ARTICLE II.—*Fracture of the Fifth and Sixth Cervical Vertebræ, without Permanent Displacement: Death from Subsequent Escape of Blood into the Vertebral Canal.* By J. JARDINE MURRAY, F.R.C.S.E., Honorary Surgeon to the Brighton and Hove Dispensary, and Assistant-Surgeon to the Sussex and Brighton Eye Infirmary.

THIS case, which was the subject of a coroner's inquest, is an instance of transverse fracture of the cervical vertebræ, from the column being violently bent by the application of forces along its longitudinal axis, and not bearing directly on the point of fracture. At the moment of injury there may have been displacement of bone, but this must have been transient and inconsiderable; for, on examination immediately after the accident, it appeared that the fractured surfaces were not dislocated; and on dissection it was found that the fragments retained their normal position, and that neither the spinal cord nor its immediate investments had been crushed or lacerated.

At 5 P.M. on the 23d January 1860, a lady, aged 62, accompanied by her daughter, entered a heavy old-fashioned fly with comparatively small wheels and short axle-trees. The driver was engaged in adjusting the steps and closing the door, when the horse suddenly started, and, turning abruptly, upset the vehicle on its side. The younger lady was little hurt, but her mother, who had sat on the side of the fly which came to the ground, was unable to move, although quite sensible. She was placed in an arm-chair and carried into the house. When I saw her shortly afterwards, she was surrounded by friends, to whom she spoke cheerfully and freely, complaining of uneasiness in the neck and arms; the pulse was 70, full and soft; the skin cold. She was at once undressed and placed in bed; and, on examination, I ascertained that there was complete paralysis of motion and sensation from the umbilicus downwards, and that both arms were quite motionless, though slightly sensitive.[1] The respiratory movements of the chest were full and normal. The spinous processes of the cervical vertebræ retained their proper position, and no loose or displaced bone could be detected by touch. There was no mark of contusion over any part of the skin. Percussion over the pubes showed that the bladder contained little or no urine. Hot water bottles were applied to the feet and sides, and an hour afterwards the upper half of the body became warm, and the pulse rose to 90. She continued to

[1] It has been remarked by Sir Benjamin Brodie (Med.-Chir. Transactions, vol. xx., p. 129–35) that in fractures of the sixth and seventh cervical vertebræ paralysis of sensibility is frequently partial in the upper extremities, while it is complete in the trunk and lower extremities. It is curious that the contrary happens when the functions of the spinal cord are interrupted in consequence of caries of the cervical vertebræ, for then the paralysis of the arms precedes that of the legs.

complain of uneasiness, almost amounting to pain, in the neck and arms, but experienced comfort from being propped up in a semi-erect position, by means of numerous pillows so arranged about the head as to remove its weight as much as possible from the neck. She was conversing quietly when I left at 12.30 P.M., after administering some soothing medicine, and enjoining particular attention to the maintenance of the head in a comfortable position.

She passed a good night, and slept during several hours.

At 8 A.M. I found her calm and sensible. The symptoms were unchanged. By means of the catheter the bladder was relieved of ten ounces of urine, clear and not ammoniacal. An hour afterwards, while I was standing by the bedside, she complained of feeling faint. The eyes immediately became fixed, the respiration and pulse irregular. From this time there was complete unconsciousness. Shortly afterwards, when Mr Oldham came, in consultation with me, to see the patient, coma had been superadded to the previously-existing paralysis. The respiration, which was now entirely diaphragmatic, became more and more laboured, and the pulse slower and slower, till death occurred at 1.15 P.M.

The failure in the respiratory movements of the chest had not, however, been sudden. Till the alarming change, the respiratory act had been easy and complete; but from that time the action of the intercostal muscles was gradually suspended, the upper ribs being raised in inspiration some seconds after the lower portion of the thoracic walls had ceased to move. Indeed, so progressively did this occur that at the time I ventured to state that blood was escaping into the vertebral canal and extending gradually upwards towards the nervous centres.

Next day a *post-mortem* examination was carefully made in presence of Mr Oldham and Mr Stevens. Externally there were no marks of injury. On dissecting the muscles from the laminæ of the vertebræ, blood was found effused over the middle and lower portions of the cervical region. The spinous processes of the fifth and sixth cervical vertebræ were separable from each other; and on further dissection it appeared that the arch of the sixth cervical vertebra was detached from its body, and that the body of the vertebra above was broken horizontally just below the middle of its depth. Coagulated blood, which had probably proceeded from the venous plexus lining the interior of the vertebral canal, lay external to the theca, throughout its entire length, behind and to the sides of the spinal cord. The cord itself was examined by making numerous sections, but no evidence of contusion or inflammation could be detected.

Remarks.—This case is peculiarly interesting from the symptoms so closely corresponding with the pathological appearances. The manner in which death took place from paralysis of one set of respiratory muscles after another, plainly pointed to the physiological inference that the functions of the spinal cord were being suspended

from gradually increasing pressure, extending from below upwards: and, in the circumstances, the diagnosis seemed warrantable that this pressure arose from effusion of blood into the spinal column.

It is evident that direct information as to the exact seat and nature of injury could not have been obtained during life without dangerous and unjustifiable examination. As the fragments were not displaced, there was no conclusive proof of disjointed or broken vertebræ; for, in other respects, the symptoms resulting from such injuries are the same as those from simple concussion and compression of the spinal cord.[1] The dangerous circumstances connected with fracture of the spine do not depend on the fracture itself, but on the injury which the cord sustains; and, in the event of life being preserved for any length of time after such a fracture as happened in the present case, the symptoms would probably only differ from those of simple concussion and compression in being more protracted and severe.

The chief indication of treatment which plainly suggests itself in such cases as that which forms the subject of this paper, is to keep the spinal column perfectly at rest.

ARTICLE III.—*Case of Adder-bite.* By J. BOYD, M.D., Slamannan.

ON the 15th of July last I was called to see Andrew Baxter, coal-miner, aged 13, who stated that he had been bitten by an adder that forenoon, about ten o'clock, while gathering blaeberries at Garbethill Wood, three miles to the north-west. His companion, it appeared, had trodden on the reptile, which darted up and bit Andrew on the dorsal aspect of the naked foot, between the first and second toes. He immediately felt a thrill pass through his whole frame up to his head; he became sick and vomited severely, then crept to a house in the vicinity, where he reposed some time, and was afterwards conveyed in a waggon on a branch railway to within a mile of his residence, to which he was carried, arriving at 4½ P.M. On examining him, I found a small punctured wound one-eighth of an inch in diameter, and a slight red scratch immediately above it, about half an inch above the junction of the first and second toes of the left foot; over the instep there was a good deal of livid œdema, which also extended over the front of the leg up to the knee; the calf was likewise somewhat swollen, but not discoloured. He was pale, but not sick; pulse 88, feeble and soft. He complained of little pain, but was much depressed.

[1] There seems good reason to doubt the occurrence of serious symptoms from concussion of the spinal cord without some attendant compression.—See Shaw in "Holmes' Surgery," vol. ii. 1861, p. 238; and also, as bearing on the subject, Prescott Hewitt on "Injuries of the Head," ibid., pp. 141–52.