The brain is large in proportion to the size of the body. The convolutions on its surface are small, but very numerous. Some of the sensory organs are, however, peculiarly modified. The lacrymal glands are very small, situated on the outer sides of the eyes. There is no lacrymal apparatus for conveying the tears from the eyes. The eyeball itself is flattened from before backwards, and has the sclerotic coat much thickened, probably to resist pressure; the cornea is flattened. There are four recti and two oblique muscles. The eyelids are stiff, and cannot be closed with the same facility as in other animals. There is no nictitating membrane or third eyelid present.

THE GREENLAND WHALE (*Balæna mysticetus*).

Although the Greenland whale has been hunted by sailors from this country for more than two hundred years, little was known of its anatomy till quite recently. Hunter, who was very anxious to procure a skeleton, only succeeded in getting its skull; and it was not till about twenty years ago that a skeleton was first procured for this Museum through Professor Reinhardt. When one of those animals is captured, it is brought to the side of the ship, and the blubber and whalebone are secured; the carcase is then allowed to drop into the water. Its ponderous size, and the consequent great cost of transport, have been serious obstacles to the investigation of its anatomy. Eschricht first succeeded in obtaining skeletons from the Danish settlement of Holsteinborg, on the west coast of Greenland, where the fishing is prosecuted, and had them prepared by the inhabitants. They were then sent to the Copenhagen Museum, from which one was purchased by the College, and mounted in the Western Museum in 1863. The name *Balæna mysticetus* was given to this species by Linnaeus, *mysticetus* being the name applied by Aristotle to a large whalebone-whale described by him, but which probably was an entirely different animal. The term Right Whale is applied to it by the whalers, from its yielding a much larger quantity of oil and whalebone than other species; but there are several species of large whales to which they give the same name. It was first discovered by the Dutch, in Arctic seas north of Europe, about the end of the sixteenth century, when they were trying to find a north-east passage by Spitzbergen to China. The first expedition to the whale-fishing set out from London in 1611. From that time the animals were hunted, till they became extinct on the northern coasts of Europe. Now they are almost entirely confined to Baffin's Bay, the west coast of Greenland, and the extreme North Pacific. They seem to inhabit the seas in the regions of perpetual ice all round the North Pole; though they have been found as far south as the Labrador Coasts of North America. They never occur on our coasts.

The most striking peculiarity of this whale is the large size of its head and of the cavity of its mouth. It differs from the *Balænoptera* in having no dorsal fin, in there being no folds of skin under the lower jaw and on the under part of the body, and in its pectoral fins being larger and broader. Its body is of a dark colour, but the chin is mottled. The lower lip is of large size. The great size of the head and mouth is to enable the animal to procure a sufficient quantity of food, which consists of the minute cephalopods, pteropods, ctenophora, and medusæ, which are extremely abundant in the Arctic Seas.

The Skeleton.—The anterior part of the head is greatly elongated and arched; this is due to the great length of the premaxillary and maxillary bones, and to the curved shape of the former. The general conformation of the back of the skull is similar to that of the other whalebone-whales. The foramen magnum is directed upwards and backwards. The occipital bone is very large, and projects so far forwards as to completely cover the parietals. The brain-cavity is comparatively small. The nasal bones are well developed. The rostrum is formed by the vomer, maxillæ, and præmaxillæ. The great breadth of the head is produced by the enormous widening of the frontal bones that takes place in this species. The orbits are situated at the extreme ends of the frontals. Between the brain and the nasal cavities is a great mass of bone, in which are situated the nasal passage and the rudimentary turbinal bones. This bony mass has been described in a former lecture as being present in the *Balænoptera*; but in the *Balæna* it is of very much larger size, as are also the nasal passage, the turbinated bones, and the canal for the olfactory nerve. The length of the head is about one-third that of the whole body, which probably never exceeds more than about fifteen mètres (forty-eight feet). The skeleton articulated in the museum measures 13.93 mètres in a straight line from the tip of the rostrum to the terminal caudal vertebra, and the head measures 5.18 mètres in length.

The whalebone is developed to a much greater extent in this than in any other kind of whale. The mass of it attached to each side of the upper jaw consists of about three hundred plates, each of which has recently been discovered to have a branch from the superior maxillary nerve passing to it. In front, it is deficient; that is to say, it is not con-

tinuous around the anterior extremity of the rostrum, as in the *Balænoptera*. The blades situated about the centre of the jaw are the longest; towards each end, they become shorter and somewhat narrower. The hairs on their sloping internal margins are finer and longer than in the *Balænoptera*. Till recently, it has been difficult to understand how the immense plates of whalebone, which exceed in length by one-third the height of the skull, from the top of its arch to the floor of the mouth, could be packed away when the mouth was shut. With the assistance of those who have seen the animal alive, it has been satisfactorily shown that, when the jaws are approximated, the plates, which are very flexible, are bent backwards towards the throat. As the mouth is opened, they straighten, and, when fully opened, fill the whole space between the upper and lower jaws. When the animal is feeding, therefore, the water, charged with myriads of small invertebrata, passes into the mouth at the anterior part, where the whalebone is deficient and short; and, after being strained of the food it contains, is driven out between the long middle and the posterior plates.

TWO CASES OF CEREBRAL EMBOLISM, MARKED BY THEIR RAPID COURSE AND FEBRILE SYMPTOMS.

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CASE I.—Rachael E., aged 13, was brought into St. George's Hospital, on January 16th, 1879, with symptoms which were suggestive to those who first saw her of either tubercular meningitis or typhoid fever. It was said that she had been quite well until two days before, when she woke up in the night with severe pain in the head generally, rather than at any particular spot, and in the region of the heart. She afterwards complained of "pins and needles" in the left arm and leg; and the mother noticed that the child could not move her left hand. No squinting was noticed, but the eyelids were thought to droop. She did not appear to recognise those about her. No affection of speech was noticed previously to her admission. There was no vomiting, excepting once after some ginger-beer, and no constipation. There had been slight bleeding at the nose.

On admission, she was delirious; tossing about wildly, and struggling much when lifted for the purpose of examination. The eyes were closed, the pupils dilated and equal; no paralysis could be made out. She could not be got to swallow food, biting at the spout of the feeder when it was presented to her. She appeared to be generally unconscious of her surroundings, and was for the most part speechless, though she used a few words articulately, and not wholly without correctness of application. She often put her hand to the right side of her head with the cry, "Oh, dear!" She repeatedly called "Mother", though, when spoken to by her mother, she gave no sign of recognition; and once, shortly before her death, she said "No, thank you", in refusing some ice which was offered to her. I mention these details to show that her speechlessness was more akin to delirium than to aphasia.

She vomited yellow matter frequently, independently of food; there was much grinding of the teeth; the pulse was quick and full; the temperature 102°, both morning and night. On listening to the heart (a matter of some difficulty by reason of her incessant movements), a loud mitral systolic murmur was heard; and, upon this, a further inquiry into her antecedents elicited the statement that she had been a patient in the hospital, nine years before, with vomiting of blood and bleeding at the nose; that, since that date, she had been, as was thought, the subject of heart-disease; and that the epistaxis had recurred, under mental excitement, three months before her admission.

With regard to diagnosis, typhoid was contraindicated by the height of the fever at so early a date; tubercular meningitis, by the abruptness of the attack. Taking the concurrent circumstances into consideration, I had no difficulty in forming the conclusion that the mischief was cerebral embolism; and that its declaration by general fever, rather than by hemiplegia, or other local paralysis, was probably due to the emboli being disseminated rather than localised. Bicarbonate of potash and nitre were ordered in this view, and the patient was fed by the rectum, as it was impossible to get her to swallow. The child rapidly grew worse; she became quite unconscious; the masseters were hard, and the teeth firmly clenched; the chest became full of loud râles; there was much exaggerated thoracic movement, and evidence of dyspnoea; the pupils became widely dilated, and the eyes quite insensitive; and she died on the day after her admission, the fourth day of her illness.

On *post mortem* examination, it was found that the heart was exten-

sively diseased; it weighed eleven ounces. The mitral and aortic valves presented thickening of old date, and there were two rough fibrous patches covered with fine granular fibrine—one on the wall of the left auricle, the other on that of the left ventricle. The meningeal vessels were full of blood, and the brain in general slightly congested. Upon the surface of the pia mater were numerous minute red spots, some consisting obviously of small extravasations, requiring a magnifying glass to display their character. These small spots of hæmorrhage were always disposed upon the course of an artery; and it was made out with regard to many of these, that in the artery, just where the point of blood was outside it, was a minute clot of decolorised fibrine. The minute spots of hæmorrhage were on or in the substance of the pia mater; they had no tangible thickness. A few very minute embolisms were found in the substance of the brain; but the larger arteries were examined in vain for evidence of any larger obstruction. There was no softening. The appearances presented by the brain are shown in a drawing, for which I have to thank my friend Dr. Drewett. I need not describe the other organs in further detail than to say that the lungs were congested, and that well-marked embolic blocks were found in the liver, spleen, and kidneys.

CASE II.—The second case is nearly parallel to the first. The subject of it was a girl named Constance S., aged 18, who came under my care at St. George's Hospital on April 9th, 1879. She had had the usual infantile complaints, but never rheumatic fever, so far as was known; and passed for well until three days before admission. On Sunday, she was noticed as pale. On Monday, she was giddy, drowsy; had severe pain in the frontal region, and vomited whenever food was taken. On Wednesday, she was very feverish, with a temperature, as was reported, of 105°, and on this day was brought to the hospital. She had hitherto been perfectly sensible.

On admission, she lay in a drowsy condition; from which, however, she could be easily roused. The skin was hot (temperature 104.8°), dry, and dusky. There was much intolerance of light; the eyelids were partially closed; the pupils contracted and sensitive. There was external strabismus of the right eye; but no other evidence of paralysis could be detected. There was slight frontal headache, but no twitching or convulsion. The pulse was at the rate of 120; the tongue red in the centre and at the tip; elsewhere coated with white. The urine presented a trace of albumen. There was no diarrhoea; no abdominal fulness or gurgling; no typhoid spots. Although there was nothing to draw attention to the state of the heart but the cerebral symptoms, a loud systolic mitral murmur was detected on examination, together with an excess of impulse and a marked præcordial thrill. The sudden beginning of the febrile symptoms, their rapid advance, the co-existence of the heart-disease, and the close resemblance which this case presented to the one previously recorded, led, as in that case, to the diagnosis of disseminated cerebral embolism, and to the use of alkalies; bicarbonate of potash being ordered in doses at first of eighty grains every three hours, together with carbonate of ammonia.

Next day, she was in much the same condition, except that there were paroxysms of severe pain in the frontal region, and more or less constant aching behind the head. Bronchitic wheezing was heard over both lungs. The temperature was only slightly lower, ranging from 103.2° to 104.6°; sordes collected about the mouth; the tongue became red and dry; and the general aspect of the patient was almost exactly that of typhoid. No *tache cérébrale* could be elicited. The urine was now alkaline. The potash was diminished, and quinine added. Without any further symptoms or abatement of the fever, the drowsiness deepened into insensibility; and in this state she expired on the morning of April 12th, on the seventh day of the disease, the third after admission.

On *post mortem* examination, the heart was found to be the subject of both old and recent disease. The mitral valve was greatly thickened, and its opening narrowed by about one-third. On the auricular surface was a patch of roughness due to granular fibrine; and at this position was attached a long thin semi-gelatinous vegetation, which hung loosely from the valve, and was probably more recent than the granular fibrine at its base, and dated, perhaps, not much before the completion of the act of death. On exposing the membranes of the brain, a number of small hæmorrhages, which varied in size from a pin's head to a sixpence, were found on the pia mater under the arachnoid, mostly over the convexity of the brain. In the centre of these, a small white speck could be seen, which minute examination proved to be a small pale clot within an artery. In connection with several such spots, were small localised effusions of yellow lymph on the pia mater external to the affected vessel. There was no lymph at the base, nor any on the convexity, except in connection with the vessels affected as described. These changes were confined to the surface of the brain; all the internal parts were natural, as far as could be seen. There was no soft-

ening, nor any excess of blood in the ventricles. The lungs were congested. Many small embolic blocks were found in the spleen, with one patch of softening, which apparently had a similar origin. In the liver were several minute white deposits, surrounded by congestion, evidently of the same nature; and several embolic obstructions were found also in the kidneys.

REMARKS.—The two cases were similar in almost every particular. The subjects of both were girls; the leading symptoms in both were high fever and delirium, without any—or with scarcely any—definite paralysis, or the aphasia so common with cerebral embolism. The temperature in one case was always between 102° and 103°; in the other, generally between 103° and 105°. In both, there was much evidence of pulmonary congestion with the progress of the disease, and rapid death by coma. With both, there was a resemblance to meningitis in the headache, the vomiting, and the mental disturbance; while in neither was there the constipation which is general at least with the tubercular form of this inflammation. In both, the resemblance to a specific fever, especially to typhoid, was superficially evident; but the fever was too high, and the cerebral embarrassment too great, for so early a date in the course of that disease. The resemblance to an acute specific fever was indeed striking, and might have been misleading, had the cases been observed hastily, or in disregard of the concomitant circumstances. The pathological condition was, in a word, the distribution through the brain of embolic dust, which was so fine as to traverse without hindrance the larger arteries of the base and substance, to be finally arrested in the minuter channels of the pia mater.

OPTIC NEURITIS IN CHLOROSIS.*

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THE occasional occurrence of optic neuritis in chlorosis—due chiefly, at least, to the state of the blood—is a fact of great interest both to the ophthalmic surgeon and the physician, which has scarcely received due attention.

In my work on *Medical Ophthalmoscopy*, I have recorded one case which is certainly, and another which is probably, of this character. I have now only one fresh case to narrate, but my apology for bringing it forward is, that its history is very significant.

One of the cases which I have already published has had lately a second slight attack, and I will, therefore, briefly narrate it first.

CASE I.—A girl, aged 17, came under treatment in November 1878, with all the well-known symptoms of chlorosis; amenorrhœa, dyspnœa, and extreme pallor. The hæmoglobin was reduced to 30 per cent. of the normal, the blood-corpuscles being 60 per cent. She complained of failure of sight, and near vision was found to be, right $\frac{1}{2}$, left $\frac{1}{4}$. Colour-vision was normal. There was $\frac{1}{2}$ hypermetropia. The ophthalmoscope showed distinct optic neuritis. The discs were red, with edges blurred on all sides to direct examination, to indirect examination on all except the temporal side. There was sufficient swelling to alter the curve and reflection of the veins. The patient was treated with iron, and very slowly improved. As the anemia lessened, the neuritis slowly subsided, and vision improved to $\frac{1}{2}$ each eye (without correction). When she left the hospital, on February 5th, the discs were much clearer. All swelling had disappeared; the edges could be seen in almost the whole circumference, but were scarcely so sharp as normal. She was seen again five months later. She still looked pale, and the hæmoglobin had fallen to 65 per cent., the red corpuscles being 79 per cent. Vision for near objects was now normal (1) each eye. The discs were perfectly clear and sharp; the cup, however, being scarcely so white as is common in a normal state. The catamenia were still absent. They returned in August, and continued regular during the next four months. During this time, the patient was not seen. In the beginning of February of 1880 she applied for advice, having become weaker. She was again extremely pale, and had only 30 per cent. of the normal amount of hæmoglobin, and 46 per cent. of corpuscles. She complained of pain at the back of the eyes, ringing in the ears, shortness of breath, and the usual symptoms of anemia. The optic discs again presented blurred edges, with slight prominence, and the physiological cups were concealed; sight was unaffected. Under the chloroxide of iron, she rapidly improved; in three weeks' time, the left disc had entirely cleared, and the right had almost cleared. A month later, she left the hospital, the hæmoglobin having risen to 80

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