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OBSERVATIONS

ON

DISEASES OF THE SPINAL MARROW.

BY

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Too little attention seems to have been paid in this country to diseases of the spinal marrow. When we consider the delicacy of its structure, and its similarity to the structure of the brain, we expect to find it liable to numerous diseases, similar in their nature to the diseases of the brain: and when we recollect the numerous nerves that arise from it, we conclude that its diseases must have an extensive influence on many functions of the body. They open an interesting field of investigation, and, if prosecuted in a cautious and philosophical manner, promise important results in the pathology of many diseases hitherto involved in much obscurity.

By the ancients, much importance was attached to the spinal marrow as a seat of disease, especially in convulsive and paralytic affections. Alexander Trallian went so far as to maintain, that paralysis of the limbs has its origin in the brain, only when it is accompanied by paralysis of some part of the head, as the eyes or tongue; and that, when not accompanied by paralysis of

any of these parts, it always depends on disease of the spinal marrow. * Galen seems to have held nearly the same opinion. † In modern times, a good deal has been done in the investigation of this subject by continental writers, among whom may be mentioned, Frank, ‡ Ludwig, § Astruc, ‖ Plouquet, ¶ Portal, ** Brera, †† and Ranchetti. ‡‡ Some of these writers, it must be confessed, have treated the subject in the way of hypothesis, or ingenious conjecture, rather than cautious investigation; but by others, many important facts have been related, which, when brought together, throw considerable light on the pathology of this important organ. In the observations which I am now to offer, I mean to attempt a very general outline of the diseases of the spinal marrow; and, in the present imperfect state of our knowledge, it will perhaps be best to arrange them simply, according to the morbid appearances that have been observed on dissection.

I.—*Inflammation and Suppuration.*

The following remarkable case I did not see during the life of the patient, but I was present at the examination of the body.

Mr R. aged 26, had been for several years liable to suppuration of the left ear. It usually discharged at all times a little matter; but he was also liable to severe attacks of pain, followed by more copious discharges. The pain on these occasions extended over the left side of his head, and often continued for a week with much severity. In the first week of April 1817, he was confined from his usual employment by pain of his head, affecting both the forehead and the occiput. He was in bed part of the day, but sat up during a considerable part of it, reading and writing; his appetite was bad, and his sleep disturbed; but there was little or no frequency of pulse, and for a week the complaint excited little attention. About the end of the week he complained of the pain extending down his neck.

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* Alexander Trallianus de Arte Medica, lib. i. cap. 16.

† De Loc. affect. cap. x.

‡ Frank, Oratio de Vertebralis Columnæ in Morbis Dignitate; in Delect. Opusculor. Vol. XI.

§ Ludwig, Adversaria Medico-practica, Vol. II. de Doloribus ad Spinam Dorsi.

‖ Astruc, Quæstio Medica an Morbo Colicæ Pictonum, rectius Rachialgiæ, Venæsectio.

¶ Plouquet, Exemplum Singularis Morbi Paralytici.

** Cours d'Anatomie Medicale, Tom. I. et IV.

†† Della Rachialgite, cenni Patologici, in Atti dell'Accademia Italian. Tom. I.

‡‡ Della Struttura, delle Funzioni, é delle Malattie. della Midolla Spinale.

In the second week of his illness, the pains in the head nearly ceased, but the pain of the neck became more severe, and extended farther down along the spine. It continued for several days to extend farther and farther down, till at last it fixed, with intense severity, at the lower part of the spine, from which it extended round the body, particularly to the spinous processes of the ilia. From the time when the lower part of the spine became so much affected, he never complained of his head, and seldom of the upper parts of the spine; but he became affected with great uneasiness over the whole abdomen, and great pain and difficulty in passing his urine. From the violence of these complaints, his sufferings about the 15th became extreme; he could not lie in bed for five minutes at a time, but was generally walking about his house in extreme agitation, grasping the lower part of his back with both his hands, and gnashing his teeth from the intensity of pain:—he had no interval of ease, and was sometimes incoherent and unmanageable. On the 16th, he went to the warm bath, walking down three stairs, and into an adjoining street, with little assistance. After his return, he thought himself somewhat relieved, but the pain soon returned with its former severity, accompanied by great pain in the belly, severe dysuria, confusion of thought, and some difficulty of articulation. The pulse was about 100; the bowels were easily kept open by the ordinary purgatives. On the 17th, the symptoms were unabated. In the course of that day some squinting was observed, but it was not permanent. His speech was considerably affected; there were convulsive twitches of the face, and some difficulty of swallowing. The pulse was from 120 to 130. At night, some blood was taken from his arm, after which he became easier, and lay in bed for some time. After a short time, however, he got up again, and continued till three o'clock in the morning, sitting up, or walking about the house, tearing off his clothes, delirious and unmanageable. About three o'clock, he suddenly threw back his head with great violence, and fell into a state of coma, in which he continued for two hours, and died. No paralytic affection had been observed at any period of the disease,—no difficulty of breathing,—no vomiting,—and no convulsion, except the twitches of the face on the 17th. The pulse had varied from 90 to 130, and was reported to have been generally small and irregular. The bowels were easily kept open; but the pain of his back was much increased by going to stool. Two days before his death he had several attacks of shivering. Much purulent matter was discharged from the left ear during his illness, and an inflamed tumour had been formed behind it. The practice that was employed consisted of general and topical bleeding, purga-

tives, and a blister on the back. The blood shewed a strong inflammatory crust.

Dissection.—After the most careful examination, every part of the brain was found to be in the most healthy state. On taking out the brain, some gelatinous matter was found under the medulla oblongata, and purulent matter appeared in considerable quantity flowing from the spinal canal. On cutting across the spine about the 4th cervical vertebra, purulent matter still flowed from the lower part of the canal, in consequence of which I laid open the whole spine down to the sacrum, by cutting the vertebræ on each side of the spinous processes. I thus discovered the spinal marrow through its whole extent, covered with a coating of purulent matter, which lay between it and its membranes. No place could be detected in which it seemed to have been formed in such quantity as to have flowed over the other parts, but it was distributed with such uniformity, as gave it the appearance of having been produced by the disease extending gradually over the whole cord. It was, however, rather more abundant at three places; at the upper part of the canal, near the foramen magnum, about the middle of the dorsal vertebræ, and at the top of the sacrum. The substance of the spinal marrow was remarkably soft, and in some places much divided into filaments. All the viscera were sound.

This may be considered as an example of idiopathic active inflammation of the spinal cord or its membranes. I add the following from Mr Charles Bell, as an example of the disease induced by external violence. A waggoner, sitting upon the shaft of his cart, was thrown off by a sudden jerk, and pitched on the back of his neck and shoulders. He was carried to the Middlesex Hospital, where he lay for a week, without complaining of any thing, except stiffness of the back part of his neck. He could move all his limbs with freedom. On the 8th day after his admission, he was seized with general convulsions, and locked jaw. After a few hours, he was affected with a singular convulsive motion of the jaw, which continued in a state of violent and incessant motion for about five minutes. This was followed by maniacal delirium. He then sunk into a state resembling typhus fever; and, after four days, was found to be paralytic in his lower extremities. "He lived a week after this, but continued sinking, and still retained about him much of the character of typhus. The day before his death, he was perfectly sensible, and had recovered sensation in his legs, for he could feel the rubbing of a finger upon them." On dissection, a great quantity of purulent matter was found within the spinal canal, which had dropped down to the lower part of it. It appeared to have been formed about the last cer-

vical and first dorsal vertebræ; there the intervertebral cartilage was destroyed, so that the pus had escaped outwards among the muscles.

In another case related by Mr Bell, in which the last dorsal vertebra had been fractured, purulent matter was found between the spinal cord and its membranes. In this case there was no paralysis, but fever, restlessness, vomiting, high delirium, and death from sudden sinking. *

These cases will serve to illustrate the active form of the disease. It also occurs under the form of *chronic inflammation.* This modification will be illustrated by the three following cases, which are related by Brera. †

1. A woman, aged 23, who had suffered considerably from syphilis, was seized with a severe quotidian intermittent, which proved very tedious, and resisted all the usual remedies. After some time, it was accompanied by pain in the lumbar region, diarrhœa, tormina, tenesmus, general debility, and emaciation. About three months after the commencement of the fever, she began to be affected with weakness and convulsive motions of the left lower extremity, resembling chorea. In walking, the leg was dragged; and if she attempted by a strong effort a greater degree of motion, it was thrown into convulsive distortions. Soon after, the left arm became affected in the same manner, and there were also convulsive motions of the face and eyes. At this time, the complaints in the bowels continued, but ceased soon after. The other symptoms increased. The difficulty of moving the limbs soon amounted to nearly complete paralysis; and to this were added, difficulty of articulation and diminution of memory. These terminated in loss of speech, coma, and death, which was preceded by general and terrible convulsions. Her death happened rather more than a month after the commencement of the convulsive affection of the leg. On *dissection*, some serous effusion was found in the thorax and in the ventricles of the brain. The spinal marrow was soft and flaccid, and to a considerable extent suppurated. Its investing membrane was in many places covered by a puriform fluid. There was also serous effusion in the spinal canal.

2. A man, aged 40, was received into the hospital of Crema in the spring of 1804, with no other complaint but general weakness and depression, for which no cause could be assigned. He lay constantly in bed, but complained of no pain; his appetite

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* Quarterly Report of Cases in Surgery, Part II.
† Della Rachialgite, cenni patologici.

was good, and he was free from fever. Suspicions being entertained that he was feigning, threats and entreaties were used to induce him to exert himself, but in vain. Meanwhile, from being lean and pale, he became fat and ruddy. Thus he continued through the summer and autumn. As winter approached, he lost his appetite, and became lean and cachectic. In February 1805, he became completely paralytic, both in his legs and arms, and died suddenly in March. On dissection, all was sound in the head, the thorax, and the abdomen. In the spinal canal there was much effusion of bloody sanious fluid, with marks of inflammation and suppuration in the spinal cord, the substance of which was remarkably soft, and tending to dissolution.

3. A young soldier who had lately recovered from a petechial fever, was affected with pain in the dorsal vertebræ, difficulty of moving the lower extremities, suppression of urine, involuntary discharge of feces, general debility, and emaciation. A variety of practice was employed for several months, without relief. The weakness of the lower extremities increased to complete paralysis; and soon after the superior extremities became affected in the same manner. He then lost his speech. After lying a fortnight in this state, completely immoveable and speechless, but in possession of his intellectual faculties, he died suddenly. On *dissection* there was found no trace of disease in the brain, the thorax, or the abdomen. The spinal cord was inundated by a great quantity of sanious fluid. The cord itself was suppurated, dissolved, and disorganised, at the lower part of the dorsal region. Above this it preserved its natural figure, but was very soft. Its investing membranes, and the periosteum lining the canal of the vertebræ, were destroyed at the part where the cord was so much diseased; the vertebræ and their ligaments were sound.

The following case related by Portal,* shews another modification of the disease. A woman had been long subject to a convulsive affection of the left lower extremity, immediately before the appearance of the menses. This occurred at every menstrual period. When the discharge took place freely it ceased. After the cessation of the menses, which happened at the age of 40, this extremity became paralytic. After some time she was affected with convulsions of the left arm, and soon after died comatose. On *dissection*, the membranes of the spinal cord were found in a state of inflammation at some of the last dorsal vertebræ and first lumbar; the cord itself was very red and soften-

* Cours d'Anatomie Medicale, Tom. IV. p. 117.

ed on the right side; on the left side it was sound through its whole extent.

Lieutaud, with his usual brevity, refers to a case in the Miscell. Curiosa, of a man who died of continued fever, after having been affected in the course of it with ischuria and paraplegia. The right kidney was found black, and the spinal marrow on that side "affected in the same manner." In a similar case quoted by him from Lælius a Fonte, in which death happened on the 14th day of continued fever, after paraplegia and suppression of urine, "in conspectum venit ren sinister, inflammatus et syderatus; læsa etiam erat medulla spinalis in eodem latere." *

When we review the phenomena which have been observed to accompany these diseases of the spinal cord, we find affections of all the principal organs. In the parts connected with the head and neck, we find distortion of the eyes, convulsive affections of the face, difficulty and loss of speech, loss of voice, contraction of the jaw resembling trismus, and difficulty of swallowing, which is said, in some cases, to have nearly resembled hydrophobia. In the viscera of the thorax there have been observed, palpitation and oppression of the heart, painful sense of stricture in the region of the diaphragm, and difficulty of breathing, which, in some cases, has been permanent, and in others, has occurred in paroxysms, like asthma. In the organs of the abdomen and pelvis we find vomiting, pain of the bowels resembling colic, diarrhœa and tenesmus, involuntary discharge of feces, and suppression or incontinence of urine. In the muscular parts are observed convulsions and paralysis, (the convulsions, in some cases, resembling chorea, in others, tetanus); in the intellectual functions, loss of memory, delirium, and coma. In the present state of our knowledge, we are by no means prepared to say, that all these diseases proceed from the affection of the spinal cord, especially as we observe remarkable diversities, and considerable want of uniformity in the symptoms. This is most remarkable in the affections of the voluntary muscles. In some cases we find both convulsion and paralysis; in others, paralysis without convulsion; and in one very severe case above described, there occurred neither convulsion nor paralysis. We observe similar varieties in the affections of the other organs; and the particular organs that are affected, do not appear to depend invariably, as has been supposed, on the part of the spinal cord which is the seat of the disease. The

* Lieutaud Historia Anatomico-Medica. Tom. I. Obs. 1072 and 1109.

laws which regulate these diversities, remain to be investigated by future observation.

II. *Serous Effusion.*

Serous effusion in the spinal canal is generally situated under the dura mater of the spinal cord. It is probably the effect of inflammatory action, as we have good reason to believe it to be in the brain. It occurred in several of the cases, already described, combined with suppuration; it is also met with unaccompanied by any other morbid appearance. The symptoms that have been observed to attend it in such cases will be illustrated by the following examples:

1.* A man, above 40 years of age, was affected with pain and weight in the lower dorsal vertebræ; the pain was acute, and occasionally extended upwards and downwards to the top and bottom of the spine. It had continued eleven days, when he was seized with paralysis of the right lower extremity, which, in three days more, was followed by suppression of urine. The pain in his back was now so acute, as to prevent him from lying down; it was soon after accompanied by difficulty of breathing, vomiting, and tonic convulsions of the trunk and superior extremities; the convulsions recurred at intervals, and continued about fifteen minutes. The left inferior extremity then became paralytic, and he died suddenly; his intellectual faculties having been entire, except during the paroxysms of convulsion. On dissection much fluid was found in the cavity of the spine. The spinal cord was sound. There was also fluid on the surface of the brain; there was none in the ventricles.

2. A child aged 12 months, whose case is very shortly related by Mr Chevalier,† after appearing to be in much pain, lost the use of the inferior extremities, and died in three days. The spinal canal was found full of bloody serum.

3. Bonetus‡ mentions a young woman who, after suffering severely from colic, fell into paralysis. It began at the upper part of the arms, and extended gradually to the points of the fingers. Afterwards the legs became affected, and she died of gradual exhaustion, a year after the first appearance of the paralysis. Through the whole extent of the spinal cord there was a space between its dura and pia mater, full of serous fluid. There was also some effusion on the brain.

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* Morgagni de Causis et Sedibus, &c. Epist. x. Sect. 13.
† Medico-Chirurgical Trans. Vol. III. p. 105.
‡ Boneti Sepulchretum Anatomicum, Vol. I.

4. A man mentioned by Portal * had numbness of the inferior extremities, followed by paralysis of them and extensive œdema. After some time the superior extremities were affected in the same manner, and the œdema extended over the whole body. He died comatose. On *dissection* much fluid was found both in the brain and in the spinal canal. In the centre of the spinal marrow there was a canal into which a large writing quill could be introduced; it extended as far as the third dorsal vertebra.

Many cases are related by Morgagni, Bonetus, and others, in which much serum was found in the spinal canal; but as in all of them there was also considerable disease in the brain, it is not easy to determine what effect the effusion in the spine had in inducing the symptoms.

III. *Gelatinous Effusion.*

A young man, † 14 years of age, received a blow upon the spine, betwixt the shoulders, by falling backwards against the corner of a chair. The injury appeared to be slight, and no urgent symptoms followed it immediately. He only complained that, upon raising his head, he had pain striking through and across his chest, and he was observed to hold his chin down towards his breast. After four weeks, he was affected with paralytic symptoms in the legs, which increased, till, in a very short time, he lost the use of them entirely. About the same time he lost the power of retaining his feces and urine. He had continued in this state for two or three weeks, when his arms became paralytic, and he lost the power of moving his head. He died on the following day, having remained sensible to the last. His death happened about three months after receiving the injury. During the progress of the disease, he frequently complained of great oppression, and a pain darting through the chest. On *dissection* the viscera of the thorax and abdomen were found to be healthy. Some bloody serum was discharged in opening the head. The brain, in other respects, was sound. Much bloody serum was discharged from the cavity of the spine. On opening the spinal canal, a soft substance was found, four inches in length, lying between the bones and the spinal cord, at the place of the injury. When this substance was taken out and shaken in water, a great part of it was dissolved. Parts of the same substance had protruded through between the trans-

* Cours d'Anatomie Medicale, Tom. IV. p. 115.
† London Medical Obs. and Inq. Vol. III. p. 160.

verse processes of the fourth and fifth dorsal vertebræ, and formed two tumours of similar soft pulpy matter, lying one on each side of the spine, in the hollow between the spinous and transverse processes. The largest of these was between three and four inches long, one and a half broad, and about an inch in thickness. The spinal cord and the vertebræ were sound.

IV. *Induration of the Spinal Cord.*

This is exemplified in the case of the Marquis de Causan, related by Portal, * the history of whose disorder is also remarkable, from the similarity of the symptoms to those of an affection of the brain. His complaint began with a prickling in the fingers and toes of the right side, which extended gradually upwards along the arm and leg; the parts wasted, became cold, and lost their feeling; but they retained such a degree of motion, that he could walk with the help of a crutch under the armpit of the affected side. He had continued in this state more than a year, when the left side became affected in the same manner. He was then confined to bed, and incapable of any motion, either of the trunk or extremities; the other functions continuing for some time in a healthy state. His sight and hearing were next affected, being first weakened, and gradually destroyed. In the same gradual manner he then lost his speech, and the power of swallowing. Soon after this he died. The pulse and breathing had continued natural till a short time before death, when both became remarkably slow; the pulse having been from 36 to 40 in the minute. On *dissection* the brain and all the viscera were found in the most healthy state. That part of the spinal marrow which was included in the cervical vertebræ was so hard as to have the consistence of cartilage. The membranes of this portion were very red, as if inflamed.

V. *Thickening of the Membranes.*

The Count de Lordat,† aged 35, received an injury of the neck by his coach being overturned from a high and steep bank. His head pitched against the top of the coach, and his neck was bent from left to right. He felt little inconvenience at the time, except some pain along the left side of the neck, which went off in a few days. Six months after, he had slight difficulty of articulation and weakness of the left arm. During nearly

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* Cours d'Anatomie Medicale, Tom. IV. p. 116.

† London Medical Observations and Inquiries, Vol. III. p. 257.

twelve months these symptoms did not increase, and gave him little trouble. After this interval, however, they did increase; the arm became withered and useless, the speech was nearly lost, and he had involuntary convulsive motions of the whole body. After another long interval his right arm became benumbed. His breathing was oppressed. He had great difficulty in swallowing; and his body was much emaciated. His bowels were loose; his urinary functions were natural. His death happened suddenly, nearly four years after the accident; his intellectual faculties having remained entire. His lower extremities had been for a considerable time weak and unsteady, but were not paralytic, for he walked from one room to another, leaning on a man's arm, a few hours before his death. On *dissection*, the spinal marrow included in the cervical vertebræ was found remarkably firm, resisting pressure like a callous body; and the membranes of this portion were so dense, that there was great difficulty in cutting through them. The medulla oblongata appeared a third larger than natural. The pia mater was thickened, and towards the falx there was some appearance of suppuration. The ventricles were full of water. The lingual and brachial nerves at their origin were very compact, nearly tendinous. This hardness was found in the cervical nerves to be owing to the density of the membrane covering them. Another example of thickening of the membranes occurs under the following article.

VI. *Destruction of a Portion of the Spinal Cord.*

A man, whose case is related by Copeland, * had paralysis of the lower extremities, difficulty in passing his urine, obstinacy of the bowels, and a feeling of tightness across the belly, as if a broad band had been bound tightly round it. His health had been declining for more than a year; and the commencement of his complaints was ascribed to having violently strained his back in lifting a heavy weight. After being confined to bed with perfect paraplegia for three months, he died of gangrene of the nates. On *dissection*, no disease could be observed in the vertebræ. Within the lower dorsal and first lumbar vertebræ, the spinal marrow was entirely wanting for more than two inches. The membranes, which there formed an empty bag, were unusually vascular, and much thickened.

* Observations on the Symptoms and Treatment of Diseases of the Spine, page 47.

VII. *Extravasated Blood.*

1. A young lady, aged 14, whose case is related by Mr Chevalier,* had been for several days affected with pain of the head and back. The pain of the head was relieved by blisters and purgatives; the pain of the back increased, and was accompanied by a tendency to sickness on sitting up. At the end of a week there was a sudden and violent aggravation of this pain, followed by general convulsions, in which she continued between five and six hours, and then expired. On *dissection*, the spinal canal was found filled with extravasated blood in the lumbar vertebræ, which had been the seat of the pain. The brain and all the viscera were sound.

2. A miller, in lifting a heavy sack, suddenly lost the use of his lower extremities. He died in fifteen days. Extravasated blood was found, mixed with sanious matter, in the vertebral canal. The membranes were inflamed, and the nerves of the cauda equina appeared rotten, as if they had been long macerated in putrid water.†

3. A man received a violent blow on the three inferior lumbar vertebræ by a log of wood which fell upon him. He died in four hours. Extravasated blood was found in the spinal canal. The vertebræ were entire, and the spinal marrow appeared to be healthy.‡

4. Du Vernay, whose case is briefly mentioned by Du Hamel, died of a disease which was considered as apoplectic, but in which he retained his mental faculties to the last. No disease was observed in the brain, but a great quantity of extravasated blood was found in the spinal canal.§

5. A boy, 14 years of age, received a violent jerk of his neck by a cord which was thrown over his head as he was swinging forwards in a swing. He felt no bad effects at the time; but after some time, he was observed to be weak and inactive. He became gradually more and more inactive, and had stiffness of the neck, and difficulty in moving his head. Nine months after the accident, the weakness of his lower extremities increased to paralysis, which was speedily followed by paralysis of the arms, with suppression of urine, and obstinacy of the bowels. He had been a short time in this state, when he was seized with very violent pain in the spine; it was of short continuance; but after that time he became rapidly worse. His breathing became

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* Medico-Chirurgical Transactions, Vol. III. p. 102.
† Ibid. p. 105.
‡ Morgagni de Causis et Sedibus, &c. Epist. 54, Sec. 25.
§ Du Hamel, Reg. Scient. Acad. Histor. An. 1683, Sec. 5. Cap. 2, p. 264.

quick, and was performed with an effort. This was first observed only during sleep, but afterwards continued while he was awake. After suffering from it severely for one day, he died. His death happened about ten months after the injury, and a few days after the violent attack of pain in the spine. The only morbid appearance that is mentioned as having been observed on dissection, is a great quantity of extravasated blood in the spinal canal. It lay between the bone and theca vertebralis. It was partly coagulated and partly fluid, and appeared to have come from the upper part of the canal, about the second or third cervical vertebra.*

VIII. *Tumours and Hydatids.*

1. A tumour the size of a nutmeg was found compressing the spinal marrow of a young woman by Harderus. There were three similar tumours in the cerebellum. The tumours were as hard as scirrhus; when they were cut into, a yellow matter could be pressed out. The case was complicated with disease of the lungs and liver. The leading symptoms were, severe headach, oppressed breathing, and, a few days before death, violent convulsions.†

2. A woman, 53 years of age, became epileptic after a fright. The fits returned every second or third day with great violence for three years. She then became comatose after one of them, and died in five days. The pituitary gland contained a cyst full of a reddish brown fluid, and hydatids of various sizes were found within the sheath of the spinal marrow, through its whole extent.‡

Hydatids in the spinal canal are also mentioned by Portal and Frank.

IX. *Ossification of the Membranes.*

In a woman who had been epileptic for five years, and died suddenly in one of the fits, Dr Esquirols found the sheath of the spinal marrow, on its external surface, covered through its whole extent with osseous scales, from one line to two lines in diameter.

X. *Fungous Excrescence.*

A young man, aged 14, fell from a window in the second story of a house into the street. His back was much bruised, but

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* Howship's Observations in Surgery and Morbid Anatomy, p. 115.

† Harderi Apiarium, p. 256.

‡ Memoir of Dr Esquirols to the Faculty of Medicine of Paris. Bulletin de Faculté de Medicine de Paris, Tom. V. p. 424.

without fracture or distortion. From the time of the accident he continued to walk with his body bent considerably forward, and he was very weak. About three years and a half after the accident he was seized with violent pain in the back, thighs, and legs. After some time, a tumour began to form over the lumbar vertebræ, which increased gradually till it attained a very great size; the prominent part of it was very red, and the veins on its surface extremely turgid. Repeated attacks of hemorrhage took place from the apex of the tumour. He was then seized with complete paraplegia, incontinence of urine and feces, and extreme emaciation, and at length died, gradually exhausted, about six years after the accident. On *dissection*, the tumour was found to consist of a large fungous mass, in appearance resembling the medullary substance of the brain. It took its origin from the spinal marrow, and had extended itself upwards and downwards from the third dorsal vertebra to the os coccygis. Many of the vertebræ, both dorsal and lumbar, were extensively carious on the posterior part; some of the lumbar vertebræ had nearly disappeared. There was a general softening of all the bones of the spine, and of the sacrum and ilium.*

XI. *Compression from Diminution of the Spinal Canal.*

This is a rare occurrence. It was, however, observed by Portal.† The canal of the last dorsal and two upper lumbar vertebræ was diminished one half, and its inner surface rendered unequal by numerous small boney eminences. The inferior extremities were much wasted.

XII. *Increased Vascularity and Turgidity of Vessels of the Spinal Cord and its Membranes.*

These appearances constitute the plethora spinalis of continental writers, to which much importance has been attached, as a cause of disease in many of the principal functions of the body. By irritation at the origin of the various spinal nerves, it has been considered as the source of many obscure affections of the thorax and abdomen; of tremors, convulsions, paralytic affections, chorea, epilepsy, and tetanus. It has also been regarded as the seat of those painful affections of the back and loins, which take place in connection with hæmorrhoids, menstruation, gestation, abortion, and continued fever. These writers have speculated much on the changes which may take place in the determination of blood in the thoracic and abdominal viscera, so as to throw it

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* New London Medical Journal for 1792.

† Cours d'Anatomie Medicale, Vol. I. p. 299.

with undue impulse on the vessels of the spinal marrow, and produce this plethora spinalis. Such altered determination they suppose to take place most frequently from violent colics, suppressed menses, from diseases of the liver, internal aneurisms, and in continued fever.* It is however extremely doubtful, whether turgidity of vessels can with propriety be considered as a cause of disease. In affections of the head, much importance was formerly attached to it, but more extensive observation has shaken our confidence in this appearance, by showing us that it occurs in a variety of cases, in which there had existed no symptom indicating disease of the brain. In no department of natural science is there a point of greater delicacy than assigning a physical cause, or considering two phenomena as connected in the manner of cause and effect. In experimental philosophy, such investigations must be conducted by numerous and varied experiments; in medicine, by extensive and cautious observation; and it cannot be denied, that a chief bane of medical science has been inattention to this necessary caution, or a practice of assigning physical causes on slight and inadequate grounds. But to return to the proper subject of this essay, I shall conclude this part of it by a short specimen of the observations on spinal plethora.

1. A man who died of peripneumony, had been affected in the course of his illness with numbness and loss of feeling in the lower extremities. On dissection, the arteries of that part of the spinal cord which is included in the dorsal vertebræ, were found turgid with blood, as if they had been highly injected; † Portal refers to several other cases, which he explains on the same principle, in which convulsive and paralytic affections of the extremities occurred in various inflammatory diseases.

2. An infant was attacked during dentition with convulsions, which degenerated into epileptic fits. When five years and a half old, he had four or five fits every day, and became paralytic; he died at six years and a half. The spinal sheath appeared as if injected, and the medullary substance softened, and of a yellowish colour, towards the 6th and 12th dorsal vertebræ. ‡

3. A young man, aged 21, was affected with fever, and high delirium. When the delirium subsided, he had convulsive motions of the superior extremities, and soon after died comatose. On *dissection*, the vessels of the pia mater of the spinal marrow,

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* See Frank, Oratio de Vertebralis Columnæ in Morbis Dignitate; Brera della Rachialgite, and Ludwig de Dolore ad Spinam Dorsi.

† Portal, Cours d'Anatomie Medicale, Tom. III. p. 219.

‡ Esquirols Bulletin de la Faculté de Medicine.

at its upper and posterior part, were found distended with blood as if they had been highly injected. This was especially remarkable about the origin of some of the spinal nerves. There was a similar appearance on the pia mater of the brain, and some serous effusion on its surface.*

The slight and imperfect outline which I have thus given of the morbid anatomy of the spinal cord, may perhaps have the effect of directing to this interesting subject, the attention of such of the younger members of the profession as have opportunities for prosecuting it. I now go on to offer a few observations on the connection betwixt affections of the spinal cord, and diseases or injuries of the spine.

I. *Concussion of the Spine.*

A severe blow upon the spine frequently occasions an immediate loss of power of the parts below the seat of the injury, without producing either fracture or dislocation of the vertebræ. It is such an affection, that I mean to express by the term "concussion of the spine." The extent of parts affected will depend on the seat of the injury. Paralysis of the lower extremities, and suppression of urine, are the symptoms that most frequently come under our observation. If the injury be on the upper part of the spine, there may also be paralysis of the upper extremities, difficulty of breathing, affections of the voice, &c.

In tracing the history of such cases, the following circumstances are worthy of attention.

1. Concussion of the spine may be speedily fatal without producing any morbid appearance that can be detected on dissection. Many cases of this kind are on record. Boyer† mentions a man, who received an injury of the spine by falling into a ditch. He was immediately affected with complete paralysis of the lower extremities, and died in consequence of the injury; the period of his death is not mentioned. On dissection, no disease could be discovered, either in the head or in the spinal canal. Frank mentions four fatal cases of concussion of the spine, in none of which could any morbid appearance be detected on the most careful examination, either in the vertebræ or the spinal cord. It may also be fatal in a short time by inflammatory action. A remarkable case of this kind has already been quoted from Mr C. Bell (p. 45). Another, different in its

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* Morgagni de Causis et Sedibus, Epist. x. § 17.

† On Diseases of the Bones, Vol. II. page 101.

history, is mentioned by Boyer. A builder fell from a height of fourteen feet, and remained for some time senseless. On recovering from that situation, he was found to have lost the use of his lower extremities. He was also affected with retention of urine, an involuntary discharge of feces, and some disorder in respiration. He died in twelve days. On dissection, a quantity of bloody serum was found in the spinal canal, the quantity of which was sufficient to fill a little more than the lower half of it.

2. Urgent symptoms may follow the injury, and after some time may be removed. Galen mentions a man, who, after an injury of the back, was affected with loss of speech, loss of voice, and paralysis of the lower extremities, the superior extremities remaining unaffected. After seven days, he recovered his voice and speech, and soon after the paralysis also disappeared. In summer 1816, I saw a man who had been employed in blowing a rock near Edinburgh. Not having retired to a sufficient distance, and standing with his back to the rock when the explosion took place, a large piece of stone struck him on the spine about the lower dorsal and upper lumbar vertebræ. He instantly fell, completely deprived of the power of the lower extremities. When I saw him, a few hours after the accident, I found him in this state, and affected with violent pain, beginning in the seat of the injury, and extending down the thighs. On the back there was an extensive swelling, which made it impossible to ascertain the state of the vertebræ. He was confined to bed for several weeks, without any power in the lower extremities, and with considerable difficulty in passing his urine; but gradually recovered; and in a few weeks more, was free from complaint, except weakness and uneasiness in his back, which affected him chiefly in attempting to stoop; he is now quite well. The practice employed consisted principally of general and topical bloodletting.

In Hufeland's Journal, Vol. XXI. is related the case of a man who fell from the top of a cart-load of wood, and lighted so that the weight of his body rested upon the back of his neck and shoulders, his head being bent forwards. When he recovered from the first effects of the shock, it was found that he had lost completely both feeling and motion of all the parts below the neck. He could move no part but his head. He had also suppression of urine, and obstruction of the bowels. After eight or ten days, he was affected with swelling of the limbs, and a sense of prickling, followed by severe pain, but without any power of motion. After lying several weeks in this state of perfect paralysis, he began to recover a slight degree of feeling and motion, begin-

ning in the fingers. From this time, the power of motion increased very gradually, so that, at the end of sixteen weeks, he was able to support himself in a sitting posture on a chair. After another long interval, he was able to drag himself about, supported on crutches; and at the time when the case was written, he could walk, supported by a stick, and do a little work with his hands, but he continued to have great weakness and pain of his back, the pain being chiefly at the junction of the spine with the sacrum. The progress of the functions of the bladder and the bowels in this patient is remarkable. He had first complete suppression of urine, requiring the use of the catheter for four weeks. He then recovered the power of passing it, but could not retain it; it flowed involuntarily. After some time he recovered the power of retention. The bowels were not moved without strong glysters for six weeks; after this, the stools passed involuntarily for four weeks. He then recovered the natural action.

3. It may induce permanent paralysis. This may either take place immediately, or the first effects of the injury may be recovered from, and a new diseased action take place after a considerable time. The slight nature of the first symptoms, in such cases, and the slowness of their progress, will be illustrated by the following case. Robert Bain, aged 43, about nine years ago, fell from the branch of a tree, and lighted on the sacrum. He was carried home, deprived of the power of his lower extremities, and affected with pain in the lower part of the spine. He was confined to bed about twelve days, and then recovered, so as to be able to follow his usual employment. From this time he was affected with a peculiar feeling of numbness, which was confined to the upper part of the left foot. This feeling gave him no inconvenience, but it never left him. After continuing in this state for four years, the numbness suddenly extended upwards, along the left leg and thigh, and was speedily followed by paralysis of these parts. After some time, he was seized with pain, which stretched across the lower part of the back, and into the right thigh. This was soon followed by paralysis of the right thigh and leg. He was then confined to bed with perfect paraplegia for about two years. About two years ago, he recovered as much power as to drag himself about, supported upon two crutches. He was in this state, without any farther improvement, when I saw him four months ago. His spine was free from distortion, but he complained of deep-seated pain upon pressure about the last dorsal vertebra, and the top of the sacrum. At this place two caustic issues were inserted, and since that time he has made considerable improvement. He can now

stand without his crutches, and, though he cannot walk without them, he can raise his legs much higher in walking, and has much more power of them.

The disease in such cases is probably of the nature of chronic inflammation of the spinal cord or its membranes, perhaps inducing thickening of the membranes, or some of the other morbid conditions which have been mentioned in the former parts of this essay. They are illustrated by several of the cases that have been related, particularly those of the Count de Lordat, and the Marquis de Causan, page 10, and the young man mentioned in page 9. Similar affections often follow slight injuries of the spine, which do not, at the time of receiving them, induce any urgent symptoms, and perhaps excite very little attention. Sometimes they take place after so long an interval, that the patient has forgotten the injury, or, if he remembers it, does not consider it as having any connection with his disease. A man, mentioned by Mr Charles Bell, became paralytic in the lower extremities several months after an injury of the spine, occasioned by striking his back against the corner of a table. A gentleman walking in Burntsfield Links, near Edinburgh, received a blow on the spine from a golf ball, which produced at the time no urgent symptom. After several weeks, his lower extremities became paralytic. In this state he continued four or five months, and then recovered under the usual treatment. In other cases the symptoms take place at an early period, and with such activity, as distinctly marks inflammatory action. A young man, mentioned by Dr Jebb, received a blow on the spine from a stone. In the evening of the same day, he was seized with a shivering fit, followed by fever, which ran high through the night, but abated in the morning. He had at the same time pain of his stomach and his back, with contraction of the legs. This was followed by weakness of the legs, which after ten days had increased to perfect paraplegia. Issues were then inserted, and he was able to walk in three months. Every injury of the spine should be considered as deserving minute attention, and the most active means should be employed for preventing or removing inflammatory action.

II.—*Disease of the Vertebræ.*

It would be superfluous to enter minutely upon this subject, which has been so amply treated of by writers of the first authority. There are, however, some circumstances relating to it, which it may be proper to mention, in connection with the subject of this essay.

In cases of carious and distorted vertebræ, attended by para-

lysis, it is well known that the paralysis is not occasioned by the distortion, for this may exist in a great degree without paralysis, and when they have existed together, the paralysis may be removed, while the distortion remains undiminished. The original disease appears to be an inflammatory action, affecting in some cases the ligaments and membranes, in others the articulating surfaces and intervertebral cartilages, and in others, the bodies of the vertebræ. It is in the latter case, that the caries which follows the inflammatory action produces distortion; but even in this case, distortion is not an invariable consequence, for the caries may take place in such a manner as to diminish the size of the vertebra equally along its whole extent, and merely to shorten the spine, without distorting it. This is said to occur most frequently in the lumbar vertebræ. The case of a boy related by Dr Armstrong is very important.* He had involuntary discharge of urine and feces, difficult breathing, and paralysis of all the extremities, except a very imperfect degree of motion of the left arm. There was much pain and tenderness on pressure in the cervical vertebræ, but no distortion. He recovered completely in a few months, the vertebræ that had been affected, remaining in a state of anchylosis. In this case, the disease was probably confined to the articulating surfaces. Mr Copeland gives a plate, in which three of the dorsal vertebræ are represented as united by anchylosis; the intervertebral cartilages being removed, but without loss of substance in the bodies of the vertebræ. In this case, paralysis had taken place, but there was no perceptible distortion. In attending to diseases of this kind in practice, therefore, it is not sufficient to ascertain the existence or non-existence of distortion. The whole spine should be examined with care, with the view of detecting the presence of inflammatory action. This will be pointed out by pain and tenderness on pressure, or pain on passing a hot sponge over the part, in the manner recommended by Mr Copeland. Such examination should be made, when symptoms occur which have been observed to be connected with affections of the spine or spinal marrow, especially if they do not yield readily to common modes of treatment, or if they have commenced soon after injuries or sprains of the spine.

The principal symptoms of this kind are the following:—Weakness, numbness, or convulsive affections of any of the limbs—spasmodic starting of the limbs, occurring chiefly in the night—loss of the full power of the muscles, so that, though the

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* Edinburgh Medical Journal, Vol. IX. p. 386.

person can walk with his usual steadiness, he cannot perform such motions as are required in running or leaping; numbness along the margin of the ribs, and a peculiar oppression and tightness across the region of the stomach; various affections of the breathing; difficulty in discharging the urine and feces, or difficulty of retaining them. Complaints such as these have sometimes been found to be connected with affections of the spine or spinal marrow, after they had been mistaken for dyspeptic or asthmatic disorders, or for diseases of the urethra or the rectum.

It is worthy of particular attention, that symptoms affecting internal organs may exist in connection with diseases of the spine, without being attended by any affection of the limbs, or any symptom calculated to direct our attention to the spine as the seat of the disease. A girl, mentioned by Mr Copeland, had difficulty and pain in emptying the bladder, pain and tightness round the margin of the thorax, and difficult breathing. Her limbs were not affected, except that she was more easily fatigued than her companions. One of the dorsal vertebræ was found to project a little. By topical bleeding and blistering on this part, and rest in the horizontal posture, all her complaints were removed. A man, mentioned by Dr Jebb, had pain under the short ribs on both sides, cough, and irregular pulse. From the parts affected by the pain, lancinating pains extended downwards along the thighs, occasioning much uneasiness in walking, resembling the pain of rheumatism. The ninth and tenth dorsal vertebræ were protuberant, and by issues applied at that place, all his complaints were removed. The most effectual treatment of these cases in the early stages, consists of topical bleeding, issues, and perfect rest in the horizontal posture. In the more advanced stages, mercury has in a few cases been given with much advantage. A girl is mentioned by Mr C. Bell, who, after an injury of the spine, was confined to bed for eight months in the most helpless state, her back bent, and her knees drawn up. She recovered completely under a course of mercury, given her for syphilis, with which it was discovered that she had been affected from the time of the accident. In the Transactions of a Society for the improvement of Medical and Surgical Knowledge, Vol. III. is related the case of a man who had squinting, difficulty of swallowing, indistinct articulation, paralysis of the left leg and arm, and protrusion of several of the cervical vertebræ. Under a course of mercury, all his complaints disappeared; the protrusion of the vertebræ was diminished, but not entirely removed. Several cases have recovered without any re-

medy, by confinement to a horizontal posture; this occurred in Dr Armstrong's case, referred to above.

Affections of the Processus Dentatus.

1. It may be affected with caries without producing any urgent symptoms, till it suddenly give way, and prove fatal. This occurred in a young man mentioned by Mr Copeland. He had been using mercury for a disease in the tibia, and had for some time complained of stiffness and pain when he moved his head. In making a sudden turn of his head, he was seized with convulsions, and died in a few hours. On dissection, the processus dentatus was found completely detached from the vertebra, having been eroded by caries.

2. It may be dislocated by violence. Examples of this are frequent. A man, mentioned by Mr C. Bell, was making a violent effort to impel a wheelbarrow from the street upon the raised foot pavement, when the wheelbarrow went suddenly from before him, and he fell with his chin upon the curb-stone. He was dead in a few seconds. The processus dentatus was found to have crushed the spinal marrow, the ligaments having given way.

3. It appears probable that the ligaments of the processus dentatus may yield in a more gradual manner, giving rise to a course of urgent symptoms, and death after some time. Some years ago, a man was received into the Infirmary of Edinburgh, who had been accustomed to carry burdens on his left shoulder, his head consequently being bent to the right side. He complained of pain of the forehead and occiput, extending down the neck, pain in the throat, great difficulty, or rather impossibility of swallowing, articles taken into the œsophagus being rejected with some violence, after they had passed a short way into it. He had rigid contractions of the neck and back, resembling tetanus. His articulation was slow and difficult; the pulse 54. These complaints had begun about six weeks before, and had been increasing gradually; difficulty of swallowing was one of the first symptoms. Two days after his admission, his left side became paralytic. On the following day, the right side was affected in the same manner, and the breathing became laborious. He died in three days more, having lost the power of every motion below the neck. On dissection, it was found that the ligaments had given way on the left side of the processus dentatus, so as to allow it to compress the spinal cord. No other morbid appearance was observed in any of the viscera.

The spine may be affected with extensive caries without the existence of any symptoms that mark such a state of disease. A

man mentioned by Mr C. Bell, who had been liable to severe pain in his back, and fits of palpitation, died suddenly after a long walk. The only morbid appearance observed on dissection, was a large scrofulous abscess in the posterior mediastinum, with caries of several of the vertebræ of such extent, that the spinal marrow was exposed in several places. I saw a similar abscess in the posterior mediastinum, with caries of five or six of the vertebræ, in a girl who died of phthisis. She had complained for some time of a severe pain of the back, but her complaints in other respects did not differ from the usual symptoms of phthisis. A similar appearance in the lumbar vertebræ, with a psoas abscess, containing lb. ij. of matter, has been described by Mr Benjamin Bell. * The vertebræ were so diseased that large pieces of them were separated, and the matter was in several places in contact with the spinal marrow. The patient, a man of 40, had complained of severe pain in his back and thighs, which prevented him from raising his body into the erect posture, but there was no distortion of the spine, and no paralysis. He had considerable difficulty of breathing, but this was accounted for by a diseased state of the lungs.

Conjectures.

The various symptoms that have been observed in connection with affections of the spinal cord and its membranes, have opened a wide field of conjecture in regard to the influence of these parts in several diseases, which have hitherto been involved in much obscurity. These conjectures are not to be altogether overlooked, but they are only to be regarded as having any value, in as far as they direct us to subjects worthy of being investigated by observation and morbid dissections. A short specimen of these conjectures shall conclude this essay.

Spasmodic Diseases.—Several writers of eminence have conceived that many spasmodic and nervous diseases have their origin in affections of the spinal marrow. Hoffman, in his essay "De Morbis Discernendis," directs us to distinguish betwixt epilepsy and convulsions. In the former, he says, the membranes of the brain are affected; in the latter, the membranes of the spinal marrow. In his treatise De Morbis Convulsivis, he divides convulsive affections into idiopathic and symptomatic. The former, he thinks, arise from irritation of the membranes of the spinal marrow; the latter depend upon diseases of other organs; but, by the influence of these diseases upon the spinal

* Edinburgh Medical Commentaries, Vol. III.

marrow, the effect of them is extended over the whole body. Ludwig discusses the same doctrine more particularly, ascribing many hypochondriacal and hysterical affections to irritation at the origin of the intercostal nerves, and explaining the affections of the lungs, the larynx, &c. in such diseases, by the connection of these nerves with the par vagum. Lieutaud holds a similar doctrine, that all convulsive diseases in which the speech is not affected depend on diseases of the spinal marrow, and he considers tetanus as an example. The same doctrine is supported by Burserius, Fernelius, and Bilfingerus (de tetano). Portal supposes that slight pressure on the spinal marrow produces convulsion; and greater, paralysis. He thus accounts for the one passing into the other by gradual increase of the pressure.

In the present state of our knowledge, it must be confessed, that these doctrines are to be considered as little better than conjecture. If, however, we attend to the cases related in this essay, and others that are on record, we must observe, that many diseases and injuries of the spinal marrow have been attended by symptoms resembling those of *chorea*, *tetanus*, and other convulsive diseases. Hoffman mentions a boy, who, after receiving a blow on the sacrum, was seized with a violent convulsive affection, nearly resembling tetanus, with loss of memory, difficult articulation, and delirium. The complaint continued with great severity for five days, and afterwards returned at nearly regular periods, for six months. Burserius relates the case of a man who died of tetanus, induced by exposure to cold after intoxication. On dissection, a large quantity of viscid yellow serum was found under the outer covering of the spinal marrow. Frank also relates a case of "horrible tetanus," which was induced by a blow upon the spine; but he gives no account of the appearances on dissection. The case related in page 22. (3.) of these observations, had also a resemblance to tetanus. In many of the cases that have been related, convulsive affections of the extremities occurred in connection with diseases of the spinal cord; and the case quoted from Brera at page 5, bears a remarkable resemblance to CHOREA. The case from Portal, at page 6, is also deserving of attention.

Colica Pictonum.—I have already referred to the case of a woman mentioned by Bonetus, in whom paralysis followed severe colic. Extensive serous effusion was found under the membranes of the spinal cord. Privatius, as quoted by Sauvage, mentions a young woman, who, after suffering from violent gastrodynia for three hours, was attacked with palsy of all the parts below the neck. She died after two months. At an early period of the disease, a protrusion had taken place of the last

cervical vertebra. No account is given of the dissection. In this case, the pain was supposed to be symptomatic of the disease in the spinal marrow. Similar to this is the view which several Continental writers have taken of colica pictonum, considering it as a real inflammation of the spinal marrow, (rachialgia saturnina), and on this principle they have proposed to treat it by blood-letting. *

Fever.—Ballonius † ascribes many of the symptoms of fever to an affection of the spinal marrow, particularly the pain in the back, tremors of the hands, and oppression of breathing. Whatever importance we may attach to such conjectures, we have reason to believe, that, in certain malignant fevers, the spinal marrow becomes diseased. A remarkable example of this has been already given from Brera, in the young soldier mentioned in page 47. Ranchetti ‡ relates the case of a girl who died of a petechial fever, which had induced coma; on dissection, there were found evident marks of inflammation in the spinal marrow and its membranes, and a quantity of puriform matter about the cauda equina. There were also marks of inflammation in the brain and its membranes.

Epilepsy.—M. Esquirols has lately presented to the faculty of medicine at Paris, a memoir on epilepsy, in which he states, that he had examined the bodies of 15 patients who died of this disease, and found the spinal marrow affected in all the cases. The dissections, however, present no uniformity of appearance. ‖ In one there were hydatids; in another, the membranes were as if injected; in a third, the arachnoid coat of the spinal marrow was "greyish." In several the medullary substance was softer than natural at particular parts, and in one it was harder; in one the spinal marrow at the eleventh and twelfth dorsal vertebræ was soft, and of a light brown colour. In a young woman, in whom the paroxysms returned with menstruation, he effected a cure by repeated applications of moxa to the spine.

Hydrophobia.—M. Salin seems to have been the first who conjectured that, in this horrible disease, the spinal marrow is affected. A case related in the London Medico-Chirurgical Journal and Review (for October 1817) seems to afford some probability to this conjecture. The case was well marked, violent, and speedily fatal. The membranes of the brain were found highly vascular, with considerable serous effusion. But the

* Astruc, Quæstio Medica, an morbo Colicæ Pictonum, rectius Rachialgiæ, venæsectio.

† Ballonii Consilia Medica.

‡ Ranchetti della Struttura, delle funzioni e delle Malattie della Midolla Spinali.

‖ Bulletin de la Faculté de Medicine de Paris, Tom. V.

greatest marks of disease were in the coverings of the pons Varolii, medulla oblongata, and upper part of the spinal marrow. These parts are said to have formed "one crust of intense inflammation." On the spinal marrow this crust was more intense than on any of the other parts. It is much to be regretted that the spine was not laid open, no more of the spinal marrow having been examined than could be cut out by a long slender knife carried through the foramen magnum.

Many cases of *dyspnœa* are supposed by Frank to proceed from disease at the origin of the phrenic nerves; and difficulty of swallowing and of speaking frequently depend, according to Portal, on "engorgement" in the cervical portion of the spinal marrow.

Whether the following case ought to be considered as connected with the spinal cord, or what was the nature of it, I do not know. I have not seen another exactly resembling it. A gentleman aged 34, of a slender make, and very active habits, was affected, in summer 1815, with numbness and diminished sensibility of all the extremities. In the inferior extremities, it extended to the tops of the thighs, and sometimes affected the lower part of the abdomen; in the superior extremities, it never extended above the wrists. There was along with it a considerable diminution of muscular power. He could walk a considerable distance, but with a feeling to himself of insecurity and unsteadiness; and he could not in the smallest degree perform such motions as are required in running, leaping, or even very quick walking. He was in other respects in good health. Various remedies were employed, without benefit. Evacuations and spare diet seemed rather to increase the complaint. He had continued in the state which I have described for about two months, when he determined to try the effect of violent exercise. For this purpose, he walked as hard as he was able, five or six miles, in a warm evening, and returned home much fatigued and considerably heated. Next morning, he had severe pain in the calves of his legs, but his other complaints were much diminished, and in a few days disappeared. He has not had any return of the disorder.

The following case occurred to me after a great part of this essay was printed. Perhaps it is worthy of some attention.

A strong healthy child, aged nearly two years, after having been oppressed and feverish for two days, was seized with violent convulsion. The first fit continued about an hour, and left her comatose, with distortion of the eyes. She had not recovered out of this state, when she had another attack of the convulsion, about two hours after the former. During the fits, and for some time after, there was violent and irregular action of the heart,

and a peculiar spasmodic action of the diaphragm. The second fit left her in a state of coma, from which she never recovered. She took drink or medicine when they were put into her mouth, but shewed no other appearance of sensibility. The eye was completely insensible; the pulse very frequent. She had afterwards several slight attacks of convulsion, and one more severe a short time before death, which happened thirty-three hours after the first attack. The most active practice had been employed without benefit On *dissection*, no disease could be detected in the brain, except an appearance of increased vascularity in the medullary substance, and slight effusion under the arachnoid coat. The brain and cerebellum being removed, there was a copious discharge of bloody serum from the spinal canal. This canal being laid open, there was found a copious deposition of colourless fluid, of a gelatinous appearance, between the spinal canal and the membranes of the spinal cord; it was most abundant in the cervical and upper part of the dorsal regions. The cavity which contained this *colourless* fluid, seemed to have no communication with the cavity of the cranium. Within the membranes of the spinal cord there remained a small quantity of the *bloody* fluid, which had flowed into the cavity of the cranium. The cord itself, and its membranes, presented no unusual appearance, except that, at the upper part, the cord appeared to be softer than usual, and very easily torn. All the viscera of the thorax and abdomen were perfectly healthy. The foramen ovale was pervious by a small opening.

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