Medical evidence in railway accidents / by John Charles Hall.

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MEDICAL EVIDENCE

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RAILWAY ACCIDENTS

BY

JOHN CHARLES HALL,

SENIOR PHYSICIAN TO THE SHEFFIELD PUBLIC HOSPITAL; AUTHOR OF "THE PATHOLOGY, DIAGNOSIS, PREVENTION, AND TREATMENT OF CONSUMPTION;" LATE LECTURER ON THE PRACTICE OF MEDICINE, AT THE SHEFFIELD MEDICAL SCHOOL, ETC., ETC., ETC.

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"At last Sir Benjamin Brodie was sent for. Now Sir Benjamin was up to these cases."—*Lectures on Medicine, by Sir T. Watson*, Vol. I., p. 692.

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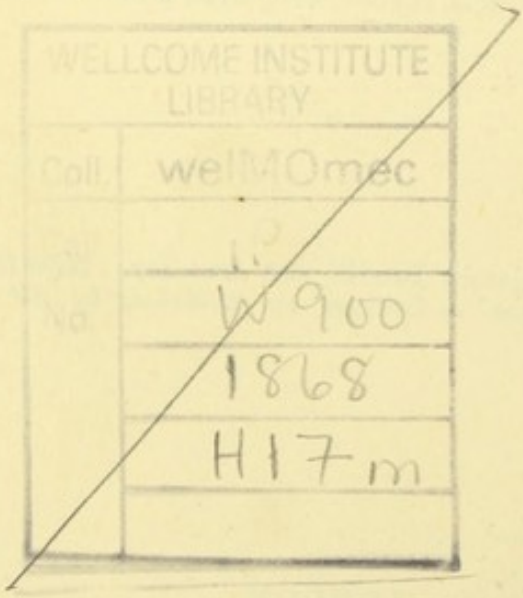

J. ROBERTSHAW, PRINTER, "EXCELSIOR" OFFICES, SHEFFIELD.

PREFACE.

In obedience to the wishes of several leading Members of the Bar, the papers on Medical Evidence in Railway Accidents, written for "*The British Medical Journal*," at the request of its Editor, are collected and published (with many additions) so as to afford a more ready means of reference.

Consulted quite as frequently by plaintiffs seeking compensation for injuries sustained, as by Railway Companies which have to meet the claims made upon them, I can have no possible bias in favour either of the one or the other.

My object has been to describe what I have seen in those who have been in railway collisions, and in those who have sustained like injuries from other causes.

These sketches are, therefore, only valuable so far as they faithfully pourtray what has been seen at the bed-side; for they are neither more nor less than literal transcripts from the leaves of the note book of a practising physician of thirty years' standing—of one anxious only to state facts, and not to establish a pet theory.

My brethren of the Medical Profession will now have an opportunity of comparing notes, and of saying how far their readings of the Book of Nature coincide with my own.

Surrey House, Sheffield, 1868.

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One morning a solicitor called upon me, and stated "that Mr. —— had been injured in a railway accident; that Mr. —— was in attendance; that he wished me to see the patient with him;" and, he added—"take notes of the case, for we shall probably want you to give evidence in an action against the company." My reply was: "How do you know that my evidence will be of use to you? I will see the gentleman with pleasure with the surgeon of the family, and report to you the opinion we may form of the nature of the injuries your client has sustained. But you must pardon my saying that a physician forgets what is due to himself and the public, when he undertakes to become an *advocate* instead of a *witness*." In this instance, after our consultation, the medical officer of the company was invited to see the patient with us. There was no difference of opinion; and, in the end, a conclusion was arrived at, alike satisfactory to the

directors of the railway company, and to the family of the gentleman who had been injured.

And here I would venture to suggest, that such a course as this ought always to be taken, and the physician or surgeon of the company invited to see the case. I have had, for more than twenty-five years, no little experience of railway accidents, and of injuries to the brain and spine from other causes. I have, of late years, been many times consulted, both by the friends of the sufferers, and also by the railway officials; and in a great majority of such cases, where there has been no attempt at exaggeration or fraud, there has been a prompt and fair settlement of claims; and, consequently, an avoidance of the public scandal which so frequently occurs in our law courts, when medical witnesses called by the plaintiff swear one thing, and medical witnesses called by the company, another.

Of course, I exclude from a chance of such honourable and satisfactory settlement a class of actions which, unhappily, are daily becoming more and more common. Actions touted for, and got up on speculation, for the mere purpose of obtaining costs—actions in which the plaintiffs play a very insignificant part, and obtain a very small share of the plunder—actions which every honourable member of our profession must feel it his bounden duty to discourage by every means in his power.

There has recently been tried in London an action against the South-Eastern Railway Company, in which two of the most eminent hospital surgeons gave opinions the most opposite. More than this. Two colleagues—two distinguished teachers in the same school—gave at this trial opinions completely at variance, not only as to the nature of the alleged injury, but also as to the probable duration of the effects of the accident.

How is this? Let any man who has been long and extensively engaged in consultation practice ask the question fairly, if this difference of opinion exist

between himself and the various brother practitioners he is daily in the habit of meeting at the bedside of his patients; and the answer must be, that between two men of experience such differences of opinion as these are the very rare exceptions, rather than the rule. Why then is it, that only when medical men become witnesses in railway accidents all is darkness and confusion? Why is it that such injuries alone lead physicians and surgeons to contrary conclusions?

This is a question, the importance of which it is quite impossible to over estimate. On the one hand, every traveller who suffers in consequence of accidents caused by the negligence of the servants of a railway company, has a just claim for the most liberal compensation; on the other hand, be it remembered, railway shareholders — many of them widows and orphans, whose all depends on the payment of the dividends—have their rights as well as the passengers they carry, and for whose comfort and convenience they provide; and it does appear every day more and more questionable, whether the present mode of assessing damages by a jury be the best way of arriving at a correct conclusion.

Last year, as the President of the Yorkshire Branch of the British Medical Association, I felt it my duty to bring the question of conflicting medical evidence in railway accidents prominently before the members; and the hearty acquiescence in the opinions I then ventured to express induces me to pursue the subject.

Mr. Erichsen, in his work *On Railway and other Injuries of the Nervous System*, says:—"Actions for damages for injuries *alleged*" (the italics are mine) "to have been sustained in railway collisions, have become of such very frequent occurrence as now to constitute a very important part of medico-legal enquiry." (Page 45.)

On this "alleged" or asserted plea the whole question rests; and in every case, it is the bounden duty of the medical examiner to separate the real from

the unreal; to carefully consider the exact nature of the injury said to have been sustained; to observe if the symptoms described by the patient are such as have been present in injuries to the same part, and more especially to the spine, which have not been occasioned by an accident on a railway, and where a trial by jury and the prospect of obtaining heavy damages have not been contingencies?

Is it because the medical men called by the plaintiffs or their solicitors in these cases receive too readily as true the statements made to them by their patients, and because the medical men called by the railway company to investigate the exact nature of the injury, and the probable duration of its effects on the system, rely on *objective* rather than *subjective* symptoms, that the differences of opinion, to which allusion has already been made, so frequently occur?

Concussion of the Brain.

The effects of concussion of the brain, whether the result of a railway or any other accident, vary very considerably.

When resulting from a collision on a railway, the speed at which the train was moving at the time of the accident, the nature of the opposing obstacle, whether fixed or moving, &c., &c., are all questions affecting the probable severity, or otherwise, of the injuries sustained; for like any other kind of accidents, these occurring on a railway may be serious or the reverse. The presence or absence of cuts, bruises, or fractures, will also assist us materially, in estimating the force of the collision.

Whatever the nature of the accident, or the cause of it, the effect on the brain may be so slight as only to occasion a momentary loss of consciousness; or consciousness may not even be lost, the blow being followed only by some trifling confusion and dizziness—

a sense of faintness and an inability to maintain an upright position.

In another person, the concussion may have been sufficiently violent to abolish almost all sensation and power of motion. The pulse is feeble, the countenance pale, respiration seems nearly annihilated, and such a condition not unfrequently speedily terminates in death—the result of a failing of the action of the heart.

But between the severe and slight cases of concussion of the brain, there is almost every possible degree. The objective symptoms present in concussion of the brain, are as a rule, in proportion to the degree of violence that it has sustained, and which indeed is only cognisable by such objective symptoms.

Where there has been only a slight concussion, among some few of these symptoms, we note that the patient is stunned, and at the moment of the injury has flashes of light or stars before his eyes,—singing in the ears, &c., and that he remains for some moments as though intoxicated.

When the concussion has been more violent, a return to consciousness is generally followed by sickness and vomiting. The bowels are constipated, afterwards the fæces are often discharged involuntarily. At first, the use of the catheter is required to relieve the distended bladder. After a time, the urine dribbles away involuntarily. The eyelids are generally closed—the pupils vary; sometimes they are natural; in another case, one or both may be dilated. In that condition of body in which sensibility is diminished and not annihilated, they contract on exposure to light and sometimes are even more contracted than natural. Respiration is often disturbed and irregular. The pulse varies according to the severity of the injury, and the stage of it. In bad cases, it is irregular, feeble, and intermitting—often hardly to be perceived at the wrist, the patient being in a state approaching syncope.

If cases of concussion of the brain vary in their severity, so do they also in their terminations.

Happily, in many cases recovery is complete,—the injury leaves no trace behind; in other cases, the recovery is slow and tedious, and months may pass before the brain resumes its normal condition.

In other still more severe cases, the health remains broken, and the memory impaired. There may be squinting, paralysis of the eye-lid, imperfect vision, loss of memory, permanent loss or impairment of nervous and muscular power, &c., &c., &c.

When there has been violent concussion of the brain, and lower cervical spine, which is said to have produced imperfect vision, it will require no little care in forming a correct diagnosis. In the first place you have only the assertion of the patient, and to the unassisted eye, the optic nerve may appear perfectly healthy. Before giving an opinion, the ophthalmoscope ought always to be used; for, by it changes in the nerve may be discovered. When a sub-inflammatory condition of the optic nerve is revealed by the instrument, it is probably a precursor of atrophy. By the use of the ophthalmoscope many doubts are solved, for when these changes in the optic nerve are discovered, the serious nature of the affection is undoubted.

In a case of impaired vision said to have followed a railway collision, and where there had been, unquestionably, concussion of the brain, the ophthalmoscopic condition of the eye decided the question. The statement of the claimant was doubted, but a careful examination of the eye, with the ophthalmoscope, by an eminent physician and surgeon, consulted by the company, shewed the optic nerve to be in a sub-inflammatory state, and the claim was admitted. The use of this instrument on the one hand assists in detecting fraud, and on the other, aids us in preventing injustice.

Injuries to the Spine.

My own experience, I doubt not, is the same as that of every other medical man who has been frequently

called in to cases, in consequence of an accident on a railway :—namely, that now, real, or *imaginary* (and the word *imaginary* is used most advisedly) affections of the spine are among the most frequent; and therefore, before narrating what has been observed in some of the injuries that have come under my own notice, it may be well to consider what are the symptoms and effects of injuries to the spine from whatever cause arising.

The "*railway spine*," as it is termed, has no right, I confidently submit, to the peculiar place assigned to it.

An injury to the spine, whether occasioned by a collision on a railway, or by a fall from a scaffold, can only be dangerous in proportion to the extent in which, at the time of the accident, or subsequently, the spinal chord or its membranes are affected. What we have to fear in injuries of the spine, including fracture and dislocation, is inflammation of the spinal chord or its membranes, and hæmorrhage into the spinal column; and, therefore, acute and chronic inflammation of the coverings of the chord; acute and chronic inflammation of the substance of the chord; induration of the chord; apoplexy of the chord ; chronic softening of the chord ; are, one and all, subjects of no little interest.

Acute myelitis, it is hardly necessary to remark, frequently arises from other causes than direct injury resulting from fracture of the spine, concussions of the spinal chord, or effusion of blood. One of the most painful cases of chronic myelitis I ever witnessed, was seen in consultation with the late Mr. Sykes. It occurred from exposure to cold ; the man, aged 54, having been immersed in cold water for some hours at the time of the great flood at Sheffield, caused by the bursting of the water company's dam. There is no more frequent exciting cause of acute and chronic inflammation of the chord, than exposure to cold.

The symptoms of spinal injury will depend not only on the degree in which the chord primarily or secondarily is affected, but also on the portion of it the functions of which are interfered with.

If the injury be of such a nature as to completely compress or divide the chord—provided the injury be not so high up as to cause instant death—all the parts below the seat of injury will have lost both sensation and motion.

Mr. Erichsen has pointed out that, in injury to the lower part of the spine, "there may be paralysis of all those parts supplied by the nerves of the sacral plexus, whilst those from the lumbar plexus are not affected;" *i.e.*, the sensibility being perfect above the knees and lost below them, the exact seat of injury becomes marked; for it evidently is above the one and below the other set of nerves.

As a rule in these injuries, there is a diminished temperature. In a few weeks the whole body wastes,—the pulse becomes feeble, the patient is cachectic,—the countenance is indicative of disease and suffering,—and there is generally exfoliation of the cuticle.

If the injury to the chord has been at the lumbar, or lower dorsal part of the spine, there will follow, as a matter of course, paralysis of the parts which derive their nerves from the sacral, or lumbar plexuses, or from both of them. Paralysis of the lower extremities—of the genital organs; and of the trunk, so high as the injury; relaxation of the sphincter-ani and inability to retain the fæces. At first, a paralysed condition of the bladder and retention of urine—which, however, after a time, dribbles away. The urine, in the course of a week, is generally found to be ammoniacal; and it is wonderful how men who have met with injuries to this portion of the spinal chord live on, month after month, dying by inches, and at last slowly sinking under sloughing bed-sores, and some low type of inflammation of the bladder.

If the seat of injury has been at the upper portion of the dorsal region, in addition to the symptoms already pointed out, there is added a train of symptoms indicative of paralysis of the expiratory muscles. Expiration is now altogether dependent on the elasticity

of the walls of the chest; because the intercostal muscles have not the power of acting—and so sneezing, coughing, &c., are no longer capable of being performed. It is hardly necessary to point out that inspiration is carried on almost entirely by the diaphragm, and that the blood, not being arterialised, congestive pneumonia in a very short period terminates the life of the patient.

If the lower cervical region be the part injured, there is also, as the result of the injury, paralysis of the upper extremities, and the inspiration is altogether diaphragmatic.

Such is an *epitomè* of the symptoms of injury to the different portions of the spinal chord which I have seen. The student must not expect to find them exactly as described in every case that may come before him. It is one thing to diagnose concussion, or any other present, remote, or possible result of spinal injury, to the satisfaction of the examiners at the London University, or the Royal Colleges of Physicians and Surgeons, and altogether another thing to do so at the bedside of a patient.

The physicians and surgeons who have been most actively and thoughtfully engaged in practice, are certainly those who are most deeply and seriously impressed with the grave responsibility of him who undertakes the instruction of a class of students in the Lecture Theatre—of him who has undertaken to instruct others in that art which he has himself found to be so difficult.

"*Ars longa, vita brevis.*"

The more we see of disease, the more do we become convinced that every case has its own individual requirements, and to which we have to accommodate the knowledge gathered in the treatment of other cases having a resemblance to it, and having the same essential pathology.

One of the most precious results of such experi-

ence, happily observes Dr. Symonds, "may be the acquirement of a certain tact which enables us to recognise the constitutional peculiarities presented to our observation, or to gauge the value of the patient's own assertions, often erroneous." This knowledge we must all feel the great difficulty of communicating. Let any man who has been in practice for many years, take a retrospect of the serious cases he has attended, and there will pass before his mental vision the minute points of practice on which the successful issue in each patient has depended. And, unless at the bed side with the patients before us, how difficult must it be to explain to another all the conditions that determined the selection of remedies, in cases of injury to the brain or spine. The conditions may have a general resemblance, but no two cases ever are, or ever can be, in all respects identical.

I quite agree with Dr. J. Ogden Fletcher, (whose work on *Railways in their Medical Aspects*, has been described as pleading as eloquently in defence of railway companies, as does the work of Mr. Erichsen on the other side of the question,) that in every case where a claim is set up for compensation, that we are bound to "*attach very considerable importance to moral evidence.*"

Many years ago, I was consulted in a case, where a young and highly educated physician had been deceived by a patient who pretended that he was paralysed, in order to obtain compensation from an assurance company. This man played his part with no little skill; and suffered a pin to be run into his legs without moving or betraying pain; and yet, in the end, he was proved, beyond doubt or question, to be feigning disease.

Again, every physician and surgeon must have seen cases of hysteria in the male. I had such a patient a few months ago, and I know he was attended by other physicians in Sheffield. He was a strong muscular man, aged 40, in whom the morbid nervous exaltation was such that he screamed on touching the spine or

left side with a feather, although, when his attention was arrested, he could bear any amount of pressure on the same parts.

For many years past, medical writers have pointed out—and no one more ably, more fully, and more clearly than my old teacher, the late Sir B. C. Brodie—that, after a shock to the nervous system, symptoms *altogether subjective* are often present, similar to what we note in *real* affections of the nerve-centres.

This state of things I have very frequently seen after railway accidents, and that, too, in ladies, and in those who have had no wish nor intention to deceive.

The absence of *objective symptoms* in such cases will always enable us to form a correct diagnosis, and to decide between real and imaginary spinal disease.

It is quite impossible to shut our eyes, however, to the fact that persons who have received very slight injuries, frequently greatly exaggerate their degree, or consequence, in order that they may induce a jury to give them a disproportionate compensation.

When, therefore, I am asked to examine, for the purpose of legal investigation, one of these doubtful cases of impaired function—said to have been the result of an accident—I feel it incumbent to collect all the information in my power respecting the person's moral and physical habits, and probable motives; and to inquire if the alleged causes of the disease are founded on fact, or probable. And more especially is it important to ascertain whether the pathognomonic symptoms of the supposed disease are present. This task, though difficult, is not altogether a hopeless one. The simulator of disease is apt to overact his part, to give a detail of incompatible symptoms, and greatly to exaggerate unimportant lesions.

Between the several symptoms which are characteristic of real diseases, there is always a certain congruity and relation. But in simulated diseases the symptoms are apt to be irregular, inconsistent, and contradictory.

If called to a man who has been in a railway collision, and who tells me that he then received a blow on the spine, or a jar, or a twist, or a sprain, or concussion; that he is now quite unable to move his legs, or even to turn himself in bed—(and, especially, if there had been no immediate symptoms after the injury of impaired or altered function of the nerve-centre, but that some weeks or months after the accident, and when it was almost forgotten, these symptoms indicative of serious disease are said to have appeared)—when this goes on week after week,—the man still remaining, apparently, without the power of moving in his bed—his lower extremities stated to be without sensation or motion—with a healthy-looking countenance—no marked lesion of nutrition—no difference of temperature between the parts said to be paralysed and the rest of the body—perfect command over the bladder and rectum—pulse natural—no bed-sores—no flattening of the nates or calves of the legs—and I am drawing no imaginary picture here—I say, emphatically, there is a total absence of the objective symptoms which I have seen during the last thirty years, in all the numerous cases of serious spinal injuries which I have attended.

In all cases, therefore, where the pathognomonic symptoms of the alleged injury are absent, who will venture to say they ought not to be submitted to the most searching, careful, and fearless investigation.

I have used the terms *objective* and *subjective*. By objective, I mean whatever is exterior to the mind—outward, external; something that we can see. To this, the term subjective is altogether opposed. In the former case I depend on the evidence cognizable to my senses; in the latter, there is nothing to depend upon, save the statement of the patient.

The result of my experience is this. I have never yet seen a case of injury, the result of a collision on a railway, where the symptoms have been *subjective only*, in which the favourable verdict of a jury, and the

payment of the damages awarded, has not been followed, sooner or later, (generally very rapidly,) by complete restoration to health and strength.

A series of most interesting cases, illustrative of railway and other accidents, will be found fully described in the next chapters.

First, are given examples of injuries to the brain and spinal chord, in accidents which were altogether unconnected with railway disasters. Case III is extremely interesting, inasmuch as it enables us to trace, day by day, what may be expected—where the spinal chord has been seriously injured—from the time of the accident to its fatal termination.

The *objective* symptoms, in all the cases in this chapter, may be advantageously compared with the *subjective* symptoms, only present in some of the cases arising from railway collisions.

Chapter II.

Accidents Unconnected with Railways.

Case I.—*Injury to the Spine from a Fall.—Partial Loss of Power in the Lower Extremities.—Slight Anæsthesia.—Perfect Recovery in Four Months.* Case II.—*Concussion of the Brain from a Fall.—Injury to the Back.—Recovery in Two Months.—Symptoms in like cases terminating fatally.* Case III.—*Injury to the Spinal Chord from a Fall.—Interesting details of the Symptoms, noted daily, from the receipt of injury to the man's death.*

Case I.

John C., aged 21, was admitted into the Sheffield Public Hospital, November 20th, 1866, under the care of my colleague, Mr. T. Chesman, F.R.C.S., with whom I saw him in consultation the following morning. I am indebted to our house-surgeon, Mr. Henry Brietzcke, for the following *epitomè* of the case. He had fallen from a height and struck the middle of the dorsal portion of the spine. When admitted, he was confused, and complained of pain on pressing over the part where the blow had been received. There was no fracture. He had partial loss of power in the lower extremities, and could not walk. There was slight anæsthesia; for, on applying a pair of compasses to the skin of the legs, at about the normal distance apart, a few hours after admission, he could not distinguish the two points, although he could do so perfectly in the arms. The next day he was feverish; pulse 120; he being unable to pass his urine; a catheter was introduced twice a day. The urine be-

came cloudy and phosphatic. His bowels were constipated.

Pain in the back and numbness in the lower extremities, continued for some weeks, as did also the inability to empty the bladder. He was kept in bed and perfectly at rest, cupped over the spine, and fed on a light and nutritious diet, and every care taken to prevent bed-sores—a task of considerable difficulty. He gradually recovered, and left the hospital on February 4th, 1867, perfectly well.

He had, when discharged, complete command over his bladder, and could walk as well as before the accident.

It will be seen that in this patient the symptoms commenced at once, continued for some time, and then gradually subsided under treatment. My long hospital experience has led me to look for symptoms of injury to the spine immediately after an accident. Should a patient after an accident, be it a fall from a height, as in this man, or a collision on a railway, not have symptoms at the time, or in a few days, or a week or two, I should certainly not expect to discover them months after the accident.

Case II.

C. F., a short muscular man, aged 40, January, 1839, fell from the top of an omnibus in the High Street of Kensington. When seen, half-an-hour after the accident, by my friend the late Mr. Andrew Carrick, R.N., and myself, he was pale, cold, and to a great extent unconscious; pulse very feeble. When roused and spoken to in a loud voice, he answered incoherently, and relapsed into a state of semi-unconsciousness. He remained in about the same condition for nearly twelve hours; then he was sick and vomited. The bladder had been previously relieved by the catheter. After vomiting, the skin became warmer, the pulse

fuller, and he could answer questions, but still with difficulty. He had pain in the head, and great intolerance of light, and the pupils were contracted. In a day or two, he complained of pain at the upper portion of the lumbar region of the spine, which, he said, had been struck when he fell. There was a considerable bruise at this point; partial loss of sensation and motion in both legs; they were described as feeling "numb," and he moved them with difficulty. He had perfect command over the sphincters. The urine was of the specific gravity of 1018, and slightly acid; there was no marked change of temperature in the affected parts. Leeches and hot linseed poultices were applied over the tender portions of the spine; the patient was kept in bed and perfectly quiet. In two months he was well, and able to resume his usual employment—that of a clerk in a warehouse in the City.

Had this man not gone on favourably, my present experience would lead me to anticipate that such a patient would soon exhibit symptoms of lowered vitality, and a gradual declining of the bodily powers—falling into a low cachectic condition of health. There is generally a marked loss of power in the legs, a shuffling walk, an inability to stand, and, if an attempt be made to rest the weight of the body on the toes, he falls forward. One foot is trailed along the ground; the sphincters lose their power; the desire to void the urine is constant, and both it and the fæces pass involuntarily, and beyond the control of the patient. The sexual power is frequently lost; there is great irritability of temper; muscular twitchings on falling asleep; severe neuralgic pains; in one, impairment of the natural sensibility of the limbs; in another, an exalted degree of sensibility painful to witness.

But in all such injuries, as a rule, this state of things is continuous from the date of the accident, increasing or diminishing in severity. We have not months of perfect health, and then the first commencement of disease of the spinal chord.

Case III.

Thomas W., aged 38, was admitted into the Sheffield Public Hospital, August 15th, 1866, under the care of the then senior surgeon, Mr. J. F. Wright, with whom I saw the patient. He was brought to the hospital by two men who had found him on the road; the horses and cart which he had been driving having strayed home. When brought in he was insensible, but subsequently stated that "being intoxicated he had fallen backwards from the cart into a pool of water, striking his head." There was a scalp wound about three-quarters of an inch long over the posterior part of the left parietal bone; the pericranium was not cut through; and the loss of blood had been trifling. He complained of great pain in the back of the head, and tenderness, over the cervical vertebræ; the spine was stiff; and he screamed when his head was moved. His clothes were saturated with water; he was cold; pulse very feeble; he had a drowsy look; the pupils were sluggish and dilated.

August 16th. He had passed a restless night; tongue furred; pulse feeble; the pupils were still dilated, but acted better to-day. He had no head-ache; his neck was painful. The lower extremities were numb, a needle pricking them occasioned no pain. His legs were powerless, and he was quite unable to move them in the slightest degree. The temperature of the paralysed limbs was diminished. Some reflex action was produced by tickling the soles of the feet. The bladder was distended; and the urine was drawn off by a catheter. He lay on his back. There was no pain in the dorsal or lumbar regions.

August 17. Pulse 80; skin warm; tongue coated; no dribbling of urine. He had no power over his legs. The pain in the neck was better.

August 18th. The urine still required to be drawn by the catheter. He vomited; there was tightness

over the abdomen, and twitchings in the legs and thighs; the bowels acted naturally; the abdomen was tympanitic.

August 19th. The wound of the scalp was nearly healed. The numbness passed over the epigastric region, and below that line sensation was deficient; no reflex action could be excited in the lower extremities; the skin over the nates was red and tender.

August 21st. Respiration appeared to be principally performed by the diaphragm, although the ribs rose a little. He could cough. When he went to sleep, the legs twitched.

August 22nd. He was placed on an air bed. He had great thirst; was free from pain; had no command over the sphincters; but had a sensation of wanting to pass urine. Pulse 80, small; no dyspnœa.

August 23rd. He could move his legs a little, but the nervous power appeared very soon to be exhausted; he could not again repeat the effort for some time; the urine had ceased to dribble: he could strain when the catheter was in the bladder.

August 25th. The urine when drawn off was turbid and alkaline; he had more power over his legs.

August 27th to 30th. The urine was thick and ammoniacal, and dribbled away. He had pain in the neck; pulse 76; the fæces passed involuntarily.

August 30th. Pulse 78, very feeble. He complained of a darting pain over the seventh cervical vertebræ.

August 31st. He had a rigor this morning, which lasted two hours. His urine still dribbled away; and the fæces passed involuntarily. Notwithstanding every care and attention, a large bed-sore had formed over the sacrum. There was reflex action on tickling the feet.

September 4th. He could move the right leg a little. Pulse 76, feeble. He complained of great sense of weakness. He took daily four ounces of wine, and some bottled porter. He had no power over the

sphincters. There was slight reflex action in the left leg. The bed-sore was rather improving.

September 10th. The right leg was now and then drawn up involuntarily; tickling the sole of the left foot did not give the sensation of tickling. Skin cool; pulse 72. He had more power over his sphincter-ani; and he could empty his bladder much better, and did not require the use of the catheter.

September 10th to 15th. The bed-sore was inflamed and sloughing; pulse 80, feeble. An erythematous eruption had appeared on the arms. It was arranged in large irregular circles, formed by red lines, which looked like inflamed lymphatics. In some of the patches the skin included within the circles was normal; in others, white, as in nettle-rash.

September 17th. The eruption had disappeared; the bed-sore was better. He had a good appetite; no pain.

October 6th. The bed-sore was sloughy. The left leg was very painful on being moved; he could move the right leg a little.

October 16th. He was delirious; pulse 108, feeble; no pain.

November 17th. Since last report, he had at times improved a little, and again relapsed. The old bed-sore had granulated, but two others had formed over the trochanters, which were very sloughy. He had no increased power over the legs; if anything, the right was the better of the two, both as regarded sensibility and motion. The bowels were regular, and the appetite good. At times he had fearful rigors, followed by profuse perspiration. He was evidently sinking.

November 18th. On examining the back this morning, the seventh cervical vertebra was observed to be unusually prominent. At first, this was attributed to the excessive emaciation; but on taking hold of the spinous process with the fingers, a lateral motion could

be produced, accompanied by a grating sound. He had no pain in the cervical region.

February 2nd, 1867. Becoming more and more exhausted, with no power over his legs, he expressed a wish "to go home and die," and left the hospital. He died in a month from this date, his friends refusing to permit a *post mortem* examination.

This case is both valuable and instructive, as showing the length of time patients may live after so severe an injury as this poor fellow had sustained. The exact nature of injury by which the spinal chord was affected we were unable to verify, no examination of the body having been made after death.

Chapter III.

Railway Accidents.

Case IV.—*Concussion of the Brain from a Collision on a Railway.—Slight Ptosis of Right Eye-lid.* Case V.—*Concussion of the Brain from a Railway Accident: recovery in three months.* Case VI.—*Railway Accident.—Subjective Symptoms of Injury to Spinal Chord only.—Subjective Symptoms apt to mislead in forming a Diagnosis, &c.* Case VII.—*A Railway Accident and its Results.* Case VIII.—*Another Injury in the same collision as the last case.* Case IX.—*Railway Collision.—Concussion of the Brain.—Recovery.—(Two other Accidents in the same carriage.)* Case X.—*Railway Accident.—Bruise on the Shoulder.—Diminished Temperature on the Injured Side.—Cause of the Difference in Temperature between the right and left side.—Recovery.* Case XI.—*Railway Accident.—Bruise to the Arm.—Alleged permanent Loss of Power.—Conflicting Medical Testimony.—Perfect Restoration to health and strength.* Case XII.—*Railway Collision.—Severe Bruise of the Abdominal Muscles.—Constant Sickness.—Slow Pulse.—Increased Temperature.—Long and tedious Illness.—Ultimate Recovery.—Value of the Thermometer.* Case XIII.—*Railway Collision.—Subjective Symptoms only.—Recovery.* Case XIV.—*Railway Accident.—Severe Injury to the Head, ending in permanent Loss of Vision.*

Case IV.

An elderly gentleman, travelling in a second-class railway carriage, suddenly found himself at the bottom of the carriage, his train having run into some coal trucks. When I saw him, three hours after the col-

lision, he was confused, and could give me no very clear account beyond what I have already stated; that he found himself with his hat off at the bottom of the carriage; and that he was helped out. How long he had been insensible he knew not, but said that he sat on the bank of the railway and felt cold, and that a gentleman had lent him a rug. He had come on by train for some miles after the accident. He felt sick, and attempted to vomit; but did not bring anything from his stomach. Pulse 58, feeble; skin cold. He was put to bed; a cup of hot tea given to him; a good fire lighted in his bed-room; and a hot-water tin placed at his feet.

Next morning he appeared confused; and, when seen by myself and an old personal friend who had known him many years, he said his head ached, and that the light from the window caused him annoyance. His pulse was 60; temperature normal; tongue furred. He had perfect command over his sphincters. He complained of pain in the head, and great tenderness along the whole of his cervical region, over which he thought he had been struck. There was no mark on the skin, nor was the part swollen. He could not read, and asked me to read a letter for him; when he attempted to read, the words ran into each other. His sleep was disturbed and broken; he awoke with a start, and was remarkably irritable, and predicted the most fearful results from the injury he had sustained.

His friend informed me that some years previously he had been injured in a railway collision; that he was then for a long time unable to attend to business; and hence, probably, the disposition to look gloomily on the future. He continued in this state for several days; the exalted sensibility of the whole nervous system was most marked. When he attempted to walk he said "his legs failed him." There was slight ptosis of the right eye-lid; and the vessels of the conjunctiva on that side were injected. He almost shuddered when the eye was examined by the ophthal-

moscope; and a hot sponge applied to the upper part of the spine caused him to cry out with pain. The temperature in every part of the body was normal. Dr. Fletcher, Dr. Bartolomé, and Mr. W. F. Favell, saw this gentleman with me. The conclusion at which we arrived was, that no permanent injury had been received; and that with perfect rest, and abstaining from business and all mental exertion, in three months he would be quite well.

The case was settled out of court by the payment of £500 and the costs. I have seen this gentleman several times since. There is no ptosis, nor any single trace of the accident. He is able to carry on his business, and is in every respect quite well.

Case V.

The Rev. J. B., aged 61, April, 1867, travelling on the Great Northern Railway in a third class carriage, was looking out of the window, when the passenger train ran into a luggage train. He was violently shaken at the time, and received a severe blow on the right side of his head; his hat had been broken by the force of the blow. He was senseless for a short time, then felt sick, and reeled at first like a drunken man, but soon recovered, and proceeded up to London; and went, after taking tea with a friend, to buy a new hat. He preached on the following day (Sunday), to a large congregation, but felt often at a loss for a word; he was a good deal exhausted after service, and at once went to bed. On the following evening, he commenced the first of a course of lectures, but broke down from exhaustion. He returned home to Sheffield the next day by railway, having been about five hours on the road, and immediately sent for me to attend him. He was very feeble, and spoke with difficulty; his face on the right side was partially paralysed. He could not read; the light gave him pain; and when a candle was held to his eyes, he frowned and asked that it might be taken away. On

putting out his tongue, it was seen to be drawn to the left side of the mouth, and this continued for nearly a month. He walked with great difficulty, and complained that his legs were cold; there was a constant desire to pass urine. His urine was acid; specific gravity 1019; pulse 66.

With perfect rest, and abstaining from all mental exertion, and a few weeks spent at the seaside, in three months from the receipt of the injury, this minister resumed his usual duties and perfectly recovered.

The case was settled out of court, the patient and the company having mutually agreed that the sum to be paid should be fixed by myself.

Case VI.

Mr. ——, a gentleman in middle life, had the misfortune to be riding in a second class carriage at the time of a collision on a railway. After the accident, he proceeded some distance, and at the end of his journey he was seen by the surgeon of the company. He complained of pain over the dorsal and lumbar regions, on which, he said, he had been bruised; and, in addition, of an inability to walk without pain. He returned to his home from London in a first class carriage, was immediately attended by his family surgeon, and was seen by myself for the first time, seven days after the accident.

I found him in bed laid on his back. He told me "he was suffering very great pain along the whole course of the spine, and that he had not power to move his legs or even to turn in bed." The temperature of the whole body was normal. He had perfect command over the bladder and rectum. He said that at first he had "difficulty with his water, but that was improved." His pulse was 76; but as he spoke of the severe injuries he had sustained by the negligence of the company, and the heavy damages (two or three thousand pounds) he would make the directors pay, he became very excited, and his pulse rose to 98.

On getting him out of bed, he was unable, he said, to walk or to bear any of the weight of the body on his feet; he supported himself by the table, and insisted on being again carried immediately to his bed. There was no mark on any part of the back. During the whole of my attendance these symptoms remained. He complained of a sensation of pins and needles in both legs; there was no reflex action; no drawing up, or starting of the legs; no wasting.

As we saw him in bed, he appeared a stout healthy man, but he told us, again and again, "that he had no power over his limbs, and that he was unable to walk." In the absence of all objective symptoms, I ventured to express a very strong opinion, that no permanent injury to the spine or spinal chord had been sustained; and in this opinion three other medical gentlemen concurred.

Having satisfied myself that he not only could walk without assistance, but that he had actually done so, and that, too, at the time when he assured me that he was altogether incapable of moving his limbs, I discontinued my attendance.

A gentleman of great skill and long experience was now called in, and through trusting to subjective symptoms only, was led to conclude that the injury to the spine and spinal chord was severe, and probably permanent.

About three months after the accident the case was compromised, on the payment by the company of several hundred pounds. It is, doubtless, a consolation to this gentleman and his friends now to know, that my prognosis was correct; and that his and their fears proved altogether groundless. Shortly after the case was settled, he was observed walking about in the street. He has almost ever since attended to his business; and no trace of the injury remains.

Case VII.

C. W., aged 23, whose income was about £70 a year, was injured in an accident on a railway, June, 1866. He was shaken and bruised, and sustained a simple fracture of the fibula. At the end of July, he complained for the first time of having "nervous fits" and of a "peculiar sensation in his head." This state of things continued until the end of August, when he told his medical attendant that "his eye-sight was impaired." In September, the sense of taste was said to be lost; there was loss of sensation also, and he swallowed his food with apparent difficulty.

The case came before a jury, at the Assizes, the end of the same year. He was brought into court on crutches. He could bear strong ammonia (NH^3) to the nose, which only produced a little watering of the eyes. The loss of taste was shewn by the impunity with which he could take a spoonful of mustard; and the loss of sensation, by his indifference to the application of a pin to all parts of the face and neck.

The medical men called on his behalf told the jury that "*as four of the special senses were impaired or lost, there must be disease of the base of the brain, resulting from the accident; that he could never be in so good a condition of health as before the accident; and that he might die in less than two years.*"

The Company, under the advice of counsel, called no witnesses—relying on a speech in mitigation of damages. The jury returned a verdict for the plaintiff —damages £1,500.

Very soon after the trial, he was seen walking in the town with the help of a stick. Next, he was observed running after a railway train when in motion, for the starting of which he was too late, and which he was prevented from entering by the officials. The last report I had of him was, that "he was in good health, going about as usual, and no worse for the injuries he had sustained."

Case VIII.

W. B., aged 30. This gentleman was in the same train as the last patient, whose case has been narrated. After the accident, he had symptoms of cerebral and spinal concussion, and also many of the nervous subjective symptoms so often present in patients who have been in a collision on a railway. These symptoms will be found fully described in the next case.

The medical attendants of this gentleman expressed the opinion that "it was altogether impossible that he could resume his occupation as a commercial traveller in less than two years." On the company proposing a compromise, £1,500 was demanded. The sum paid in the end was £1,000.

I am informed that "three weeks after the settlement of his claim, this person resumed his usual occupation, and that he has been perfectly well and able to do his work ever since."

Case IX.

Mr. H., aged 46, a stout and well formed man (who although of a nervous temperament, had always enjoyed good health), was waiting in one of the third-class carriages of an excursion train, at a station, expecting every minute that it would start on the return journey, when owing to a mistake in the signals, his train was run into by another. The door of his carriage being open, he was thrown by the force of the collision upon the platform. He remained for some time insensible. Mr. Benson, his medical attendant, informed me that at the time of the accident Mr. H. had symptoms of concussion of the brain, and that the right arm and shoulder were bruised, much discoloured, and very painful.

The accident happened on the 12th of June, but he was not seen by me until the 6th of the following August. At first he appeared to have had the usual

symptoms of slight concussion of the brain. Then he slept but little, and when he did so awoke with a start, and fancied that he was falling. He tells me now "that his sleep is broken and uncomfortable," that he does not know what it is to enjoy a good night's rest; that he has fearful dreams; and he added "I have not had a good night's rest since it happened."

The power of attending to his business in a great measure is lost, for he cannot direct his attention to any one subject long together. He is one of the Board of Directors of a large company, and it had been his duty to reckon the wages, and to cast up the books of the workmen. He can no longer do so. His family tell me "he is a changed man, and now irritable and discontented." His tongue is furred. He has no appetite; no inclination to do anything; "feels best when sitting in his chair." He can walk well, though he feels very weak, and as though his legs would give way under him. The utterance is not affected; still, he appears, now and then, at a loss for the right word to complete a sentence; his taste and smell are not impaired; there is slight intolerance of light. He stated that "loud noises distressed him very much." The sense of touch is not impaired. He can read, but it makes him "mazey." There appeared some difference of power on the two sides; he did not grasp with the right hand so firmly as he did with the left. He had perfect command over the sphincters; the bowels were inclined to be constipated; pulse 76.

He was advised to go immediately to the sea-side; to keep his mind altogether at rest; and to leave his warehouse in charge of others for a month or two.

The case was settled out of court by the payment of £500. When I saw this gentleman some months afterwards, all traces of the accident had passed away.

Two other persons, both young, were in the same carriage with this gentleman, and were also injured. One, a young gentleman, that I saw, had ptosis, the result of a cut over the eye-brow, but who perfectly

recovered in a few months. The other was a young lady, who had slight concussion of the brain. There was nothing in either of these cases calling for comment, and they are only mentioned as illustrative of the different degrees in which persons travelling in one carriage may be injured by the same collision on a railway.

Case X.

Mrs. ——, aged 32, married to a respectable artisan, and the mother of several children, three days before I saw her in consultation with Mr. Morton, had been in a collision on a railway. She was at the time of the accident for a short period insensible, and on recovering consciousness felt very sick and faint. I found her in bed, with inability to move, from "feeling sore and bruised all over." There was considerable pain in the left shoulder, also over the collar-bone, and in the axilla on that side. There was a somewhat severe contusion just above the collar-bone, and extending backwards. She said, "she was thrown forward against some part of the carriage," and the shoulder had evidently been severely struck, probably in the recoil. The pulse was 86; the pupils acted well; there was no intolerance of light. She had some pain in the head, and slight tenderness on pressure at the cervical portion of the spine.

There was a marked difference of temperature between the two sides. This was tested very carefully by a thermometer, which showed the difference to be no less than four degrees. The difference of temperature, however, was also quite evident to the touch. The pulse on the left side was weaker than on the right. She described the left hand as being "dead." A silver spoon dipped into hot water could be felt along the spine and over the right arm; no sensation was produced on passing it over the left arm and fore arm.

Mr. Morton and myself came to the conclusion that the present condition of the left arm was the result of

pressure from effused blood; and that as this became absorbed the symptoms would disappear. I was the more decided in this prognosis, because it was clear to me that the cause was local, and that the brain and spinal chord had sustained no injury.

The treatment consisted in keeping the patient in bed; rubbing the arm, neck, and shoulder with the belladonna liniment, and wrapping the arm in a flannel bandage. Day by day the difference in the temperature became less and less; in a week, there was no difference between the two sides as regards temperature; neither was there any difference in the pulse. When I saw her last, about a month after the accident, beyond looking a little thin and pale—and her surgeon said "she always did so"—I could detect nothing to lead to the conclusion that her recovery would not be perfect; and she was left with the assurance that she would very soon be quite well. The case was settled by a payment of £100; and I am happy to add when I last heard of her she was in every respect as well as usual.

In this case of somewhat severe railway accident, there are many points of very great interest. 1. More especially the marked difference in pulse and temperature, between the right and left side. 2. That this only came on two days after the injury had been received. 3. That as the effused blood became absorbed, the parts resumed their normal condition. 4. The perfect recovery.

Case XI.

Mr. R. M., aged 62, a very temperate, respectable, and industrious hard-working smith, using a very heavy hammer in his trade, was in a carriage next to the one which was thrown off the line in a railway collision.

I saw him a few days after the accident, in consultation with my friend, the late Mr. Sykes. When I called he had gone out to the back of his house; and

he came into the room where we were seated, walking with difficulty, and leaning on a stick. He told us "that at the time of the accident he was looking out of the window of a second-class carriage; that his head was knocked backwards and forwards; that he fell with his back on to the top of one of the seats; that his eye was bruised; and that two of his teeth were knocked out;" that "he was bruised all over, more particularly on the back, and on the right arm; that he could not walk without great pain and difficulty; and that he had lost the power of grasping with the right hand." There was pain on pressure over the lower portion of the spine; this was red from the application of hot fomentations and embrocations when I saw him; but the principal injury appeared to me to be over the right gluteal region, the skin over that part being tender, swollen, and discoloured. There was also a somewhat large bruise over the right elbow, extending up the arm for some inches on that side. The pulse was 76. He complained of pain in the head, and there was a slight cut on the right side of the head, near the eye. The eyes were carefully examined with the ophthalmoscope. No intolerance of light or impaired vision was at this time complained of.

He was under my care for about five weeks, during which time he gradually improved, although he still told me that "he had lost all power over the right hand and arm, and that he had no power to grasp anything."

The opinion I formed was that the injury was not permanent; that the brain and spinal chord had not, in any degree, been injured; and that it was in the highest degree ridiculous, to suppose for a moment that such a blow as had been received at the elbow and on the front of the arm, could possibly lead to a permanent loss of power.

An action was tried at the assizes, and very heavy damages were claimed. The plaintiff appeared with his arm in a sling, said he had still little or no power in his right hand and right arm, that he had lost flesh,

and he complained also of such an affection of vision as set at naught all our previous notions of optics.

Three medical gentlemen, two of them having had a large hospital and private practice, swore that "in all probability the injuries received would lead to a permanent loss of power in the right hand and arm." How such an injury could possibly lead to such a result, I freely confess my inability to discover.

I was not examined, but three medical practitioners of the highest attainments, and very large experience, confirmed my opinion on oath in the witness box. They testified that it was only a matter of time; and that the man would soon be able to work again at his trade. No one denied that the man had been injured, the only question was the *degree and probable duration of the effects of the accident*.

The Company had paid, I think, £75 into court. The jury doubled that sum, giving £150. Mark the result. On the 13th of November—exactly five months after the accident—R. M. called at my consulting room. He shewed me his arm. He had the most perfect use of it (he doubled his fist, flexed his fore-arm, and firmly grasped my hand); for a man of his age, he was well nourished and muscular. He said "he was going to commence his work in a day or two." The last time I saw him was in the street; not a trace of the accident remained! He had the perfect use of his arm.

Case XII.

Mrs. M., aged 37, married, and in the seventh month of pregnancy, was in the third carriage from the engine in a railway collision. I attended her, in consultation with my friend Mr. Morton. She was removed from the carriage by her husband in a state of insensibility, and so she continued for many hours. When in this state, she was seen by Dr. Younge and Mr. Browning.

At the time of the accident, she had been thrown forward on her stomach; the abdominal muscles, and

the muscles over one hip were swollen, and the skin discoloured. From the time of recovering her senses she had been constantly sick; temperature of the body increased; pulse slow and feeble.

Her medical attendant was fearful that premature labour would come on; but I am correct in stating that such is not a very usual result of railway accidents. The continued increased temperature, and slow pulse, were to me by far the most serious causes of anxiety; for, *in all cases of severe concussion that I have seen, nothing has pointed so clearly to the probability of an unfavourable termination as a feeble slow pulse, and an increased heat of skin.*

After a long and tedious illness, this lady improved, went to her full time, and ultimately recovered. The case was settled out of court for far less than is usual where injuries so severe have been sustained.

The symptoms present in this patient supply an opportunity for speaking of the use of

The Thermometer in Diseases.

What has already been said of the ophthalmoscope, applies with equal force to the thermometer; and those physicians and surgeons who place "no reliance" either on the one or on the other, possibly do so from not having taken the trouble to ascertain how valuable may be the assistance rendered by them in the investigation of certain affections following railway accidents. The use of the thermometer, in diseases, will always be regarded as valuable, by all who have made themselves masters of the indications which its readings convey.

A high temperature, and a slow and feeble pulse, after a concussion of the brain or spinal chord in a railway accident, are most unfavourable, although not always fatal, symptoms.

In erysipelas, in some few cases of pneumonia, and fever, temperatures above 105° may be met with without being necessarily of evil prognostic omen; but, in

most other diseases, a mid-day temperature above 105° is a decidedly grave symptom.

If the pulse and general symptoms of a patient are favourable, the thermometer, in spite of this, marking a high temperature, the former symptoms are to be chiefly relied on in forming a prognosis, though the latter should make us still more careful in searching for any intercurrent disease, especially inflammation of the lungs.

Where the general symptoms are perplexing, one counterbalancing the other, a very high temperature registered by the thermometer, throws one more weight into the scale for forming an unfavourable prognosis, and *vice versâ*.

Where the pulse and general symptoms, on the one hand, indicate danger, the temperature, on the other hand, not raising alarm from being either very high or very low, the pulse and general symptoms are by far the more trustworthy in forming a correct prognosis.

Case XIII.

November 9th. Mr. G. R., aged 35, on the second of the previous October, was in a second-class carriage of a railway train, which came into collision with another train in a tunnel. He stated that he was struck between the shoulders, and that even now the skin was "tender, and smarted when touched." He complained of a feeling of numbness in the left arm, fore-arm, and fingers; but, there was no prickling sensation. He went out of his house and walked about the day after the accident. Was at church a week ago—walked more than a mile to his place of worship, "but not in his usual way." Pulse 76; tongue clean. The pupils act equally and perfectly. Can read, but thinks the left eye is not so good as the right. He has perfect command over the bladder and rectum, and can grasp firmly with both hands. I saw this gentleman with Mr. Favill and Dr. Younge.

February 10th. I did not see him again until to-day—three months from my last visit. He has not worked yet; walks out every day a little, but cannot walk well; vision appeared perfect, for we found him seated in his chair, and reading a newspaper without spectacles; states that he has lost flesh, but he appeared to Mr. Favill and myself well nourished and muscular; the muscles of his legs and arms felt firm; his chest measured 39, and expanded to 41 inches; the abdomen measured 38 inches. There was no difference of circumference between the right and left arms, or the right and left thighs or legs. He still complained of being unable to attend to his business—why this was so did not appear evident. Gently passing the finger along the spine was said to cause much pain, but his attention being directed from this part, considerable pressure was borne without remark.

From the first, we could detect no evidence of injury to the spinal chord. The muscles of the back had doubtless been bruised, but of the many severe bruises of those parts that I have seen resulting from blows, the inflammation has not extended to the spinal chord; and it has been found, both in hospital and private practice, that such contusions, as a rule, do not lead to inflammation of the chord. In severe sprains, sometimes, pain is felt for a longer or shorter period, but even severe sprains seldom lead to permanent spinal impairment.

The case was settled out of court, on the payment of £150, and I am happy to add the last report I had of this gentleman fully justified the prognosis of Mr. Favill and myself.

From the time when I was first consulted, the symptoms of Mr. G. R. were subjective only. The most careful examination of Dr. Fletcher, Dr. Younge, Mr. Favill, and myself, failed to discover a single objective symptom of injury to the brain or spinal chord; nor could we detect, on using the ophthalmoscope, any difference between the right eye and the

left—his vision not having in the slightest degree suffered.

Case XIV.

Mr. ——, an agent, aged 42, December, 1857, was in a railway collision. Severe blow on back of head; side bruised; bleeding from ears and nose; insensible for half an hour. When he recovered, noticed dimness of vision in left eye, with severe pain in the head. After two or three weeks, the dimness of vision improved in the left eye, then returned with a prismatic halo around objects. Two months from this time right eye affected also; in four months he was quite blind; suffered severe pain in the head, with tremor, wasting, and some loss of power over the limbs.

1863. Six years after the accident; blind of both eyes; general health good; can walk well; no paralysis; memory and mental faculties healthy.

This case, taken from the work of Dr. Fletcher, is instructive, as showing that from the receipt of the blow on the head there were symptoms indicative of injury to the brain—immediate insensibility after the accident, and continuing for some time; bleeding from the nose and ears; impaired vision—a progressive change from bad to worse, and ending in permanent loss of sight.

Cases 1, 2, 3, 4, 5, 9, and 14 clearly prove what pathology had previously taught us to expect, namely, that injury to the brain and spinal chord is immediately followed by objective symptoms pathognomonic of such injury.

Chapter IV.

Fractures and Dislocations.

Fractures of the Ribs often serious.—Fractures of the Spine: Local and General Symptoms.—Dislocations of the Spine.—Dislocations of the Cervical Vertebræ, generally accompanied with Fracture.—Case of Baron Dupuytren.—Fractures of the Upper and Lower Jaw Bones, &c.

Since the publication of my papers on Railway Accidents, in *The British Medical Journal*, numerous questions have been asked me with regard to fractures and dislocations caused by collisions on a railway.

Fractures of the arm, fore-arm, thigh, leg, hand, foot, &c., do not differ from simple or compound fractures of these bones from other causes. Fractures of the ribs, especially when two or more are broken, are very commonly serious, being not unfrequently co-existent with severe injuries to the brain and spinal chord.

Fractures of the spine are always serious; for from their structure, the bodies of the vertebræ cannot be broken without considerable violence. The blow which is of sufficient force to fracture the spine must produce more or less of concussion. Consequently, the mischief done to the spinal chord at the time of the accident is much more likely to produce perilous consequences than even the fracture of the bones.*

The spinous processes which project backwards are the weakest parts, the most superficially situated, and

* Note.—Fractures of the spine are usually the result of a direct violent blow on the back; of a fall on the head, the body at the same time being forcibly bent forwards; or of a gunshot injury.

the most exposed; and, it it is quite possible for them to be broken without injury to the chord.

Much will depend on the extent of the fracture, and the amount of displacement—for the spinous process may be broken off—the arch on either side of the spine may be broken through—or, the fracture may have passed directly through the body of the vertebra.

The symptoms of fracture of the spine vary with the degree of displacement, and the part of the spine that has been injured. The local symptoms mark the injury to the vertebræ—the general symptoms exhibit the effects of compression or laceration of the chord itself. The local symptoms are inability to stand upright, or even to move the spine; pain over the part injured, which is increased on pressure; irregularity in the spinous processes; there is prominence of the lower, and depression of the upper portion of the spine. The general symptoms have already been fully described in the first chapter.

Dislocations of the Spine.

From the construction of the articulating surfaces of the vertebræ—their trifling capability of motion, and their peculiarly powerful anatomical formation, dislocations of the spine must, of necessity, be very rare; so rare, as to be deemed impossible by many eminent surgeons. Sir A. Cooper, in his work on dislocations, page 17, says—"What have been called dislocations of the spine, are really fractures of the vertebræ with displacement of the bones, but not of the intervertebral substance." The only true dislocations of the spine admitted by this celebrated surgeon, are those of the first and second cervical vertebræ.

Two instances of dislocation of the atlas from the occipital bone have been recorded—the one by Lassus, the other by Paletta. One man lived five hours, the other five days. But little dependence can be placed on the description of Paletta.

Dislocation of any one of the cervical vertebræ may occur, but almost in every instance is accompanied with fracture. Sir A. Cooper, in his very extensive practice, never saw a separation of one vertebra from another, through the intervertebral substance, without fracture of the articular processes: or, if these processes remained unbroken, without a fracture through the bodies of the vertebræ.

Baron Dupuytren, however, has recorded (Clin. Chir., t. I., p. 390) an instance of a dislocation of the sixth from the seventh cervical vertebræ, without any previous fracture. The patient, a woman 56 years old, lived 34 hours after the accident. There was total loss of sensibility in the lower extremities. The rectum, bladder, parieties of the abdomen, and all parts below the diaphragm, seemed as it were, dead. Above this point the upper extremities were also in a state of incomplete paralysis, both with regard to motion and feeling. Respiration was frequent and laborious; but the speech, senses, motions of the countenance, and intellectual faculties, were not affected, and seemed to belong to another individual. The pulse was full and soft, the tongue dry and brownish, and the skin natural in point of temperature and exhalation.

Dislocation of the spine at the dorsal region may occur, but rarely, if ever, without fracture. There are several cases described where the last dorsal vertebra had been separated from the first lumbar. So far as I know, no example of a dislocation of the spine, in the lumbar region, has been recorded.

Fractures of the upper and lower jaw bones are not nearly so frequent as might at first sight be supposed, in railway accidents. The malar bone, from its prominence on the face, very commonly receives a severe blow in a railway collision, either from the face being forcibly driven against the other side of the carriage, or some passenger sitting opposite. Strange to say, the malar bones are very seldom broken; and, as a

result of direct violence, the superior maxillary bone, or its nasal process, is much more frequently fractured than the malar bone. On this point, all writers are unanimous. After a severe blow on the face, followed by bleeding from the nose, the probability is rather that the antrum of the upper jaw, or the ethmoid bone has been injured, than the malar bone. I have only seen three cases of fracture of the malar bone, one of which was the result of a railway injury, and as such is here briefly described.

Case XV.

Mr. S., aged 47. October 12th. Had been four months previously in a railway accident. Was driven forwards at the time, either against the head of a passenger, or the opposite partition of a third-class carriage; was insensible at first, and brought back some miles in a railway carriage; then rode four miles in a cab to his home. There was considerable bleeding from the nose; the soft parts were bruised, and there was a depression over the malar bone, which remained when I saw him, for the first time, to-day; pulse 72; eyesight as good as before the accident; memory perfect. He stated that "he had lost weight," but there was no evidence of loss of muscular power; and the only objective symptom was a somewhat considerable depression on the left side of the cheek.

I saw him again eight months after the accident. There was no evidence of weakened brain power; the only consequence of the injury was the depression over the cheek bone and the personal disfigurement which it occasioned.

In the three cases of fracture of the malar bone that I have seen, although one was followed by a severe attack of erysipelas, there has been perfect recovery. There were no symptoms indicative of injury to the brain in any one of them.

Chapter V.

Compensation in Railway Accidents.

Railway Collision.—Heavy Damages against the Midland Railway Company.—The Verdict of the Special Jury at Leeds tested by a post mortem examination.—Verdict of the Coroner's Jury.—Resumè, &c., &c., &c.

Case XVI.

As these sheets were passing through the press, an action for compensation for injuries said to have resulted from a railway collision, was tried against the Midland Railway Company, which certainly must be regarded as the most extraordinary ever brought in consequence of a railway accident.

Mr. J. M. G., a commercial traveller, aged 62, April, 1867, was in a train of the Midland Company, which ran off the line at Methley. At the Leeds Assizes, March, 1868, he brought an action against the Company, for damages for the severe injuries alleged to have been sustained. The case was stated by Mr. Digby Seymour, Q.C., with his usual pathos and ability, who told the jury that in consequence of the shock sustained, at that very moment, the sands of life were fast passing away, and that ere long his unfortunate client would be no more.

The evidence for the plaintiff went to show that at the time of the accident he was "driven backwards and forwards"—"he was so much hurt that he could not be removed for nine weeks;" yet it was shown by other evidence, and by the adroit cross-examination of his own witnesses, by Mr. William Overend, Q.C., who appeared for the Midland Railway Company, *that he got out of his carriage unassisted,* "bellowed with

pain," swore "he would make the Company pay handsomely," and conducted himself in a manner so comical that the other passengers (none of whom, I believe, even said they were hurt) laughed at him. It was also shown that this gentleman was most convivial, loved a glass of wine and the good things of the table, and that he was known by his friends, as Sir Roger de Coverley.

The medical witnesses called on his behalf testified that he was suffering from irritation of the spinal chord. The medical men called by the Company, including Mr. S. Hey, and Mr. Nunneley, of Leeds, stated that he was dying from natural causes—namely, chronic disease of the liver, heart, and stomach, altogether unconnected with the accident on the railway. The jury believed the evidence for the plaintiff; and, accepting injury to the spinal chord, the result of railway shock, in lieu of the truth, gave a verdict in his favour, with £1,500 damages.

Here, under ordinary circumstances, the question would have been ended, and the damages awarded paid; but, doubtless, little did Mr. Digby Seymour think, at the time he uttered those eloquent words, that they would prove so prophetically true. Within one week of the verdict of the special jury, at Leeds, all the sands had run from the glass of life—Mr. G. was dead; nature became a party in the suit, and entered an appeal against the verdict.

The old saying, "Doctors differ—patients die," was realised in this case. The theory of the medical men for the plaintiff, who had sworn that he was suffering from spinal irritation, the result of concussion, was to be tested by a *post mortem* examination, as opposed to the evidence of the medical witnesses for the Company, who had sworn that Mr. G. was undoubtedly dying, but dying from long-standing disease of the heart, liver, and stomach, in no way connected with, or caused by, the concussion said to have been sustained at the time the train (twelve months before the trial) had got off the line.

I am indebted to my old friend, Mr. S. Hey, for the following notes of the *post mortem* examination of Mr. G. He died on the Saturday; the body was examined on the following Monday, in the presence of Messrs. Hey and Nunneley, of Leeds, and Messrs. Meade, Brown, Parkinson, Burke, and Terry, of Bradford. All the medical gentlemen were unanimous as to the condition of the body, which was wasted. Externally, it bore no marks of violence.

POST MORTEM EXAMINATION.

A. *Brain and Spinal Chord.*—Perfectly healthy.
B. *Pleura.*—Effusion into—4½ pints.
C. *Lungs.*—Tubercles to a great extent throughout the whole of both lungs; some emphysema.
D. *Pericardium.*—Thickened.
E. *Heart.*—Small, degenerated, over-loaded with fat, very thin walls. Weight, 9¼ ounces.
F. *Coronary Arteries.*—Both ossified.
G. *Aortic Valves.*—Ossified.
H. *Liver.*—Very hard, contracted, cirrhosed.
I. *Stomach.*—Small, dotted over for several inches with red spots, and patches of ecchymosis.
J. *Spleen.*—Enlarged, and so broken up as to contain little more then a large semi-fluid coagulum.
K. *Kidneys.*—Dark, congested, soft.
L. *Aorta.*—Converted into a bony tube for several inches, about the origin of the cœliac axis.

The coroner's jury, after a deliberation of nearly an hour, returned the following verdict:—"That Mr. J. M. G. *died from natural causes, accelerated by a shock received when travelling on the Midland Railway, on the 24th of April*, 1867."

Tuberculated lungs, ossified coronary arteries, and aortic valves, some inches of the aorta converted into a bony tube, diseased kidneys, diseased stomach, diseased spleen, cirrhosis of the liver: how could a shock so slight as not even to have prevented this gentleman from getting out of his carriage immediately afterwards, have accelerated his death, which did not take place until twelve months after the shock, and of which

alleged shock only subjective symptoms were ever present? "Accelerated" his death. Far more probable that the accident, by inducing him to keep quiet and lead a comparatively temperate life, prolonged his existence.

The immediate cause of death was doubtless effusion into the chest. With such a state of heart, lungs, kidneys, and spleen, the wonder must be, not that he died, but that he had lived so long.

Tuberculated lungs, fatty heart, ossified aortic valves, coronary arteries, and aorta, diseased liver, stomach, and kidneys, disorganised spleen, &c., &c.—I put it to the actuary, or medical referee, of any Life Assurance Company in the United Kingdom, if such a life could possibly be worth a month's purchase, or if it would have been accepted on any terms?

I regard this trial, followed by the death of the plaintiff, and the verdict of the jury immediately tested by a *post mortem* examination—thus tried in the balance and found wanting—as one of the most important and valuable that has ever taken place in connection with a railway accident, and as one which cannot fail to have a most useful effect.

Resumè. The series of railway and other accidents described in the preceding pages, require but few additional remarks.

Nothing has been further from my intention than to contend for a moment that, after concussion of the brain or of the spinal chord, from a railway accident, very serious, possibly fatal, consequences do not frequently follow.

What I wish, however, to impress on the members, and more especially on the junior members of my profession is, that in all injuries to the brain and spinal chord, such injuries are immediately recognised by well-marked objective symptoms—that, day by day, objective symptoms are present, showing a progress either towards the restoration of the functions of the brain and spinal chord, or of the permanent loss or

impairment of them—and, not a long interval of time after an accident, without symptoms, and then the sudden appearance of them—that, when immediately after an accident the usual objective symptoms of injury to a nerve centre or its surroundings, are not discoverable, I have never yet seen a patient in whom after the lapse of many months, symptoms pointing to some serious disease have for the first time made their appearance, which disease could fairly be traced to such accident.

When objective symptoms of injury to the brain, and spinal chord, are present after an accident in a railway train—or in fact after any other kind of accident, no physician nor surgeon can venture to say what may be the termination. When, therefore, there is undoubted proof that such an injury has been sustained, I have always advised that some time should be permitted to elapse before attempting to fix the amount of compensation. The sufferer will not then receive too little, and the railway company will not be called upon to pay too much.

Although injuries to the brain and spinal chord, whatever may be the cause of the accident, are always to be regarded with great anxiety—for, as Mr. Liston once said, "no injury to the head is too trivial to be despised, nor too serious to be despaired of;" still, we must not run away with the erroneous idea, that all railway accidents are of necessity fatal, or even serious: indeed, some of the cases already described, abundantly prove the contrary.

Dr. Fletcher has collected 175 cases of railway accidents, more or less severe, including fractures, blows, cuts, &c., affecting the eyes, face, head, back, abdomen, chest, ribs, and other parts of the body. Of these, 26 were insensible for longer or shorter periods after the accident—5 had concussion of the brain—4 had concussion of the spine—and yet, out of the 175 cases, only 8 were unable to resume their ordinary occupation. Of the 8 so disabled, one was an old man aged 70

years, and 3 could not work again in consequence of badly united fractures producing incurable lameness. In fact, the carefully tabulated results of these 175 railway accidents, shew that only 2 were permanently disabled.

Of the Thermometer and Ophthalmoscope as valuable aids in forming a correct diagnosis in railway accidents, mention has already been made. The day cannot be far distant, when the use of them will be taught as generally in our Medical Schools, and Hospitals, as is now the use of the Stethoscope.

That the Ophthalmoscope opens a wide field for interesting discovery, to such of our younger brethren as are now climbing the hill of professional life as rapidly as some are going down on the other side, no one will venture to doubt. Still, long as many of us have been in the profession, we should as soon think of investigating an affection of the lungs without a Stethoscope, as of going to a patient injured in a railway collision without taking a Thermometer and an Ophthalmoscope in our pockets. To Gräfe, Galezowski, Liebreich, Lancereaux, Bader, Bouchut, Dr. J. W. Ogle, Dr. Jackson, Mr. Hutchinson, Mr. P. Teale, and Dr. Allbutt, we are not a little indebted for our present knowledge of medical Ophthalmoscopy.

Clear is it, that at present we know not nearly the full extent to which this instrument may aid us in detecting diseases of the brain and spinal chord. But already, it has enabled us to see for the first time the beginning and progress of alterations in nerve tissue, and to mark, day by day, the times and way in which such alterations take place.

For the future, the student must be taught to watch, with the utmost diligence, the optic disc, the retina, the choroid, and the blood vessels, in order to note the changes to be observed in the eye, in certain diseases of the brain and spinal chord.

It would be altogether foreign to my intention, here to sketch at length the changes in the eye which are

already known to be present in certain diseases of the brain and spinal chord. The reader anxious to investigate them, is referred to the beautiful Atlas of Liebreich, to the chromo-lithographs in the works of Galezowski and Bouchut, and, especially, to the correct and beautiful plates in the work just published by Bader.*

The optic disc may suffer from congestion—from congestion and effusion within and around it. It is, also, liable to attacks of inflammation of its sheath, and of its substance, to anœmia, and to atrophy. The retina suffers from fibrinous and fatty exudations, and from hæmorrhages; and the choroid, from loss or disturbance of its pigment, as well as from hæmorrhages. The blood-vessels exhibit many changes—diminutions, obliterations, dilatations, tortuosities, varicosities, embolism, &c. Here, the caution of an able writer, in a recent number of the *Med. Chi. Rev.*, must not be forgotten. "Great variations may be found even in healthy nerves. * * Many peculiarities, which to the unwary observer appear to be marks of disease, are in no way of evil meaning. Not only do we find, from time to time, such peculiarities as large white patches upon the retina, and white rings, or rings of pigment upon the margin of the disc, which varieties may be congenital, or may be mere harmless changes, having no special meaning."† Optic neuritis may be present, without any deficiency of vision.

As a rule, an excess of pigment is not uncommon in the aged: in children, such excess is seldom seen, except in morbid conditions.

A word or two as to the settlement of claims arising out of railway accidents.

Is the present lottery system of trial by jury satisfactory either to claimants or to railway companies; and, is not the claim of one who has really suffered,

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* "The Natural and Morbid Changes of the Human Eye."—By CHARLES BADER.

† Med. Chi. Rev., January, 1868.

and asks only what is just and reasonable, frequently jeopardised because of the extortion of others, who either have not suffered at all, or ask compensation far beyond that to which they can possibly be entitled? In the battles so often fought between companies and their passengers, fair dealing is apt to become an exception rather than the rule; and the question too often is discussed in a spirit of partizanship that prevents the chance of the scales of justice being fairly balanced between the person injured and the railway company.

I would, therefore, venture to suggest, that in order to arrive at more certain and equitable results, all claims arising from collisions on railways should be referred not to a jury, but to three Commissioners—a barrister, a physician, and a surgeon—appointed by the Secretary of State for the Home Department. The Commissioners to have the power of examining the plaintiff, and such witnesses as to them may seem necessary for making their award, which shall, in all cases, be final.

I have thus endeavoured, I hope carefully, faithfully, and truthfully, to place before my professional brethren—before the bench, and the bar—for this is a question in which all classes are most deeply interested—the conclusions I have arrived at, after thirty years' extensive experience, in hospital and private practice, of railway and other similar accidents.

My conclusions, I have illustrated by cases, the like of which, had space been at my disposal, could have been multiplied again and again.

The cases now published will I trust, lead every physician, and surgeon, for the future to admit, that in forming an opinion as to the probable effects of a railway accident, nothing is so likely to lead to error, as the basing of that opinion on subjective symptoms only.


DEO ADJUVANTE LABORI PROFICIT