investigation of several problems; for example, the biogenesis of contractile protein relative to cell division and identification of the "trigger" for cytoplasmic division. The study of both will be simplified in the absence of mitotic spindle formation and other nuclear events leading to mitosis. Also, the ability to induce a single burst of mitotic nuclear division should prove useful in the study of microtubule protein biogenesis.

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Complete Cycle of Development of a Pelagic Chaetognath in Culture

The complete cycle of development from egg to egg for a pelagic species of chaetognath has not been achieved previously[1] in the laboratory. Dallot[2] maintained *Sagitta setosa* and Murikami[3,4] *S. crassa* long enough to observe cyclic reproductive changes. Murikami reared larvae for several days as I did[5] with *S. hispida*. Otherwise, the life span of most chaetognaths brought into the laboratory has been measured in hours[6]. Extended studies of live chaetognaths would be useful because these are among the commonest marine macroplanktonic carnivores and, as such, must play a major part in the trophodynamics of the sea. They have also frequently been used as "indicator species" for water masses[7].

Eggs, obtained from sexually mature *Sagitta hispida* Conant, were kept at the experimental temperature (22–24° C) and salinity (30–33 parts per thousand) for two days before hatching. Approximately 3,000 larvae were then transferred into a glass aquarium containing 30 l. of seawater that had been filtered through a mesh of 35 μm. Each day, 25 per cent of the total volume was removed and replaced by fresh seawater to avoid progressive accumulations of metabolites. For food I used first natural microzooplankton, which passed through 75 μm bolting cloth, consisting mostly of copepod nauplii, with some veligers, polychaete larvae and tintinnids. The size of food was gradually increased, and composition consequently changed, as *Sagitta* grew. The increase in length and time of survival for a typical population during the first 45 days after hatching are shown in Fig. 1. Survival until the sixteenth day was determined from larval populations kept at similar densities, but in 2 l. volumes, because it was too difficult to assess numbers of larvae accurately in large volumes without damaging them.

Although development is continuous in *Sagitta*, four stages can be described on morphological grounds. First there is the larval stage, from 0·9 to 4 mm (10 to 15 days), during which it gradually gains the full complement of fins and attains the bodily proportions of older animals. Second there is the juvenile stage, from 4 to 6·5 mm (4 to 8 days) until the first signs of gonad development visible under a magnification of × 50. Third is the immature stage, from 6·5 to 8·5 mm (6 to 10 days) during which sperm and eggs become mature. Fourth is the mature stage, commencing with the filling of the seminal

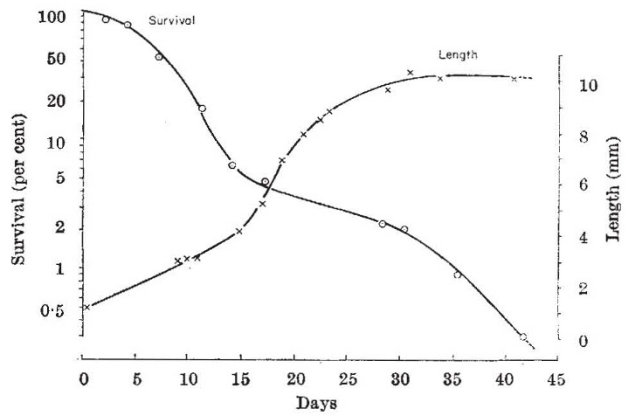

Fig. 1. Mean length increase and survival (logarithmic scale) for a population of *Sagitta hispida* for 45 days after hatching.

vesicles and the laying of the first batch of eggs about 24 h later. This cyclic process continues usually until death[2,5]. Maturity was reached within 33 days of hatching with about 1 per cent survival, and the last animal died on the fifty-seventh day.

An important factor controlling survival and rate of growth in my experiment was the concentration and composition of food, which was subject to daily variations in availability and may rarely, if ever, have been optimum. After the first few days when larvae began feeding, mortality was much greater than over the later growth curve. This may be correlated with the fact that food less than 100 μm in size was usually more difficult to provide, either in adequate concentration, or free from plant or detrital material. Cumulative effects of food inadequacies may also help to explain slower growth and higher mortality in two populations cultured to the second generation. So far only a few third generation larvae have been obtained, but populations are being reared through the first generations routinely. Efforts are now concentrated on the optimum culture conditions for the larval and juvenile stages.

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Inhibition of Rodent Malaria in Mice by Rifampicin

A number of rifamycin compounds have been found to be active against Gram-positive—and to a lesser extent against Gram-negative—bacteria, *in vitro* and *in vivo*, when administered parenterally. More recently rifampicin has been found to be active orally[1–5]. Several investigators have studied the action of the rifamycins on protein