

***ON A VISUAL AREA IN LAMPSIDA VENTRICOSUS.**

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The following observations were made on *Lampsida Ventricosus* (*Unio subovatus*), with a view to determining the exact nature of what appears to be a visual area on the posterior mantle lobe.

This particular clam attracted the writer's notice during several years while collecting material for laboratory use. The females while carrying the young glochidia, in the fall, frequent the ripples rather than the quiet portions of the stream as most clams do: and always lie in the gravel with the long axis horizontal. In addition to these two peculiarities, *ventricosus* almost always has two large frill like appendages on the hinder edge of the mantle lobe, and these are usually found moving in the running water. These frills are from one inch to an inch and a half long, and bear a prominent eye like spot on the dorsal portion. The frill is widest on the ventral portion and gradually merges into the mantle on its dorsal surface. The free edge of this frill bears tentacles which are well pigmented.

The dark spot on the dorsal portion is borne on a light field.

The waving of the frill, which at first appears to be due to the current, was found, after specimens were kept under observation in the laboratory, to be quite regular in quiet water, and to occur at the rate of from thirty to fifty contractions per minute.

The purpose of these movements seems to be to furnish fresh water to the young in the gills. These are frequently so distended with young that the clam cannot close its shell at all. It can hardly serve the purpose of distributing the young as they are carried until spring.

The animal, while moving its mantle lobes in the water, bears a striking resemblance to a bit of grass attached to a half submerged stone. This protective resemblance can hardly account for the peculiarity, and, as suggested above, it is probably respiratory in function.

The animal is much more active on bright days, and was observed to retract its mantle when a shadow was thrown on it. This suggested that there must be a visual epithelium somewhere on the mantle lobe.

The attempt to demonstrate the connection of the nerves running to the posterior mantle region with the epithelial cells was not successful, although both Golgi, and Vom Rath methods were used. The histology of the pigmented area, especially the eye like spot was carefully worked out, and while the actual con-

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tact between nerve and epithelial cell would be needed for a demonstration, this spot has every appearance of being visual and the writer believes it to be such.

The mantle was found by repeated experiment to be sensitive to both concentrated rays of light and to shadows. It was not determined whether the visual area was confined to one spot or generally distributed.

A section through the eye like spot shows the epithelium to be greatly thickened, and much more pigmented than the ordinary epithelial cells. The slightly pigmented epithelium is about 15 micromillimeters thick while the eye spot is 60.

The ordinary epithelium is pigmented throughout about half its length, the remaining basal portion of the cell being taken up with the nucleus, while in the visual cell the nucleus is 15 mm. long and the pigmented area 45 mm. long.

The outer exposed end of the visual cell bears a well marked corneous like coat while this is almost absent from the surrounding epithelium.

In addition to these marked differentiations, the basal ends of the visual cells are drawn out into branched processes which are about 15 mm. long. These extend down into the subjacent tissue and supply the place of a rather well defined membrane which exists between the ordinary epithelium and underlying tissue. While these processes have not been proven to be in contact with nerves, yet there is an undoubted visual area here. The modification of the ordinary epithelium into a heavily pigmented epithelium and this finally into a visual area as in this form does not involve nearly so radical a change as has gone on in the development of the pallial eyes of *pecten*. The corneous lens like body is only a modified cuticle and any cell bearing pigment may be sensitive to light.

The presence of so well defined visual area in one of our fresh water clam is a striking fact since the group as a whole seems to be entirely insensitive to light.