the blood-glands was traced to William Hewson (1739-1774), who was the first to show that the so-called blood-glands were concerned in one function, namely, in the elaboration, or, as he called it, the "secretion" of blood. For many years Hewson's work had no attention paid to it, but its excellence was brought to light in consequence chiefly of the discovery, by Virchow and Hughes Bennett, of leucocythæmia, in 1845.

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 IV.—DEVELOPMENT OF THE LAMPREY. (*Continued.*)

On the ventral aspect of the head, immediately in front of the mouth, is the olfactory pit. It is from its beginning unpaired, and in the larva just hatched forms a shallow groove of thickened epiblast at the base of the fore-brain. Its ventral part is gradually prolonged into a pit, which extends backwards beneath the brain, nearly up to the infundibulum.

On the side of the head, nearly on a level with the front side of the notochord, is the eye. It consists of a very shallow optic cup with a thick outer or retinal layer, and a thin inner or choroid layer. In contact with the retinal layer is placed the lens, which is formed by an invagination of the skin, to which it is still attached at the time when the larva is hatched. The eye only differs at this stage from that of other vertebrates in its extraordinary small size, and the rudimentary character of its constituent parts. The auditory sac is a large vessel placed at the side of the brain, opposite the first persistent branchial pouch. The brain is formed of the usual vertebrate parts, but it is characterised by the very slight cranial flexure. The fore-brain consists of a thalamencephalon and an undivided cerebral rudiment. To the roof of the thalamencephalon is attached a flattened sac, which is probably the pineal gland. The floor is prolonged into an infundibulum, which contains a prolongation of the third ventricle. The lateral walls of the cerebral rudiment are much thickened. Behind the thalamencephalon follows the mid-brain, the sides of which form the optic lobes, and behind this again is the hind brain. The notochord is continued forward in the head to the hinder border of the infundibulum, and is slightly flexed anteriorly.

From the hinder border of the auditory region to the end of the branchial region the mesoblast is dorsally divided into myotomes, which nearly correspond in number to the branchial pouches. The head of the larva differs strikingly in general appearance from that of other vertebrates. This is due to the want of a pronounced cranial flexion in the former, a want probably caused by the small development of the fore-brain. The stomodœum of Petromyzon is very large. In the region of the trunk there is an uninterrupted dorsal fin, continuous with a ventral fin round the end of the tail. There is a well-defined body-cavity which is especially dilated in front, in the part which afterwards becomes the pericardium. In this region is placed the nearly straight heart, divided into an auricle and ventricle, the latter continued forward into a bulbus arteriosus. The myotomes are very numerous, are separated by septa, and have a wavy outline. The notochord is provided with a distinct sheath, and below it is a subnotochordal rod. The alimentary canal consists of a narrow anterior section free from yolk, and a posterior region, the walls of which are largely swollen with yolk. The anterior section corresponds to the region of the œsophagus and stomach, but exhibits no distinct parts. Behind this, the alimentary canal dilates considerably, and on the ventral side is placed the opening of a single large sac, which forms the commencement of the liver. The posterior part of the tract constitutes a kind of yolk-sac, the vertical walls being thick, and formed of several layers of yolk-cells. The excretory system consists of two segmental ducts, each connected in front with a well-developed pronephros, and with about five ciliated funnels opening into the pericardial region of the body-cavity. The mouth undergoes considerable change during the course of development. The upper lip becomes much more prominent, forming, of itself, the anterior end of the body. The opening of the nasal pit is, in this way, relatively thrown back, and is at the same time caused to assume a dorsal position. On the inner side of the oral cavity a ring of papillæ is formed. Dorsally, these papillæ are continued forward as a linear streak on the under side of the upper lip.

The gill-pouches become gradually enlarged, but it is some time before their small external openings are established. Their walls, which are entirely lined by hypoblast, become raised in folds forming the branchial lamellæ. The walls of the head-cavity between them become resolved into contractors and dilators of the branchial sacs. The extrabranchial basketwork becomes established very early. On the dorsal walls of the branchial region, a ciliated ridge is formed. The primitive hepatic diverticulum grows rapidly outwards, and forms a tubular gland. The opening of the duodenum changes from a ventral to a lateral or even dorsal position. The ducts lead into a gall-bladder imbedded in the substance of the liver. Ventrally the liver is united with the abdominal wall, but laterally passages are left by which the pericardial and body-cavities continue to communicate. The yolk-cells doubtless supply nourishment for the growth of the embryo; and although in the anterior part of the intestine they become, to some extent, enclosed in the alimentary tract and break up, yet, in the posterior part, they become wholly transformed into the regular epithelium of the intestine, a condition which does not obtain in other vertebrates. The opening of the olfactory sac becomes narrowed and ciliated; it is carried on to the dorsal surface of the head. The lumen of the sac is well developed. No maxillary arch proper is developed. The larval stage of the lamprey seems to correspond to the adult stage of the development of the hag-fish; while, as will afterwards be seen, the adult lamprey reaches only to the state of development in which we find the larval frog.

THE CAUSE OF THE WAVY OR INTERRUPTED BREATH-SOUND OF INCIPIENT PHTHISIS.*

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BRIEFLY stated, my view of the causation of the wavy or interrupted breath-sound of incipient phthisis is, that it is due, not to any inequality of the breath-sound itself, but to the breath-sound having here and there superadded to it less or more of the cardiac sound, which, by the partial pulmonary consolidation, is conducted with abnormal force.

When the pulmonary tissue is quite normal, and when the heart is beating with usual force, the cardiac sounds are not heard at all over the apices of the lung during inspiration. When there is considerable pulmonary consolidation, or when the heart is beating very forcibly, or when there is simultaneously pulmonary consolidation and cardiac overaction, then the heart-sounds may be quite distinctly heard through the inspiratory breath-murmur. But intermediate between these two conditions is a third, in which occurs the so-called wavy or interrupted breath-sound. Here the consolidation of the lung-tissue is but very slight; and, while conducting the cardiac sounds with more than usual ease, so that in the inspiratory pause they are quite distinctly heard at the apex of the lung, still the inspiratory sound is in loudness so much more distinct to the ear, that it masks the cardiac sounds; so that, during the continuance of the inspiratory sound, they are not distinctly heard *as such*, but to the ear it only appears as if the inspiratory sound were at these points of time abnormally loud; it

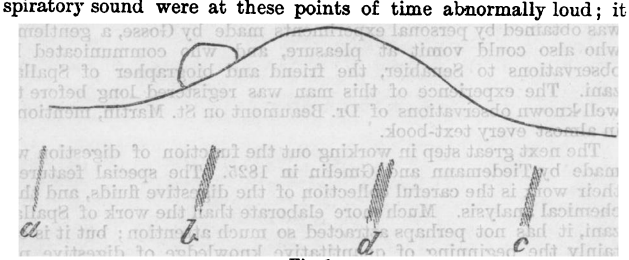

Fig. 1.

thus seems wavy or jerky. If, for example, under such circumstances of slight increased conductivity of the lungs, a cardiac systole occurred in the middle of each inspiration, then the inspiratory murmur would be augmented in the manner shown in Fig. 1.

* Read in the Section of Medicine at the Annual Meeting of the British Medical Association in Worcester, August 1882.