

Light, directed through the tank wall and 'Perspex' bracket, was not very efficient in illuminating the viscera. Instead, a tapered 'Perspex' probe was designed to pass into the tank and protrude through a groove in the observation bracket. No heat from the lamp passed down the probe, so that the fish was not disturbed. In this way, an excellent source of reflected light for microscopic observation of the viscera was established.

Comparisons of fish gut motility seen *in vivo* and *in vitro* in an organ bath will be given in a later paper.

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Mucous Gland Cells of the Outer Mantle Epithelium of *Arca noae*

Mucous gland cells occur in the outer mantle epithelium of most lamellibranchs, in some relatively commonly, for example, *Pinna*¹, in others less frequently, for example, *Mytilus*, *Ostrea*, *Tellina*. In *Arca noae*, cells with two different types of histochemical properties have been observed throughout the outer mantle epithelium but most commonly proximal to the line of attachment of the pallial muscle where the epithelium consists almost entirely of gland cells.

One type of cell stains blue in Mallory's triple stain, gives positive results with both alcian blue and the periodic acid-Schiff reaction, and shows gamma metachromasia with toluidine blue. The contents of these cells also exhibit a capacity to bind methylene blue at below pH 4, which indicates the presence of acid mucopolysaccharides². The other type of mucous gland cell, which occurs approximately ten times more frequently than the other, stains red in Mallory's triple stain, exhibits a less-marked periodic acid-Schiff reaction, a faint reaction in tests for proteins, no staining in alcian blue, orthochromatic staining in toluidine blue, and binds with methylene blue at above pH 4. These results point to the presence of neutral mucopolysaccharides or of mucoproteins². Two similar types of mucous cells have been described in the outer mantle epithelium of *Pinna*¹, but only a single type of cell comparable to that secreting a neutral polysaccharide in *Arca* is found in the outer mantle epithelium in many lamellibranchs, for example, *Anodonta cygnea*³. In this species, cells secreting an acid mucopolysaccharide are generally found on the inner surface of the outer mantle epithelium. In *Pinna*, Yonge¹ has observed that the mucous cells occur particularly in the outer mantle fold and suggests that they supply the necessary lubrication for the extensive withdrawal and re-extension of the mantle. The distribution of the gland cells in *Arca noae*, in which they are most plentiful proximal to the line of pallial attachment of the mantle, is not in accord with lubrication being a suitable explanation of their function in this species.

It has been suggested that the products of the mucous gland cells are concerned with the calcification of the valves^{4,5}. No evidence of the presence of calcium in the mucous cells of *Arca* was, however, obtained by routine staining techniques. Incineration of sections at 600° C. in a manner similar to that used by Hedley⁶ to detect calcium in a study of serpulid tube formation left a residue of white ash

in the outer mantle epithelium, which gave characteristic crystals of calcium sulphate when treated with dilute sulphuric acid and a marked staining reaction with alizarin red⁷. This points to the presence of calcium in the outer mantle epithelium, particularly in the mucous cells. The absence of a staining reaction before incineration probably indicates that the calcium present may be bound to some organic substance, possibly the mucopolysaccharide, which inhibits normal staining reactions. An investigation of the secretion of calcium by the mantle epithelium of other lamellibranchs using the incineration technique is proceeding.

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Occurrence of *Crepidostomum metoecus* (Braun, 1900) in Britain

DURING the course of an investigation into the food and parasites of freshwater fishes in west Wales it was found that 74 per cent of 1,294 trout, *Salmo trutta* L., and 33.9 per cent of the 274 salmon parr, *Salmo salar* L., examined were infested with two species of *Crepidostomum*, namely, *C. farionis* (Müller) and *C. metoecus* (Braun). The parasites also occurred in one of the 243 eels, *Anguilla anguilla* (L.); but it is believed that the latter species constituted an accidental host.

The present record of *C. metoecus* in Britain is new. It has previously been recorded only in Austria¹, Sweden (= *C. suecicum* Nybelin, 1933)² and Ireland³, and appears to have a more sparse geographical distribution than the allied species, *C. farionis*, which is known to have a circumpolar distribution.

The two species of *Crepidostomum* occurred together in the same host fishes, but there is some evidence of habitat isolation as *C. metoecus* occurred predominantly in the region of the pyloric caeca while *C. farionis* occupied a more posterior station in the intestine. Although *C. metoecus* is superficially very similar to *C. farionis* it may be distinguished from it by a consideration of the morphological features shown in Table 1. Certain of the differences, particularly those in the size of the body and the ventral sucker, may well be adaptations to the organ of the host infested.

Table 1. DIFFERENCES BETWEEN *C. metoecus* AND *C. farionis*

Character	<i>C. metoecus</i>	<i>C. farionis</i>
Total length	0.87-2.12 mm.	1.52-5.02 mm.
Neck region	narrow	no distinct narrowing
Ratio of oral to ventral sucker	1:1.09-1:1.26	1:1.4-1:1.5
Oral papillae	0.062-0.070 mm.	0.037-0.050 mm.
Pharynx	less than half length of oral sucker	more than half length of oral sucker
Gut caeca	narrow and short	wide and long
Excretory bladder	ends near anterior level of testes	extends in front of testes
Genital pore	behind gut bifurcation	in front of gut bifurcation
Vesicula seminalis	chambers overlapping	chambers in straight line
Vitelline follicles	small, occur dorsally and ventrally to gut caeca	large, occur ventrally to gut caeca
Number of eggs	rarely more than 30	up to 100
Space between ovary and anterior testis	narrow	wide