XVII. *A Description of the Anatomy of the Sea Otter, from a Dissection made November 15th, 1795, by* Everard Home, *Esq. F.R.S. and Mr.* Archibald Menzies. *Communicated by* Everard Home, *Esq.*

Read May 26, 1796.

THE subjects from which the following description is taken, were procured from the natives on the west coast of America, near Queen Charlotte's isles, by Mr. ARCHIBALD MENZIES, surgeon in the navy, and naturalist to the expedition fitted out by government for making discoveries, under the direction of Captain VANCOUVER.

The sea otter is not confined to this particular situation; it was met with in the course of the voyage every where along the coast, from 30° to 62° north latitude, and sometimes even an hundred leagues out at sea.

Two sea otters were examined, both of them males; one was a cub not old enough to leave the mother, the other appeared to be full grown.

A Description of the external Appearances.

The large one measured four feet four inches from the nose to the extremity of the tail. The body appears a little compressed, and is nearly of the same thickness throughout; its circumference is two feet four inches and an half.

The colour of this animal varies in different subjects, but in general the head and neck are grey, or of a silver colour; the back, sides, legs, and tail, black and glossy; in some, the longest hairs are tipped with white, which gives them a beautiful greyish cast; the breast and belly also vary from a silver grey, to different shades of light brown. The long hairs shine with a brilliant gloss, but the short fur is exceedingly fine, soft, and thick set; and its colour is either a light chesnut-brown, or it has a silver hue, and a beautiful silky gloss.

In the cub state, the hair is a long, coarse, shaggy fur, of a brown colour, destitute of any gloss; but as the animal grows up the fur becomes finer and more beautiful.

There are two nipples, one on each side of the sheath of the penis, nearer to the anus than to the external orifice of the sheath.

The sheath of the penis does not project beyond the skin of the neighbouring parts; its external orifice is seven inches from the anus, but the sheath itself extends an inch and half further on under the skin of the belly; by which means the penis, when inclosed in it, has its point more effectually defended from injury.

The head is somewhat compressed, and small for the size of the animal. The nose and upper lip are very muscular, and protrude about an inch and half beyond the gums and lower lip. The eyes are small, and placed directly over the angles of the mouth, about half way between the ears and the tip of the nose.

The ears are nearly naked, black, slightly notched at the ends, and about an inch long; they are six inches removed from the tip of the nose.

The whiskers are in great number, they are white and strong, they arise from the upper lip on each side of the nose. There are a few weak long hairs on the eyebrows.

In the upper jaw there are six conical incisor teeth, regularly placed; of these the middle ones are the smallest. Two strong conical fangs, $\frac{3}{4}$ths of an inch long, measuring from the edge of the gums; on each side there are two small obtuse pointed teeth, of which that next the fang is much the smallest; and two broad molares with very irregular grinding surfaces.

In the lower jaw there are four incisores, flatter than those in the upper; two fangs, shorter than the upper ones; and on each side two small teeth and three molares, similar in appearance to those in the upper jaw.

The fore legs are short and strong, with palmated feet; each foot has five toes. They are covered with a thick black fur, which has a fringe of the same colour round the edge of the sole of the foot, where the fur terminates.

The hind legs, when stretched backwards, reach nearly to the end of the tail, and are well adapted for swimming, having five long wide-spreading palmated toes with claws, of which the innermost is the shortest; they measure across eight inches, and are completely covered with fur, except a small spot under the extremity of each toe. The claws are of a light colour, and channelled on the under surface; those on the fore feet are small, and placed so far back that they seem of little use but as a defence for the upper part of the toe; those on the hind feet are stronger, and project beyond the toes.

The tail is flat, and tapers to a sharp point; it is covered with a thicker short fur than any other part of the animal.

A Description of the internal Parts.

The panniculus carnosus, which lies immediately under the skin, is very strong, and extends over the greatest part of the body.

The tongue is four inches long, and rounded at the end, in which there is a slight fissure, giving the tip a bifid appearance. The papillæ on its surface are soft; they are long towards the root, but less so near the tip.

The os hyoides, thyroid, and cricoid cartilages are small for the size of the animal, and weak in their texture. The cricoid cartilage is not a circular ring, but made up of two equal parts, united anteriorly; their lower edge at this union forms an acute angle, the two sides pass a little down upon the trachea as they go round it; and the lower edge laps over the upper annular ring of the trachea.

The thyroid gland is small, and divided into two parts.

The epiglottis is short, and its edges are attached by means of a ligament to the inner side of the thyroid cartilage. The passage of the glottis is small.

The rings of the trachea are circular, and disunited behind, so that their edges meet, and when pressed upon, they lap over each other, being bevelled off for that purpose. Towards the bifurcation of the trachea, the space behind, which is not occupied by the cartilaginous ring, is much increased. This space is occupied by a muscle whose principal fibres are transverse. The trachea is very elastic in a longitudinal direction: seven inches of its length being readily elongated to $10\frac{1}{2}$, and immediately upon being left to itself it contracts to its former state.

The lungs onthe right side have three lobes, two large and

one small azygos lobe; the lower lobe sends a process between the pericardium and diaphragm. On the left side there are two lobes. The lungs were completely empty, so as readily to sink in the spirits in which they had been preserved; the cells are very small, and so elastic that they are difficultly expanded, and readily collapse.

The anterior mediastinum is of considerable breadth, but free from fat, consisting of nothing besides the duplicature of the pleura.

In the fœtus there is a very large thymus gland, convex on its external surface, and concave upon the other.

The heart is inclosed in a thin pericardium, is rather short, free from fat upon its external surface, and rounded at the apex. The ventricles have no communication between them, but the foramen ovale between the auricles remained open; the passage was, however, so oblique, that it must have acted as a valve; it admitted a crow quill. In the fœtus it was less oblique. The structure of the heart, and the valves of the aorta and pulmonary artery, are the same as in other animals. There were no remains of the canalis arteriosus.

The aorta had nothing unusual in its appearance, but the vena cava descendens is very large; when slit open, its breadth is $5\frac{1}{2}$ inches.

The œsophagus is small for the size of the animal.

The stomach is bent upon itself, the pylorus being on a line with the entrance of the œsophagus, and not at a great distance from it. The cardia does not project much into the left hypochondre; and that half of the stomach next the pylorus is much smaller than the other. The coats are thin. The internal surface is free from rugæ; the posterior portion is

smooth, without any appearance of glandular structure; the anterior portion is more vascular and villous. At the pylorus there is an oval part of the internal surface of a dark colour, and rougher or more villous than the rest of the stomach, with a determined edge; the small end of the oval extends about half an inch beyond the pylorus into the duodenum; the larger end goes some way into the stomach, and extends chiefly over the posterior surface, also a little way beyond the great arch anteriorly, covering about half the breadth of this part of the stomach; it is nearly as long again as it is broad. This part is probably glandular; it was only seen in the young subject, which from the smallness of its size was more perfectly preserved, and its internal parts better fitted for anatomical examination. At the pylorus there is the usual thickened valvular appearance.

The stomach was entirely empty, and in a very flaccid state.

The duodenum makes a considerable bend downwards on the right side before it crosses the spine, to become a loose intestine; there is no cœcum or difference of size in the intestines, they are all strung upon the mesentery till within 15 inches of the anus; this part of the gut crosses the spine above the root of the mesentery, and passes down to the anus. The intestines have no valvulæ conniventes; they were 52 feet long, which is 12 times the length of the animal. In a common otter, the intestines are only $3\frac{1}{4}$ times the length of the animal.

In a common otter two bags are found at the anus, but there are none in the sea otter.

The mesentery is 7 inches broad, and its lower part, which may be called meso-rectum, is only five inches in breadth.

The mesentery is thin, and has a great many blood-vessels which are accompanied with fat. There are no lymphatic glands upon the general membrane, but a cluster of very large ones close to the root of the mesentery. The lacteals appear a little larger than in the human subject, but the circumstance of the animal having been two years in spirits, was very unfavourable for their examination.

The omentum is a thin reticular membranous double bag, covering the whole of the intestines; it is attached anteriorly to the great curvature of the stomach, but not to the duodenum; posteriorly to the loins.

The liver is made up of five lobes, besides the lobulus Spigellii; three on the right of the falciform ligament, two on the left.

The gall-bladder is found in the usual situation, is bent in the middle upon itself, and is 6 inches long. The cystic and hepatic ducts unite at the external surface of the duodenum, forming a common canal, or ductus communis cholidochus, about an inch and half long, of an oval shape, with an irregularly rugous internal surface, placed between the muscular coat and the internal membrane of the intestine; it opens into the duodenum by a projecting orifice $2\frac{1}{2}$ inches from the pylorus.

The vena portarum is very large, and the passage behind the ducts of the liver into the cavity of the little epiploon is also large.

The pancreas is situated across the spine behind the stomach, it is not confined within the usual limits, but extends along the posterior membrane of the omentum. It is subdivided into a number of small parts, of an oval shape, all at a certain distance from each other, united by blood-vessels re-

sembling small leaves upon the branch of a shrub. The little pancreas puts on the same appearance, covering the whole meso-duodenum, which is unusually broad. The duct of the pancreas is of the ordinary size, it opens into the duodenum by a separate orifice $1\frac{1}{2}$ inch from the pylorus.

In the common otter the pancreas has not this unusual subdivided appearance, and the duct opens by a common orifice with those of the liver into the duodenum.

The receptaculum chyli is an oval bag, $\frac{3}{4}$ths of an inch broad, from which two trunks go off to form the thoracic duct, each of them about $\frac{1}{5}$th of an inch in diameter; these anastomose frequently in their course, so that there are always two, sometimes three, and even four trunks, running parallel to each other; the thoracic duct is 8 inches in length.

The kidneys are conglomerated, six inches long, and three broad.

The urinary bladder is pendulous and pyramidal, and the ureters open into it very near each other at the lower posterior part.

The testicles are situated under the external skin on each side of the sheath of the penis, but have no pendulous scrotum. They are small, flat, and oval. The tunica vaginalis communicates with the cavity of the abdomen. The cremaster muscle is very strong.

The vasa deferentia, as they pass behind the bladder, become a little convoluted, and open into the urethra at the caput gallinaginis.

The penis, in the relaxed state, is 8 inches long, the bone 6 inches. The corpora cavernosa are small, but strong in their coats. The bone near its anterior end appears to be covered

with a quantity of loose cellular substance; this in the erected state is filled with blood, and forms a large glans six inches in circumference, and four inches long; its anterior extremity is concave, and the end of the bone is seen in the centre.

The penis, when erect, is 11 inches long. The erectores muscles are very strong.

The globe of the eye is extremely small, and the optic nerve is small in the same proportion. Its internal parts were not in a state to bear examination.

The articulation of the lower jaw admits of no motion forwards or laterally; it is a simple hinge an inch long, and very narrow. The condyle of the jaw is so much inclosed in the socket as to be with difficulty disengaged.

The ribs are 14 in number, nine true, and five spurious.

EXPLANATION OF THE PLATES.

Tab. VIII. A side view of the scull of the sea otter, in which the articulation between the scull and lower jaw is different from that in other animals: the condyle of the jaw is almost completely confined in the cavity adapted for it in the basis of the scull, so as to prevent all lateral motion, and make the teeth, when the jaws are closed, always touch upon the same surfaces.

Tab. IX. A view of the basis of the scull, and the lower jaw separated from each other, to show the number and appearance of the teeth; and the peculiar shape of the condyles of the lower jaw, and of the oblong cavities in the basis of the scull with which they are articulated.

Tab. X. fig. 1. A view of the thoracic duct, which in this

tribe of animals is a kind of chain made up of several ducts, and not single, as is more commonly the case in the human body:

a, The receptaculum chyli.

b, The duct which passes over to the left side.

c, A lymphatic vessel from the neck.

The animal's having been preserved two years in spirits prevented the terminations of the ducts in the veins being shown, as they were not filled, the state of the parts not allowing the injection to pass so far.

Tab. X. fig. 2. The penis filled with injection, putting on the same appearance as when erected in the living animal.

aaa, The crura and corpora cavernosa penis.

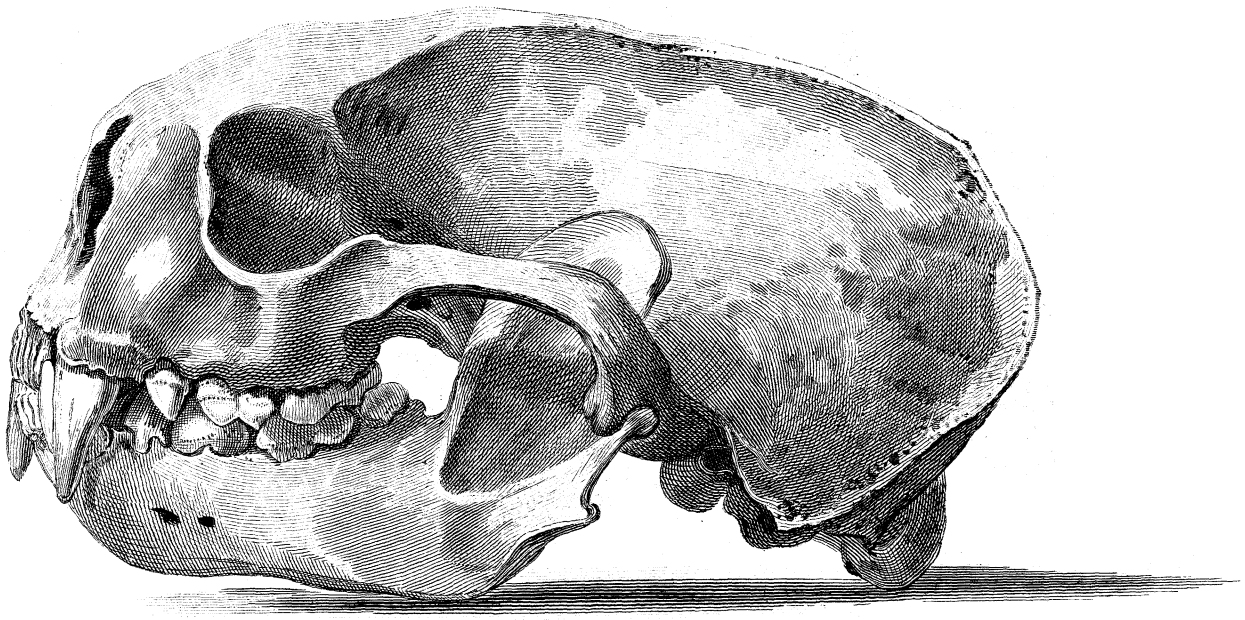
b, The bone of the penis, seen through the membranes which cover it.

c, The end of the bone in the centre of the glans.

d, The glans penis, which at its anterior extremity forms a cavity with a well defined edge; from the centre of this cavity projects the bone and the orifice of the urethra.

e, A large vein going along the back of the penis from the glans. In the relaxed state the glans entirely disappears, the penis at that part being only the thickness of the bone covered with skin. The substance of the glans is made up of a fine reticular membranous structure, which in the relaxed state of the parts is completely emptied of its blood.

These plates are nearly the natural size of the parts they represent.



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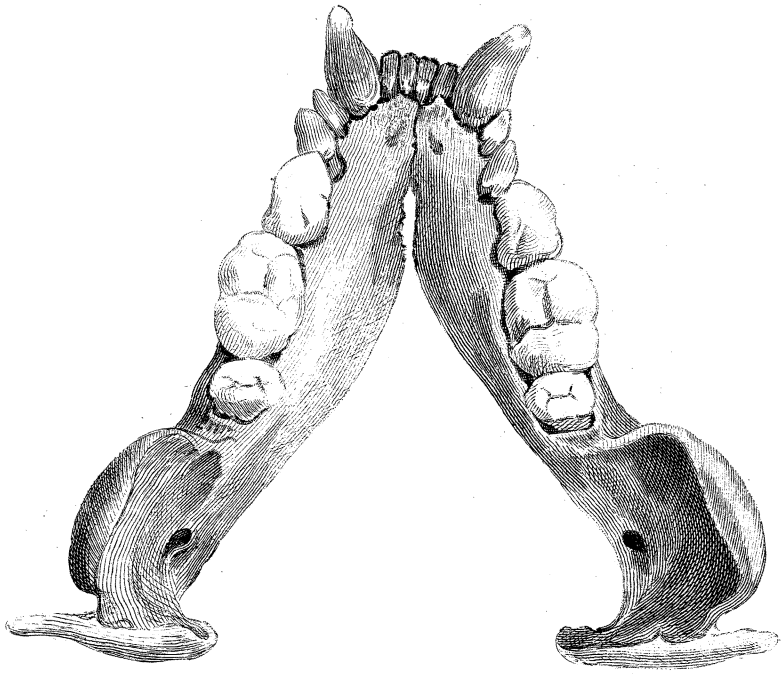

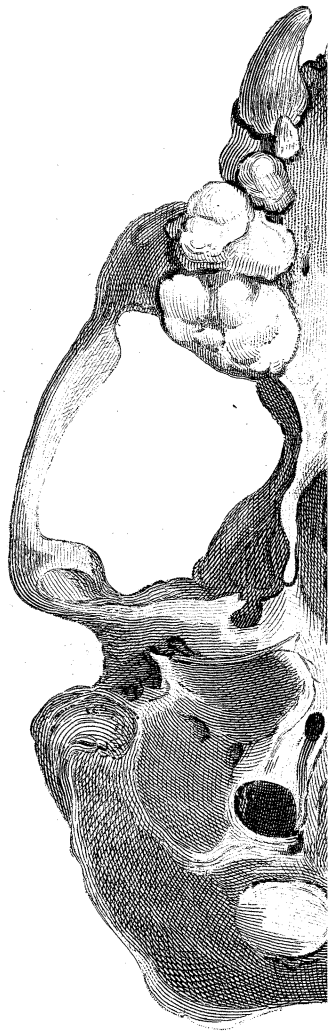

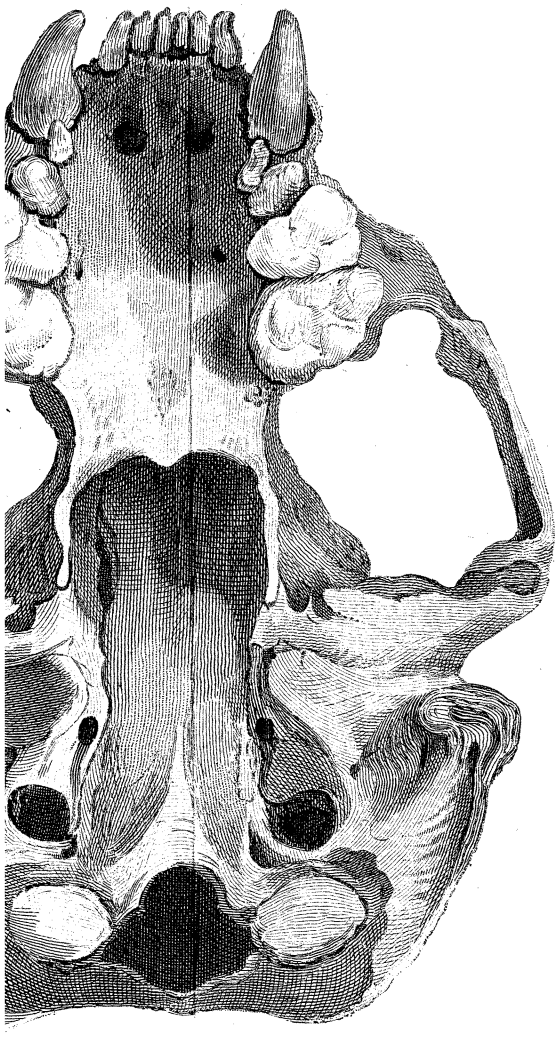

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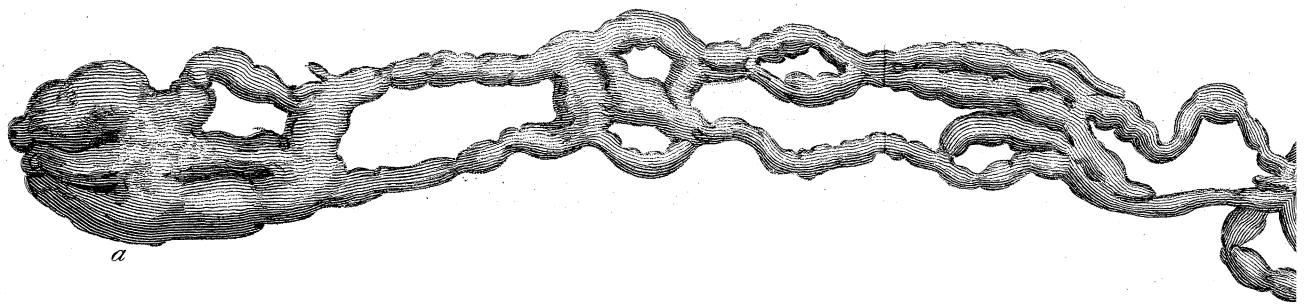
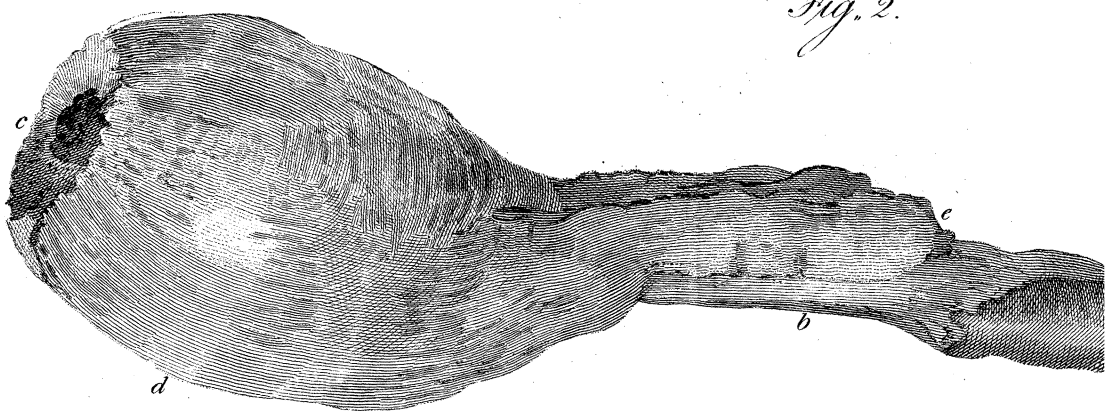
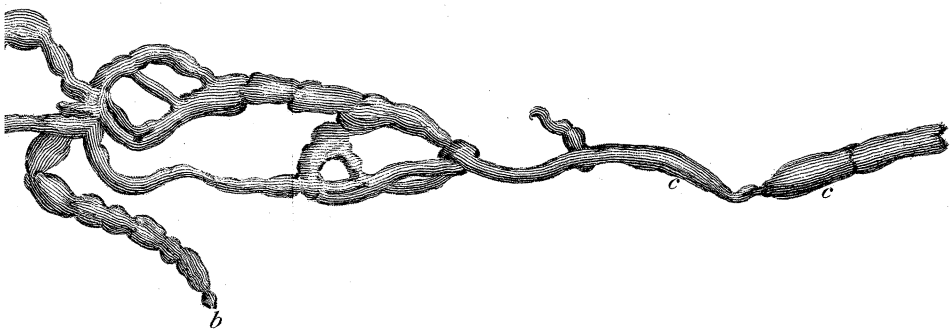


Fig. 2.





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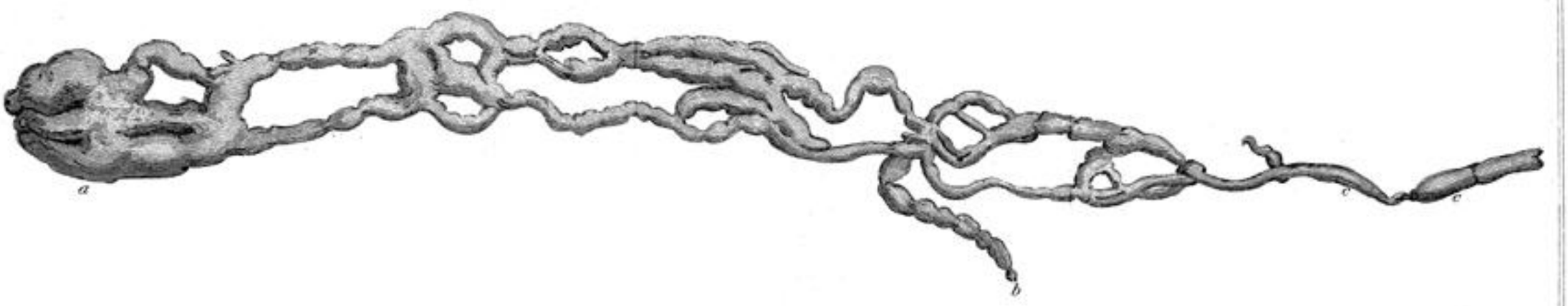

Fig. 2.