MINISTERIE VAN ONDERWIJS, KUNSTEN EN WETENSCHAPPEN

ZOOLOGISCHE MEDEDELINGEN

UITGEGEVEN DOOR HET

RIJKSMUSEUM VAN NATUURLIJKE HISTORIE TE LEIDEN

Deel 40 no. 19 6 mei 1965

NOTES ON A FEW OPISTHOBRANCH MOLLUSCA FROM SURINAM (GUIANAS)

by

J. NIJSSEN-MEYER

Zoölogisch Museum, Amsterdam

The Opisthobranchs dealt with in this paper were entrusted to me by Dr. C. O. van Regteren Altena, Rijksmuseum van Natuurlijke Historie, Leiden, and belong to that museum. They are part of a large collection of marine molluscs from Surinam of which Dr. van Regteren Altena intends to publish an annotated catalogue. The material was preserved rather badly, e.g. 3 specimens of *Bornella calcarata* had dried out and were hard and stiff.

No descriptions or colour-notes on the living animals were available. These appear to be the first Opisthobranchs recorded from the Guianas.

The drawings illustrating this paper were made by Mr. Jos Ruting, artist at the Zoological Museum at Amsterdam.

ORDER NOTASPIDEA

FAMILY PLEUROBRANCHIDAE

Pleurobranchaea hedgpethi Tucker Abbott, 1952 (fig. 1-2)

RNHL no. 6266; 1 specimen, Surinam, dredged by the "Coquette" on her 5th trip, 29.IV.-3.V.1957, NNW of Marowijne river, 20 miles off the coast, depth 15 fathoms.

The preserved animal (slightly contracted) is 15 mm long, 5 mm high, the foot 5 mm and the total animal 6 mm broad. The body has an oval shape. The foot protrudes behind, with a small firm dorsal spur that is about 0.6 mm high. The pedal gland measures 2 mm. The animal has a pale yellow colour with a few traces of brown mottling near the tail and on the tip of the right rhinophore. The mouth shows as a straight line between the jaws with dark coloured skin of the trunk surrounding it. The border of the frontal veil is very slightly tuberculated. The velum with tentacles is slightly pushed aside on top of the head by the strongly protruding trunk. The dorsal surface of the mantle is thin and minutely pimpled.

The oesophagus can be seen as a black mass on the underside of the head.

The ctenidium is 7-8 mm long and 3.5 mm broad, with about 20 pinnules on each side, and a smooth rhachis. The branchial membrane extends to the 14th pinnule, about ¾ of the length of the gill plume. The anus lies above the 6th pinnule, the renal pore under the 3rd pinnule. The genital apertures are surrounded by a common membrane with a dorsal flap, pointing sideways and slightly upwards.

The mandibular rodlets have a hexagonal shape (fig. 1) and overlap each other with a denticulated border (9-10 denticles). The teeth of the radula (½ × 29 - 34 × 53) have one strong cusp and a denticle (fig. 2a, b, c) of which the size depends on the place in the radula. For the moment I agree

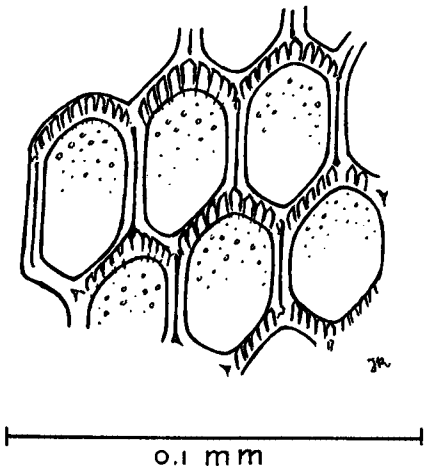

Fig. 1. *Pleurobranchaea hedgpethi* Tucker Abbott, mandibular rodlets.

with the statement of Marcus (1961) that the number of teeth of the radula lacks systematic significance. A better knowledge of the range of variation of this number in different populations is, however, necessary to prove this statement to be correct.

Discussion. — The flap above the genital apertures has a dorsal direction in the subspecies *P. hedgpethi hamva* Marcus, and is directed anteriorly in *P. h. hedgpethi* Tucker Abbott; in our specimen it has an intermediate direction. In my opinion this direction could also have been influenced by preservation. As long as no other differences are found I consider our animal to be *P. h. hedgpethi* Tucker Abbott.

The genus *Pleurobranchaea* is characterized by a united mantle and veil. Distinctive for this species is the position of the anus together with less distinctive characters as caudal spur, shape of teeth, flap above genital apertures, smooth rhachis and number of pinnules of ctenidium.

Further distribution. — Point of Cape Hatteras, North Carolina (Marcus, 1961); Port Isabel Channel, Texas (Marcus & Marcus, 1959); Port Aransas, Texas (Tucker Abbott); Bay of Campeche, Mexico (Tucker Abbott).

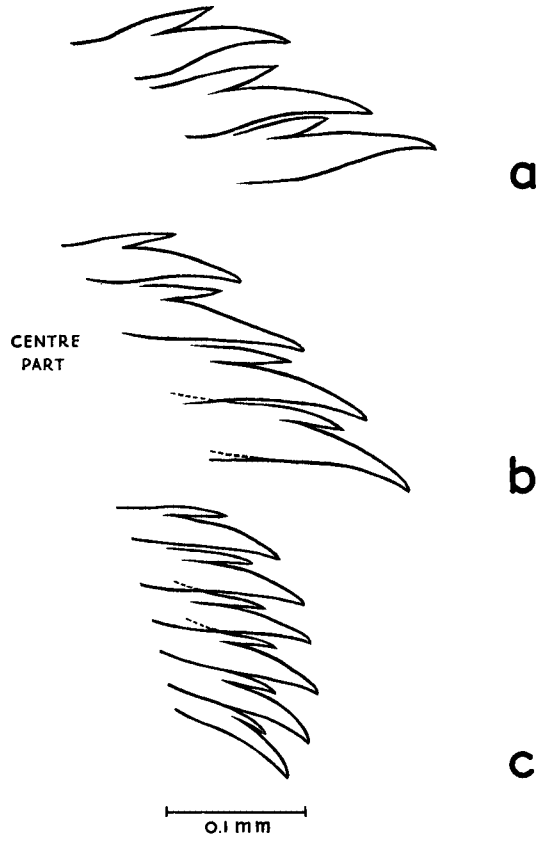

Fig. 2. *Pleurobranchaea hedgpethi* Tucker Abbott, radula.
a, about the 1st-3rd teeth; b, about the 26th-29th teeth; c, about the 45th-50th teeth.

LITERATURE

ABBOTT, R. TUCKER, 1952. Two new opisthobranch mollusks from the Gulf of Mexico belonging to the genera Pleurobranchaea and Polycera. — Florida State Univ. Stud. **7**: 1-7.

MARCUS, E., 1961. Opisthobranchia from North Carolina. — J. Elisha Mitchell sci. Soc. **77**: 141-151.

MARCUS, E. & E., 1955. Sea-hares and side-gilled slugs from Brazil. — Bol. Inst. Oceanogr. S. Paulo **6**: 3-48.

——, 1959. Some opisthobranchs from the northwestern Gulf of Mexico. — Publ. Inst. mar. Sci. Univ. Texas **6**: 251-264.

ORDER NUDIBRANCHIA

Suborder Dendronotacea

FAMILY BORNELLIDAE

Bornella calcarata Mörch, 1863 (fig. 3)

RNHL no. 6265; 1 specimen, Surinam, dredged by the "Coquette", sta. 89, 22.V.1957, 5° 50′ 30″ N and 53° 03′ W, depth 17 fathoms.

RNHL no. 6264; 3 specimens, Surinam, dredged by the "Coquette" on her 6th trip, 6-9.V.1957, N. of Surinam river, 20 miles off the coast, depth 15 fathoms.

The preserved animal (no. 6265) is 51 mm long, 6 mm broad in front and 15 mm high, with a rather narrow foot along the whole body, tapering towards the tail (the body is rather shrunken and wrinkled by preservation). The head is rather swollen on the top, with at both sides of the base of the mouth a velar lobe. These lobes are 5 mm long and carry a number of finger-like appendices, arranged in double rows along their stems. The left lobe bears 10 appendices, the right lobe 17 (as seen from the ventral side). The rhinophore sheaths are club-shaped, 9 mm long, and also have several flaps (at the left 7 and at the right side 5) along the margins of the sheaths, and also a few (2) along the cranial side of both rhinophore sheaths. The rhinophores are completely retracted. The sheaths have a rather leaf-like appearance, firm in front and flattened backwards, with a firm and broad stalk. Along the back 4 pairs of well developed cerata are implanted, following these are 2 pairs of very small ones and at the end of the back on the tail 2 minute flaps along the dorsal ridge. Each ceras has 2 or 3 long finger-like flaps placed centrally at the top, and 2 or 3 gills placed on the lateral side of the ceras more towards the base, with 1 or 2 smaller gills near the top. The gills have a cauliflower-like appearance. Between the first and second pair of cerata the anus can be found, somewhat protruding and close to the second ceras on the right side. On the same side of the animal, a little in front of and beneath the first ceras the genital pore is located. The male orifice is surrounded by a rather well developed ridge. The renal pore is situated very close to the anus.

The radula (23 × 11(12).1.(12)11) consists of at least 23 rows of teeth of which 11 rows are in use. The median tooth is strongly developed, with a smooth cusp (fig. 3). The first lateral teeth (next to the median tooth) are small and claw-like, they grow larger towards the 8th and 9th lateral tooth and the remaining teeth diminish in size. The jaws have a smooth margin.

This animal belongs to the genus *Bornella* because of the feather-like gills that are attached to the cerata. Distinctive for this species is a median tooth with a smooth cusp and a rhinophore base bearing papillae.

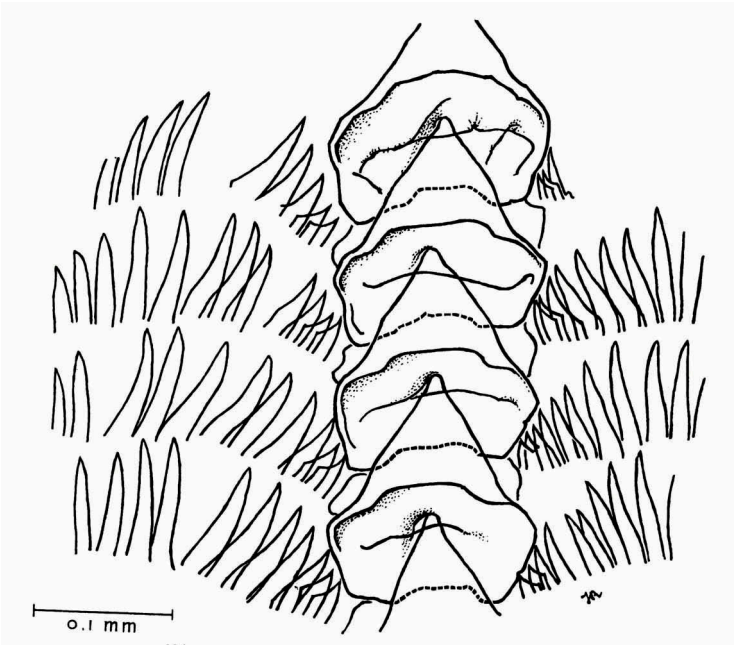

Fig. 3. *Bornella calcarata* Mörch, radula.

Further distribution. — St. Thomas, Danish Antilles (Mörch); Recife, Pernambuco, Brazil (Marcus).

Literature

Bergh, R., 1874. Bornella, Hero. — Semper's Reisen Arch. Philippinen, 2 (Wiss. Res.), 2 (Malac. Unters.) 1, **7**: 287-314.

Marcus, E., 1958. On western Atlantic opisthobranchiate gastropods. — Amer. Mus. Novit. **1906**: 1-82.

Mörch, O. A. L., 1863. Contributions à la faune malacologique des Antilles danoises. — J. Conchyliol. **11**: 21-43.

Odhner, N., 1936. Nudibranchia Dendronotacea. Mélanges Paul Pelseneer. — Mém. Mus. Hist. nat. Belg. (2) **3**: 1057-1128.

ORDER NUDIBRANCHIA

Suborder Arminacea

FAMILY ARMINIDAE

Armina semperi (Bergh, 1861) *(Pleurophyllidia)* (fig. 4)

RNHL no. 6263; 1 specimen, Surinam, dredged by the "Coquette" on her 5th trip, 29.IV-3.V.1957, NNW of Marowijne river, about 20 miles off the coast, depth 20 fathoms.

The preserved animal is 31 mm long, 14 mm broad (in front) and 10 mm high with a yellowish colour and scattered dark pigment. The foot is rounded

in front with an uncoloured margin and deeply cleft (1-2 mm), pointed behind. It measures 29 mm and is 12 mm wide in the middle. Along the whole centre of the sole a thin line can be distinguished, the posterior end of which widens and shows the pedal gland, about 8 mm long. The mantle is darkly pigmented with thicker and thinner — light coloured — longitudinal ridges. The semilunar shaped velum (10 mm wide) consists of a thin rimmed dorsal part and a thick margined ventral part that covers the mouth with a 2 mm wide labial disc containing 8-10 grooves. Both parts have a greyish colour and a yellowish border.

To the dorsal side of the velum, in front of the rhinophoral pocket, lie 2 flaps (Bergh's caruncles) with a small median boss between them. Above the rhinophoral pocket the mantle protrudes; it is slightly curved in front, rounded at the corners and ends pointed posteriorly. The ridges on the mantle are not of exactly the same size; not all ridges begin in front nor end behind. At about 1/5 of the total length of the animal, where the branchial leaves begin, 39-42 ridges were counted; at half the length of the animal 33-35 ridges.

The insides of the mantle bear branchiae consisting of about 21-28 very thin — larger and smaller — leaves, beginning where the velum ends. From the end of the branchiae lateral lamellae start with 2-4 together towards the posterior end of the animal. They are gradually succeeded by smaller ones. Total number of lamellae about 34-36, with the smaller and shorter ones included. The genital apertures are on the right side of the animal, just below the gill leaves. The anus is situated just in the middle under the lateral lamellae on the right side of the animal, and forms a small prominence.

All my efforts to detect the renal pore were in vain.

About 12 glandular pores in 2 indistinct rows could be seen along the margins of the mantle. The rhinophoral pocket contains 2 rhinophores, 2 mm long and with many (at least 13) leaflets.

The radula formula is: 43 × 54(46-62).1.1.1.54(46-62). The median tooth has a strong central cusp with 3-4 denticles at each side of it (fig. 4). The first lateral tooth differs from the other lateral teeth by having a large basal part and at least 6 denticles on the inner side of its cusp. The following 30 lateral teeth are long, thin and bear 1 or 2 denticles, the remaining teeth are smooth.

The jaws have a masticatory process, half the length of the whole inner ridge, with at least 7 rows of scaly teeth.

Discussion. — The characters in which our animal agrees with the description of *A. muelleri* by Marcus (1961) are the following:

1. Presence of Bergh's caruncles and a median boss between them.
2. Number of notal ridges (Marcus: 35-40, our animal: 39-42).
3. Number of branchial leaves (Marcus: 22-25, our animal: 21-28).
4. Number of rows of teeth and number of teeth in one row of the radula (Marcus: 44 × 50.1.1.1.50, our animal: 43 × 54.1.1.1.54). First 20-30 lateral teeth denticulated and remaining lateral teeth smooth in our animal as well as in the animal Marcus described.

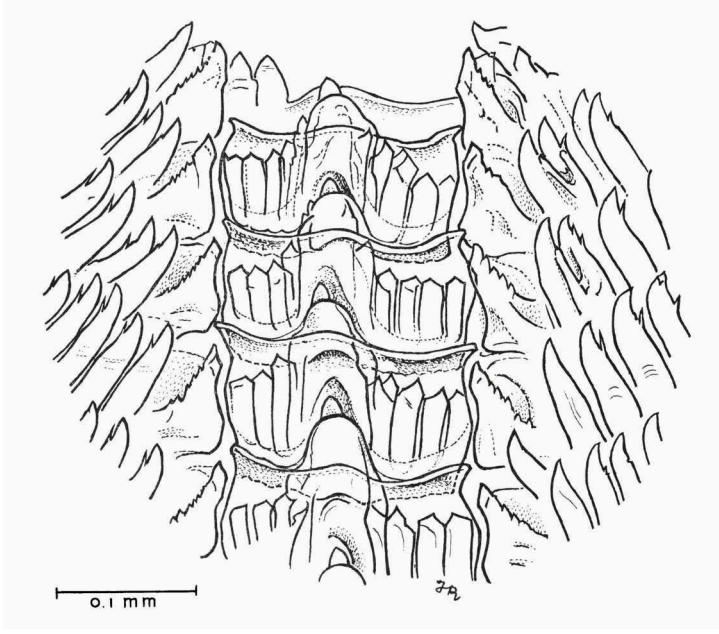

Fig. 4. *Armina semperi* (Bergh), radula.

Differences:

1. Number of rows of denticles on masticatory process (Marcus: 4 rows, our animal: 7 rows).
2. Innermost lateral tooth (Marcus: smooth, rarely one denticle, our animal: always many denticles).
3. Lateral teeth (Marcus: 1-4 denticles, our animal: never more than 2 denticles).

Comparing our animal with descriptions of *A. semperi* by Baba (1955), Bergh (1866, 1874), Eales (1938), and Eliot (1905), we find the following. Characters that agree:

1. Number of rows of teeth and number of teeth in one row (Eales:

40 × 50.1.1.1.50, our animal: 43 × 54.1.1.1.54). Not agreeing with Bergh (1874): 50-55 × 30-32.1.30-32.

2. Denticulation of teeth (as given by Eales; exactly as figured by Bergh, 1874: pl. 31 fig. 24-26).
3. Number of notal ridges (Bergh (1866): 35-52, our animal: 39-42).
4. Number of rows of scaly teeth on masticatory process (Baba: 8-9 rows, our animal: at least 7 rows).
5. Number of lateral lamellae (Baba: 30-40, our animal: 34-36).

Differences:

1. Caruncles (Bergh, 1874: not developed; our animal: well developed).
2. Number of teeth in one row and number of rows of teeth (Bergh (1874), Eliot, Baba).
3. Number of rows of scaly teeth on masticatory process (Eliot: 4-6 rows).

Due to the similarity of the radula, especially in the shape of the teeth, with *A. semperi,* I would suggest this animal to be *A. semperi.* However, it is clear that more information is needed on this genus, as the distinguishing characters, viz. caruncles, radula, number of lateral lamellae, are not satisfactorily known.

Further distribution. — Sagami Bay, Japan (Baba); Masinloc, Philippine Sea (Bergh, 1874); Maskat, Indian Ocean (Eliot); sta. 194, Gulf of Aden (Eales); sta. iv, vi, northern Red Sea (Pruvot-Fol).

Perhaps future research will point out, that the many similar species distinguished at the moment, all belong to one cosmopolitan species, with many different populations, due to isolation of the localities.

Literature

Baba, K., 1955. Opisthobranchia of Sagami Bay (suppl.): 1-59, pl. 1-20. Iwanami Shoten, Tokyo.

Bergh, R., 1861. Om Forekomsten af Neldefüm hos Mollusker. — Vidensk. Medd. dansk naturh. Foren. Kbh. **1860**: 309-331.

——, 1866. Bidrag til en monographi af Pleurophyllidierne. I Zoologisk Afdeling; II Anatomisk Afdeling. — Naturh. Tidsskr. Kbh. (3) **4**: 1-80; 1-180.

——, 1874. Pleurophyllidiadae, Pleuroleuridae. — Semper's Reisen Arch. Philippinen, 2 (Wiss. Res.), 2 (Malac. Unters.) (1) **6**: 247-285.

Eales, N. B., 1938. A systematic and anatomical account of the Opisthobranchiata. — John Murray Exped. Sci. Rep. (Brit. Mus. Nat. Hist.) **5** (4): 77-122.

Eliot, Ch., 1905. Nudibranchs from the Indo-Pacific: I. Notes on a collection dredged near Karachi and Maskat. — J. Conch. **11**: 237-256.

Ihering, H. von, 1886. Zur Kenntnis der Nudibranchien der brasilianischen Küste. — Jahrb. dtsch. Malakoz. Ges. **13**: 223-240.

Marcus, E. & E., 1960. Opisthobranchs from American Atlantic warm waters. — Bull. mar. Sci. Gulf & Caribbean **10**: 129-203.

Pruvot-Fol, A., 1933. Opisthobranchiata (Mission Robert Ph. Dollfus en Egypte). — Mém. Inst. Egypte **21**: 89-160.