Under these conditions, *C. celata* (which is oviparous) may discharge tens of thousands of eggs from a large osculum in a few hours. The eggs are sticky, and adhere to each other and to the substratum in an irregular flattened mass. Diatoms, the shells of larval molluscs, silt and other debris rapidly accumulate on and in the mass, so that on hatching many of the larvæ are temporarily trapped, able to wander among the interstices of the egg mass but delayed in their escape to open water. In their wanderings, the larvæ sometimes come together in twos or threes and fuse. Fusion is without apparent regard for polarity, so the swimming movements of compound larvæ are often merely ineffective gyrations and many perish within the tangle of debris. A few escape, however, since two such compound larvæ metamorphosed successfully into single sponges, with single oscula, and began boring in crystals of calcite placed near an egg mass.

It seems quite possible, then, that *Cliona* larvæ occasionally metamorphose after fusion, in their normal environment. The natural occurrence of larval fusion, previously dismissed as a purely experimental phenomenon, emphasizes its interest to students of individuation and related problems of theoretical morphology.

This observation is part of a study of *Cliona* conducted at the Fisheries Research Board of Canada's Biological Sub-Station at Ellerslie, Prince Edward Island, which will be more completely reported elsewhere. I thank other members of the Sub-Station staff for their help.

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Pressure developed within the Reticular Compartment of the Ruminant Stomach

IN order to investigate the mechanical aspects of digestion in the ruminant stomach, pressure variations occurring within the reticulo-rumen have been measured on many occasions[1-3], using balloons connected to liquid-filled manometers or to recording tambours. Wester[1] reported that the intra-ruminal pressure in the cow showed phasic fluctuations of 2·5 cm. mercury, while Quin, Van der Wath and Myburgh[2] recorded a maximal rise of 10·0 cm. water in the sheep; in both instances the basal intra-ruminal pressure was close to atmospheric pressure. Balch, Kelly and Heim[3], using a balloon connected to a writing tambour, recorded pressure-changes from within the reticulum of the cow and showed a basic level of 2·5–3·5 cm. mercury above atmospheric pressure rising by 1–2 cm. mercury with contraction of the reticulum. It is probable that in the latter case the higher resting pressure is due to the hydrostatic effect of the liquid contents of the reticulum.

Brody and Quigley[4] have examined the balloon–water manometer technique for measuring intra-lumen pressure in the digestive tract and have demonstrated that inflated balloons and water manometers produce a number of artefacts in the pressure records which become unreliable and inaccurate. Such criticisms could be applied with even greater force to recordings made in this way from the very capacious reticulo-rumen where differential contraction and relaxation of the various subsidiary sacs occurs[5]. Brody and Quigley advocate the use of open-ended small-bore tubes connected to electromanometers as the technique of choice for the accurate measurement of pressure within the gut.

This method has been used for measuring the pressure within the reticulum of the goat using a 'Polythene' tube (2·0 mm. int. diam.) passed into the œsophagus intra-nasally. Pressure variations were registered by means of a Hansen capacitance manometer and d.c. amplifier and displayed by means of an Ediswan pen oscillograph. It was easy to make pressure records while the tube was being manipulated within the alimentary tract, so that entry of the tube into the antrum of the reticulum was indicated precisely by the replacement of the rapid respiratory pressure changes with the slow pressure variations of the reticulo-ruminal contraction cycle.

Pressure records made in this way show the well-known contraction of the reticulum occurring regularly at 43–52 sec. intervals, the pressure rising from near atmospheric level to 50 cm. water or more in 2–3 sec. and falling rapidly in 1–2 sec. to the resting level. Pressures up to 65 cm. water have been recorded, but 50 cm. water was the more common value of intra-reticular pressure recorded from eight goats on numerous occasions. Electromanometer pressure records from the antrum of the reticulum do not show the biphasic peak which is a feature of recordings when balloon–water manometer systems are used deep in the reticulum. Smaller and irregular pressure waves of up to 20 cm. water were also recorded from the reticulum near the cardia, and since these pressures accord with those obtained when the tube is pushed farther posteriorly it is likely that they are produced by contraction of the rumen musculature.

The figure of 50 cm. water reported here, although more than double the value recorded from the reticulum by balloon systems inserted through a rumen fistula, can be regarded as authentic, the disparity being due to the physical characteristics of the recording systems. This new result agrees very well with the pressures evoked in the reticulum following electrical stimulation of that region of the medulla oblongata which exerts control of the reticulum and rumen[6]. Pressures of this order have also been recorded by means of electromanometers from the reticulum of cattle during experimental studies of eructation phenomena[7].

It is possible that the rapid development of high pressure within the reticulum close to the cardia plays a part in the forward propulsion of ingesta during the regurgitative phase of rumination. As yet it has not been possible to measure the pressure in the reticular antrum during rumination as the presence of the tube in the œsophagus appears to inhibit the process.

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