Models are widely used to investigate the hydrodynamics of prototypes larger than themselves, but their use with very small prototypes is relatively unexplored.

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Continuous Recording of the Hydrostatic Pressure in a Sea Anemone

Investigation of the hydrostatic skeleton in the invertebrates has generally been limited to the use of manometric techniques to determine the hydrostatic pressures involved both at rest and during activity[1]. Some workers, notably Batham and Pantin[2], have based their results on manometer readings taken at frequent intervals, but there seem to be few reports of work using continuous recording of pressure changes.

Some recordings have been made of the hydrostatic pressure of the coelenteron of the actinian polyp *Tealia felina* with the view of making some comparison with the results previously obtained on *Calliactis* and *Metridium*[1,2] before investigating other animals. A four-channel pen recorder (manufactured by E. and M. Instrument Co., Texas) was coupled by d.c. amplifiers to a myograph to record activity, and a Bourdon gauge, by way of a photoelectric transducer, to record, simultaneously, pressure. The Bourdon gauge used had the advantage of low fluid displacement, about 15 mm³ per 130 cm water pressure applied, and a sensitivity of 1 cm pen deflexion for 6 cm water pressure at maximum gain. It was not convenient, however, to work at maximum amplification for long periods, but the instrument proved stable enough at lower gain to register constant pressures steadily over periods of at least several hours.

A glass cannula of 3 mm diameter with the mouth cut obliquely to minimize blockage was inserted through the lower part of the wall of the column of an anemone and connected to the gauge. A thread from the margin of the disk and a light isotonic lever were used to record simultaneously the movement of the *Tealia*. While the anemone remained fairly constant in shape the pressure recorded from the enteron gave values of up to 3·5 cm of water, comparable with those observed by Chapman for *Calliactis*[3]. Some considerable movement was recorded at night, including what appeared to be sharp retractions, but with no corresponding changes in pressure. A gradual increase in pressure of 2·8 cm of water was recorded, however, during 20 min at the commencement of activity and this was sustained during activity. This is in general agreement with the findings of Batham and Pantin[2], who point out that an increase in muscle activity will raise the average hydrostatic pressure. A typical recording of a naturally occurring contraction (Fig. 1*a*) shows a rapid build-up in pressure and a slow subsequent drop. The maximum pressure recorded from a natural contraction was 10 cm of water, the anemone in this case taking 1·75 h before returning to the initial pressure. Mechanical stimulation by poking hard at the base of the column gave maximum pressures (15 cm of water) when the anemone was half retracted before stimulation (Fig. 1*b*), but pressures of only 2 or 3 cm of water when the polyp was originally fully expanded. Long periods of relaxation were again experienced. These values of pressure recordings are again comparable with those observed in *Calliactis*[3] by use of manometric techniques. Although the Bourdon gauge in its present form is not so sensitive as the more refined manometric techniques[2], its use over longer periods and for continuous pressure readings without observational fatigue is clearly of value. Investigations are proceeding into the continuous recording of the coelomic pressure during burrowing in annelids and of the pressure relationships of heart and haemocoele in molluscs.

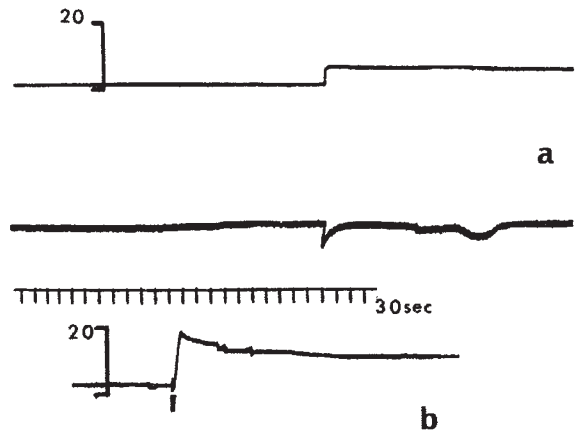

Fig. 1. Recordings of hydrostatic pressure changes in *Tealia*. Upward movement of the pressure traces indicates an increase in pressure, the scales representing a pressure of 20 cm of water and a 30-sec time mark. *a*, The sharp increase and slow relaxation of pressure (upper trace) of a naturally occurring contraction (lower trace, downward deflexion); *b*, rapid retraction of the anemone with mechanical stimulation at the point indicated

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MICROBIOLOGY

Effects of the Diethyl Ester of Pyrocarbonic Acid on Bacteriophage and Transforming DNA

The synthesis of the diethyl-ester of pyrocarbonic acid (DEP) was first reported by Boehm and Metha[1] in 1938. Later, G. Hecht[2] observed that this compound had a strong bactericidal effect. It is also known that DEP rapidly decomposes in water into toxicologically indifferent products; carbon dioxide and alcohol:

$$C_2H_5—O—CO—O—CO—O—C_2H_5 + H_2O \rightarrow 2\,C_2H_5OH + 2\,CO_2$$

These two characteristics—its bactericidal effect and its decomposition in water—make it useful as a sterilizing agent. In recent years a number of publications recommended it as an advantageous preservative for use in the food industry[3]. The mechanism of its bactericidal effect is not yet known exactly.

We performed experiments aimed at testing the effect of DEP on bacteriophage and on DNA capable of genetical transformation.

The phage material and the bacterial strains used in our experiments originated from the collection of the Microbiological Institute of the Medical University of Szeged (Hungary) and the DEP was a commercial product of Farbenfabriken Bayer *A.G.*

The virulent *Bacillus subtilis* phage referred to as 4*L* was propagated in yeast extract peptone media[4] on the sensitive strain of *Bacillus subtilis*, Marburg. The lysate we received contained 5×10^7 plaque-forming units (p.f.u.) per ml. 1 ml. of the lysate was incubated at room temperature with 0·02 ml. DEP (dissolved in 96 per cent ethanol in concentrations of 50–0·5 per cent) and after 24 h (after the decomposition of DEP) the number of infective phage particles was tested as described by