cytes evidenced the occurrence of 2 silver bands in the pachytene bouquet configuration. These bands correspond to the pairing of the 4 homologues as 1 quadrivalent or 2 bivalents (figure 5).

Our observations on the chromosomal origin of 'circular' DNA fit well with the repetition models proposed by Thomas[4,12]. It implies the formation of circles in tandem and in intermittent repetition[12]. The distribution of the circles we describe supports the occurrence of tandem repetition. Evidence of ring formation in intermittent repetition was previously reported[13]. We still ignore the DNA base composition of these circles, as well as its possible involvement in RNA synthesis. The hypothesis that the rings might be copies of rDNA is attractive but obviously deserves further proof. Therefore the question whether the mechanism of gene amplification found in oocytes has its counterpart in spermatocytes is still speculative.

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Filter characteristics of appendicularian food catching nets

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Summary. Scanning electron micrographs reveal extensive filter surfaces in the external food catching net of planktonic appendicularia. This filter consists of crossing arrays of filaments about 0.04 μm thick and pores about 0.24 × 0.07 μm wide. The open area fraction is above 50%. The filter probably enables the appendicularia to feed efficiently on particles much smaller than bacteria.

Appendicularia (Chordata, Tunicata) are tiny planktonic animals of abundant occurrence and world-wide distribution. They feed in a most unusual way by secreting an external gelatinous house containing an elaborate feeding filter (figure 1). Undulatory movements of the tail forces water through the house, and any particle present in the water will be trapped by the filter and sucked into the mouth of the animal[2].

In this way the appendicularia is one of the few zooplankton organisms that feed in a very efficient way on phytoplankton and other nanoplankton. As this is a very important step in the food chain from primarily produced organic material to nectonic fishes etc. in the sea, the appendicularia has been studied with increasing interest during recent years.

The gelatinous house and feeding filter is secreted by cells covering the trunk of appendicularia[3]. A previously

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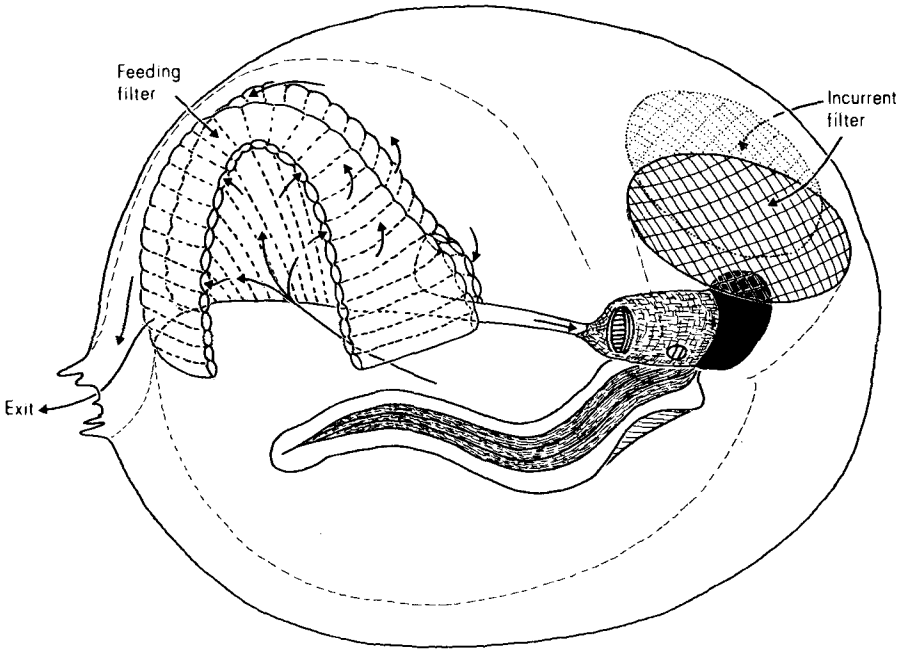

Fig. 1. Schematic diagram of *O. dioica* in its house. Lateral view.

secreted house is expanded by special movements of the tail as soon as the animal abandons its old house. This happens every few hours when the feeding filter has become clogged[4].

Only in the case Oikopleuridae, some information exists on the construction of the feeding filter and its ability to withhold particles of small diameter[3,5,6]. However, no agreement seems to exist when it comes to the precise way in which particles are trapped in the filter.

By traditional fixation for transmission electron microscopy and critical point drying from acetone[7], I have succeeded in preparing a few expanded gelatinous houses of *Oikobleura dioica* Fol, caught near Plymouth in England, for scanning electron microscopy. The feeding filters of these extremely fragile houses were exposed after drying[7], mounted on aluminium pegs by double adhesive tape, coated with evaporated gold, palladium and carbon and examined in a Philips PSEM 500 scanning electron microscope.

Micrographs of the filter surface taken at low magnification (figure 2) reveal parallel ridges about 50 µm wide and more than 0.5 mm long, corresponding to those seen by macrophotography of living animals and houses (figure 1). By higher magnification (figure 3), the surface on all ridges is seen to be covered with a continuous, extremely fine and regular meshwork of threads about 40 nm thick. There are 2 sets of threads at right angles to each other; 1 parallel to and 1 transverse to the ridges. The distance between successive threads parallel to the ridges is quite constant; 107 nm ± 16 nm (mean ± SD). The distance between the threads transverse to the ridges is more variable; 280 nm ± 84 nm (mean ± SD). Taking the thickness of the threads into account, the mean pore size is about 0.24×0.07 µm and the open area fraction of this 'microfilter' about 55%. Although the mesh-size is somewhat different, this filter is probably the same as that seen by Fjerdingstad in ultrathin sections in the transmission electron microscope[6].

At the border between 2 ridges, the micro-filter is condensed in a longitudinal thick filament-bundle that anchors it to the underlying structures. Above each ridge, the micro-filter appears smooth and evenly curved at low magnification (figure 2). At higher magnification, however, numerous small folds and sharp bends (probably shrinkage artefacts) are evident (figure 3). These folds and bends indicate that the micro-filter is made up of quite flexible

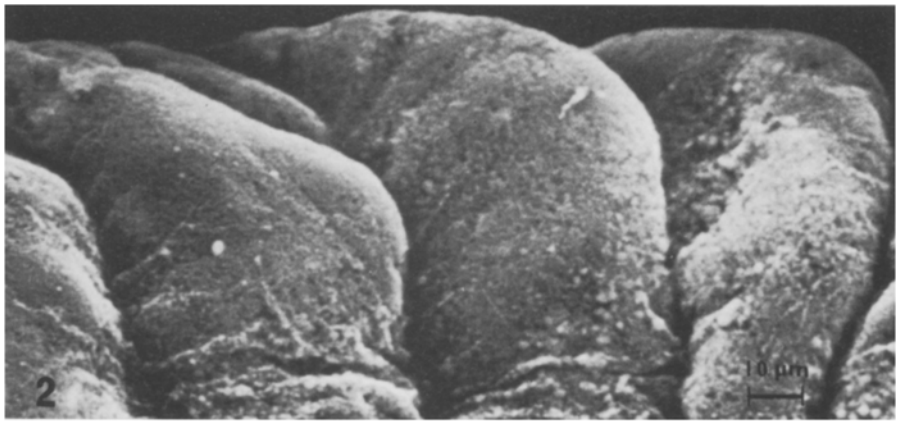

Fig. 2. Scanning electron micrograph of a few ridges in the feeding filter of *O. dioica*. ×720.

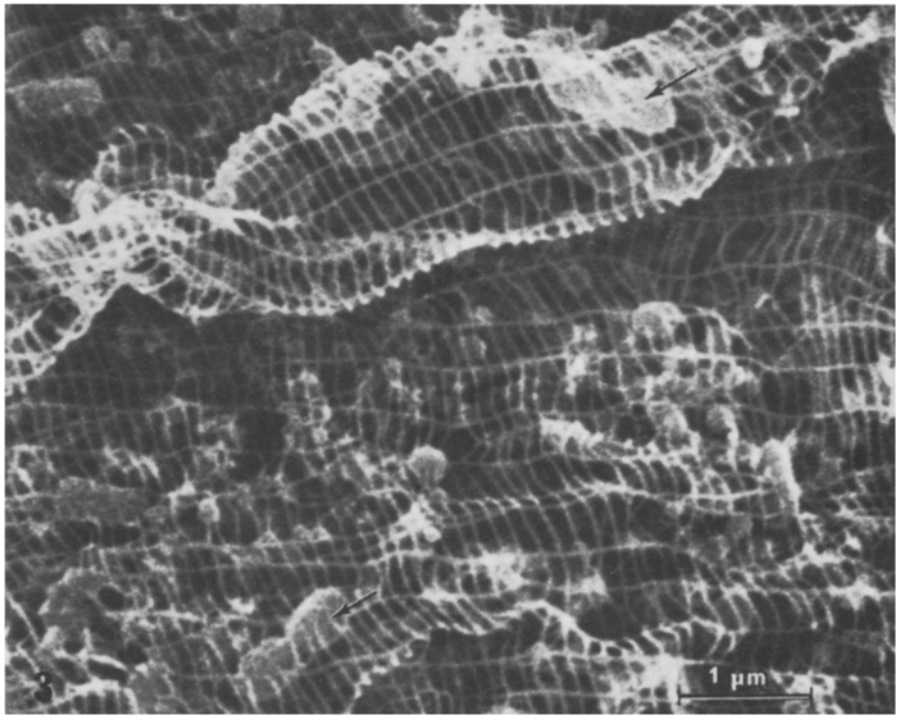

Fig. 3. Scanning electron micrographic detail of the feeding filter of *O. dioica*. Arrows point to bacteria-like organisms behind the 'micro-filter'. ×17,000.

filaments and that its smooth ridges must be due to distension by a higher hydrostatic pressure on one side of the filter.

Unfortunately the observed filter parameters may not be the same as those of the unfixed micro-filter. First of all the house and feeding filter will shrink to some degree as soon as the muscular activity of the animal is stopped. Secondly, the fixation and especially the acetone dehydration will cause further shinkage. Although the overall size of the house may be reduced drastically after drying, it is uncertain to what degree the micro-filter filaments shrink. Thirdly, the evaporation of a conductive layer on the specimen will increase the apparent thickness of the filaments and thereby reduce the pore size.

In spite of these factors, I find it reasonable to believe that the micro-filter traps particles down to about 0.1 μm in diameter. The size distribution of the particles seen behind the filter (figure 3) speaks in favour of this view. Compared with the size-range of bacteria and other well defined nanoplankters, this is an exceedingly low limit. It may accordingly be supposed that smaller living and dead particles are an important food source of *O. dioica*.

The observed micro-filter constitutes a continous layer throughout the feeding filter. A second layer, making up the opposite side of the ridges or channels, may also be present, but has not been disclosed so far. It seems reasonable to believe that this micro-filter is essential for the particle-trapping function of the feeding filter and that water passes across the meshwork[6]. The small rectangular meshes and the smooth surface, combined with the large open area fraction, will delay clogging of this micro-filter as particles are unlikely to enter the pores without being able to penetrate them. When the animal stops its tail movements, as it does every few sec, and continues to suck particle-enriched water from the feeding filter, the water current through the micro-filter may also be reversed and the particles lifted away from the meshwork.

A water passage exclusively along the filter ridges in socalled 'Reusengänge' or 'Reusenbahnen' and a particle-trapping mechanism based on numerous trabeculae within these tunnels[3] will render the micro-filter functionless and give a very small filtering surface and rapid clogging of the filter. Likewise, the presence of any sticky material in the feeding filter[5] would prevent particles from being sucked into the mouth of the animal and cause immediate clogging of the filter.

By continued scanning and transmission electron microscopic studies, I hope to reveal how the beautifully spaced meshwork of the micro-filter is produced by cellular secretion and to disclose its relation to the other components of the expanded feeding filter.

A similar, but much coarser silk micro-filter has recently been described in a larval philopotamidae (Trichoptera)[8].

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Presence of ATPase on the vesicular membrane of *Cysticercus cellulosae*. A high resolution cytochemical study

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Summary. ATPase was demonstrated by high resolution cytochemistry in the microtriches of *C. cellulosae*. It is thought that the enzyme is important for the parasite's acquisition of raw materials for surviving and distribution in host tissues.

Porcine cysticercosis is produced by *Cysticercus cellulosae*. In the human, cysticercosis occurs when man accidentally becomes the intermediate host of the cestode *Taenia solium*.

C. cellulosae is preferentially localized in the brain of man, whereas in the hog it is usually lodged in skeletal muscle[2]. Although the reasons for such a preferential distribution are not yet known, it is evident that the adaptation of *C. cellulosae* to different microenvironments which offer distinct metabolic recourses, must require the possession, by the parasite, of a carefully and strictly regulated transport system. Therefore the study of the presence and distribution of those enzymes associated with transport mechanisms might shed some light on the explanation for this particular body tissue distribution[3]. Many studies have provided evidence for the close association of a specific (Na, K, Mg) activated ATPase with active cation transport[4–6]. In some systems this active cation transport may also be linked to the transport of nonelectrolytes[7–10]. Therefore ATPase might be highly significant to this particular distribution of the parasite. The purpose of the present study was to localize the cytochemically demonstrable ATPase activity of *C. cellulosae*'s vesicular membrane at ultrastructural level, and relate it to the possible role in the preferential tissue distribution of this parasite.

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