuted the Great Northern Railway Company for compensation on account of an injury alleged to have been sustained from a collision on their line. In this case, Sir William Ferguson, Mr. Erichsen and Dr. Russell Reynolds declared that there was organic disease in the spine, which in all probability would soon prove fatal; while, on the other hand, Mr. Borlase Childs, Mr. Pollock, of St. George's Hospital; Mr. Cock, of Guy's Hospital; Dr. Risdon Bennett, of St. Thomas' Hospital; Dr. Dunsmure, President of the Edinburgh College of Surgeons, and myself, no less confidently expressed the conviction that there was no organic disease whatever, and no reason why the claimant should not enjoy good health. The jury, instead of the £12,000 asked, gave £4,700 (\$23,500) damages, and before the end of many months the plaintiff, who had been rapidly recovering, *admitted he was quite well and continues to be so.*

"The truth is, that when juries find the medical evidence so conflicting—not being able to judge for themselves as to the merits of the case—they almost always decide in favor of the claimant; so there is great encouragement afforded to unfounded or exaggerated demands for redress. Indeed, any man who travels by railway may easily obtain a competence by stumbling on the platform, after the door of his carriage has been opened by a servant of the company, but before the train has ceased to move. He has merely to go to bed, call in a couple of sympathizing doctors, diligently peruse Mr. Erichsen's lately published work on railway injuries, go into court on crutches, and give a doleful account of the distress

experienced by his wife and children through his personal sufferings, which have resulted from the culpable negligence that allowed him to leave his seat prematurely.

“Who can doubt that in such circumstances the jury would give him large damages? This system ought certainly to be put down, and as one means of doing so, I beg to suggest the publication of cases exhibiting an entire discrepancy between the medical evidence, in order that regard for professional character may tend to cheat the reckless advocacy of one-sided views. The results of such cases in regard to the claimant's speedy recovery of health would also be worthy of attention for the same purpose, and having given one of these, I may add a case of medical diversity of opinion that has just occurred here. On April 27 last, a commercial traveller drove out in the evening to my residence, in the neighborhood of Edinburgh, and informed me that he had been shaken the night before in a railway collision near Berwick-on-Tweed. He had walked immediately afterward—nearly a mile and a half—to see Dr. McLagan, of Berwick; and having been assured by him that there was no local injury or occasion for confinement, he had come on to Edinburgh. Finding that there was no local complaint, I desired him to call next morning at my house in Rutland street, and tell me if there was anything wrong. He accordingly did so; and then exhibiting the most perfect freedom in all his movements, without any sign of local injury, I concluded that if he felt any uneasiness, it must be more mental than bodily. Having expressed my opinion to that effect, I was rather surprised by being asked to recommend a law agent—and it is hardly necessary to say, declined to do so. On the same day, April 28, it appears that this person, having procured an

accomplished agent, applied to a surgeon of experience in cases like his own, who discovered that he had sustained a severe wrench of the spine and of the sacro iliac synchondrosis. The surgeon put him to bed, called in a trusty coadjutor, and visited his interesting patient at least once a day for months. On June 12, Dr. Dunsmure requested me to see the claimant, as he had now become. We found him lying upon a sofa, from which he rose and walked with flexibility of body. There was not the slightest swelling, discoloration or rigidity of the spine, and, on the contrary, every appearance of good health, as far as we could judge from our own observation. On July 29, the trial being about to take place, the claimant desired to be examined by a commissioner, and his ordinary attendant, having given a certificate on 'soul and conscience' that he was unable to appear in the witness box without serious injury to his health. I was requested, along with Dr. Dunsmure, to report as to this for the information of the court. We found the claimant laying or rather lolling, on two chairs in a garden, to and from which he walked in leaving and returning to his room, which was up a stair, on the drawing-room floor. He told us that he sat at his meals, and on the whole he had no appearance of bad health. We reported our opinion that he could safely appear in court, and the trial was ordered to proceed. But the claimant's legal advisers applied for delay.

"On December 14, Dr. Dunsmure and I were requested to see the claimant, as the trial would take place on the 24th. We found that he was not at home, but after a little while we saw him walking stoutly along the street from a public bathing establishment, which, it appeared, he had frequented for several months. He walked up the stairs of his residence

before me, and neither then nor afterward, when more particularly examined, showed any sign of spinal disease. At the trial, after the plaintiff had been examined seated in a chair, not being able to get into the witness-box, his counsel agreed to accept £1,000, instead of £3,000, which had been demanded. I deem it unnecessary to offer any observation on this case, but would suggest the following questions: 1. Could any one who had sustained a severe wrench of the sacre iliac synchondrosis immediately afterward walk a mile and a half, or on the two following days travel sixty miles by railway, drive about in cabs and make visits, without local complaint? 2. Could serious disease of the spine, resulting from external violence, exist for eight months without presenting some sign of its presence in the patient's gait, flexibility of trunk, or general appearance?"

Mr. Edwin Morris, surgeon to the Spalding Dispensary and Union Infirmary, in a work on "Shock," thus criticises Mr. Erichsen's cases (page 62):

"It is a remarkable fact that the complainants in these cases of alleged injury to the nervous system are always well up in the symptoms of spinal affections, and detail them in such a manner and use such terms to describe their feelings, that I am at once convinced that they have perused some surgical work on railway injuries. One popular complaint is that they have in a great measure lost the power of copulation—a very telling injury with an English jury, and one which invariably carries damages. In one case, this defect was put prominently forward, when, at the same time, I knew the patient had, since the accident and before compensation was awarded him, actually been brought before the magistrates, and was accused by his servant-maid of committing a crim-

inal assault upon her and of accomplishing his purpose. The case was dismissed in consequence of the groom coming forward and stating that he frequently had had connection with her during the time she was in the master's service."

Mr. Erichsen did not rest easy under these severe lashings. In a letter to the *British Medical Journal* he attempts to break the force of the criticism, by saying the title was put on the book by the publisher or printer without his knowledge. Mr. Charles Wilkins, Mr. Erichsen's lawyer, demanded of Mr. Syme, Mr. Dunsmure and others retractions of their allegations. They replied, proving their original statements, and published the correspondence in the *Lancet* and other medical journals. As might be expected, these severe criticisms concentrated public attention on Mr. Erichsen's work, and the success of his specialty was secured. He comes out with a new edition, containing more cases, all written up in a popular style, with symptoms that patients themselves can understand and use. He had made two parties and had got one—that was the public. His book run through large editions; was published on the Continent and in America; translated into German and other languages, and the Railway Spine took its place thenceforth in the public mind as one of the expected events of railway travel.

Mr. Erichsen endeavors to sustain his view of the concussion of the spinal cord from the well-known effects of concussion of the brain, but the analogy is not good, because the surroundings of each organ is entirely different. The brain is a large, soft mass, closely surrounded with its membranes, in direct contact in every part of its surface with the skull, abundantly supplied both on its surface and interior with blood vessels that may easily be ruptured, and it receives the

full force of a blow or a violent shaking of the skull ; while the spine is not one solid shaft of bone, but is composed of twenty-four separate vertebra. Between each of these is an elastic cushion, which, by their elasticity, allow of a violent oscillation, without transmitting its force to the cord. These vertebra are united together by nearly eighty joints ; each of these joints has its complement of ligaments. Beside these ligaments proper to the joints there are other ligaments which pass from vertebra to vertebra, among which are the ligamenta sub flava, particularly noted for its elasticity and strength. Then, again, the spinal cord does not lie in close contact with this bony cavity. The spinal canal is lined with a proper membrane of its own ; between this membrane and the membranes of the cord is a cushion of fat and loose areola tissue. Then comes the dura mater, which does not closely encircle the cord, for within is the arachnoid membrane, which folds on itself like a bag, and is filled with fluid ; and then comes the pia mater, encircling the cord. So that when the cord is violently shaken, it oscillates in this bag of waters ; and even if it could be impinged upon hard enough to bring it in contact with the bones of the canal, it would not strike them, for there is interposed between them this cushion of fat and areola tissue. Still further to protect it from harm, the inner membrane is anchored to the outer membrane of the cord along its whole length, from the foramen magnum to its terminal extremity, by little cross bars of ligament. These little cross bars of ligament thus anchor the cord in the centre of the bag of waters and hold it there. Finally, the dura mater itself is attached to the posterior common ligament, through the whole length of the spinal canal, thus still further anchoring the cord in its place of

safety in the centre of this bag of waters. And, finally, the dura mater is continued beyond the spinal cord in the shape of a slender string to the back of the coccyx, where it blends with the periosteum, thus holding the lower end of the cord in its place of safety. A mechanical provision for the protection of this most important organ from concussion is thus made, which only Infinite Wisdom could have conceived.

It is easy to see how absurd it is to reason that the same causes that produce concussion of the brain would produce concussion of the spinal cord. The pathological changes that Mr. Erichsen claims take place in the cord and its membranes are spinal anemia, molecular changes, and inflammation of the membranes of the cord, and of the cord itself, or meningio myelitis. We may dismiss the spinal anemia and the molecular changes, because Mr. Erichsen himself admits they are mere assumptions on his part, or, to use his own words, "A clinical expression, probably, more than a well proved pathological fact." Mr. Erichsen felt the importance of having post mortem verification of his theories, for he quoted a case from the practice of Mr. Gore, which was reported to the Pathological Society of London by Lockhart Clarke.

Mr. Gore's description, as published by Mr. Erichsen, is that "he was a man of fifty-two years of age at the time of his death—three and a half years before, he had been in a railway collision. Immediately after the collision the patient walked from the train to the station close at hand. He had received no external sign of injury, no contusions or wounds, but he complained of a pain in his back. Being most unwilling to give in, he made every effort to get about in his business, and did so for a short time after the accident, though with much distress. Numbness and a want of power in the

muscles of the lower limbs gradually, but steadily, increasing, he soon became disabled. His gait became unsteady, like that of a half intoxicated person. There was great sensitiveness to external impressions, so that a shock against a table or chair caused great distress. As the patient was not under Mr. Gore's care from the first, and he only saw the case for the first time about a year after the accident, and then at intervals up to the time of his death, he has not been able to inform me of the precise time when the paralytic symptoms appeared, but he says this was certainly within less than a year from the time of the occurrence of the accident. In the latter part of his illness, some weakness of the upper extremities became apparent, so if the patient was off his guard, a cup or a glass would slip from his fingers. He could barely walk with the aid of two sticks, and at last was confined to his bed. His voice became thick and his articulation imperfect. There was no paralysis of the sphincter of the bladder until about eighteen months before his death, when the urine became pale and alkaline with muco purulent deposits. In this case the symptoms were not so severe as usual; there was no very marked tenderness or rigidity of the spine, nor were there any convulsive movements;" page 179. On page 180, Mr. Erichsen says "this case is of remarkable interest and practical value, as affording evidence of the changes that take place in the cord under the influence of concussion of the spine from a railway accident. Evidences of chronic meningitis cerebral, as well as spinal; of chronic myelitis, with subsequent atrophy, and other organic changes depending on malnutrition of the affected portion of the cord." This case became one of marked interest, from being the only one claimed as post mortem from railway spinal concussion.

Mr. Lockhart Clarke's report of the case is as follows: "I found the membranes at some parts were thickened and adherent to the surface of the white columns. In the cord itself, one of the most striking changes consisted in the diminution of the antero posterior diameter, which, in many places, was not more than equal to half of the transverse. This was particularly the case in the upper portion of the cervical enlargement, where the cord was consequently much flattened from before behind. On making sections, I was surprised to find that of all the white columns the *posterior was exclusively the seat of disease*. These columns were darker, browner, denser and more opaque than the antero lateral, and when they were examined both transversely and longitudinally in their preparation under the microscope, this appearance was found to be due to a multitude of compound granular corpuscles and isolated granules, and to an exuberance of wavy fibrous tissue, disposed in a longitudinal direction. It was very evident that many of the nerve fibres had been replaced by this tissue, and that, at certain spots or tracts, which were more transparent than others, especially along the sides of the posterior median fissures, they had wholly disappeared. Corpora amylacea were also thickly interspersed through the same columns, particularly near the central line. The extremity of the posterior horns contained an abundance of isolated granules like those in the columns, and in some sections the transverse commissure was somewhat damaged by disintegration. The anterior cornua were decidedly smaller than natural and altered in shape, but no change in structure was observed. The striking resemblance between this case and cases of locomotor ataxy, as regards the limitation of the lesion of the white

substance of the cord to the posterior columns, although the nature of the lesion is somewhat different, excited my curiosity, whether the paralysis and difficulty of locomotion partook of the nature of ataxy."

In a letter to Mr. Gore, I inquired whether the patient's gait was remarkable for its unsteadiness, like that of a man intoxicated, or whether the movements were jerky or spasmodic. In reply, I received the following information :

"The semi-paralytic state which I attempted to describe was precisely that of unsteadiness, somewhat like that of partial intoxication, but, on the other hand, there was very little, if any, jerking or twitching."

That this case is not accepted by the profession is not a matter of surprise. Mr. A. Shaw, Consulting Surgeon to the Middlesex Hospital, thus comments on it in vol. 2, p. 377, Holmes' Surgery :

"The first remark which the reading of the above case suggests is concerning the disproportion that appears between the slight injury sustained by the patient and the magnitude of the results, occupying three and a half years in coming to an end. From progressive paraplegia and a morbid condition of the spinal cord identical with what have been described in the case, being known to originate independent of injury of any kind, the question forces itself upon us—was the shock in the railway case a cause or a coincidence? This doubt would not have been expressed if Mr. Gore had been in attendance on the gentleman at first, but according to the narrative, he did not see him till a year after the accident. But, granting for argument's sake that a shock analogous to concussion of the brain had really been received, the question may be asked, how would that assist in accounting for

the peculiar morbid change found in the cord on dissection? The concussion would be followed by inflammation; but that inflammation would be general. It would extend over the whole surface and enter into the deep structures of the cord, including every column equally. The organic change is not general, but partial. It is confined to the posterior columns. How, then, is that selection or limitation to be explained? Another objection presents itself, according to modern views of pathology, the morbid action concerned in producing granular degeneration of the tissues is distinct from inflammation. The process is seen in operation in fatty degeneration of the muscular substance of the heart, in the formation of the arcus senilis, in the production of atheroma in the arteries, etc. And in none of these cases is the degeneration preceded by inflammation. It may be argued, therefore, that the organic changes in the columns of the spinal cord, consisting of degeneration of the nerve fibres, depend on some cause not hitherto ascertained, different from inflammation, and that, accordingly, their connection with concussion of the cord is merely hypothetical. On the whole, it may be affirmed that what is most wanted for the better understanding of those cases commonly known under the title of concussion of the spine, is a greatly enlarged number of post mortem examinations. Hitherto our experience has been derived almost wholly from litigated cases, deformed by contradictory statements and opinions, and the verdicts of juries have stood in the place of post mortem reports."

With the claims of this case so thoroughly demolished by Mr. Shaw, and others of the most distinguished surgeons and neurologist of England, one would suppose that Mr. Erichsen would have endeavored to produce some undoubted post

mortem specimens, to show that inflammation of the membranes of the cord, or of inflammation of the cord itself, did result from these concussions of the spine. But, no ; in the latest edition of his work, published the past year, he quietly publishes this case again without comment, as though it was an accepted fact in the pathology of railway spine. What difference to him that the man's injuries were so slight, that he went about his business, *and did not see a doctor for a year afterwards* ? What difference that he died of a disease of the spinal cord, that is produced by *syphilis*, or by *sexual excesses*, by *exposure to cold* and by *rheumatism* ? The man had been in a railway collision and had afterwards died of disease of the spinal cord. The case had served him for his stock in trade with the juries, if not the courts, for nearly a generation, and he could not part with his old friend that had done him such yeoman's service.

Although it is now seventeen years since Mr. Erichsen introduced spinal concussion to the general public, with its slowly commencing and permanently continuing inflammation of the spinal cord and its membranes; although he has appeared in the courts as a personal damage physician in these important cases more often, probably, than any other physician in all England; although the public attention and that of the medical profession have been concentrated on these cases from the enormous verdicts that have been rendered—a single railway corporation having to pay \$300,000 in one year alone; notwithstanding the ablest surgical and neurological talent in the land has been employed in these cases on the one side or the other; notwithstanding Mr. Erichsen has been at the head of the largest Accident Hospital in London during all these years—during all this time he

has also been Professor of Clinical Surgery, and now Emeritus Professor at the University, with facilities unequalled for the obtaining of post mortems—he has been unable to obtain a single post mortem specimen to sustain his theories.

Although death is the common lot of us all, and these concussed spines die, according to his own statement, in from three to four years, notwithstanding that his views have been shown as fallacious by the most distinguished neurologists of the age, by Erb in Germany, by Wilkes and Gowers, Le Gross, Clark, Ross, Hulings, Jackson and a host of the lesser lights. Though post mortem specimens of every kind of chronic spinal disease can be procured by all other surgeons or neurologists, is it not probable he would have produced them by the score from the 'thousands of cases of spinal concussion that have been before the courts had they existed anywhere except in his own imagination? That he does not despise the views and experiments of neurologists is shown by his culling from them whatever will sustain his side of the case or increase claims for damages. I quote from his latest edition, p. 17: "The importance of these inquiries, that is concussion of the spine, has latterly assumed a new aspect from the very interesting fact pointed out by Brown-Sequard that, in many animals, morbid states of various kinds may be hereditarily transmitted, as the results of injuries inflicted on the nervous system of one or the other of their parents." Thus, for instance, this distinguished physiologist has experimentally proved that epilepsy may appear by transmission in animals whose parents have been rendered epileptic by an injury of the spinal cord, as well as in the offspring of those in which that disease has been induced by section of the sciatic nerve.

Exophthalmia, malformations of the ears and toes, partial closure of the eyelids, hæmatoma, and dry gangrene of the ears have all been thus produced in animals, and although there is no proof, as yet, that analogous effects can be developed in man by hereditary from parents who have suffered from injury of the nervous system, yet we may fairly assume that such is the case. And now that attention has been called to this most important subject we may expect to find similar instances in the human subject. Could partizanship go further? Mr. Erichsen with his lifetime of experience among these concussed spines, visiting a wrench of the sacro iliac synchondrosis at least once a day for months, intimately acquainted as he must have been with their families, appearing as their champion in courts, admits with all his experience among them *he never has seen or heard of a case of concussion of spine transmitting nervous defects*, attempting to reason where the surgeons knife had wounded the spinal cord or sciatic nerve of a guinea pig, and therefore diseased offspring sprang from a diseased parent, therefore a concussed spine, of which he has never been able to show a post mortem specimen, would transmit diseased nervous systems. If Mr. Erichsen's sworn statement is true that these parties cannot copulate, would it be amiss for him to show how they would have children? This is the work we see so often admitted in court as an authority in these diseases, and page after page allowed to be read to juries in these damage cases. The large majority of these cases that are brought into court are those where there is an absence of very evident injury, coupled with a history of anomalous symptoms of impaired nerve function, while fractures, bruises and wounds present comparatively little difficulty of adjustment out of court.

Well, if these are not cases of concussion of the spinal cord what are they? Sprains of the muscle and ligaments of the back and joints of the vertebræ. Shock to the whole system. In some few cases hemorrhage in the vertebral canal. Liti-gation symptoms. When a train in rapid motion is suddenly stopped, the passenger's momentum sends him violently forward and then he rebounds, he may be violently jerked to and fro if the carriages bound and rebound and jump up and fall again. Every portion of his body suffers from this rude shaking. It cannot be forgotten that the viscera of the thorax and abdomen partake each, more or less, of the character of "floating;" that they are suspended at their roots by ligaments or their equivalents, and within the folds of the serous membranes which form these connections, not only blood vessels but also nerves, particularly of the great sym-pathetic system, are enclosed. Thus all the parts of the arterial, nervous, sympathetic and digestive systems become, more or less, disturbed, and an anomalous train of symptoms follow, accordingly, as one or the other of these systems have suffered. Add to this the intense fright which the utter help-lessness of their situation brings, and the nerve exhaustion from this shock, and you can account for the symptoms presented.

Sprains of the ligaments of the vertebræ, rupture of por-tions of the tendons or muscles of the back are, without exception, the most frequent cause of the phenomena assumed to be those following concussion of the spinal cord. They give rise to much local pain, to a rigidity of the spine, a difficulty in rising from the seat, a stiffness in walking, and contribute readily to any disposition on the patient's part to make much of his injury. It is a mistake to suppose men-

ingitis or myelitis is accompanied by pain on pressure. The examination of spinal diseases in any hospital will show that the spinal cord is surrounded by a bony wall thicker than the bones of the skull, and you might as well press on the head to see if the brain is diseased. Flushing of the face and head, cold feet and hands are from disturbance of the vaso-motor system, the sequence of the shock. Complaints of being easily startled, depression, intolerance of noise or light, irritability of temper, are simply loss of nerve power, of a hysterical state. Easily induced fatigue, the lines all running together when attempting to read come under that head. The sight will return to its normal state if there has been no previous asthenopia. Loss of memory is not real. It is simply an incapacity for sustained thought, and like the inability to apply himself to his business, are simply loss of nerve power, and with the return of the muscular strength the nerve power will return. English surgeons call these litigation symptoms. Why? Because they are never found in the employés of the railways who have been in the same accidents. If they were, the result of the injury to the nervous system, or the brain, or spinal cord, or its membranes, then the conductors, engineers, firemen, brakemen, etc., would suffer in the same way, but they do not. Why? Because one has an object to get well, the other has not. It is a principle of law that those who go into a business must take the risk of the business. The employés can have no claim for damages, their support and that of their families depends on their labor. If they don't attend to the business another man will, and their situation will be lost. It is incredible to see how quickly an employé will be to his work and well when a passenger will spread it out to months and years.

It is scarcely reasonable to look for much improvement in a patient who is placed in exactly the worst condition for recovery. The passenger is constantly visited by one or more medical men who are continually directing his attention to these symptoms, awaiting in trepidation the ordeal of an examination in a court of justice when his claim is likely to be stoutly contested; afraid to make any effort towards recovery because it will diminish his claim. The mind without any other object to dwell upon turns and returns to all these little ills and becomes intensely sensitive about this suit, and this emotional excitement will retard the recovery till the suit is settled. After the settlement the recovery, as shown by Professor Syme and others, often occurs with indecent haste.

One point more: It seems that the decisions of the General Term of the Supreme Court, in refusing the defendant the right of examination by his physicians into the physical condition of the plaintiff is an injustice, and lays the ground for fraud, which cannot be punished. An unscrupulous physician has little to fear, for the defendant cannot prove a negative. The reason assigned by the court does not seem sufficient; that reason is that nervous females might, through fear of examination by adverse physicians, forego the pressing of a suit, and thereby be debarred of justice. Every corporation knows how severely anything done by their representative is commented on, and if their physician should conduct himself in any way obnoxious, the jury would make them pay fearfully for it.

The English rule seems more equitable. It gives the defendant the right to examine through his physicians, but the report of the defendant's physician must be public to both sides.

See the ruling of the Lord Chief-Justice in the case of *Farquhar vs. Great Northern Railway Company*, Solicitors' Journal Annual Reports, January 30, 1875, page 236.

His Lordship said that it was most desirable that a medical man on the part of the company should have an opportunity of seeing the patient, in order to ascertain the nature and extent of the injury; but then, on the other hand, the patient should have the corresponding advantage of knowing what reports had been made to the company concerning him. The object of the defendants in an action for compensation for alleged injury in sending their medical man to examine the plaintiff, is for their own advantage—not his. It is to determine whether he really has been injured, as alleged. If so, to what extent, and when he is likely to recover? It is but fair, therefore, to the plaintiff, that if he submits to the intrusion of a stranger and suffers himself to be personally and minutely examined by one whom he is apt to regard in the light of a hostile witness, he should be made acquainted with the opinion that has been formed of his case. The plaintiff's course will be very much guided by a knowledge of such opinion. If the patient has been really and seriously injured, it is only just and right that he should be made acquainted with the candid opinion of the medical man sent to examine him. If he over-estimates his sufferings and finds that the defendants' surgeon suspects him, he will be more likely to take a less serious view of his case and to accept reasonable compensation. Whereas, if he be wilfully misrepresenting his condition, he will be little disposed to submit himself to the searching cross-examination of counsel, if he knew that the surgeon employed on behalf of the railway company had detected his fraud."

But Germany has the fairest course. The physician there testifies as to the fact. Any expert testimony is given by a physician appointed by the court, who examines the case when he pleases, and as often as he pleases, and after studying up the case, makes his report in writing to the court. If either side feels aggrieved, then they can submit further interrogatories to him. He reinvestigates the case from the standpoint furnished him, and then makes a supplementary report. Finally, when the case comes to trial, he is placed on the stand, and can be examined by both parties as to the soundness of his opinions. Here we have a judicial mind—a physician who has no interest in the result—whose whole future employment depends on the honesty and intelligence with which he discharges his duty to the court.

Contrast this with the scenes so often witnessed in the New York and Brooklyn Courts! Where a personal damage lawyer, who has the case on shares, proves his case by a personal damage doctor, whose fees are contingent on the jury's verdict, fortified with Erichsen's concussion of the spine, protected by a court who refuses the defendant a chance to examine by skilled surgeons the plaintiff in such a suit, and then tell me if it is any wonder that more than half of all your calendars in both City and Supreme Courts are made up of such personal damage cases?

Dr. JOHNSON opened the discussion with the following remarks :

The importance of this question is shown in the fact that in five years the English railways paid £2,200,000 as damages awarded by juries in these cases of concussion of the spine, or a yearly average of two million two hundred thousand dollars. The *Dublin Quarterly Journal of Medical Sciences*, vol. 44, p. 380, gives this fact.

The Revere disaster alone cost the Eastern Railroad of New England half a million of dollars, and the Old Colony Railroad paid three hundred and ninety-five thousand dollars for damages in a single accident. Verdicts in England, more frightful in amounts, have been awarded than in this country. The *British Medical Times and Gazette* reports the case of Dr. Phillips, who was awarded eighty thousand dollars; and Lord Coleridge, who held court, was not dissatisfied with the results.

If these were all really cases of injury to the spinal cord or its membranes—permanent in their character—no one could complain, for no money could compensate for the suffering and blighted life; but they are not. Dr. R. M. Hodges, in the *Boston Medical and Surgical Journal*, for 1881, makes a very able analysis of the injuries of the Wollaston and Revere accidents. The whole of the evidence and the information in possession of the corporations was placed in his hands by Dr. Lovejoy, the surgeon of the road. The Wollaston accident was settled by arbitration, three medical men being selected, who were not connected with either side. They

reported that in fifty-three cases there was evidence enough to satisfy an ordinary jury that the claimants were suffering from what was called concussion of the spine; and the company settled with each one at the amount awarded by the commission. Two years afterward, Dr. Hodges found that of the fifty-three, all but three had entirely recovered.

He states that "in twenty-one cases where the so called symptoms of concussion of the spinal cord were alleged to be present, which *have been under my personal care*, ten are believed to have been deceptions; and in six, the diagnosis, as regards deception, was doubtful." Of twenty-six similar cases observed by J. Rigler (an eminent German authority), seven were found simulated; and in thirteen, the diagnosis in regard to fraud was doubtful. Of these forty-nine cases, seventeen are shown by their own physicians to be absolutely fraudulent, while the probability is that three-fourths of the whole were, according to the opinion of these physicians who had charge of their cases. As to the claim of destruction of their virile powers, Hodges gives several cases showing how fraudulent was this claim. In one of the cases, this claim of impotency was strenuously insisted on before a jury, as the results of the spinal concussion, and a verdict of \$18,000 was given. Not long after the satisfaction of the judgment the plaintiff was convicted of bastardy (p. 364, *N. E. Medical and Surgical Journal*, 1881). In another case, an award of ten thousand dollars was made, this alleged sexual disability being the chief ground for damages from the spinal concussion. The claimant was married a year afterward, and his wife in due time gave birth to a child, presumably legitimate.

Fifteen months after the Wollaston accident, a similar event occurred in the family of one of the injured on that occasion

who claimed to have been made wholly impotent, and was paid \$5,000 by the commission's award.

Curling, an eminent authority on the genital organs, shows that when impotence has really followed injury of the brain or spinal cord, it is evidenced by atrophy, or wasting of the testicles. They become small, soft and flabby.

Dr. Hodges also, in the same paper, says: "In 1872 the Metropolitan Railroad was mulcted \$10,000 by a man, the detailed account of whose symptoms satisfied a jury that—as a result of concussion of the spinal cord—he was utterly enfeebled in body and wholly unable to earn his living, or to perform the ordinary acts of life with comfort. It required the united strength of three policemen to take him to the station house when, at the close of the trial, he celebrated his victory by getting too uproariously drunk. He has since followed the active and laborious calling of a junk dealer."

Dr. Hodges says: In the Wollaston accident there were one thousand two hundred persons on the train at the time of the derailment. Thirteen persons were killed outright, and more than two hundred and fifty injured, of whom six afterward died. It is impossible to determine how many cases of claims preferred were absolutely fraudulent or grossly exaggerated in their character. It is a notorious fact that this was true of a large number. Persons claimed compensation for injuries who were not even on the train to which the accident occurred. Attempts were made to palm off old fractures—old hernia, hydroceles, varicoceles and varicose veins of long standing as immediate results of the catastrophe. And, in several instances, boards of arbitration met, counsel were present, claimants examined, and no award made, simply because nothing could be found on which to base any just

foundation for damages. The striking feature of the accident was the number of persons who claimed to have spit blood or to have passed it by the bowels, in whom no distinct signs of injury, such as external marks of contusion, fractured ribs, etc., could be found.

At the Medical Society of London, March 7, 1881, Mr. Wordsworth, an eminent oculist, made a report of the claimed defects of vision in twelve cases in which he had been requested to appear as a witness for plaintiffs, and in all of which considerable pecuniary compensation was received, on account of the unfavorable prognosis that was given. In none of them could he find any signs of injury on examination, except a slight hyperaemia of the fundus oculi; and, so far as he was able to trace the cases, they all recovered on the settlement and resumed their usual avocations. He commented on the fact that medical men were seldom consulted in these cases, except with a view of obtaining compensation. He stated that in a long experience in hospital and private practice, he had never seen any of these cases, simply as patient, either before or after the settlement of their claim for compensation. These circumstances threw a doubt on their bona fides and deprived this claim of its supposed importance.

Dr. Abbott, whose work on the ophthalmoscope is the standard authority in the London *Lancet*, 1881, page 462, says: "I have never seen true optic neuritis with active proliferation as the sequel of spinal disease."

Speaking of locomotor ataxia, the disease of the cord, of which Mr. Gores' patient died, which Mr. Erichsen claimed as a case of spinal concussion, though he did not come under any physician's care for a year afterward, Mr. Gowers, one of

the leading neurologists of England, in an article in the *Medical Times and Gazette*, October 16, 1880, shows that 75 per cent. of all the cases of locomotor ataxia that have come under his observation were the results of syphilis.

Dr. Hodges says : The claims of spinal concussion were chiefly based on tenderness of the back—stiffness of the back and difficulty of urination. When the claims were honest, Dr. Hodges found that they resulted from sprains of the ligaments and muscular aponeuroses ; and in some cases from a periostitis of the spinous processes. And in some cases exostoses, or bony enlargement, at the subsequent examinations, showed the truth of his original diagnosis.

Medical literature abounds with similar material, showing the falsity of these claims of permanent injury, or of any injury whatever of the spinal cord, or its membranes, as claimed in these cases.

Where there is really any injury of the cord or its membranes, the objective symptoms are the most prominent. There are two classes of symptoms by which surgeons form their opinions—the subjective and the objective. The subjective, that is the patient's statements ; and the objective, what the case reveals.

If you can thrust needles into the legs, burn the patient's legs with a lighted match, or apply the electric whip, and there is no evidence of pain, you need no statement of the patient that he has no sensation in the limbs. Again, if you find the tendon reflex perfect, you know that its path of conduction is not destroyed ; and so all through the various tests that are known to neurologists. The symptoms of disease of the cord or membranes is the same, whether it be a medical disease or traumatic. Where we have merely *the patient's*

statements, without objective proof, the case is to be regarded with suspicion. Where there arises either a meningitis or a myelitis, contrary to Erichsen's teaching, the disease arises soon after the injury, and give objective symptoms that are paramount.

Dr. Hodges closes his paper with a remark which every one who has had much to do with railroad claimants will endorse. He says:

"The frequency with which *exaggerated* and *fraudulent* cases presenting the so-called symptoms of concussion of the spinal cord are made the subject of litigation and claims for pecuniary compensation, will be diminished by legislation providing for a wiser and more discriminating use of expert testimony than now prevails."

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