Internal changes

When the anterior/posterior orientation of the larva is clearly evident, the early gastrula, with cilia, the blastopore, and blastoporal groove, appears as in Figure 8 (1). The arrangement of the tissue layers is as in Figure 8 (2), which is a larger than average gastrula. At the appearance of the apical tuft, the mantle lobe is just forming as a meridional ridge, then light spots are seen laterally in the ectoderm, on the posterior edge of the mantle. These are the developing setal sacs (Figure 8 (3)). At this stage the coelom is developing in the apical and mantle lobes (Figure 8 (3)).

As the setae and eyespots appear, the gut rudiment starts to elongate posteriorly and the pedicle mesoderm begins the formation of the paired pedicle adjustor muscles which extend from the base of the apical lobe into the pedicle (Figure 8 (4)). The gut rudiment becomes very elongated. It extends from the middle of the apical lobe, just below the site of the blastopore, to between the adjustor muscles. This is illustrated in Figure 8 (5), which is a figure of a 13-day old larva less than 24 hours before release from the parent mantle cavity.

SETTLEMENT

On the release from the mantle cavity, the larvae are on average 220μm from the apex of the apical lobe to the base of the pedicle lobe. They bear cilia on the apical and pedicle lobes, backward-projecting setae from the lateral rim of the mantle lobe and have four pairs of eyespots towards the apex of the apical lobe (Figure 8 (5)). Natural release from a parent has not been observed but larvae have been observed that must have left the parent only six hours previously, and also some which, at a late stage of development, were released due to damage to the parent. This latter group compensate for the lack of development by either roaming for several hours or days before settling on a rock, or by settling and then waiting—in one case for six days—before mantle reversal takes place. Mature larvae, upon release from the mantle cavity, swim searching for a suitable substratum. Within 24 hours they settle upon the pedicle, usually in a crevice, and by choice they will settle on a weathered rock surface rather than a freshly exposed surface, even if this means the upper rather than the lower surface of a rock.

When the larva first settles on a rock it becomes attached by a secretion of mucus from the pedicle. Then, before mantle reversal actually takes place, it undergoes a wriggling period, flexing its muscles considerably. This causes it to contract and relax and move from side to side whilst the cilia beat rapidly. Similar activity was described by Percival for *Waltonia inconspicua* (Percival, 1944).

During this time the mantle lobe appears somewhat more transparent and moves away from the pedicle lobe, and can clearly be seen to consist of a dorsal and ventral part (Figure 9 (3)). This is unlike *Notosaria nigricans,* in which the mantle is a circular ring until two crescentic slits in the apical lobe have joined and the mantle has commenced to secrete a bivalved shell (Percival, 1960).

The mantle is drawn up in an unrolling fashion with the edge bearing the setae being the trailing edge (Figure 9 (2)). *Waltonia* behaves similarly (Percival, 1944). The setae stick out over the apical lobe, like a protective fringe, during the latter part and after mantle reversal (Figure 9 (4)). Whether these setae are lost is not known, but certainly, at a later stage they did not appear to be so large or so numerous.

The adjustor muscles then pull the apical lobe down between the mantle (Figure 9 (5)) and secretion of the shell commences in a short while.

After reversal, the cilia and eyespots gradually disappear.