

A NEW SPECIES OF *PLATIDIA* (BRACHIOPODA) FROM THE LA CHAPELLE BANK REGION

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From the Plymouth Laboratory

(Text-figs. 1-8)

A new species of *Platidia* (Brachiopoda, Platidiidae) was dredged by R.V. 'Sarsia' in November 1956 in the La Chapelle Bank region, attached to the dead part of the coral *Anisopsammia rostrata* (Pourtales).¹ Eight entire specimens and two smashed were dredged at position 47° 30' N., 7° 20' W. at a depth of 870 to 970 fathoms, and one at position 47° 38' N., 7° 28' W. at 710 to 750 fathoms. All, except the two smallest, were a reddish brown, the coloration being due to a deposit of manganese oxide: the natural colour is a yellowish white. The dead coral was almost black with the same deposit (see Southward, 1958, p. 644).

Some individuals were transversely oval, others somewhat rectangular and irregular in shape, according to the surface of attachment (Fig. 1). The *Anisopsammia* was fairly free of encrusting organisms but the polyps are closely spaced and therefore apt to interfere with the regular spreading of the closely attached *Platidia*.

The new species of *Platidia* was difficult to deal with. As it was from deep water it was brought back in a refrigerator at a temperature of 5°-7° C: specimens then went into laboratory tank water of 13° C. It has been found that brachiopods generally cannot withstand sudden changes of temperature, and it was this change in temperature which no doubt adversely affected the specimens, most of which showed separation of the cells of the epithelium of the filaments after a few days. Those opened the day after arrival in the laboratory did not extend the filaments on the anterior region of the lateral arms, although the posterior and lateral filaments and those on the posterior extremities of the lateral arms expanded well. This continued contraction of the filaments of the anterior region of the arms may be dependent in some way on the fact that the arms remained depressed and did not raise themselves as they do under similar conditions in *P. davidsoni* and *P. anomioides*. Attempts were made to narcotize the animals with 1% stovaine and with 7% magnesium chloride, a drop added at intervals to a small dish or watch glass of sea water. The latter acted rather the better, but results were not good. The specimen with most expanded lophophore is shown in Fig. 5: it is not

¹ Identified by Dr A. J. Southward.

fully expanded. This specimen left in cedar wood oil for a few months suffered severe deterioration, the tissue becoming extremely brittle, and fragmenting.

All figures were drawn with the aid of a camera lucida.

Description

Platidia annulata sp.nov.

The general shape of the shell is that typical of the genus *Platidia* (Fig. 1, A, B). The pedicle is short, and the dorsal or brachial valve is closely applied to the substratum; it is generally approximately flat, while the ventral valve is gently domed. So far as can be judged by the few specimens obtained, this is a small species. The three largest individuals had the following measurements: (a) length 4.7 mm, width 4.2 mm; (b) length 4.2 mm, width 4.3 mm; (c) length 3.7 mm, width 4.7 mm. This is approximately the size of *P. anomioides* (Philippi) found to the south-east of the La Chapelle Bank area (Atkins, 1959).

The test is smooth, with growth lines discernible, and is conspicuously punctate. As in *P. anomioides* and *P. davidsoni* the punctae appear to be smaller on the dorsal than on the ventral valve, probably because the shell is thinner. The beak is very short, rostrum apiculate, foramen amphithyrid. The deltidial plates are narrow. The pedicle collar is short, sessile and not as conspicuous as in *P. anomioides* and *P. davidsoni*. Running anteriorly from the pedicle collar is a slight median elevation. The hinge teeth have very feeble dental plates as in the other two species. Fig. 2 shows the beak region at three sizes.

In the dorsal valve the inner socket ridges are prominent; the crural bases arise from them. A high septal pillar is present posteriorly. In adults the pillar is continued posteriorly by a septum gradually decreasing in height to a mere ridge on the foraminal margin. The crura are long, the crural processes short, but distinct. The descending branches are quite stout for the size of the shell and widen broadly at their insertion high on the septum, up which they run obliquely to become attached to the sides of the ring formed by the ascending branches. The tips of the short ascending branches are connected by a transverse bar, so that a ring is formed over the septum (Fig. 3). The brachial support is thus more completely developed than in any other species of *Platidia* described, but in spite of this the descending branches reach only to the centre of the oral disc.

The lophophore may be considered a modified plectolophe with an extremely small spiral arm, or even as a modified zugolophe (Fig. 5): it is possible that if *P. annulata* grows to a larger size than seen so far, the spiral arm may also be correspondingly developed. A greater area of the ventral surface of the oral disc is free from spicules than in either *P. anomioides* or *P. davidsoni*: they are present over an area anterior to the transverse bar of the loop (Figs. 5, 7A).

P. annulata is especially noticeable for the long, closely set mantle setae, reaching a length of at least 2 mm; considerably longer than those of *P. anomioides* and *P. davidsoni*. The setae in the specimens seen were dark and iridescent, but this was probably due to a deposit present also on the shells.

The flesh of specimens was pale coloured: this may have been because the gonads were not fully developed.

As alcohol, neutral formalin and cedar wood oil have severally caused deterioration of the few specimens obtained, no single one has been chosen as the holotype. The adult specimens which may be considered as syntypes

have been deposited in the British Museum (Natural History) and given the following numbers: ZB. 2910-16, all at 870 to 970 fm.; ZB. 2917 at 710-15 fm.

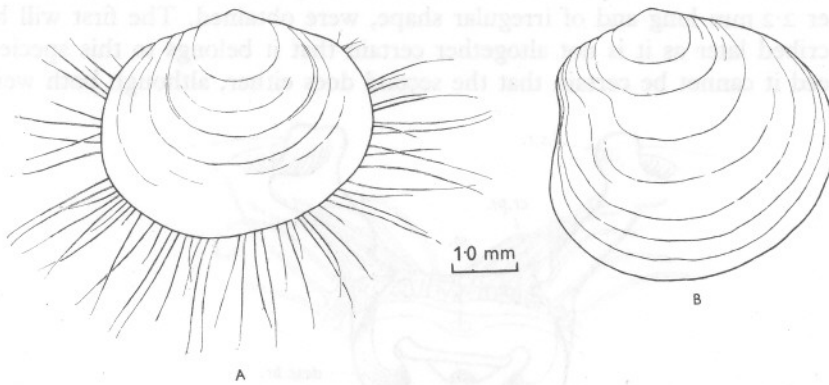


Fig. 1. *Platidia annulata*. A, specimen of regular, transversely oval, shape; mantle setae shown: shell length 3.5 mm, width 4.2 mm. B, specimen of irregular shape; mantle setae omitted: shell length 4.2 mm, width 4.3 mm.

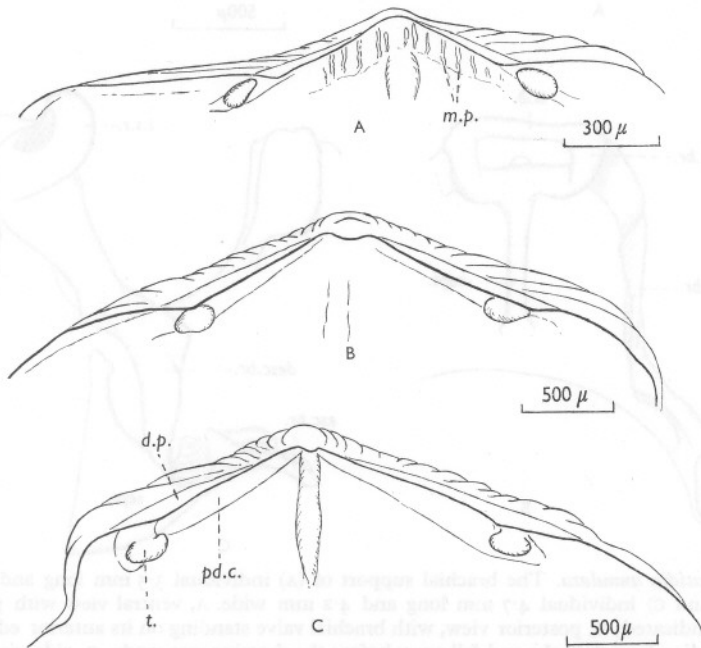


Fig. 2. *Platidia annulata*. Beaks of three individuals of different size. A, length 2.2 mm, width 2.4 mm; B, length 4.2 mm, width 4.3 mm; C, length 4.7 mm, width 4.2 mm. *d.p.*, deltidial plate; *pd.c.*, sessile pedicle collar; *m.p.*, mantle pits in pedicle collar; *t.*, tooth.

THE ADULT LOPHOPHORE

Material for the study of the growth stages of the lophophore was not available. Two small specimens, one 2.1 mm long and 2.2 mm wide, and the other 2.2 mm long and of irregular shape, were obtained. The first will be described later as it is not altogether certain that it belongs to this species, indeed it cannot be certain that the second does either, although both were

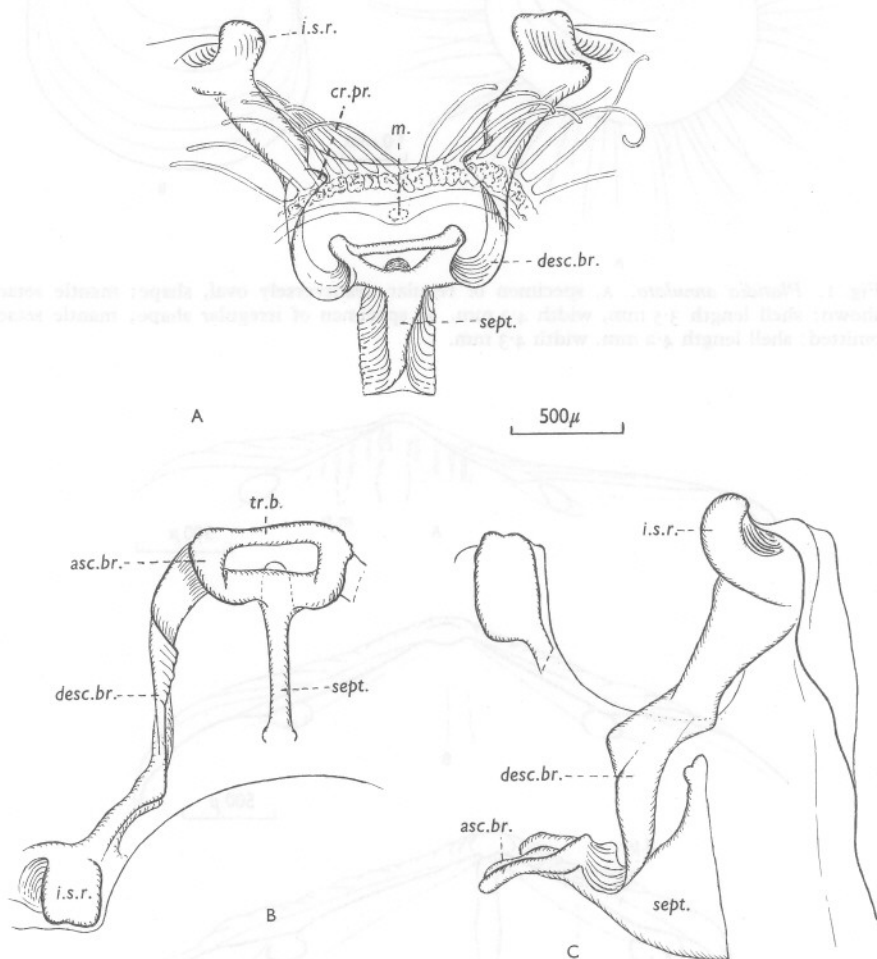


Fig. 3. *Platidia annulata*. The brachial support of (A) individual 3.5 mm long and 4.2 mm wide; (B and C) individual 4.7 mm long and 4.2 mm wide. A, ventral view with posterior filaments indicated; B, posterior view, with brachial valve standing on its anterior edge. The left descending branch broke and fell away before the drawing was made. C, side view of the same. *asc.br.*, ascending branch; *cr.pr.*, crural process; *desc.br.*, descending branch; *i.s.r.*, inner socket ridge; *m.*, position of mouth covered by lip; *tr.b.*, transverse band of the loop; *sept.*, septum.

found in the haul which contained the adults. The second specimen was an empty shell although still attached to the coral; it had probably died since collection. The septal pillar was high, not triangular, with minute triangular prongs at the apex. Crura and crural processes were present; descending branches from the crura were short and their anterior ends were wanting (Fig. 4). In *P. davidsoni* at a corresponding size the septum is low, with almost horizontal lamellae at its apex: crura are absent (Atkins, 1959).

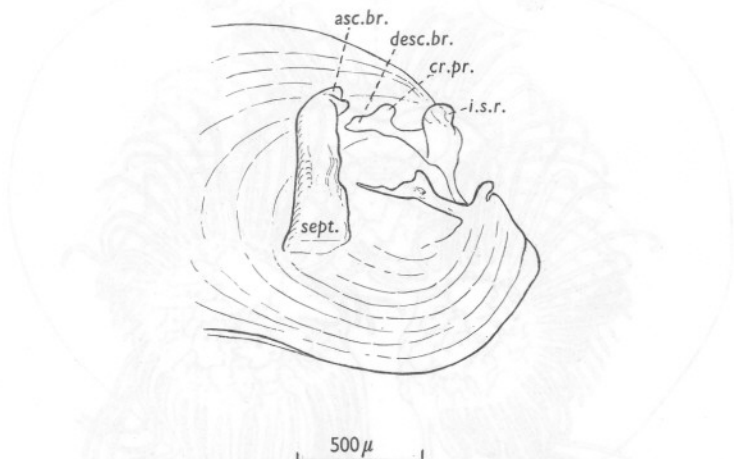


Fig. 4. *Platidia annulata*. Brachial support of immature individual of irregular shell shape; length 2.2 mm. *asc.br.*, ascending branch; *cr.pr.*, crural process; *desc.br.*, descending branch; *i.s.r.*, inner socket ridge; *sept.*, septum.

P. anomioides at about this size has the septum a broadly based triangle, and although long crura are present, descending branches have not yet grown from them. At a slightly larger size, however, the septum may become taller and less triangular in shape (Atkins, 1959).

The largest individual of *P. annulata* obtained has a shell length of 4.7 mm and width of 4.2 mm. At this size the lophophore was in about the same condition as in the individual figured (Fig. 5) of length 3.5 mm and width 4.2 mm; there was little development of the spiral arm and the recurved portion of the lateral arms was short.

Some eighteen to twenty pairs of filaments behind the mouth are in single series and have ridged frontal surfaces.

In the adult the descending branches, although complete, reach only to the centre of the oral disc, and together with the septum, ascending branches and transverse bar support no more than the posterior region of the lophophore to about the centre of the oral disc (see Figs. 5, 6). The individual of which the lophophore is figured (Fig. 5) has a wide base to the septal pillar, the anterior face of which is somewhat asymmetrical (Fig. 3A).

In *P. annulata* a lesser area of the oral disc is covered with spicules than in either *P. anomioides* or *P. davidsoni* as may be seen from Fig. 7.¹ A band at the bases of the filaments, narrow behind the mouth, widens laterally as it passes on the outer side of the descending branches into the lateral arms (Fig. 5). The abfrontal surfaces of these are almost covered with large spicules, only a small central area in each being free. The floor of the lateral arms, or

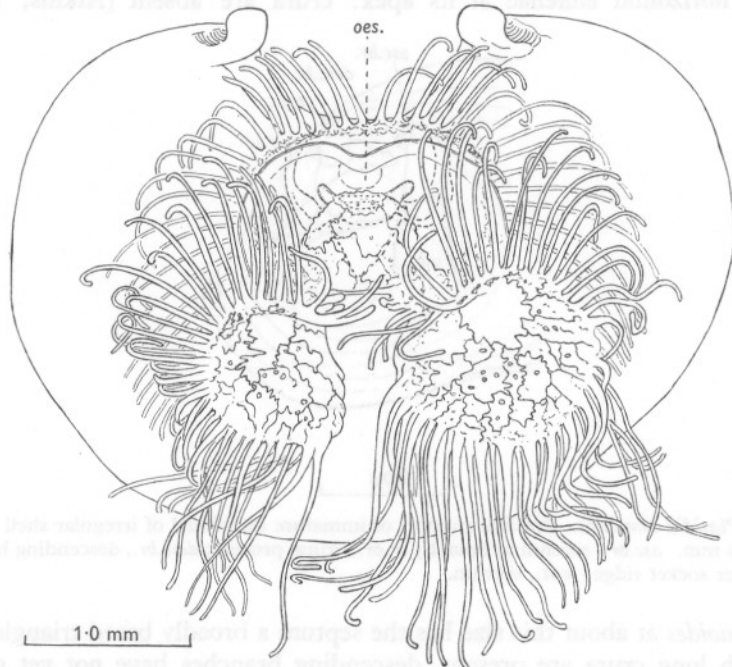


Fig. 5. *Platidia annulata*. Shell length 3.5 mm, width 4.2 mm. Brachial or dorsal valve with the lophophore not fully expanded: drawn narcotized. Brachial support, indicated by broken lines, added after clearing in cedar wood oil. *oes.*, position of oesophagus.

brachial membrane, seems to be without spicules, except perhaps for a narrow band at the bases of the filaments. A ventral area of spicules beginning at the transverse band extends to the anterior edge of the oral disc; laterally it joins the bands just described.

The outer filaments with grooved frontal surfaces are heavily spiculated, the inner ones, with ridged frontal surfaces less so. The spicules are broad bands with granulated surface such as are present in the filaments of the other two species.

The lips of the food groove are without spicules.

¹ In larger specimens of *P. anomioides* an even smaller area of the oral disc is left naked than shown in the figure.

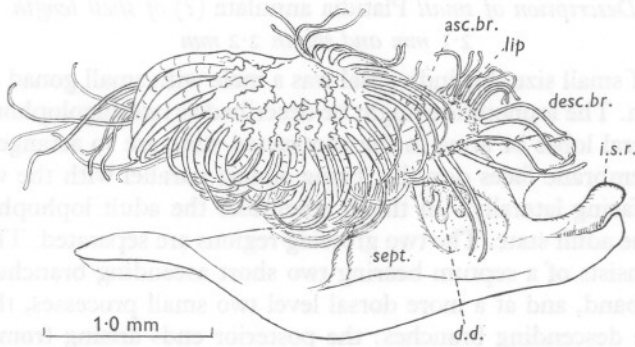


Fig. 6. *Platidia annulata*. Same individual as in Fig. 5 shown in side view to show position of the lophophore with regard to the descending branches and the septal pillar. The lophophore is somewhat depressed and contracted anteriorly. *asc.br.*, ascending branch; *d.d.*, digestive diverticula; *desc.br.*, descending branch; *i.s.r.*, inner socket ridge; *lip*, lip of food groove; *sept.*, septum.

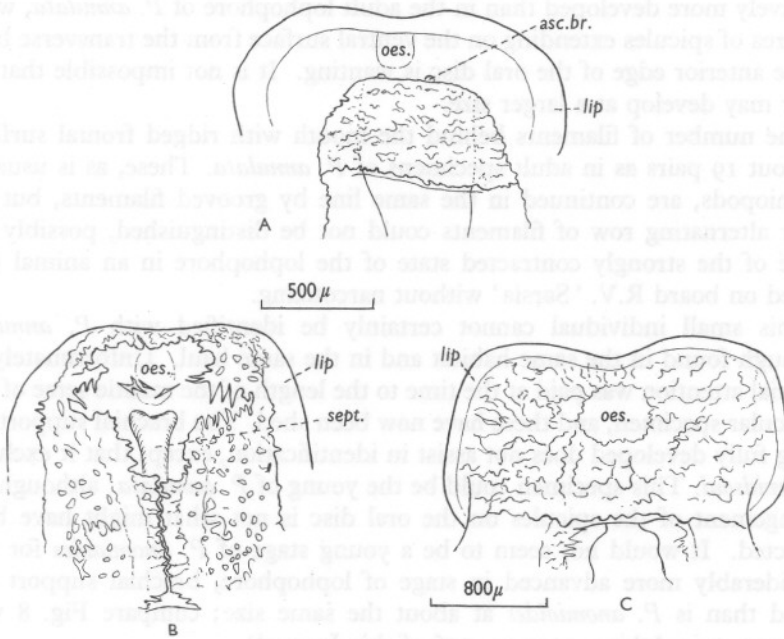


Fig. 7. Oral discs to show the distribution of spicules on the ventral surface of A, *Platidia annulata* of shell length 4.2 mm, width 4.3 mm; B, *P. anomiooides* of shell length 3.9 mm, width 4.1 mm (at a larger size an even smaller area of the disc is naked); C, *P. davidsoni* of shell length 6.5 mm, width 8.1 mm. *asc.br.*, tip of ascending branch; *lip*, lip of food groove; *oes.*, position of oesophagus; *sept.*, septum. A and B are drawn to the same scale.

*Description of small Platidia annulata (?) of shell length
2.1 mm and width 2.2 mm*

Although of small size this individual was a male with small gonad containing tailed sperm. The lophophore might be described as late zugolophous (Fig. 8), but the lateral lobes or arms in the contracted state are so arranged that the brachial membrane faces dorsally, being almost parallel with the valve floor, instead of facing laterally. In this it resembles the adult lophophore and is almost in the adult state. The two growing regions are separated. The brachial support consists of a septum bearing two short ascending branches, without transverse band, and at a more dorsal level two small processes, the anterior ends of the descending branches: the posterior ends arising from the crura are short. The descending branches thus arise from both crura and septum as in *P. anomioides* (Atkins, 1959). It may be assumed that the brachial support is not yet fully formed.

On the oral disc a band of spicules, narrow behind the mouth, widens as it passes on either side of the septum into the lateral arms. This band seems relatively more developed than in the adult lophophore of *P. annulata*, while the area of spicules extending on the ventral surface from the transverse band to the anterior edge of the oral disc is wanting. It is not impossible that the latter may develop at a larger size.

The number of filaments behind the mouth with ridged frontal surfaces is about 19 pairs as in adult specimens of *P. annulata*. These, as is usual in brachiopods, are continued in the same line by grooved filaments, but the inner alternating row of filaments could not be distinguished, possibly because of the strongly contracted state of the lophophore in an animal preserved on board R.V. 'Sarsia' without narcotizing.

This small individual cannot certainly be identified with *P. annulata* although found in the same habitat and in the same haul. Unfortunately no especial attention was paid at the time to the length of the mantle setae of this particular specimen, and these have now been shed. The brachial support not being fully developed does not assist in identification, except that it excludes *P. davidsoni*. This specimen could be the young of *P. annulata*: although the arrangement of the spicules on the oral disc is not what might have been expected. It would not seem to be a young stage of *P. anomioides* for it is considerably more advanced in stage of lophophore, brachial support and gonad than is *P. anomioides* at about the same size; compare Fig. 8 with Fig. 23A, B in Atkins, 1959 (p. 126 of this Journal).

REMARKS

Perhaps the characters by which *P. annulata* is most easily separated from *P. anomioides* and *P. davidsoni* are (1) the loop over the septum (Fig. 3); (2) the small area of the oral disc covered by spicules (Figs. 5, 7); and (3) the long

mantle setae up to at least 2 mm long (Fig. 1). There is also a difference in the number of filaments in single series behind the mouth: in *P. annulata* the number is 18 to 20 pairs, in *P. anomioides* 25 to 26 pairs, and in *P. davidsoni* 16 to 17 pairs (Atkins, 1959).

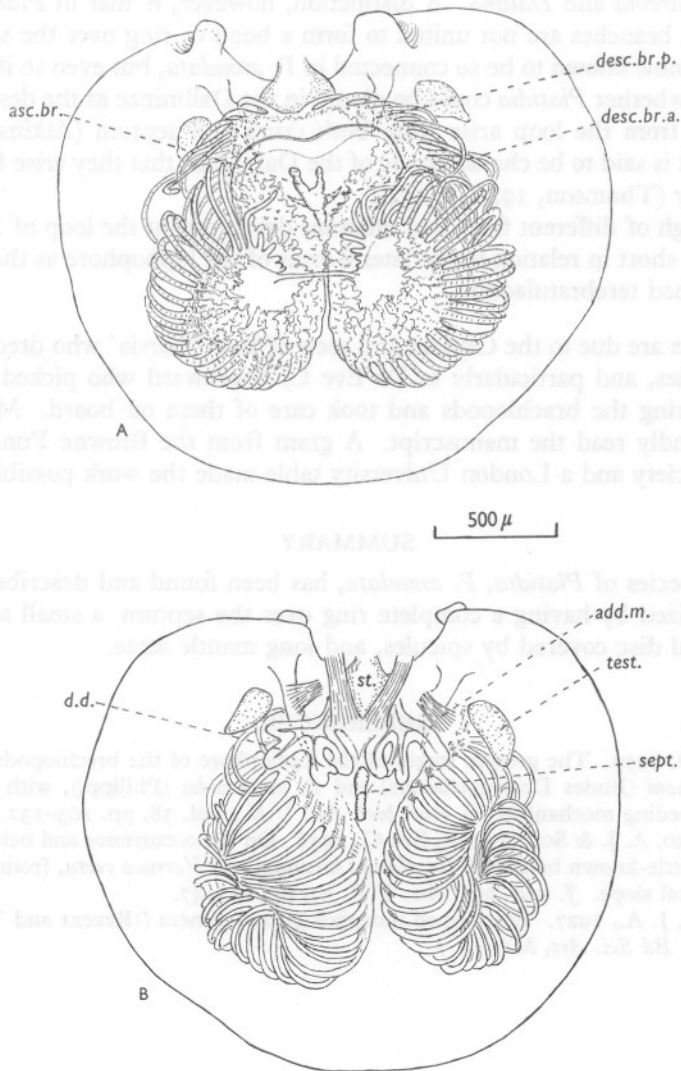


Fig. 8. *Platidia annulata* (?): shell length 2.1 mm, width 2.2 mm. Brachial valve with lophophore. A, ventral view: the distance apart of the two growing regions is to be noted. B, dorsal view of lophophore and body seen through the shell after staining and clearing in cedar wood oil. *add.m.*, adductor muscle; *asc.br.*, ascending branch; *d.d.*, digestive diverticula; *desc.br.a.*, anterior, and *desc.br.p.*, posterior ends of descending branch; *sept.*, septum; *st.*, stomach; *test.*, testis.

The umbonal region of *P. annulata* (Fig. 2) resembles that of *P. anomioides* more than that of *P. davidsoni*.

Thomson (1927, p. 219) remarked that 'Beecher placed the genus (i.e. *Platidia*) in the Dalliniinae, comparing the loop with the earliest loop stages of *Macandrevia* and *Dallina*. A distinction, however, is that in *Platidia* the ascending branches are not united to form a hood or ring over the septum.' They are now known to be so connected in *P. annulata*, but even so it is most doubtful whether *Platidia* could be placed in the Dalliniinae as the descending branches from the loop arise from both crura and septum (Atkins, 1959), whereas it is said to be characteristic of the Dalliniinae that they arise from the crura only (Thomson, 1927, p. 234).

Although of different form and different development the loop of *P. annulata* is as short in relation to the lateral arms of the lophophore as that of the short-looped terebratulaceans.

My thanks are due to the Captain and crew of R.V. 'Sarsia' who dredged the new species, and particularly to Dr Eve C. Southward who picked out the coral bearing the brachiopods and took care of them on board. Mr G. F. Elliott kindly read the manuscript. A grant from the Browne Fund of the Royal Society and a London University table made the work possible.

SUMMARY

A new species of *Platidia*, *P. annulata*, has been found and described. It is characterized by having a complete ring over the septum, a small area only of the oral disc covered by spicules, and long mantle setae.

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