in young children, is in cases of severe burn. Precisely the converse obtains in old age. The aged are less impressible than the vigorous adult; the effect of shock is less profound, but more often fatal, in consequence of the impaired resiliency of the organism,—the incapacity of the controlling centres to recover the equilibrium which has been abruptly disturbed; the enfeebled vessel has been so rudely jarred, that its contents have been spoiled by the commotion; and the lamp never burns brightly again, though the flame may flicker for a while in the socket. It is certainly in the prime of life, when the natural vigour is unabated, that the consequences of shock are most pronounced. And this is what we might anticipate, as the nerve-centres have then attained their full development, their mutual relations and sympathies are matured, and their functions, physical, psychical and organic, are most active. It is these same conditions, also, which determine a more energetic reaction,—proportioned to the vigour of the individual, and, within certain limits, to the gravity of the shock. Beyond such limits, *i. e.* where the shock is severe, the reaction is tardy and protracted in its full re-establishment; although indications of an effort to restore the lost equilibrium may be observed at a comparatively early period.

In that form of shock which is consequent on *Railway collision*, usually the distant sequelæ are more noticeable than the immediate effects; and I may remark that these, as far as my experience enables me to judge, are more often observed in the adult than in the very young and aged. No doubt this relative proportion is in a measure due to the circumstance that there are comparatively few old persons and children who are travellers; yet, I think it may be accounted for, partly, by the relative susceptibility of different ages to which I have alluded. Unfortunately there is one seriously disturbing element in the data on which we may found any conclusions respecting this class of injuries, *viz.*: the temptation to the patient, from pecuniary considerations, to make the worst of his case; and it is almost impossible to arrive at the truth, where so many of the symptoms rest exclusively upon the sufferer's assertion. I speak especially of that class of cases—the most numerous—where there is no evidence of physical lesion, and in which the symptoms supervene at an interval, longer or shorter, after the occurrence of the shock. Some of these instances are, no doubt, genuine; and in them we have the opportunity of studying the remote effects of shock, in which the spinal cord is the nerve-centre which is often primarily, though not exclusively, involved. In some which are characterised by loss of muscular strength, shrunk limbs, defective power in coordination, feeble exercise of motive volition, and even paralysis and imbecility, there must be organic change, which is often progressive, and marked by corresponding development of the signs and symptoms above enumerated. But in others the morbid condition is evinced by deteriorated health and defective nerve energy; and in these probably the impaired health is due to the indirect influence exercised on the organs of assimilation, and a reactionary impression exerted on the nerve-centres themselves.

Certainly, one general feature which I have noticed in this class of injuries is, that the shock at the time is comparatively slight and usually transient; or, if enduring, unmarked by any extreme symptoms or excessive reaction. Of course I refer to such cases as come within the category of so-called “railway injuries”; and not to those which present the usual characteristics of concussion of brain or spinal cord from other causes; and the shock of which I speak is that which I have already defined. The peculiarity of these accidents appears to be that the spine is roughly jarred, sometimes subjected to a succession of minor concussions or violent oscillations, and that the entire nervous system is simultaneously agitated. There is, consequently, no immediate persistent incapacity, as in ordinary concussions from a blow on the head or spine; but a prolonged series of symptoms ensue, directly traceable to the shock, and often assuming a more aggravated character as time elapses. But I am anticipating the next division of my subject, when I shall again refer to these injuries, and to the diagnostic features by which they are characterised. I may, however, be permitted to make a passing observation in reference to the remarkable, I fear I must say almost uniform, diversity of opinion which these cases elicit in medical witnesses, in courts of justice. This subject, as is not unnatural, is regarded in its moral rather than its scientific aspect by the public, and in a way not very complimentary to the profession. No doubt much of this antagonism is due to a cause which I have already touched upon, *viz.*: the deception practised by patients, and the consequent suspicion aroused in the minds of those who are required to investigate critically the veracity or probability of their statements. Suspicion may, in some particular instance, ripen into an assurance of fraud; whereas, a confidence, which may be apparently well founded, in the honesty and truthfulness of the same individual, may induce another medical man to take an entirely opposite view of his case, which rests chiefly on assertion, or on symptoms which may be simulated. Nevertheless, after making every allowance for discrepancies arising from this cause, it must be admitted

that there is left sufficient to constitute just ground for severe criticism on the part of jurists and of the public at large. I think this state of things is much to be regretted, and that an effort should be made to rid ourselves of the consequent scandal which attaches to the profession. The only remedy which suggests itself to me is, I fear, too utopian to hope for, and too simple to realise. It is that, when medical men are engaged in the prosecution or defence of such claims, they should make it conditional that they be permitted to confer together, and, at the least, attempt to arrive, by consultation, at a joint opinion as to the true nature of the case and validity of the claim; leaving, of course, the amount of compensation, if any, to be assessed by the jury. I trust, Sir, you will not think that I am deviating too far from the path of my duties, in thus glancing at an ethical question which involves the honour and credit of our profession.

To return from this digression, shock and impaired nerve-function are, in one sense, identical; that is, shock is impaired nerve-function, although the converse is not the case. Yet, certain symptoms are present which, in paraplegia, are fully established, and possess an intelligible meaning; such, for instance, is the apparent anomaly of retained urine and involuntary evacuation of the bowels. This, however, is no real anomaly, but a consistent consequence of the cause in operation; for we know that the contractility of the bladder, and the peristaltic action of the intestine, are under the control of distinct nervous centres. Volition is suspended by compression or laceration of the spinal cord, but the cyclo-ganglionic influence is unimpaired. Peristaltic movement, therefore, proceeds; and the resistance,—probably enfeebled by the injury—due to the excitomotor contraction of the sphincter, is overcome by the *vis a tergo*; the action is entirely independent of the will. In some instances, in fact in most, of fracture of the spine, the general symptoms of shock give rise to difficulty in precisely defining the extent of permanent lesion; but as reaction succeeds, and the temporary disturbance in the circulation and respiration subside, the healthy restoration of the upper part of the body offers an interesting contrast to the suspended animal life of the lower half. The influence of shock on the heart introduces the question of the dependence of this organ on nerve-energy for its contractility. Its essential independence has been assumed by physiologists, although nervous control has been admitted in its fullest sense. That the muscular tissue of the isolated heart is contractile there is no doubt: but so is that of any other isolated muscle; such, for instance, as in an amputated limb. But I apprehend the rhythmic action of the heart after death or removal, and the peristaltic action of the intestines under similar circumstances, may be explained in the same way, *viz.*: by the limited generation of nerve-force within the organs themselves, derived from the scattered ganglia which pervade their structure. Rhythmic or regulated action would seem to imply the existence of a co-ordinating influence.

[To be continued.]

TETANUS SUCCESSFULLY TREATED BY ATROPIA.

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A HEALTHY looking lad, aged 14, was seized with lockjaw and severe pain in the cervical and dorsal regions, with fever, a few days after jumping from a coal-waggon. On my visit (fourth day of symptoms), I noted well marked risus sardonius; incisors separable for less than half an inch; masseters rigid; cervical and dorsal vertebræ arched forwards; sterno-mastoids and muscles of back rigid; abdomen flat and hard; legs and feet rigidly extended; tenderness along spine; arms free from tetanic symptoms; paroxysms of severe general spasm every few minutes; pulse 140; sleepless. I ordered one-sixtieth of a grain of atropia every three hours; and linimentum belladonnæ to be well rubbed over the spine and rigid muscles every six hours.

Within twenty-four hours, the physiological action of atropia showed itself; then the clonic spasms became less severe, and of shorter duration; and the tonic rigidity gave way, first in the legs and neck, then in back, and last of all in abdomen and masseters. On the sixth day of treatment by atropia, rigidity of the masseters alone remained. He was kept under the influence of atropia for three weeks. He then quickly and completely recovered his usual health under steel and quinine.

It is said by Brown-Séquard, that belladonna reduces congestion of the blood-vessels of the spinal cord and its membranes; that its principal physiological action is “spinal anæmia”. I believe that the tetanic symptoms in this case depended on an excitability of the spinal cord, probably caused by “spinal congestion”—a derangement of the vaso-motor nerves of the cord and its membranes, which allowed more blood than normal to circulate through the contents of the spinal canal. If so, we have the *rationalité* of the therapeutic action of atropia in this and allied cases.