A series of samples of the surface water was taken and the salinities determined by direct titration of 10ml aliquots of the sample against a 27.25 grams per litre solution of silver nitrate, using potassium dichromate as the indicator (Barnes, 1959: 95). The extreme salinity range found was from 0.2 parts per thousand (‰) at low tide to 29.1‰ at high water spring tide, with a minimum of 3.1‰ at mid-tide level.

Breeding Cycle

Methods

The procedure adopted for study of the breeding cycle was based on that used by Dales (1951) for work on *Nereis diversicolor* O. F. Muller. Specimens of *Nicon aestuariensis* were collected from the area in which they were most numerous, initially once a fortnight, then once a month. A length of steel tubing was used to extract a vertical core of mud with a cross-sectional area of 0.01 m^2 and a length of about 30cm. The worms were sorted from the mud by hand. At first six of these cores were taken on each occasion, but after the April collection eight were taken to maintain an adequate total sample number. The cores were taken at intervals of a few metres along the bank all at the mid-tide level where the population density was greatest. Over-sampling was easy to avoid as the places from which the cores had been taken could be seen for many weeks afterwards.

The worms were taken back to the laboratory and kept in seawater for twenty-four hours. In this time most of the mud was passed out of the gut and the worms were then anaesthetised in a solution of 60 grams of magnesium chloride ($MgCl_2$. $6H_2O$) per litre of tapwater. This concentration gave better results than a solution isotonic with seawater (80 grams per litre). Anaesthetisation to the point where the worms did not react to being extended for measuring took about 18 hours.

The worms were measured while extended along a wetted millimetre scale, and the measurements were made to the nearest millimetre. A low power magnifying glass above the scale gave greater accuracy and ease of reading. Two lengths were measured on complete specimens (a) the total length from the tips of the palps to the posterior end of the pygidium, excluding the anal cirri, and (b) the length from the tips of the palps to the posterior edge of the thirtieth setiger. On damaged specimens the length from the tips of the palps to the posterior edge of the thirtieth setiger was measured. Shorter fragments were counted for calculations of the population density but were not measured. Magnesium chloride has a relaxing effect, so the measured lengths are greater than in live specimens.

A graph (Text-fig. 1) of the relationship between the total length and the length to the thirtieth setiger was constructed from the measurements of complete specimens. Anterior fragments were assigned a total length from this curve. Worms which had been injured in the field and were regenerating a posterior end were treated in the same way. The total lengths were then grouped into classes with limits two centimetres apart and plotted as a length-frequency diagram for each month (Text-fig. 2). Specimens of a length such that they might have been placed in either of two classes were always put into the larger one.

The sex of the worms was determined by inspection under a stereoscopic microscope. This is practicable as the body wall of *N. aestuariensis* is not pigmented, but when necessary the body wall was slit and the coelomic contents teased out for closer observation.

After being counted, measured and sexed the worms were fixed in Bouin. Gametogenesis and the anatomical changes during metamorphosis were not studied.