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ON THE SO-CALLED
CHOROID GLAND
OR
CHOROID MUSCLE OF THE FISH'S EYE.

By T. WHARTON JONES.

[From the Medical Gazette.]

ABOUT five years ago I examined the structure of the body in the eyes of fishes known by the name of the "choroid gland," or "choroid muscle," and obtained the following results:—

When the sclerotica is removed from the back part of the eye of a fish, of a cod (*gadus morrhua*) for example, a silvery-like membrane is seen covering the posterior surface of the choroid coat. Tear this off, and a dark red swollen body, somewhat of the shape of a horse-shoe, and encircling irregularly the entrance of the optic nerve, will be exposed. This body, the relief of which can be seen before the removal of the silvery-looking membrane, is the so-called *choroid gland* or *choroid muscle*. Its extremities meet, but are not incorporated together, at the line or fissure which runs from behind, forwards, along the lower half of the eye. A fine aponeurotic-looking expansion covers the body.

A great number of large vessels are connected with the outer edge of the so-called gland or muscle, and a little careful examination will show that vessels enter by its inner edge also.—How do these vessels comport themselves? Examined with a magnifying glass, it will be discovered that at either edge the vessels, after subdividing to a considerable degree of minuteness, anastomose with each other, and form a network. If now we subject the central substance of the body to microscopical examination, we shall find it is composed of an aggregation of minute straight vessels running across and connected by their extremities with the plexus on either edge of the body.

Close by the optic nerve two blood-vessels are connected with the eye; one of these, thicker in its coats and a little larger than the other, an artery, after

having entered the eye divides into two branches which run along the inner edge of the body, giving off twigs which by their subdivision and anastomoses form the net-work already mentioned at the inner edge. From the minute plexus at the outer edge vessels emerge, which run together to form larger twigs. The latter enter pretty considerable trunks, which at first skirt the outer edge of the body, but afterwards turning away from it, proceed forwards and ramify in the choroid coat.

The vessels which emerge from the outer edge of the body have very thick fleshy-looking coats. The minute vessels forming the central substance of the body, have also thick coats; on account of which circumstance, and on account of their straight parallel course betwixt the two net-works, the body, when torn, presents a fibrous structure. And this structure, on account of the red colour, (which is derived, in a great degree, though not entirely, from the blood globules the vessels contain), simulates very much the appearance of muscular fibre. It is easy to inject with mercury the artery entering the eye as far as the network, on the inner edge of the body; but I have not found the mercury go across to the network at the outer edge. Sometimes, however, a minute globule may be pressed across.

After this description there can be little doubt but that the so-called choroid gland or muscle of the fish's eye is a tissue of vessels—that it is in fact a *rete mirabile*. But this is not the only *rete mirabile* in the eye of the fish, for the arteries as they proceed forward in the choroid, many of them, subdivide into small branches, which again unite into one, thus forming secondary and more simple *retia mirabilia*. Lastly, the arteries of the choroid terminate in

a starlike manner, and the radiating twigs of these stars inosculate together.



Fig. 1 represents the so-called choroid gland or muscle, or, as I would now call it, the great *rete mirabile* of the eye of the cod. Its posterior prominent surface is sliced away to a level with the entrance and exit of the vessels, in order to show the network at its edges, and the straight vessels between these networks, forming the central substance of the *rete mirabile*. It is to be remarked that the whole body is delineated of the natural size, but the lines representing the straight vessels are drawn in a gross diagrammatic manner: *a* is the artery at its entrance into the eye, subdividing into branches.

Fig. 2 is a magnified representation of one of the secondary *retia mirabilia*.

Fig. 3 represents the star-like terminations of the vessels in the inner layer of the choroid, also magnified.

At the time I made the above observations, I thought of communicating them to the public, but I observed in Carus's Comparative Anatomy a reference to a communication made about thirty years ago to the Royal Society of Göttingen, by Dr. Albers of Bremen,

in which he also had compared the so-called choroid gland to a *rete mirabile*. I was anxious, before publishing any thing on the subject, to learn how Dr. A. described the structure of the body, but I could not procure the volume of the Göttingen "*gelehrte Anzeige*," in which Dr. Albers's communication is noticed. I therefore thought no more of the matter. I now only write this at the suggestion of my friend Dr. Mackenzie of Glasgow, in order to confirm Dr. Albers's views of a structure which is still very much misconceived;—witness the most recent account we have of the Anatomy of the Eye, by Dr. Jacob, in Part xi. p. 205, of the Cyclopædia of Anatomy and Physiology. To call it, with De Blainville, a *vascular ganglion*, does not help us much.

I have since seen the report of Dr. A.'s communication in the 2nd volume of the "*gelehrte Anzeige*" for 1806: no details of structure, however, are given: it is merely said, "The middle of the three membranes which, in the fish's eye, take the place of the choroid, consists in this species (the cod) of a most beautiful net-like plexus of vessels, the roots of which have their origin in a prominence of a horse-shoe shape, altogether peculiar to the fish's eye, and which was formerly so obscure. It has been considered by many zootomists a gland, by others a muscle; but according to the accurate researches of Dr. Albers, it is only a convolution of considerable blood-vessels, and is consequently to be looked upon as a kind of reservoir of blood (just as a *rete mirabile*)."

In conclusion I would observe that the demonstration of the above structure, and some peculiarities in the distribution of the veins outside the eye, which I have not now time to notice, remove from Mr. Alexander Shaw's reasonings* regarding the relations between the respiratory function, the eyelids, and vasa vorticosa, the negative support which he seeks to draw from the eye of the fish.

Newman Street, Oxford Street,
Jan. 10, 1838.

* Medical Gazette, vol. xxi. p. 172.