(5) In the large number of *Pumilus* that I have inspected during the breeding season, no ova have been seen extending into the visceral cavity as far anteriorly as the digestive diverticula. At this position they are always within the lateral pockets. This may have been chance but so also may the presence of the ovum shown within the visceral cavity in Atkins' Specimen 8 (Atkins, 1958, p. 571, Fig. 8). This ovum may have been displaced during transport from New Zealand or during sectioning. However, if the ova do pass into the coelomic cavity, they are not retained in this position for a considerable time.

(6) From the facts that larvae in the mantle cavity are all at the same stage of development and that when larvae are present the gonads are empty of mature ova, it is concluded that the ova are all shed together. How can all the ova be retained in the coelomic cavity if only half of the ova of Atkins' Specimen 8 causes such compression of the digestive diverticula?

(7) The unfilled space of the coelomic cavity is not unusual as shown in section of an animal collected September 18, 1965 (Figure 6), and as seen in Atkins' section (1958, p. 568, Fig. 6B).

BROODING

After fertilisation the embryos are retained in the mantle cavity for varying times, but for at least nine days. During this time they are kept within the mantle cavity by the lophophore, which being schizolophophous provides a natural basket. There are no brood pouches formed as in the other hermaphrodite brachiopods *Argyrotheca cordata* and *Argyrotheca cuneata* (Senn, 1934; Shipley, 1883). The extent of movement within the parent is not known. The larval cilia could function to keep the larva in its place in the mantle cavity. However, on removal from the brooding adult, the larvae swim actively.

The larvae remain in the parent until eyespots and setae are present, the apical tuft, the pedicle and mantle cilia have disappeared, the gut is elongated but closed and the pedicle adjustor muscles are present. They are released just before the mantle lobe is ready to reverse.

When a parent *Pumilus* is opened artificially prior to natural spawning, the larvae have to be withdrawn by means of a dropping pipette. However, if the parent is injured by the breaking of the adductor muscles during the opening of the shell, then the embryos are shed from the mantle cavity via the median exhalent current. Atkins (1958) reports this current to be small. Thus it is possible that upon injury the cilia forming the median inhalent current reverse their direction of beat. This would be similar to the description of this occurrence in *Megathyris* (Atkins, 1960).

DEVELOPMENT WITHIN THE MANTLE CAVITY

The ova and sperm are released into the mantle cavity via the nephridia. The ova gradually become spherical with release of pressure due to packing in the mantle sinuses. At this stage they are approximately 200μm in diameter and are surrounded by a single layer of follicle cells.

As development within the mantle cavity has been found to take from 9 to 17 days, it is impossible to state accurately at what age a particular change takes place. Therefore, in the text, the sequence of events is recorded without reference to the age of the larvae. In the drawings the ages of individuals are noted.

After fertilisation the follicle cells break down leaving the egg cell wall naked, then cleavage commences within the mantle cavity. The first was horizontal, and the second is at right angles to the first, giving four equal blastomeres. The third