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ON THE GENUS AUSTRODORIS (MOLLUSCA, OPISTHOBRANCHIA) AND A NEW SPECIES

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RESUMO - As espécies do gênero *Austrodoris* Odhner, 1926, são enumeradas e comparadas com a espécie nova *A. mishu* da Ilha dos Elefantes. *A. nivium* of Vicente, 1974, é diferente de Odhner's *A. nivium*, 1934, por isso chamo-a *A. vicentei* sp.n.

ABSTRACT - The species of *Austrodoris* Odhner, 1926, are listed and compared with the present new species. *A. mishu* from Elephant Island. *A. nivium* Vicente, 1974, differs from *A. nivium* Odhner, 1934, and is called *A. vicentei* spec. nov.

INTRODUCTION

Dr. Edmundo Nonato, Oceanographic Institute, University of São Paulo, entrusted me with a single specimen, nº 4412, of an opisthobranch for classification, collected by the Pro antar I - Expedition of the Oceanographic Vessel "Wladimir Besnard" 1983 in Drake Strait. I could immediately recognize it as an *Austrodoris*, but had to compare the species of that genus and found out that it is different from the previous descriptions of all species of the genus, which Odhner(1934: 258) called taxonomically a very difficult genus, hence I consider it as a new species and call it *Austrodoris mishu* sp. n. The genus *Austrodoris* has, until now, with one exception (Minichev, 1972:360) only been found in the Antarctis and Subantarctis, up to Patagonia and Chile. The Expeditions generally brought very few specimens, so that the descrip - tions are often incomplete, as also the present one is.

As Vicente's description (1974:630, figs. 2, 3, 5, 7, 8 and I B) from Kerguelen, which he called *nivium* Odhner, differs from Odhner's *nivium* by the shortness of its pedal commissure, I distinguish it as a new species and call it *Austrodoris vicentei*.

Genus *Austrodoris*

The genus *Austrodoris*, taxonomically a very difficult genus (Odhner, 1934:258), is characterized by a straight anterior border of the foot with a transverse furrow (excep - tion, *grandis* Minichev, 1972, fig. 1B). The tentacles have a lateral furrow. The teeth have no denticles. There is no prostate, and the vas deferens is winding in a thick muscu - lar sheath on all its length. There is no penial papilla.

The shape of the dorsal papillae and their distance from one another compared with their height and diameter are considered as possible specific characters. Odhner indicated the number of tubercles (papillae) between the rhinophores as a useful character (1934:261-267) It is, however, variable, and I did not succeed to count them, as they do not stand in a straight line and may be of very different sizes. Moreover, Odhner's figures of *A. rubescens* (1926: figs. 33, 36) show quite different numbers.

Odhner characterized the species (1926:72-75) by the number and size of the papillae on the margins of rhinopho - ral and branchial openings. This is also a variable charac - ter, and his description (p. 75) of subequal length and the figure(pl. 2, fig. 38) with equal length in *crenulata* do not agree. The breadth of the mantle border behind the gills is sometimes equal, sometimes variable in one and same species, even in the same population.

Several species were said to have no spicules, or the spicules were not mentioned. Possibly they had been dis - solved in the preservation fluid, or they were so small that they were not recognized, as in *tomentosa*,where Odhner(1934) does not mention them, and Vicente (1974:629, figs. 4, 6) calls them disorderly, and considers them as belonging to the eaten sponges. The same holds for *granulatissima* (Vicente & Arnaud, 1974:536). Spicules are not mentioned in *peculiaris* and *antarctica*, and are said to be missing in *australis* and *crenulata*.

I divide the species known for the position of their spicules onto two groups, those with a bundle of spicules in the papillae: *australis* (Bergh,1884 pl. 1, f 14), *rubes - cens*, *michaelseni*, and *stellata*, or as radiating around the papilla: *granulatissima*, *tomentosa* (Vicente, 1974:630), *macmurdensis*, *nivium* and *vicentei* (Vicente, 1974: fig. 2,3).For *grandis* and *longa* they are mentioned "in the tissue". The present specimen belongs to the group with spicules in the papillae. Its number of gills agrees with *michaelseni* (Odh - ner, 1926), from which it differs by the long right salivary gland (Fig. 8).

The lip cuticle is smooth. The salivary glands are, as a rule, short and broad or tongue-shaped, not band-like. In 1934 Odhner mentioned an exception, long glands in *australis* (Bergh, 1884:910). The left gland is short and broad, the right one elongate in *nivium* (Odhner, 1934:269) and in the present specimen (Fig. 8)

The teeth have no denticles. Their number is not always correlated with the size (Odhner, 1926:72-73; 1934:263).

The nervous system is not mentioned in *peculiaris, rubescens, michaelseni, crenulata, stellata,* and *longa.* The shape of pedal ganglia is generally figured as round. The length of the pedal commissure is indicated or figured only in five species: long in *granulatissima* (Odhner, 1934 , fig. 31) and in *nivium* (Odhner, 1934:268) For *macmurdensis* Odhner (1934:269, fig. 27) said it is long, but figured it as half long. The pedal commissure is short in *australis*(Bergh, 1884, fig. 13) and in *vicentei,* spec. nov. (Vicente, 1974 , fig. 1D), as in the present species (Figs. 11, 12) Vicente does not mention the length of the pedal commissure for *tomentosa,* but indicated a "perioesophageal collar" and in his figure 1B the pedal ganglia are drawn so narrow, that they are evidently bent around the oesophagus and united ventrally by the short pedal commissure.

The reproductive organs show slight differences in the species (Odhner, 1926, fig. 49; 1934, figs. 20-24, 34). The male duct is distinguished from that in other genera by absence of a prostate or a wider prostatic part of the vas deferens, and by the strong muscular sheath around its tightly winding outer part There is no penial papilla. The female organs vary specially in the length of the vagina. Spermathe ca and spermatocyst are inserted vaginally in the ental end of the vagina. The differences between the spermathecae and spermatocysts in the figures may be due to the degree of their filling. The vas deferens is pleurembolic. Direct development was observed for *A. macmurdensis* by Gibson, Thompson and Robilliard, 1970.

Minichev (1972:360-366, figs. 1-3) described four species of *Austrodoris.* The first he calls *A. nivium* Odhner , which he says to have found in the Davis Sea, from where also his new species *grandis* and *stellata* came. His *grandis* has a notch in the lip of its foot (fig. 1B) and a very long spermatocyst. Only his *A. longa* is Subantarctic, from Bransfield Strait. It is characterized by five large papillae around each rhinophore and eight around the gills. The postbranchial distance is 1/12 of the body length.

The species of *Austrodoris* with the characters distinguishing them from *A. mishu*

As only four of the species of *Austrodoris* have a complete description, I cannot give a distinguishing key of all species, but can only give their differences from the present specimen.

Austrodoris peculiaris (Abraham, 1877)
Doris peculiaris Abraham, 1877, 211, pl. 29, figs. 15-17.
Austrodoris peculiaris Odhner, 1934:958; Burn, 1962:157,figs. 8, 9; 1966:264.
Staurodoris pustulata Basedow & Hedley,1905:151, pl. 9, fig. 3.
Archidoris varia Burn, 1957:29. non *Doris varia* Abraham,1877.
South Australia.
Papillae cylindric; ampulla thick.

Austrodoris australis (Bergh, 1884)
Archidoris australis Bergh, 1884:89, pl. 1,figs. 13-18, pl.2, fig. 13.
Austrodoris australis Odhner, 1934:258, 264.
Kerguelen.
11-12 gills; salivary glands long, bent in the middle, pedal commissure short.

Austrodoris rubescens (Bergh, 1898)
Archidoris rubescens Bergh, 1898:501, pl. 29, figs. 17-20.
Austrodoris rubescens Odhner, 1926:71, pl. 2, figs. 33-37 , text figs. 51-53; 1934:257-9, pl. 2 fig. 24.
Punta Arenas to South Georgia.
7-12 gills. Salivary glands broad.

Austrodoris antarctica (Hedley, 1916)
Doris antarctica Hedley, 1916:65, pl. 9, fig. 102,textfig.3.
Austrodoris antarctica Odhner, 1934:258, 264.
South Australia.
8-15 gills; pedal commissure long.

Austrodoris granulatissima (Vayssière, 1917)
Archidoris granulatissima Vayssière, 1917:17, pl. 4 figs. 43 -44.
Austrodoris granulatissima Odhner, 1926:68, 75; 1934:263 , pl. 2, figs. 13-15, textfigs. 22, 28-31; Vicente & Arnaud , 1977:536, pl. 1, figs. 6, 7
Oates Land, Macmurdo Sound; Adelieland.
Pedal commissure long.

Austrodoris michaelseni Odhner, 1926
Austrodoris michaelseni Odhner, 1926:68, pl. 2 figs. 30-32 , text figs. 47-51.
Ushuaia, Beagle Channel.
Broad salivary glands.

Austrodoris crenulata Odhner, 1926
Austrodoris crenulata Odhner, 1926:68, 75, pl. 2, figs. 38 , 39, textfig. 54.
Terra del Fuego.
10-13 gills; long salivary glands.

Austrodoris macmurdensis Odhner, 1934
Austrodoris macmurdensis Odhner, 1934:260, pl. 1, figs. 9, 10; pl. 2, figs. 16-18, textfigs. 20, 21, 25-27; Bouchet , 1977:43, fig. 43.
Macmurdo Sound, and 37°46'S, 54°46'W.
Pedal commissure half-long.

Austrodoris tomentosa Odhner, 1934
Austrodoris tomentosa Odhner, 1934:265, pl. 2 figs. 19, 20, text figs. 23, 24, 32; Vicente, 1974:629, pl. 1, figs. 1, 4, 6, 9,10.
Macmurdo Sound; Kerguelen.
Spicules radiating; 8 gills; pedal commissure very short.

Austrodoris nivium Odhner, 1934
Austrodoris nivium Odhner, 1934:267, pl. 2, figs. 21-23, text figs. 33, 34; Minichev 1972:361, figs. 1A-E.
non Vicente, 1974:630, pl. 1, figs. 2, 3, 5, 7, 8.
Macmurdo Sound; Arctic, Davis Sea.
Pedal commissure long.

Austrodoris grandis Minichev, 1972
Austrodoris grandis Minichev, 1972:361, figs. 1A-E.
Arctic, Davis Sea.
A notch in the fore end of the foot.

Austrodoris stellata Minichev, 1972
Austrodoris stellata Minichev, 1972:363, figs. 2A-D.
Arctic, Davis Sea.
Short salivary glands.

Austrodoris longa Minichev, 1972
Austrodoris longa Minichev, 1972:364, figs. 3A-F.
Antarctic, Bransfield Strait.
Spicules in tissue, 12 gills.

Austrodoris vicentei, sp. n.
Austrodoris vicentei, sp. n. for *A. nivium* Vicente, 1974:630, pl. 1 figs. 2, 3, 5, 7, 8, textfigs. L C, 1D.
Kerguelen.
Spicules radiating, 10-15 gills; pedal commissure short.

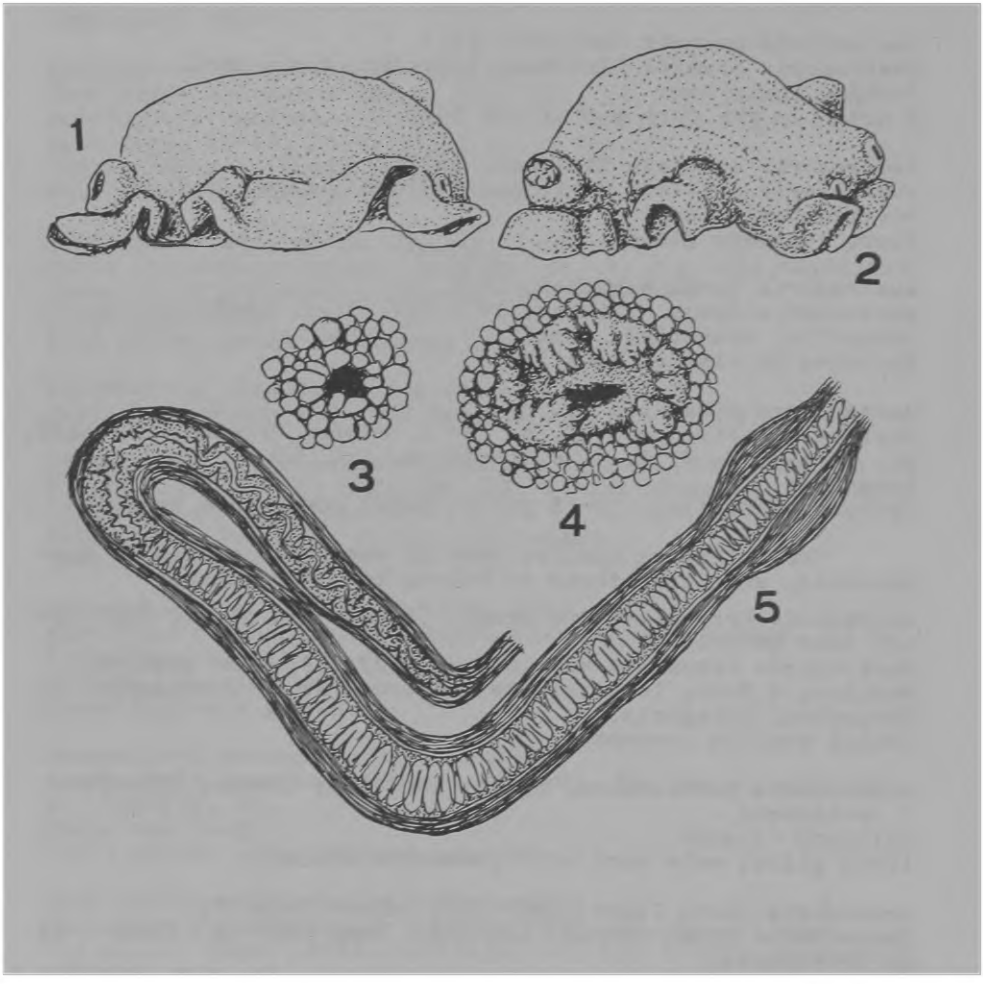
The following species were at some time placed in *Austrodoris*, and later found to belong to other genera:

Archidoris kerguelenensis Bergh, 1884:85-87, pl. 1, figs. 1-12; Burn 1973:39.
Austrodoris kerguelenensis Odhner, 1926:68; Burn 1968:90. Merilees & Burn, 1969:137-138, returned it to *Archidoris*.
Kerguelen, Patagonia.
Penial papilla present.

Staurodoris falklandica, Eliot, 1907:356; Odhner, 1926:68
? Archidoris
Falkland Islands
12-13 gills; male duct with granulate scales.

Archidoris fulva Eliot, 1907:338; Odhner 1926:67;
Austrodoris fulva Odhner, 1934:259. Burn 1973:40, lists it in *Archidoris*.
South Australia.

Austrodoris odhneri MacFarland, 1966, 171, pl. 26 fig. 1, pl. 29 fig. 14, pl. 36 fig. 1-19.
Archidoris odhneri Burn, 1968:90.
California.
Ental glandular part of vas deferens wider than ectal muscular one.



Figures 1-5: Figures 1, 2, two views of the preserved specimen. Figure 3, Papillae on margin of rhinophore opening. Figure 4, Papillae on margin of branchial groove. Figure 5, Male duct, clarified.

Austrodoris mishu, spec. nov.
Figures 1-12

Drake Strait, near Elephant Island, 61°15'S, 55°05'W, 110m. Sandy mud with some rock fragments. 4412 "Wladimir Besnard", 1983, in alcohol; one specimen.

The preserved animal measures about 48 mm in length, contracted (Fig. 1, 2), over the back, 63 mm. Its breadth is 25 mm, the height, 18 mm. The sole is 45x10 mm. The lateral brim of the mantle is 7 mm, the postbranchial one 9 mm, but it is folded in and shows only 7 mm, so it occupies 1/6 to 1/7 of the total length. The anterior border of the foot has a transverse groove, no notch.

The notum is beset with papillae of different sizes (Fig. 6). These are generally wider than high, the largest measure up to 1 mm in diameter, they are about 3 mm apart, and between them are many smaller ones of all sizes. The distance between them is smaller than their diameter (Fig. 6) In the middle of the larger papillae is a bundle of spicules (Fig. 7) They were not visible in the skin in alcohol nor in glycerine, but in balsam and in sections their outlines were recognizable.

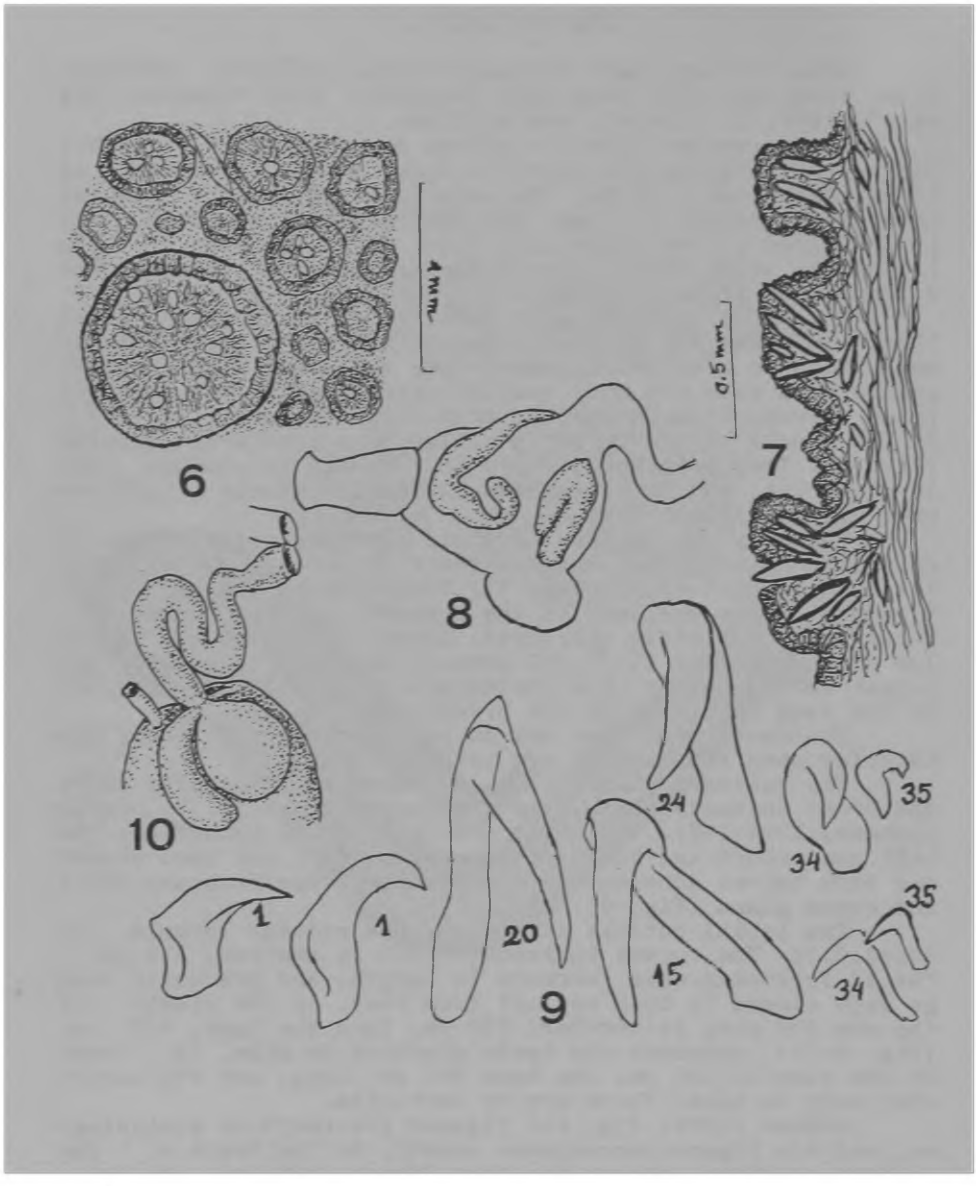
Probably the preserving fluid had decalcified them. Around the rhinophorial margins there is a dense row of papillae of different sizes (Fig. 3); those around the gill (Fig. 4) are a little smaller. In the present specimen the rhinophores are completely retracted. Odhner indicated the papillae of *michaelseni* (1926:69) around the gills as smaller and larger warts, but in his photograph (fig. 30) they are all of the same size like in the present specimen.

The seven branchiae are of rather different sizes, the anterior ones are largest and tripinnate.

The salivary glands (Fig. 8) which are generally short and broad in *Austrodoris*, are similar to those in *nivium* (Odhner, 1934:269). The right one is long and band-like, the left one, short and broad; it looks as if it was band-shaped and both halves adherent to one another, appearing one short and broad gland (Fig. 8)

The labial cuticle is smooth. The radular formula is 30x36.0.36. The curved innermost tooth is smaller, 310 µm, the 12 following ones increase in length, and gradually change from curved to cusp set off from base. In the middle of the row the cusp is shorter, 310 µm, than the base, 490 µm. (Fig. 9-15) Outwards the teeth diminish in size, in tooth 34 the cusp is 150 µm, the base 390 µm long, and the outermost vary in size. There are no denticles.

Odhner (1926; fig. 48) figured the teeth of *michaelseni*, and his figure corresponds exactly to the teeth of the present specimen, except for that Odhner indicated the curved ones as outer teeth and the angular ones as inner teeth. This must be an error: in my specimen it is the opposite, the curved teeth are the inner ones and the angular ones the outer. Odhner's figure 71 has curved inner and angular outer teeth as Bergh's figures 7 and 9 (1884, pl. 1) of *Archidoris kerguelensis*. The aspect of the teeth is so different accor-



Figures 6-10: Figure 6, Aspect of clarified skin with spicules in papillae. Figure 7, Section of same. Figure 8, Pharyngeal bulb with asymmetrical salivary glands. Figure 9, Radular teeth. Figure 10, Vagina, spermatheca and spermatocyst.

ding to their position under the microscope, that it is difficult to apply their shape as specific character. Odhner (1934:257) says: form as usual.

The well preserved nervous system of the present specimen (Fig. 11, 12) is like Bergh's figure of *australis* (Bergh, 1884, pl. 1, f 13) and similar to Vicente's figure of *nivium* (1974, textf. 1 D). It differs from Odhner's figures of *macmurdensis* (1934, f. 27) and *granulatissima* (f. 31) by the short pedal commissure, which is half-long in *macmurdensis*, but quite long in *tomentosa*. Odhner (1934:269) indicated a long suboesophageal commissure for his *nivium*. The shape of the ganglia differs from that of the four mentioned figures which have round ganglia, while those of the present species are longish and pointed outwards. The cerebro - pleural ganglia (cpl), divided dorsally by a furrow in *macmurdensis* and *nivium*, are coalescent in *granulatissima* (Odhner, 1934 , f. 31) and the present species. The pedal ganglia (p) are narrow and pointed outward. From the right one a strand goes out and then divides into three nerves. The corresponding nerves leave the left ganglion separately. The short pedal commissure (pc) is distinctly composed of three nerves.

I did not follow all genital ducts, not to tear the only specimen too much. The efferent duct was taken out (Fig. 5) It is about 30 mm long and has a strong muscular sheath with a specially thick outer part. The duct is winding in its inner part, similar to *A. nivium* (Odhner, 1934, fig. 34), and farther outwards its epithelium is transversely folded . The outermost end of the duct was lost. There was no penial papilla. I place this species in *Austrodoris* for the thick muscular sheath of the male duct and the vaginal spermatheca and spermatocyst. Its male duct is exactly like that of *nivium* Odhner (1934: fig. 34), though there might be a part with prostatic cells in the male duct, not wider than the rest (Fig. 5) I call this new species *Austrodoris mishu*. Mi shu is the name of a cat.

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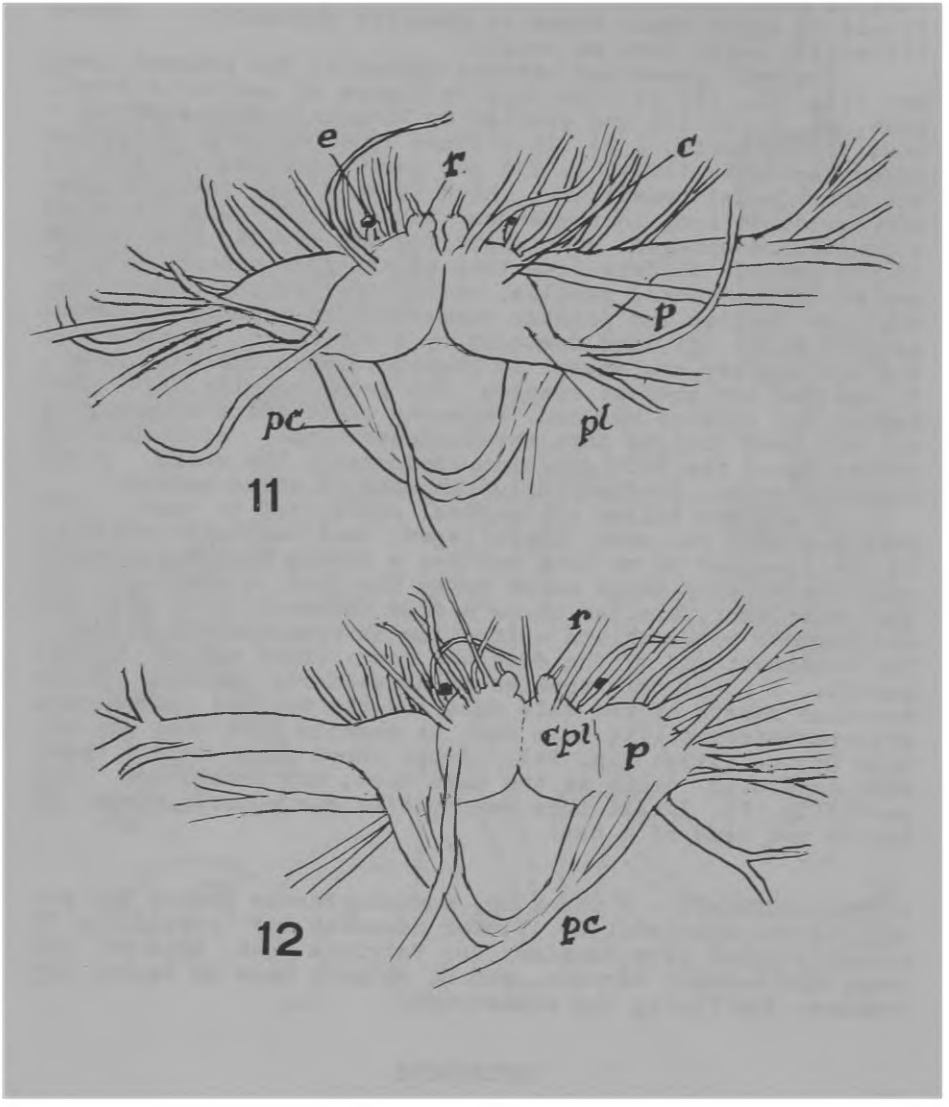

Figures 11, 12: Nervous system. Figure 11, Dorsal view. Figure 12, Ventral view. *c*, Cerebral part of cerebro-pleural ganglion. *cpl*, cerebro-pleural ganglion. *e*, eye. *p*, pedal ganglion. *pc*, pedal commissure. *pl*, pleural part of cerebro-pleural ganglion.

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