ACCOUNT OF A CASE
OF
FRACTURE AND DISPLACEMENT
OF
THE ATLAS.

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COMMUNICATED BY SIR BENJAMIN C. BRODIE, BART.

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IN the summer of 1827, during the hay-making season, William Cross, an agricultural labourer, was standing upon a hay-rick, for the purpose of receiving the hay which was brought from the fields, While he was thus occupied he slipped off the rick, and fell to the ground head foremost, the occiput coming in contact with the soil. By the fall, he was "stunned," but the stunning effect, or concussion, thus produced, was soon sufficiently dissipated to allow of his walking a distance of half a mile, to the residence of the parish surgeon, by whom he was bled and purged.

On the following day he felt scarcely any inconvenience from the accident, and in two days more he proceeded about his usual business.

From the day succeeding the accident he felt what

he termed, and what really was, a "stiff neck," for he was unable to rotate the head. This "stiffness" was all he complained of when I first saw him, which was between three weeks and a month from the occurrence of the accident, and on that day he had walked above two miles.

He was a powerful, scrofulous looking man of thirty-two, but he said that his health had been, usually, good. I examined the back of his neck which was, he stated, the seat of the only uneasiness, and that inconsiderable, which he experienced. Immediately over the second cervical vertebra, a small tumour was apparent; pressure upon it occasioned only a very little pain.

All the functions of the economy, with the exception of the inability to rotate the head, were well performed, and I was not able to detect any other lesion of motion or sensation. The idea which occurred to me was, that a chronic inflammation of a scrofulous character was developed in the first or second cervical vertebra, or perhaps in both, and that the articulating surfaces between them had been so modified as to threaten what is termed "false" anchylosis.

He stated that up to the receipt of the injury I have described, rotation of the head had been in no wise impeded; the presumption therefore appeared to be, that the morbid action had been excited by the accident. In consonance with this diagnosis it was determined that he should lie upon a mattress without a pillow, and that twelve leeches should be applied

upon the affected region every third day. The leeches were applied six times, but the only benefit which was derived from their use was to remove, to a great extent, but not entirely, the tenderness.

At the end of ten days from the last application of leeches, an issue was made over the same point ; this continued to discharge for two months, at the expiration of which it was determined that it should be dried up ; the symptom which has been described remaining, as nearly as may be, unchanged.

The surface being cicatrised, the tenderness having almost completely yielded, but the tumour still retaining its original character, it was determined to try the effect of another issue, which was accordingly made. The second caustic was applied in the fifth week from the period when the cicatrisation of the preceding one was decided on ; and up to that time, no other benefit was experienced from the treatment which had been employed, than the removal of the tenderness, which was not now felt even upon pressure.

Soon after this I noticed, what may have existed for some time before, a *thickness* of the voice, such as is produced by enlarged tonsils. I looked into the throat, and discovered that the tonsils were very large, but they did not afford any decided indication of recent disease. In a few days after I had discovered the change in the character of the voice, he complained of a little inconvenience in swallowing. I then carefully examined the throat, and discovered a slight projection or fulness at the back of the pharynx, as near as may

be at the level of the body of the second cervical vertebra. It appeared to me that this circumstance was perfectly reconcilable with my diagnosis, and I concluded that an enlargement of the body of the axis had been produced, and that the interference with phonation and deglutition was so caused.

The second issue had been discharging for about five weeks, when he became the subject of a severe attack of pleuritis, for which he was copiously bled; by this attack, from which he recovered, he was a good deal debilitated, and during its progress the issue was healed. At the time the pleuritis had subsided, and the issue had been healed, nearly thirty-three weeks had elapsed from the occurrence of the injury.

Soon after this time, say at the end of nine months from the accident, symptoms of anasarca were manifested, and the infiltration shortly became general, but it more particularly affected the lower extremities, the scrotum, and the prepuce; the integuments covering these several organs being tense and glistening. To relieve this state, he took drastic purgatives, digitalis, and supertartrate of potash; great relief was also afforded by acupuncture, applied to the organs I have named.

From the anasarcous affection he continued to suffer more or less, until the forty-seventh week from the injury, when effusion into the cavity of the thorax took place, and he died from hydrothorax. Up to the last week of his life, he was accustomed to walk to the water-closet, which was on the same floor with

his bed, and was never assisted in taking food, even though lying on his back ; and no evidence was ever afforded to those around him, that motion or sensation, with the exception I have already named, was in the slightest degree impaired, neither had the difficulty of swallowing materially increased.

Many obstacles were placed in the way of a post mortem inspection of the body, by his friends, who felt much repugnance at the idea of his being made the subject of such an examination ; and as the case did not, to my mind, present any feature of very peculiar interest, I had almost determined to urge the matter no further ; I however obtained permission to examine the back of the neck, when I found the appearances which will be illustrated by the accompanying preparation.

The condyles of the occiput still rested upon the articulating surfaces of the atlas, but the atlas was found to be, not a separate and independent vertebra, but an appendix to the axis. So much of its anterior portion, as includes the surfaces by which it is articulated with the occiput and with the axis, had been violently separated from the posterior portion of its ring, and had been carried in an oblique direction, downwards and forwards, until it arrived upon the same plane, but anterior to the axis, to the body and transverse processes of which it became attached by perfect bony union, whilst the posterior fragment had suffered no displacement.

Under these circumstances, the bone presented two spinal foramina, and four transverse, but no odontoid

process. This organ having been fractured and separated no organ passed through the anterior spinal foramen.

For the purpose of discovering any thing like a parallel to this case, I have referred to all those works mentioned by Ploucquet and Reuss to which I could obtain access, as well as to the later works of Sir A. Cooper, Scarpa, Sæmmering, Boyer, and Richter, but without success.

There are two cases recorded in the work of Sir A. Cooper, in one of which there was a fracture of the atlas, consequent upon violence, in which too, the odontoid process was set free, and by the pressure of which upon the medulla, death was eventually caused:—in the other, a fracture of the processus dentatus occurred without violence, during the time the patient was under treatment for a syphilitic affection; we may therefore presume that the bone was diseased.—A third case occurred a few days ago, in the Westminster Hospital, in which the anterior portions of the atlas and axis were affected by caries, the odontoid process was “broken off,” but as no symptoms were produced which would indicate a displacement of that process, it might have been detached during the examination after death.

In the present case, not only was there fracture and great displacement of the atlas, but a fracture and displacement of the processus dentatus, without any material disturbance of the functions of the economy. The blow was received upon the postero-superior surface of the occiput, the impetus was directed ob-

liquely downwards and forwards in the course of a line, drawn from that point, as nearly as may be through the occipito-atloidal articulation. A portion of this ring of the atlas, immediately posterior to the articulating surfaces, is comparatively unsupported; this portion gave way, and the anterior portion was propelled downwards and forwards, between the axis and the pharynx, the posterior portion remaining as nearly as may be in situ.

The body of the atlas being thus displaced, one of two things was necessary, either that the odontoid process should be fractured, or that the transverse ligament by which it is attached to the atlas should be ruptured; in this case the former contingency obtained, and to this circumstance the patient owed his life.

Cases occasionally occur in which the fragility of bones is so great, that a comparatively inconsiderable injury may produce fracture; such was, probably, one of the cases mentioned by Sir A. Cooper:—an inspection of the accompanying preparation, must convince every one that the present was not such a case. It is therefore very extraordinary, that the violence which was necessary to produce such a result, even though the medulla spinalis escaped immediate injury, was not followed by consequences which would have placed that organ in great peril.

When the examination was made there was scarcely any appearance of condensation of the surrounding tissues, or indeed any thing to warrant the idea that the region had been the seat of so much violence.

There are many cases on record where the bodies and other portions of vertebræ have been fractured without destruction of life; there are others where from caries of the bodies of vertebræ, the medulla has lost its natural protection, and where the anterior ligaments have performed that function^A; there are others where deformity of the column has been so great, that the anterior surfaces of the bodies of superior, have come into contact with the like surfaces of inferior vertebræ, as in a case described and figured by Cruveilhier*, where the medulla was even flattened, or as in a case which is described by Mr. Lawrence, of which the preparation is in the possession of Mr. Langstaff; but none of these cases have any parallel with the present case. Why, during life, there was an absence of those symptoms which the injury would lead us to expect, it is easy to explain: there was no lesion of the spinal cord.

As a point of practice, this case is comparatively unimportant from the extreme rarity of its occurrence; but in two other points it is not wanting in importance:—as an example of the extent of injury which may be experienced by this portion of the spinal column, without harm to the important organ whose natural protector it is, or even to the economy: and as a reason for rescinding the dicta that “a fracture of the processus dentatus proves instantly fatal,” and “that a fracture of the cervical vertebræ (above the third) with considerable displacement, is almost immediately fatal.”

* Anat. Pathol. Liv. iv. Plate iv.