tion, and is thus a contrast to the last lecture. It illustrates, even in a more striking manner than the first two lectures, the relations of modern physiology to the physiology of our forefathers. The latter were engaged in observing and explaining the more obvious phenomena, whilst the modern physiologists are pushing their researches further, and are endeavouring to study the hidden phenomena which, like a second order, lie behind these. It need scarcely be added that even the results of modern research are not to be regarded as final, although we see a little further and more clearly than those who went before. There is still uncertainty as to fact and obscurity as to explanation in most departments of physiological science, and not least as regards the function of respiration.

ABSTRACT OF LECTURES

ON THE

METAMORPHOSIS OF SUCTORIAL FISHES AND BATRACHIA.

Delivered at the Royal College of Surgeons of England.

By W. K. PARKER, F.R.S.,

Hunterian Professor of Anatomy in the College.

LECTURE II.—ON THE STRUCTURE OF MYXINOID FISHES.

THE myxinoïd fishes include the various forms of Hag-fish and Bdelostoma. They are the only vertebrates which do not possess cartilaginous rudiments of vertebrae, and are the very lowest forms of the order to which they belong. They live in the interior of other fishes, and are consequently parasitic. Their presence in great numbers was discovered in the digestive organs of a cod by Professor Allen Thompson, who showed that their ovum, when ready to be laid, is enclosed in a horny shell of oval form, in many respects similar to that of Elasmobranchs, and that from its ends there project a number of trumpet-shaped tubular processes, which serve, most probably, to attach it to marine objects. Of their development little is known, but, from what we have been able to ascertain, the Hag-fish, when fully formed, does not rise higher in the scale of development than the larval form of *Petromyzon*, or the lamprey, the next form we will have to study. It is, however, specialised enough to enable it to perform its particular purposes of life.

The skeletal structure of the Hag is entirely cartilaginous, and is confined to the head. The notochord, and other more solid portions of its structure, are composed of extremely soft cartilage, apparently of a much more elementary form than is found in other fishes with which we are acquainted. To this form of cartilage, Professor Parker proposes to give the name of *vacuolar tissue*, on account of its peculiar character. Its presence in the Hag he regards as a physiological indication of the low position the animal occupies in the scale of vertebrate development. The parts composed of this tissue are surrounded by a fibrous sheath, which serves to strengthen them. The base of the skull is composed of harder cartilage. The notochord can be traced forwards as far as what corresponds, in the higher vertebrates, to the posterior clinoid processes of the sphenoid. This point seems to mark the termination of the body-axis not only in the Hags, but in all other vertebrates, as the notochord has never been traced further forwards. On each side of the anterior end of the notochord are the basal plates which unite to form the basis cranii, projecting from the anterior margin of which, are two bars of cartilage, one on each side of the middle line of the body; these are called the trabeculae cranii. Filling up the space between these is a small plate of cartilage, called by Professor Parker the intertrabeculae cartilage. To the anterior ends of the trabeculae is attached a small cartilage called the anterior trabecula, which is connected with the perpendicular plate of the ethmoid, and which along with the trabeculae and intertrabeculae cartilage, gives support to the fore-brain. The nasal organ is simple, the nose being long and proboscis-like. The septum nose is absent, and there is no segmentation of parts about the face, such as can be named in regular order. The lower jaw is wanting, as are also the labial cartilages. The mouth and nose are surrounded by barbels. There is no suctional oral ring present, or it is represented only by the broad base of the core of the barbels. There is a backward displacement of the respiratory and circulating organs. The nervous system is remarkable on account of the abortion or suppression of the third, fourth, and sixth pairs of cranial nerves.

From this condition of the nerves, it is not surprising to find that the eyes are rudimentary organs. Limbs seem to be entirely absent.

CLINICAL REMARKS ON HYDROPHOBIA.

By J. S. BRISTOWE, M.D., F.R.S.,

Senior Physician to St. Thomas's Hospital, etc.

(Continued from page 761.)

CASE II.—J. G. T., a law-stationer, aged 43, who was sent to St. Thomas's Hospital by Mr. Sandwith of Wandsworth, was admitted under my care late in the evening of September 30th, 1880.

At the end of July, he was bitten in the hand by a dog, which at the time was not suspected of rabies. For precaution, however, it was given into the charge of a veterinary surgeon, and it died with symptoms of this disease a few days later. The patient then consulted a medical man, and had his wound excised. It healed in three weeks, and he troubled himself no more about the matter. He felt well; and no fear of hydrophobia crossed his mind.

On September 26th, that is, four days before admission, he felt drowsy, and for the first time complained of pain in his bitten hand, and up the corresponding arm. It was a stinging pain, beginning in the scar, and extending thence into the shoulder and axilla. He complained further of a choking sensation in the throat. These symptoms continued, apparently without much aggravation, until the morning of the 30th, when he experienced for the first time a marked difficulty in swallowing fluids. He had gone to the City to business every day, and he went even on the morning of the 30th; but increasing illness compelled him to return home in the middle of the day, when he took a dose of castor-oil, and sent for a doctor. The attempt to drink caused, he said, a stoppage in his breath, and spasms not only in his throat, but occasionally in the extremities. He had no difficulty in eating solids, and was able even to take bread and milk. He vomited once or twice in the course of the day.

The patient, when admitted, had a wild look, but was perfectly sensible, and spoke freely about his condition. He knew that there was a suspicion that he was suffering from hydrophobia, but he said that he did not share this suspicion, that he was not at all frightened, and he attributed the uncomfortable sensation in his throat to an elongated uvula. On examining his throat, the uvula was found long, as he had asserted, but nothing else abnormal was detected. There was no marked accumulation of saliva visible in his mouth or throat. The pupils were equal, dilated, sensible to light. He complained of feeling at one moment hot, at another moment cold. Temperature 99.2°; pulse 80, full and strong. He begged for something to gargle his throat with; but, on attempting to use some alum-gargle that was brought to him, a violent convulsive attack compelled him to desist. He said he felt very thirsty, and that he should like to drink; some water consequently was brought, the first sight of which induced some spasmodic contractions. He persisted, however, in his determination to drink. He brought the glass with manifest effort to his lips on more than one occasion, and on each endeavour to drink, violent paroxysms were excited. He managed, however, with difficulty to swallow a few drops at a time, but when he took a mouthful, it was immediately ejected with violence from his mouth. He was able to swallow solids; and it was found that cold fluids caused much more severe spasms than hot fluids. The slightest draught of cold air, even such as was caused by the movement of the bedclothes, brought on spasms; and for this reason, when he was being exposed for examination, he begged that the windows and doors might be closed. All attempts to swallow or to expectorate the mucus which collected in his throat were attended with slight spasms; and once, when some water was accidentally spilt on the floor, the same result ensued.

In the paroxysms, the muscles of respiration and deglutition were thrown into violent spasms; the muscles of the neck became rigid; the face became congested; and frequently the convulsive action extended to the rest of the trunk and to the limbs. He had been somewhat drowsy, and had one or two short naps during the evening. But at midnight he was very restless, and inclined to chatter. He still had a wild look; but he was quite sensible, said he was not at all frightened, and made the remark that we should be disappointed if we expected his case to be anything special. He complained of dryness of the mouth, and was continually crying out for a wet rag to moisten his lips with. The pain in the right arm continued; but there was no sign of inflammation in the neighbourhood of the wound.

October 1st. He was very restless during the night; but quieted somewhat after a dose of bromide of potassium and chloral—swallowed, though with difficulty, in a little warm water. He expressed himself as feeling better in the morning; and, though he acknowledged that he had felt a little frightened at so much fuss being made about him, he still maintained that his case was not serious, and that he should be cured in the course of a few days. During the morning, he frequently complained of pain in the cardiac region, with palpitation, and of nausea, but he was not actually sick. Mucus accumulated more abundantly in the mouth than it had done, and he frequently sat up in bed to expectorate. He remained in much the same condition during the day; and took a little warm pudding, and then swallowed a little warm milk. But towards night, he became much worse. He complained greatly of pain in the cardiac region, and of severe palpitation, and thought that his heart must be affected. Tenacious mucus now accumulated largely in his mouth and throat, which he was constantly trying to expectorate, and which hung in long strings from his lips; and the spasms had become so severe, that he was unable to swallow any kind of liquid. He passed urine on several occasions; and it was noticed that this act did not bring on convulsions, though the splashing of any other fluid would do so immediately. At eleven o'clock at night, I was accompanied in my visit to him by several other medical men. He was then highly excited in his manner, his look was wild, and his eye glanced restlessly about him. He had, in fact, the aspect and manner of a maniacal patient; he was obviously emotional, but he had no delusions; and his talk was rational, excepting perhaps that it was a little disconnected, and that he did not hesitate to express his opinions freely. He still talked from time to time of his condition, and endeavoured to persuade himself and others that he was not suffering from hydrophobia. At one moment he accused me of cruelty to him, because I had not seen him for some hours; the next moment he apologised, and said he really did not mean what he had said, and shook hands with me in a friendly way. Again, he reproached me angrily for having brought so many people with me to see him, and making a spectacle of him; and again he apologised. He was extremely restless; at one moment complaining of feeling very cold, at the next throwing all the clothes off him on account of the heat. It was noted that, during the spasms, his face became congested, and his hands and feet cold and livid. His thoracic and abdominal viscera appeared to be healthy. The urine was of high specific gravity (1046), acid, contained a large quantity of urates, and about one-fourth of albumen; no sugar.

It was determined to put the patient under the influence of curara; and the following notes were taken at intervals during the night, by the gentleman who sat up with him.

11.30 P.M. One-eighth of a grain of curara injected under the skin; no apparent effect. He begged for something to give him sleep. He was sensible, but excited. Much expectoration; mucus hanging in long strings from his mouth.

12.30 A.M. (October 2nd). One-fourth of a grain was injected. Pulse 80. About ten minutes after the injection, he exclaimed: "I feel paralysed; do not leave me until I go to sleep." He remained quiet, with few convulsions for about a quarter of an hour; but he was trying to keep quiet with the hopes of going to sleep. Respirations 48. He then became frequently and severely convulsed; and during the attacks, his eyes were fixed on the ceiling, his head was thrown back, and his body raised from the bed in an arched position, while he continued to beat his chest with his hands with much violence.

1.30 A.M. One-third of a grain was injected. Convulsions almost ceased in the chest and throat for ten minutes; but at the end of that time they returned with their former violence, excepting in the lower extremities. Pulse 100, irregular, fairly strong. He said he had a creeping sensation.

2.30 A.M. Half a grain was injected. At this time, the pulse was regular, and only 64.—2.45 A.M. He was lying quiet. At times, he drew a few deep noisy inspirations, followed by blowing expirations, which gradually diminished in force, depth, and rapidity, until they were scarcely perceptible. Then gradually the forcible respirations returned (Cheyne-Stokes breathing).—3 A.M. He remarked that the injection was again unsuccessful in procuring sleep. Pulse 100, irregular. Perspiring slightly. His legs were not numb, and he could move them freely. At 3.15 A.M., he brought up a large quantity of stringy mucus, which caused violent spasms.

3.30 A.M. Half a grain was injected. The prick of the needle caused general tremors. He moistened his lips frequently with rags dipped in warm water.—3.45 A.M. He was very restless, threw himself about in bed, beating his pillows continually; he got up hurriedly, and then threw himself down again.

He said we were only making experiments upon him with the injections, and that so far they were failures. Pulse 92, occasionally intermittent.—4 A.M. He wanted to get up and dress. He took up a newspaper, and read it for about ten minutes, when he threw it down, and beat his chest on account of spasms. Arching of the body backwards was present several times. Pulse 116, irregular.—4.30 A.M. He sat up in a chair by the fire, wrapped in a blanket.

4.40 A.M. Three-fourths of a grain were injected. Pulse 132, irregular. Respiration sometimes quick, at others laboured and slow.—4.45 A.M. He complained of giddiness, and said he longed for sleep. He expectorated some mucus, which brought on general convulsions.—4.50 A.M. He insisted on getting out of bed. He staggers very much; says he is easier.—5 A.M. He was sitting up in bed, and complaining of feeling cold.

5.30 A.M. Three-fourths of a grain were injected. Convulsions followed. Pupils dilated. Pulse 120, full, irregular. Temperature 102.4°. He rambled a little; said the curara had not yet taken effect.—6 A.M. Convulsions were very severe, attended with arching of the back. A little later, he made an attempt to drink a teaspoonful of fluid, which brought on violent convulsions. He then got up and sat on a chair by the fire, and remained there for half an hour or more.

6.30 A.M. One grain was injected. He was much excited, and at first refused to have the injection. Fifteen minutes later, he was complaining of abdominal pain, and tried to be sick. His speech was very abrupt. About 7, he made for the door of the room, and tried to get out. He struck the gentleman with him for trying to prevent him, and said he was not mad.—7.30 A.M. He thought he was at home. He continued under this impression, and at the same time wanted everyone to leave the room, in order that he might be left quiet after the injection. Very weak. He became extremely restless, continually wiping mucus from his lips, complaining of cold and of pain at the epigastrium. A poultice was applied at his request, but he immediately removed it, exclaiming: "It is too heavy; take it off." He asked for his clothes; expressed a desire to see an acquaintance who might help him to go up stairs. A little later he was talking of his wife and family, of the workhouse, and of his business going to ruin.

8 A.M. The injection was repeated.—8.30. Temperature 101.4°. He cried out that he had had no breakfast, that he was cold, that it was cruel, and he begged that a friend might be fetched. Then he had a severe attack of dyspnoea. A little before 9, he again exclaimed: "I'm cold; don't you know what it is to be cold?" He talked also of his family, and was constantly retching. Thought he was in an asylum; got up again and sat by the fire; and struck at anyone who opposed him.—9 A.M. He asked the sister if his wife was coming. "Tell her I'm here. Will she get me something to cover my legs with? Plenty of things upstairs." At 9.30, he had a violent attack of dyspnoea; and about this time he again tried to get out of the room. He had much frothy saliva about his mouth. He did not like strangers to be in the room; and told the house-physician (who had not been near him since late the previous evening) to go away, for he did not want him, and not to touch him.—At 10 A.M., I paid him a visit. He was evidently much weaker, and much more incoherent than he was when I left him the night before. He had spoken of me frequently during the night; but now said: "I will not shake hands with you; you are my servant." He was very anxious to be dressed; and as he had had this desire for a long time, I thought it best to accede. He told me to help him on with his coat, for I was his paid servant. He now believed that he was suffering from hydrophobia.

11.15 A.M. One grain was injected. It had little effect. He had resisted the last two or three injections and consequently they were not administered; but, on this occasion, he was persuaded to submit. He was continually rising from his chair, and walking round the room, though he was too weak to do so without assistance. The convulsions were not so severe as they had been, but the patient was much more exhausted; no numbness or paralysis in legs.—12 noon. He swallowed a little beef-tea, and afterwards some milk; the spasms attending the act were comparatively slight. This was the first fluid that he had been able to take for more than twelve hours. His friends thought he was better; but, though his spasms were less severe, his weakness had increased notably.

12.15 A.M. One grain and a half injected. Pulse very weak and irregular. Face congested; hands cold and blue; he was more sensible than he had been. The spasms, too, have much diminished, and he can drink a little fluid without difficulty. There is much mucus, however, in the mouth, which he has not sufficient strength to get

rid of. He was very restless, at one time getting up and walking about; then asking to lie down again. He gradually grew weaker; the pulse at the wrist became imperceptible; and he died exhausted and unconscious at 12.50 P.M., October 2nd. No priapism or erotic tendency was ever observed.

The *post mortem* examination was made on October 3rd. At that time, the body was extremely rigid, and the surface universally livid. The brain and spinal cord were, perhaps, rather soft, but presented no other naked-eye change. The fauces and larynx were somewhat congested, as also were the kidneys. But nothing else abnormal was discovered.

REMARKS.—I do not think much comment is needed on these cases. They were both of them typical in their history and in their symptoms. In both, there was the clear history of a bite by a mad dog. In both, the incubation period was, as is usually the case, of about two months' duration. In both, pain at the seat of injury was one of the earliest symptoms. In both, the main clinical phenomena were: general hyperæsthesia, with special sensitiveness to cold air and cold liquids, and spasms primarily affecting the muscles of respiration and deglutition; a mental condition resembling that observed in the early stage of acute mania; and rapidly developing asthenia, with extreme feebleness of circulation. Other phenomena, also generally present, were observed here, namely: febrile elevation of temperature, and scanty excretion of urine, which was of high specific gravity, and contained much albumen and abundant crystals of uric acid and oxalate of lime.

Both patients complained of thirst, but both experienced the usual distress in endeavouring to swallow fluids; and, partly on that account, partly because of the abundant secretion of tenacious mucus, were constantly hawking up phlegm, and discharging it from the mouth. It is noteworthy, however, that warm fluids were much less productive of spasms than cold fluids; and that solids could be taken without much difficulty. In the man, too, the inability to drink diminished very much before death.

The spasms were of the usual kind, beginning in the throat and respiratory muscles; and, for the most part, limited to those parts, though occasionally becoming general. In the man, the general convulsions were tetanic, and attended with arching of the back. The final convulsion in the case of the child, also, was tetanic.

The mental condition was of the same kind in both cases. There were hallucinations and delusions, no doubt; but these were, on the whole, slight, and came on late. The patients were rather in the condition of so-called "affective" insanity; the condition, as above stated, which generally precedes an outbreak of mania or melancholia. They were emotional, and variable in mood; suspicious, hasty, apt to take offence, and even to attack those offending them; but amenable to reason, and ready to apologise, and often manifesting feelings of kindness or affection. Their actions and speech corresponded; they were restless, constantly looking about suspiciously, constantly shifting their position, at one moment sitting up, at another lying down, at one moment covering themselves with the bedclothes, at another throwing them off; they had a tendency to chatter without ceasing, to express themselves abruptly and somewhat incoherently, and to make more or less pertinent remarks on persons and things about them, remarks which were sometimes humorous, but not unfrequently offensive. The man, not unnaturally, was much inclined to talk about his own condition; and, as will be recollected, constantly maintained that he was not suffering from hydrophobia. There can be no doubt, however, that, so long as he was able to command his thoughts, this constant denial really expressed his constant fear that he had the disease.

Extreme asthenia was a characteristic of both cases. The man, doubtless, died mainly of the asthenia. But the child, though suffering from excessive exhaustion, died in a convulsion.

No lessons as to medical treatment are taught by either case. In the former, no special line of treatment was pursued; and, in the latter, though curara was employed, it had little effect; and we found out subsequently that it had been in stock for some little time, and that there was reason to believe it had deteriorated in quality.

MOUNTAINEERING in winter is becoming popular, and many people, the *Athenæum* says, will be glad to hear that Mrs. Burnaby (the wife of Colonel F. Burnaby) is about to publish an account of her remarkable ascents, during the past winter, of Mont Blanc, the Aiguille du Midi, Col du Chardonnet, etc., and her adventures in connection therewith. The work, illustrated from photographs taken by the author, will be issued very soon, under the title of "The High Alps in Winter; or, Mountaineering in Search of Health."

TWO CASES OF PLACENTA PRÆVIA.

By J. MACKENZIE BOOTH, M.A., M.B.,

Physician to the Aberdeen General Dispensary.

THE following are a few particulars of the second and third of three cases* of placental presentation, occurring, singularly enough, in a rather limited midwifery practice within the space of three years. The first of these was that of a married woman, aged 30, to whom, in the absence of a brother practitioner, I was called on January 9th, 1882. She had had one child three years before, the labour being a normal one, and since that time had enjoyed fairly good health. She was now in the eighth month of her second pregnancy, and, except that she had frequently suffered from attacks of mental depression, had been well up till this time, when labour-pains suddenly came on, accompanied by severe flooding. She fainted while medical assistance was being sent for. On arriving, I found the os well dilated and relaxed. The hæmorrhage still continued, but the pains had ceased. The placenta was adherent round three-fourths of the cervix, and had evidently been partially torn away from the remaining fourth. A wineglassful of whiskey was administered. Turning was easily effected, and a still-born child delivered, the head passing with some difficulty. Ergot was given, and a compress and bandage applied over the uterus. The mother, though extremely weak for some time, ultimately made a good recovery.

On the forenoon of March 3rd, 1883, I was called to see a dispensary patient, Mrs. S., a woman aged 32, the wife of a poor artisan, and the mother of seven young children. She stated that she was in the seventh month of her eighth pregnancy; that, up till a fortnight ago, she had been well, and assisting her husband in his work; that then, after carrying home a hundredweight of cork, she had been suddenly prostrated by a severe flooding, which had persisted more or less since; and that, this morning, she had again fainted from an active recurrence of the hæmorrhage. The midwife who had attended her in her previous confinements told me that, in all seven, she had had very easy labours, and was wont to get up, in defiance of her orders, and sit at the fireside immediately after delivery; nor had she ever suffered from this practice. So, thinking she would get better with a little rest, she had on this occasion delayed calling in medical aid till she was considerably reduced by loss of blood.

On vaginal examination, the os would scarcely admit the tip of the forefinger, and the cervix had a doughy feel. The hæmorrhage, though much less active, still continued, but there was no uterine contraction. The pulse was over 100, and very weak. Thirst was intense, and the patient was constantly having draughts of cold water for its relief. The clothes and bedding, which were drenched with blood, showed how profuse had been the previous hæmorrhage. There had been no foetal movements perceptible for some days. The only article available for the purpose, a pocket handkerchief, was introduced as a vaginal plug; perfect rest and oft-repeated liquid nourishment enjoined; and a mixture containing sulphuric acid given to relieve the thirst. The midwife was also directed to have a strict watch kept, in case of a return of the bleeding.

The same evening, about nine hours after, I was hastily summoned by one of the children, who said that her mother was dying. There had been another very severe attack of hæmorrhage, during which the patient fainted, and she was unconscious and pulseless when the midwife arrived. When I reached the house she had rallied somewhat, but was incoherent, and only partially conscious, calling on those around her to give her water to drink and to bathe her face and hands. Examination showed the os to be about the size of a crown piece, part of the placenta protruding, and the uterine tissue much relaxed. Finding the os so dilatable, and considering the persistent and severe discharge, and the likelihood of the child's being dead, I determined to attempt immediate version and delivery as the best chance for the mother's safety. The placenta was adherent all round the cervix save at one point in the right anterior quadrant, where it could be pushed aside by the fingers, the adjacent adhesions being torn by the hand as it was being passed up. The membranes being torn, a foot was grasped, but, owing probably to the small amount of liquor amnii, version could not be effected. At this juncture, too, from the presence of the hand in the uterus and the efforts at version, the patient roused up and threatened to get unmanageable, calling on her husband and ordering us to leave her. Chloroform was soon got, and a few whiffs sufficed to dispose of the patient's objections. Turning was then with difficulty enough

* The first is noticed in the JOURNAL of January 8th, 1881, p. 52.