

**SOME OPISTHOBRANCHS
FROM WEST AFRICA**

BY

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The following report is based upon material submitted to me by the Director of the Institut Royal des Sciences Naturelles of Belgium whom I wish to thank for the opportunity of examining it. It comprises material collected by the training-ship « MERCATOR » on her 9th voyage in 1935-6, her 11th voyage in 1936-7 and her 14th voyage in 1937-8. Additional specimens were collected by the Belgian expedition to the South Atlantic in 1948-49 and from West Africa in 1953.

The region covered is the west coast of Africa from Rio de Oro in the north to Angola on the south, and it lies roughly between longitudes 17° West to 13° East and latitudes 26° North and 15° South.

The depths extend from shore down to 50 fathoms.

The Opisthobranchs of this region have received no attention. Collections from Morocco in the north have been reported upon by A. PRUVOT-FOL in 1927 and 1953 and by J. RISBEC in 1931. Collections from S. Africa have been described by R. BERGH in 1908, K. H. BARNARD in 1927, C. H. O'DONOGHUE in 1928 and N. B. EALES and H. ENGEL in 1935. References to these reports have been made and to A. VAYSSIERE's accounts of the Mediterranean fauna published between 1865 and 1919.

In all twenty-six species of Opisthobranchs have been recognised of which eighteen are previously described species, two are new varieties of known species and four appear to be new species. In two instances it did not seem justifiable to go beyond referring the specimens to a genus for reasons that will be given.

One Prosobranch, *Lamellaria perpicua*, and one Pulmonate, *Onchidella celtica* were in the collection and are described here. Owing to their general appearance species of *Lamellaria* and members of the family Onchidiidæ tend to occur among Opisthobranchs awaiting identification.

My thanks are due to Professor A. GRAHAM in whose department the work was done, and to Professor C. H. O'DONOGHUE who has read and criticized the manuscript.

CLASSIFICATION OF THE MATERIAL.

Tectibranchia.

Cephalaspidea.	Philinidæ.	1. <i>Philine aperta</i> .
	Atyidæ.	2. <i>Haminea mauritaniæ</i> .
Notaspidea.	Pleurobranchidæ.	3. <i>Pleurobranchæa melanopus</i> .
		4. <i>Pleurobranchæa capensis</i> .
		5. <i>Berthella edwardsi</i> .
Anaspidea.	Aplysiidæ.	6. <i>Bursatella leachii</i> .
		7. <i>Aplysia leporina</i> .
		8. <i>Aplysia depilans</i> .
		9. <i>Aplysia maculata</i> .

Nudibranchia.

Holohepatica.	Fimbridæ.	10. <i>Fimbria fimbria</i> .
	Duvauceliidæ.	11. <i>Marionia cabindæ</i> .
	Euphuridæ.	12. <i>Polycera capensis</i> .
	Dorididæ.	13. <i>Archidoris</i> sp.
	Dendrodoridæ.	14. <i>Dendrodoris limbata</i> .
Cladohepatica.	Arminidæ.	15. <i>Dendrodoris</i> sp.
		16. <i>Doriopsilla areolata</i> .
		17. <i>Armina tigrina</i> .
		18. <i>Armina pustulosa</i> .
		19. <i>Armina pustulosa</i> var. <i>denticulata</i> .
		20. <i>Armina gilchristi</i> .
	Aeolidiidæ.	21. <i>Armina microdonta</i> .
		22. <i>Armina adami</i> .
	Fionidæ.	23. <i>Eolidina glauca</i> .
		24. <i>Fiona marina</i> .
		25. <i>Facelina faurei</i> var. <i>quadridenticulata</i> .
26. <i>Caloria</i> (?).		

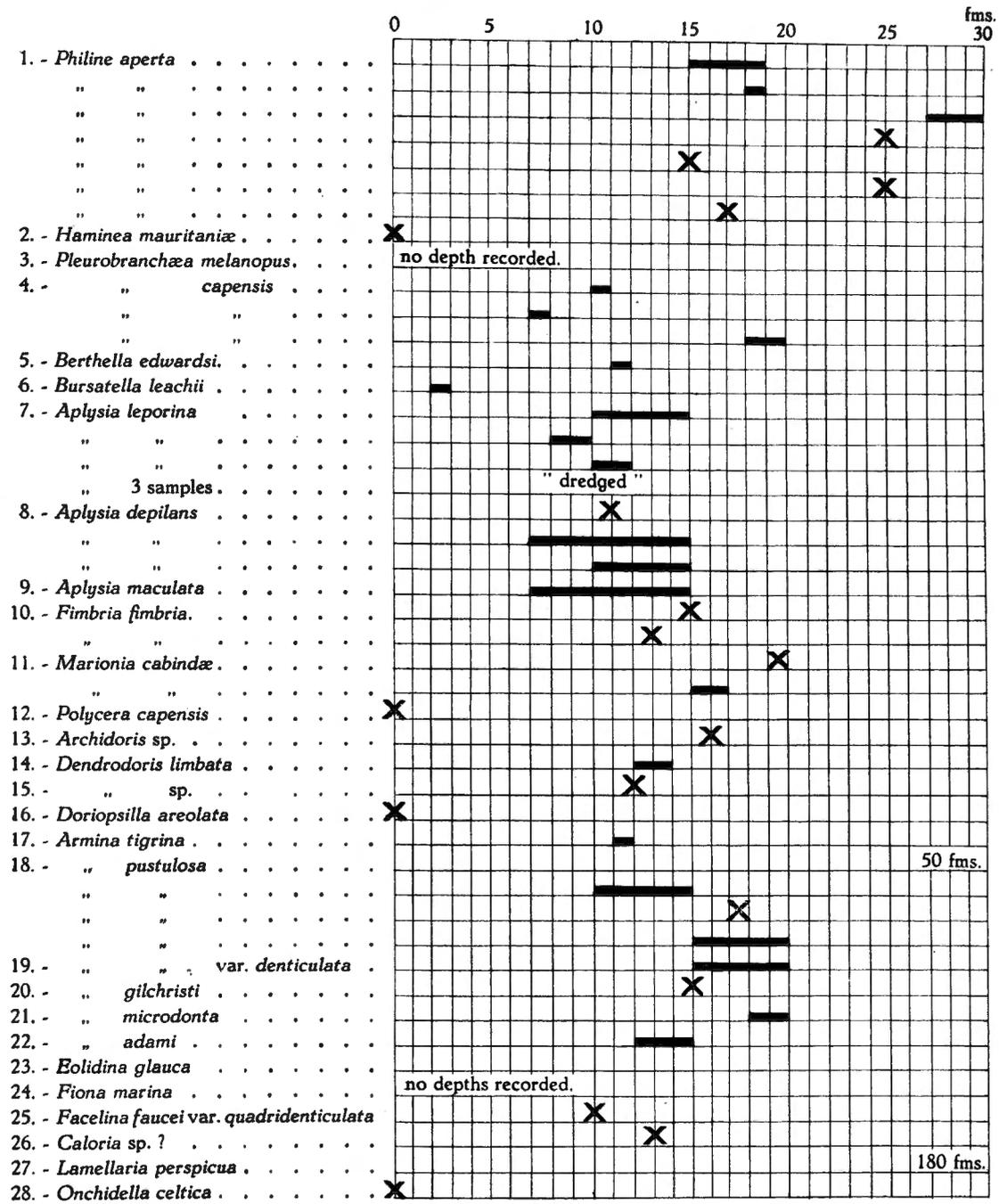
Facelina faurei var. *quadridenticulata* and *Armina pustulosa* var. *denticulata* are new varieties. The new species belong to the genera *Haminea*, *Marionia*, *Armina* and possibly *Caloria* (but see page 191). The undetermined are species of *Archidoris* and *Dendrodoris*.

The occurrence of the animal is shown in the map (p. 189), the figures representing the number of the species in the foregoing list.

DISTRIBUTION TABLE.

	South Africa	Morocco	Mediterranean	Pages
1. <i>Philine aperta</i>	×	×	×	168
2. <i>Haminea mauritanix</i>	—	new species	—	170
3. <i>Pleurobranchæa melanopus</i>	×	—	—	173
4. <i>Pleurobranchæa capensis</i>	×	—	—	171
5. <i>Berthella edwardsi</i>	—	Cape Verde and the Azores	—	174
6. <i>Bursatella leachii</i>	—	West Africa	—	175
7. <i>Aplysia leporina</i>	?	×	×	176
8. <i>Aplysia depilans</i>	?	×	×	177
9. <i>Aplysia maculata</i>	×	—	—	178
10. <i>Fimbria fimbria</i>	—	×	×	179
11. <i>Marionia cabindæ</i>	—	new species	—	180
12. <i>Polycera capensis</i>	×	×	×	181
13. <i>Archidoris</i> sp.	—	probably new species	—	182
14. <i>Dendrodoris limbata</i>	—	—	×	183
15. <i>Dendrodoris</i> sp.	—	probably new species	—	183
16. <i>Doriopsilla areolata</i>	—	×	×	184
17. <i>Armina tigrina</i>	—	—	×	184
18. <i>Armina pustulosa</i>	—	×	×	185
19. <i>Armina pustulosa</i> var. <i>denticulata</i> ...	—	new variety	—	186
20. <i>Armina gilchristi</i>	×	—	—	187
21. <i>Armina microdonta</i>	×	—	—	188
22. <i>Armina adami</i>	—	new species	—	188
23. <i>Eolidina glauca</i>	—	—	×	189
24. <i>Fiona marina</i>	—	—	×	189
25. <i>Facelina faurei</i> var. <i>quadridenticulata</i>	×	—	—	190
26. <i>Caloria</i> ?	—	new species	—	191
27. <i>Lamellaria perspicua</i>	—	—	×	193
28. <i>Onchidella celtica</i>	—	—	×	193

TABLE OF DEPTHS.



No 25. — Correction : instead of *Facelina faucei*, read : *F. faurei*.

The collecting grounds occupy four large areas (see map, fig. 28). The most northerly, the coast of Rio de Oro, about 25° North, produced *Aplysia leporina*, *A. depilans*, *A. maculata*, *Armina pustulosa*, and a new variety, *Eolidina glauca*, and *Lamellaria perspicua*, all of which except for *A. maculata* have been reported from the Mediterranean.

From the second area, Senegal, about 15° North, the material consisted of *Aplysia leporina*, *Doriopsilla areolata*, *Bursatella leachii*, *Haminea mauritanix*, *Facelina faurei* var., *Caloria* sp., and *Dendrodoris limbata*, all of which are Mediterranean forms, new species or a new variety. *Doriopsilla areolata* is also reported from Temara by Pruvot-Fol. *Pleurobranchæa melanopus* was described from S. Africa.

From the third area at about 10° North were identified *Lamellaria perspicua*, *Armina tigrina*, *Onchidella celtica* and *Pleurobranchæa capensis*, which, except for the last are Mediterranean species.

A fourth area south of the equator, round the mouth of the Congo River produced the South African species *Armina gilchristi*, and *Pleurobranchæa capensis*. *Berthella edwardsi* is recorded from the Azores and Cape Verde. *Fimbria fimbria*, *Armina pustulosa* and *Aplysia leporina* come from Morocco and the Mediterranean.

Philine aperta, a cosmopolitan species, occurs in all four areas. *Pleurobranchæa capensis*, the type specimen of which comes from South Africa, occurs in areas 3 and 4. *Aplysia leporina* was taken in all four areas but *A. maculata*, a S. African species, occurs in the most northerly area and not in any of the others. *Fimbria fimbria* was taken from the River Congo and not from any intermediate northerly area. The last two and *Fiona marina* from area 4 are the only species where geographical continuity is not shown. The only other anomaly is possibly shown in the new variety of *Facelina faurei* from Senegal, the type species being South African.

TECTIBRANCHIA.

CEPHALASPIDEA.

FAMILY PHILINIDÆ.

This family contains the single genus *Philine*, established in 1772 by ASCANIUS for *Philine quadripartita* = *Bulla aperta* LINNÉ, 1767 which came from the Cape of Good Hope. *Lobaria* MÜLLER, 1801, and *Utriculopsis* SARS, 1870 are synonyms.

PHILINE ASCANIUS, 1772.

The genus contains a number of species, two of which have been reported from S. Africa, *P. aperta* (LINNÉ) and *P. capensis* BERGH. The latter name was shown by O'DONOGHUE (1928, p. 10) not to be valid and he therefore replaced it by *P. berghii*.

1. — *Philine aperta* (LINNÉ, 1767).

The type locality of *P. aperta* LINNÉ is the Cape of Good Hope as it is also of *Bullæa schroeteri* PHILLIPI and *B. capensis* PFEIFFER, both of which however are synonymous. *P. aperta* (LINNÉ) has been described in European waters from Norway to the Mediterranean and the coast of Morocco under many synonyms. Some authorities favour splitting off the European form, which, if distinct would be *P. quadripartita* ASCANIUS, but there seems no adequate reason for so doing.

No specimens of *P. berghii* O'DONOGHUE occur in the collection but there are thirty-six specimens of *P. aperta* from seven localities:

14th Voyage of the «MERCATOR»:

1. Four miles from Ancra de Cintra, on 30.XII.37, one specimen taken at a depth of 15-20 fathoms measured $25 \times 13 \times 8$ mm. The shell is 11×10 mm. The colour of the animal is very pale pink, the condition good. The radula is typical with formula 1.0.1., and there are 30 rows of teeth.

2. From eighteen to twenty miles from the coast of Sierra Leone one specimen taken at 18-19 fathoms, on 15.I.39, is also pale pink, measures $24.5 \times 16 \times 8$ mm. and has 24 rows of teeth (Fig 1).

3. From the mouth of the River Longa, $10^{\circ}0'S-13^{\circ}30'E$, one specimen taken on 9.XI.38 at 27-30 fathoms, measures $23 \times 15 \times 8$ mm., is very pale grey and has only 13 rows of teeth.

South Atlantic.

4. From $6^{\circ}16'S-12^{\circ}7'E$ (15 miles S.W. of Moita Seca) at a depth of 50 metres, taken on 3.VIII.48, nine specimens which are pinkish grey and well-preserved. The largest measures $36 \times 30 \times 12$ mm., and the smallest $17 \times 12 \times 7$ mm. The one dissected measured 32×28 mm. and had 33 rows of teeth.

5. From 5°55' S-12°0' E (25 miles W.N.W. of Banana) taken at a depth of 30 metres on 26.VIII.48, six white specimens with a few rust coloured marks. The largest is 20 × 12 × 5 mm., and there are 25 rows of teeth.

6. From 15 miles S. by W. off Cap Lopez at a depth of 51 metres on 8.III.49, three specimens light brown in colour, firmer and somewhat harder than the rest of the material. They are considerably larger being 58 × 24 × 12 mm., 50 × 40 × 14 mm., and 28 × 19 × 7 mm. The shell of the largest is 28 × 33 mm. The radular formula is 24. × 1.0.0., and the teeth and gastric plates are quite typical for *P. aperta*.

7. From 29 miles South of Cap Lopez at a depth of 34 metres on 9.III.49, seventeen specimens which are the characteristic warm grey of a preserved *Philine*. The one examined measured 50 × 32 × 13 mm. and had 36 rows of teeth.

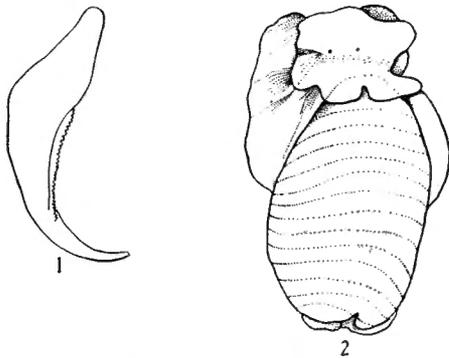


FIG. 1. — *Philine aperta*. A single radular tooth, ×100.

FIG. 2. — *Haminea mauritanica*. Dorsal view of the whole animal, ×3.

A. VAYSSIERE (1885 p. 33 and p. 11) figures a specimen from the Mediterranean measuring 30 × 19 mm. C. H. O'DONOGHUE (1928, p. 8) describes one from South Africa measuring 42 × 27 with 22-24 rows of teeth. R. BERGH's largest was 60 × 40 × 20 mm. (1908, p. 24), the shell measured 28 × 25 mm., and the radular formula was 27-36 × 1.0.1.

The specimens in the present collection range from 58 × 24 × 12 mm., to 17 × 12 × 7 mm., and the radula from 36 to 13 rows of teeth.

FAMILY ATYIDÆ.

There is one member of this family in the collection which is a new species of the genus *Haminea*.

Haminea (LEACH) GRAY, 1847 with type species *H. hydatis* (LINNÉ) has the following generic characters :

Animal capable of retraction into the shell, cephalic disc large, truncated anteriorly, bilobed posteriorly. The eyes are small. The epipodial lobes are

large, reflected over and partly covering the shell. The foot is long, tapering behind. The gizzard is very long, and is armed with three large horny curved plates and three pairs of small ones.

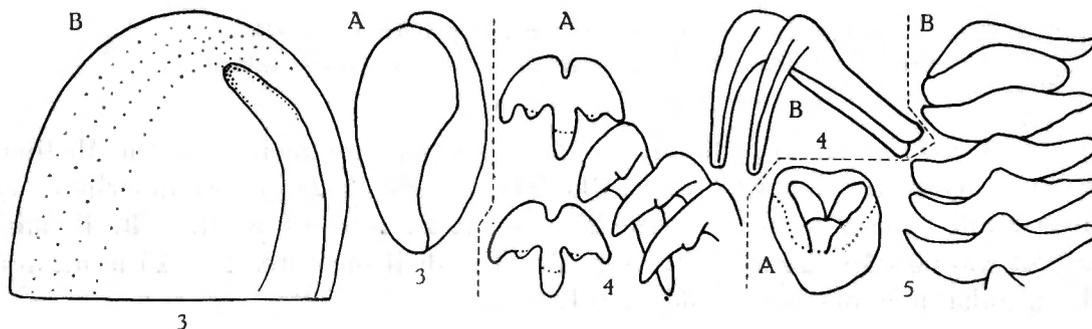
The radular formula is 1.1.1. According to H. A. PILSBRY (1895, p. 352), the central is small and the adjacent laterals large with long serrate cusps and the uncini are many with long simple cusps; the resulting formula would therefore be 1.1.1.1.1., but A. VAYSSIÈRE (1906, p. 22), omits mention of denticulations on the first lateral in his list of generic characters resulting in a formula 1.1.1. He includes *P. pemphix* PHILIPPI, 1847 in the genus whose radular formula he writes as 7.1.7., and he stresses the fact that the first lateral does not differ markedly from the remainder.

The present specimen has all the characteristics of the genus (except the three pairs of small plates). The epipodal lobes are contracted so their size is difficult to estimate. It seems probable that they would be capable of covering part of the shell (Fig. 2).

2. — *Haminea mauritaniæ* n. sp.

One specimen from the 9th voyage of the « MERCATOR », collected 8.XI.35, on *Zostera* at Baie du Repos, Port Etienne, Mauritania.

The animal is cream-coloured and measures 12.5 × 8 × 7 mm. The shell is thick, pure white, and the periostracum has nearly all gone; it measures 9 × 8 mm. The growth lines are moderately distinct and there are no signs of



Haminea mauritaniæ.

FIG. 3. — A. The shell, ×2; B. Posterior view, ×6.

FIG. 4. — A. Part of the centre of the radula, ×100;

B. Two teeth from centre of a half row, ×100.

FIG. 5. — A. Stomach opened to show the three plates, ×6;

B. Part of a single plate, ×50.

the spiral striae characteristic of *H. hydatis*. The outline is elliptica, the outer lip evenly rounded above and below. The columella is short and curved. The shell was not removed from the animal for fear of damage to either part, but the soft parts were made transparent and the shell sketched in situ (Fig. 3).

There are 21 rows of teeth with 29.1.1.1.29. in a row. The median tooth is tricuspid and of the shape characteristic for the genus. The intermediate is slightly thicker than the first lateral, out of alignment with it but not denti-

culate and not differing therefore at all markedly from it. The laterals are all hamate with a tendency to become longer and thinner towards the centre of the row after which they become somewhat smaller and more slender towards the periphery. (Fig. 4).

The stomach contains three plates and each plate bears 12 teeth (Fig. 5). No small plates were found.

The jaws are elliptical and composed of small rods which are quadrangular in cross section.

There are three species of this genus described from the Mediterranean and Atlantic coasts of France and Spain; *H. navicula*, *H. hydatis*, and *H. orbignyana*.

The present specimen is separated from the first by the shell and radula, and from the others by the radula, the intermediate tooth of which is not denticulate or markedly larger than the lateral.

H. natalensis KRAUSS from Natal has a very thin inflated shell, and Bergh's figures for the stomach plates and radula differ from those of the present specimen. Many species have been described on shell characteristics only but the shell of the present animal does not appear to fit any of these. It is therefore proposed to form a new species on both conchological and anatomical grounds and I name it *Haminea mauritanix* using the locality for the holotype as the specific name.

NOTASPIDEA.

FAMILY PLEUROBRANCHIDÆ.

The present collection comprises material collected from five stations, which are referable to three species: *Pleurobranchæa capensis*, *Pl. melanopus* and *Berthella edwardsi*.

PLEUROBRANCHÆ LEUE.

3. — *Pleurobranchæa capensis* VAYSSIÈRE, 1901.

Fully described by A. VAYSSIÈRE (Part II, page 46) from the Cape of Good Hope. Four specimens have been recorded by C. H. O'DONOGHUE (1928, p. 48), from South Africa and twenty-eight by R. BERGH (1908, p. 21).

1. Three specimens taken on 7.II.38 from Angola, thirty to thirty-five miles south of the mouth of the Congo on sandy bottom, at a depth of from eleven to twelve fathoms. They are very soft, nearly transparent, and pinkish grey. The largest is $20 \times 12 \times 12$ mm., and one measuring $14 \times 9 \times 6$ mm. was dissected. This had the pharynx extruded for a further 8 mm. The foot is very broad, rounded anteriorly, with a pointed tail. The branchial plume is exposed throughout and occupies the whole length of the posterior part of the body. It has about 24 leaflets the posterior of which are very small.

The reproductive aperture is a single oval opening at the base of the insertion of the gill.

The jaws are 3 mm. long \times 1 mm. wide and very pale yellow. The elements are lozenge shaped and appeared to be smooth. The radula measures 6×3 mm., is pale straw coloured and contains 32 rows of teeth arranged as 50.0.50. The teeth are all fairly similar with a triangular base and a sharply pointed cusp at the side of which is a lateral denticle. Near the centre of the radula the teeth are small and the denticle is nearly as large as the cusp. At the centre of the row the teeth are at their largest and the difference in size at its greatest. The outer teeth have only small denticles and the last two have none.

2. One specimen from Kabinda dredged at 7-8 fathoms, taken on 1.II.38, at a water temperature of 27° , is smaller, $12 \times 6 \times 6$ mm., and is pale grey in

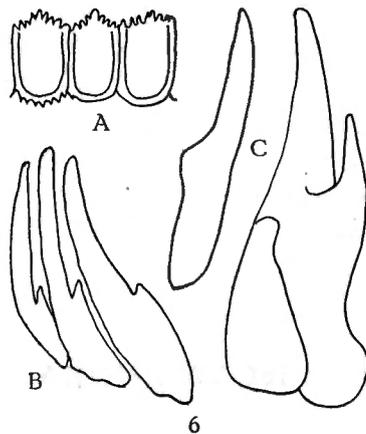


FIG. 6. — *Pleurobranchæa capensis*.

A. Three elements from the jaw; B. Last three teeth from a middle row; C. 2nd and 1st teeth from the centre of a row, $\times 200$.

colour. It resembles the previous specimens but its jaws, 5×2 mm., have elements with up to ten denticulations on the anterior end. A. VAYSSIÈRE describes five to ten and C. H. O'DONOGHUE four to eight.

The radula is 6.5×2.5 mm., and there are thirty rows of teeth with up to 65 as the maximum number in a row (Fig. 6).

3. A third specimen comes from $9^{\circ}59'N-15^{\circ}43'W$, taken on 22.II.37 on the 11th voyage of the « MERCATOR », at a depth of 18-20 fathoms, at a water temperature of 27° , measures $25 \times 13 \times 9$ mm., has jaws 6×2 mm., a radula 6×3 mm., and 27 rows of about 60 teeth. The teeth are darker yellow in colour than in the other specimens but in other respects agrees with them.

There seems to be no doubt about this identification although one of the specimens from Angola lacks the denticles on the jaw elements. The radular formula seems to differ within the species, A. VAYSSIÈRE having found 58 teeth on each side C. H. O'DONOGHUE 105 and R. BERGH 95.

Examination of more material may indicate the existence of two varieties, one with a radula of about 60.0.60, which includes A. VAYSSIÈRE's original

species, one of R. BERGH's specimens which he names *P. capensis* VAYSSIÈRE var., and the above described material. Another variety would include C. H. O'DONOGHUE's specimen and R. BERGH's twenty-seven.

4. — *Pleurobranchæa melanopus* BERGH, 1908.

One specimen taken on the 4.III.53 from Bay de Gorée, 14°30' N-17°13' W. No depth is mentioned.

The animal measures 25 × 12 × 8 mm. with the pharynx extruded for another 4 mm. The body is of the usual rectangular form but there is a broad flat tail extending for 5 mm. posteriorly. The mantle is quite smooth, semi-transparent, confluent with the body on the left and projecting very slightly on the right. The anterior margin has fine processes occurring in 2-3 series as

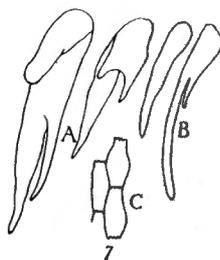


FIG. 7. — *Pleurobranchæa melanopus*.

A. Two teeth from the centre of the radula; B. The last two teeth;
C. Jaw elements, ×50.

described by R. BERGH and it extends laterally into two elongated processes resembling small rhinophores. The gill, consisting of 25 lamellæ, is freely exposed and measures 10 mm.

The colour in preservation is cream with a few sepia streaks on the anterior edge of the mantle, the rhinophores and the tail. The foot has some chocolate brown in its anterior part. The lining of the mouth and pharynx is black.

The rhinophores are 5 mm. long, and are widely cleft on their posterio-lateral margins. The jaws appeared strong when dissected but after treatment with caustic potash became soft and fragile. The elements are of the usual polygonal shape and possess fine projections as figured by R. BERGH.

The brown radula contains 36 rows of teeth. There is no rachidian and there are about 58 teeth on each side of the rachis. All the teeth are similar and consist of a single elongated tooth with a lateral denticle arising rather more than a third of the way from the apex. A well-developed projection arises from the base of the tooth. The first five of the centre gradually increase in size after which there is uniformity until the last 20 are reached which decrease very gradually. The outermost two teeth lack the lateral denticle (Fig. 7).

The reproductive apertures lie in a shallow depression 2 mm. in front of the gills, and the renal aperture lies on the base of the gill axis.

This species was described by R. BERGH from a specimen taken off Cape Point. It has been recorded by C. H. O'DONOGHUE from South Africa.

BERTHELLA BLAINVILLE, 1825.

5. — *Berthella edwardsi* VAYSSIÈRE, 1896.

Described by VAYSSIÈRE from four specimens, one from Cape Verde Islands and three from the Azores (I, page 265).

One specimen dredged from 7°16'S-12°47'E, six milles west of Ambrizette on 29.IX.48, at a depth of 22-25 metres.

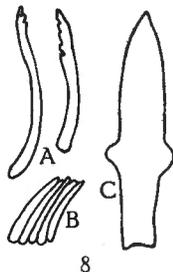


FIG. 8. — *Berthella edwardsi*.

A. Radular teeth from near the centre; B. From near the centre of the youngest part; C. Jaw elements, $\times 100$.

The specimen is soft and firm, very humped in the middle. The rhinophores are joined for about half their length, a feature remarked on by A. VAYSSIÈRE.

The colour is cream, the size $16 \times 9 \times 8$ mm., the foot is flat, square, the anterior bilabiate, the posterior rounded.

Examination of the reproductive aperture shows that the penis is surrounded by a distinct fold which, except for a slight groove, separates it from the female opening.

The jaws, 4×1.5 mm., consist of elongated elements about six times as long as wide, without denticles but with flanges. The flanges are not well-developed but are clearer than those shown by A. VAYSSIÈRE.

The radula measures 5×2 mm. and is formed of 120 rows of closely-packed elongated slender teeth which are very numerous. The teeth are curved rods with irregular denticles at the tips (Fig. 8).

Another species of the genus *B. granulatus* (KRAUSS, 1848) has been recorded from South Africa and well-described by A. VAYSSIÈRE (1898, p. 268) and R. BERGH (1908, p. 40) but does not occur in the collection.

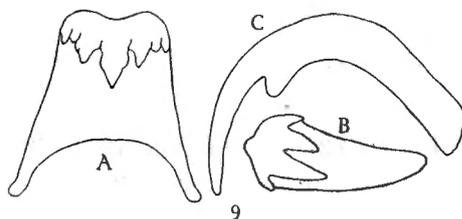
ANASPIDEA.**FAMILY APLYSIADÆ.**

There are four members of this family in the collection: *Bursatella leachii* DE BLAINVILLE, *Aplysia leporina* LINN., *Aplysia depilans* LINN., and *Aplysia maculata* RANG.

BURSATELLA DE BLAINVILLE, 1817.

6. — *Bursatella leachii* DE BLAINVILLE, 1827.

From examination of the type specimen this species has been fully described with an account of the literature by Eales and Engel 1935, who have suggested six geographical sub-species. The West African sub-species was named by

FIG. 9. — *Bursatella leachii*.

A. Central tooth; B. First lateral tooth; C. A lateral from middle of a row, $\times 100$.

H. ENGEL *Aclesia rosea* (1926, p. 183; 1927, p. 104) and presumably therefore the present specimen is *B. leachii rosea* (ENGEL) solely on geographical grounds. This sub-species is characterised by being rose-coloured, a character very rarely of use in preserved specimens, and by being less « woolly » than *B. leachii africana* = *Aclesia africana* ENGEL (1926, p. 180; 1927, p. 100). The type sub-species *B. leachii leachii* is also less « woolly » than the South African form. It is therefore considered better to record the present specimen as *B. leachii* DE BLAINVILLE.

One specimen occurs in the collection, taken from Port Etienne 3.1.38, at a depth of $1\frac{1}{2}$ to 3 fathoms, and the following are notes upon it :

It measures $78 \times 34 \times 33$ mm., is pale yellowish brown in colour, and bears both simple and branched papillae which make it somewhat woolly in appearance especially round the head and on the edge of the foot. The foot is broad and flat and measures 72×32 mm. The radular formula is $36 \times 45.1.45$. (Fig. 9).

APLYSIA LINNÉ, 1767.

= *Tethys* LINNÉ, 1758, with type by designation *Aplysia leporina*
 [*Tethys limacina* being *T. depilans*].

7. — *Aplysia leporina* LINNÉ.

= *A. fasciata* POIRET, 1789, etc.

The anatomy of this species has been described from Mediterranean specimens by A. VAYSSIÈRE (1885, p. 60) as *A. fasciata*. The species has been recorded from the French Atlantic coast and from Morocco by J. RISBEC (1931, p. 68) also as *A. fasciata*. In the present collection it occurs from six localities:

1. Rio de Oro, Pulpito Bay, at a depth of 10-15 fathoms on 25.XI.36. Four young specimens taken with *A. depilans*. The largest measures $30 \times 21 \times 16$ mm. and the smallest $16 \times 9 \times 8$ mm. All have a very small shell aperture with fine lines radiating from it. The shell aperture of the smallest specimen is somewhat larger than that of the largest one. As a shell aperture usually decreases in size with age this would be expected.

2. Angola, Baie des Tigres, at a depth of 8-10 fathoms on 24.I.37, one specimen which is described below.

3. Farta Bay, Angola, 10-12 fathoms on 10.XI.38. A somewhat firmer specimen than usual, which measures $65 \times 34 \times 28$ mm.

4. $12^{\circ}20' \text{S}-13^{\circ}34' \text{E}$, Bay de Lobito, dredget, taken 6-9.XII.48. One specimen measuring $93 \times 23 \times 40$ mm. having radula consisting of 41 rows of teeth with formula 28.1.28.

5. $8^{\circ}48' \text{S}-13^{\circ}14' \text{E}$, dredged at Loanda on 1.II.49. A single specimen measuring $70 \times 43 \times 20$ mm. (Fig. 10).

6. $14^{\circ}47' \text{N}-17^{\circ}25' \text{W}$, dredged at Dakar at 12.VI.49. A single specimen measuring $75 \times 28 \times 38$ mm.

It is noteworthy that all specimens, except juveniles, are reported singly.

The specimen from Tigers Bay is the largest, measuring $105 \times 60 \times 40$ mm. long. The animal is humped, evenly curved, very fleshy with long swollen oval parapodia which are attached along their bases only and meet to form a flat area or platform 30 mm. long posteriorly. The foot has a narrow median base and is very inflated at the sides where it merges completely into the body. The anterior margin is also very inflated. There is a short rounded tail.

The colour is an homogeneous sepia except that the foot and free edges of the parapodia are darker.

The head is small with inflated oral lobes and tentacles. The rhinophores are small, directed forwards and 18 mm. in front of the parapodia.

The mantle slit is 28 mm. long and the siphon is 10 mm. long. The shell aperture is minute and has thickened edges.

The reproductive aperture is at the edge of the mantle, 10 mm. in front of the dorsal slit. The seminal groove is very distinct.

The alimentary canal is dark grey and the jaws and radula are very dark brown, turning reddish on treatment with caustic potash.

This species differs particularly from the following in the size of the shell aperture and in the posterior platform formed by the parapodia.

8. — *Aplysia depilans* LINNÉ, 1767.

Aplysia depilans LINNÉ, 1767; *A. leporina* DELLE CHIAJE, 1823; *Dolabella lepus* RISSO, *A. vulgaris* DE BLAINVILLE, 1825.

This widespread species has been recorded from the coast of Morocco by J. RISBEC (1931, p. 14). It was collected at three stations :

1. Rio de Oro, 26°4'N-14°33'W, 2½ miles from the coast at a depth of 11 fathoms on 28.X.35. One specimen measuring 18 × 11 × 8 mm.

2. Rio de Oro, Pulpito Bay, at a depth of 7-15 fathoms, on 30.X.35, with *A. maculata* Rang. Numerous specimens and one young, very dark specimen taken near the coast.

3. Rio de Oro, Pulpito Bay, at a depth of 10-15 fathoms on 25.XI.36, eight specimens taken with *A. leporina* and described below.

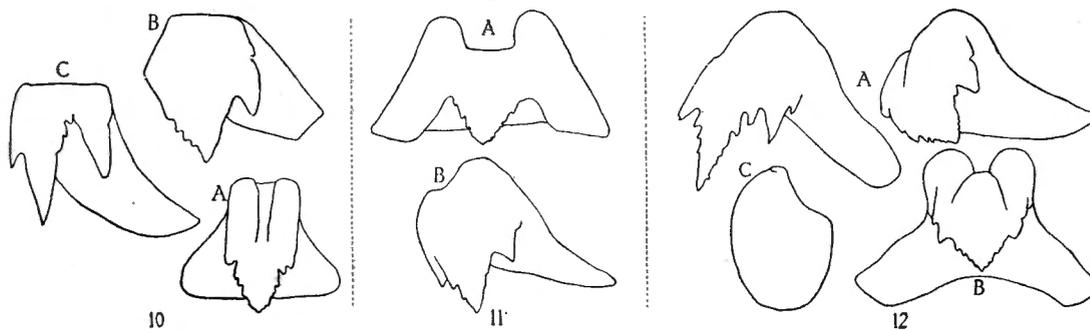


FIG. 10. — *Aplysia leporina*.

A. The central radular tooth; B. The first lateral; C. The tenth lateral, ×100.

FIG. 11. — *Aplysia depilans*.

Central and first lateral radular teeth, ×100.

FIG. 12. — *Aplysia maculata*.

A. Central and first lateral radular teeth; B. A typical lateral, ×100; C. Shell, ×2.

The animals are as usual soft and plump, but not humped. The fleshy parapodia are united immediately behind the visceral hump to form a swollen posterior end. They are capable of mobility for about half their length from the anterior end. There is a well-developed branchial siphon and a large shell aperture. The preserved animals are cream with varying numbers of brown ocelli (these are very numerous in one specimen). Brown dots are present

inside the rhinophores and cephalic tentacles. Dimensions are about $20 \times 10 \times 8$ mm., with 12 mm. long parapodia. The head is well-developed and has pronounced oral tentacles, but in some specimens contraction has reduced the size considerably.

The foot varies considerably but is usually the same width as the body. It is not two-lipped anteriorly and it extends into a short round tail. The visceral hump is strongly rounded posteriorly and does not slope away at all.

The ctenidium is large with a semi-circular axis. The reproductive aperture is at base of the gill axis and therefore well into the parapodia.

The jaws and radula are light straw-coloured (Fig. 11).

9. — *Aplysia maculata* RANG.

This species has been recorded from Table Bay and the Natal coast, S. Africa, by S. RANG (1828, p. 58), WAHLBERG (See PILSBRY, vol. XVI, p. 108) and F KRAUSS (1848, p. 14).

In the present collection it was collected with *A. depilans* from Rio de Oro, Pulpito, at a depth of 7-15 fathoms on 30.X.35.

Sixteen specimens of the usual form occur which are fairly firm and elongated. The parapodia are of moderate size and meet well behind the visceral hump. In some specimens they are ragged as if they had been partly eaten away. They are erect and leave the dorsal cavity wide open.

There is a well-developed siphon. The shell aperture is small and oval with a thickened margin sometimes surrounded by radiating lines. The shell is somewhat convex and the armour of calcareous matter slight, even for a preserved specimen.

The colour is greyish-yellow with sepia streaks.

The largest measures $30 \times 12 \times 10$ mm., which is about one-third the size of the type specimen.

The head is well-developed and elongated.

The foot is narrow and extended posteriorly to form a rounded tail 5 mm. long.

The rhinophores are 7 mm. from the anterior of the head and 5 mm. from the commencement of the parapodia. They are directed anteriorly and eyes are clearly visible at their bases.

The branchial plumes are not large.

The jaws were extruded in one case. The radula consists of 33 rows of 20.1.20 teeth (Fig. 12).

The shape of the shell, paucity of calcareous matter, widely exposed mantle cavity, and small tubular foramen, and the rounded tail are all characteristic of the species.

NUDIBRANCHIA.

HOLOHEPATICA.

FAMILY FIMBRIDÆ.

= *Tethymelibidæ* BERGH, 1892,

a name which does not conform with the rules of nomenclature;

= *Tethydæ* THIELE, 1931,

after the Linnean genus TETHYS, 1767 (non LINNÉ, 1758).

As this name is not valid even if one preserved *Aplysia* for the Tectibranch as a *nomen conservandum*, ODHNER, 1936 accepts O'DONOGHUE's proposal made in 1926 that *Tethys fimbria* of LINNÉ 1767 be called *Fimbria fimbria*.

Fimbria was the generic name used by BOHADSCH, 1761 and used as a trivial name by LINNÉ in 1767.

10. — *Fimbria fimbria* (LINNÉ, 1767).

= *T. leporina* auct., non LINNÉ, 1758.

This is a widely distributed species in the Mediterranean and Atlantic. It is reported from the coast of Morocco by J. RISBEC as *Tethys leporina*, but was not recorded from South Africa by J. BERGH, K. H. BARNARD, or C. H. O'DONOGHUE.

I have no hesitation in referring four specimens to this species.

One specimen from 5°52'S-12°0'E, twenty-five miles W.N.W. of Banana, taken at a depth of 30 metres on 26.VIII.48, and three specimens from the same area taken on 8.IX.48 at a depth of 25 metres.

The length of the largest including the velum is 150 mm., the width of the velum is 35 mm., and of the body 35 mm.

N. ODHNER gives the dimensions as 160 to 180 mm. long and the breadth of the velum as 100 to 140 mm., so the present specimens are somewhat small although preservation would account for a good deal of shrinkage especially in such a soft structure as the velum.

The form of the body is typical; the cerata are difficult to investigate as they are somewhat damaged and the buccal gills are difficult to see. C. ELIOT has remarked that the cerata are easily damaged.

No jaws, radula or stomach plates are present. The colour is grey with darker mottling, and one specimen has a brown band on the margin of the foot. The salivary glands are short, and the liver does not spread far on to the stomach.

The other described species, *F. occidentalis* ODHNER, which does not occur in the collection, is smaller (43 mm. long) and also differs in having elongated salivary glands and a liver spread further forwards.

FAMILY DUVAUCELIIDÆ.

A family of five genera with an involved nomenclature which was fully revised by N. ODHNER in 1936. I refer two specimens to the genus *Marionia* VAYSSIÈRE, 1877.

In this genus N. ODHNER has left some of the previously described species but others he has placed in the genus *Marioniopsis* ODHNER, 1934. The characters which distinguish *Marionia* VAYSSIÈRE, 1877 are: the liver in two masses, stomach plates present (see below), genital opening beneath 3rd gill, jaws with 3-6 rows of very fine denticles. The radula has a tricuspid median tooth and the first lateral is differentiated. The velar papillae are compound.

11. — *Marionia cabindæ* n. sp.

One specimen taken at 5°39' S-12° E, at a depth of forty metres, on 14.X.48, twelve miles W.S.W. of Cabinda, and one taken at 5°48' S-12°03' E at a depth of thirty to thirty-five metres on 16.X.48, seven miles S.W. of Pointe Ngelo.

Both specimens are firm, cream in colour, and one has a few brown streaks. They measure 65 × 24 × 12 mm., and 60 × 18 × 9 mm.

The mantle is so finely papillose that the papillae, except for a few larger ones, are only visible under the lens. There are thirteen branched gill processes on each side, each of which is branched into four and these into three, and the three bearing four or more finely branched processes. One specimen has an additional small process. The cephalic veil bears six simply branched processes on both sides of the middle line in one specimen, and in the other there are eight on the left.

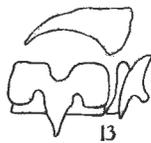


FIG. 13. — *Marionia cabindæ*.
The central and first two lateral radular teeth and the fifth lateral, ×100.

The foot of one has a slightly crenulate anterior margin and a rounded tail with a crenulate margin; the other specimen is torn anteriorly and the buccal mass is extruded. The tail is small and pointed.

The rhinophores are club-shaped and in one are retracted into lobed sheaths which bear four simple processes.

The anus is lateral, round, and between the fourth and fifth gills in one, and under the fifth gill in the other. The renal aperture is very small and appears to be under the fourth gill.

The reproductive aperture is found below the third gill and, in one, the penis is extruded on a small globular sheath with four simple processes.

The jaws and radula were removed from one specimen. The jaws appear smooth but careful examination shows several rows of fine denticulations.

The radular formula is $62 \times 100.1.108$, and the teeth are characteristic of the genus (Fig. 13).

The stomach lies in a hollow in the left lobe of the liver which is partially separated from the right lobe. Stomach plates were not found, otherwise these animals show all the characters of the genus *Marionia* VAYSSIÈRE. Odhner, however, does not emphasize the presence of stomach plates as he places in the genus a species *pustulosa* with a « low cuticular hyaline crest thus no true stomach plate ».

These specimens appear to be sufficiently distinct from previously described species to be regarded as new and the name *Marionia cabindæ* is suggested. The specific name is taken from the nearest named locality of the holotype.

FAMILY EUPHURIDÆ.

POLYCERIDÆ BERGH, 1892.

POLYCERA CUVIER, 1816.

12. — *Polycera nigrocrocea* BARNARD, 1921.

= *P. capensis* (Q. et G.).

This species was described from several South African localities by K. H. BARNARD in 1927 (p. 191). One specimen taken on the rocks at Farta Bay, Angola, on 11.II.38, on the 14th voyage of the « MERCATOR » is colourless and measures $14 \times 6 \times 5$ mm. The type specimen is nearly 70 mm. long, so therefore the present specimen is a small one even allowing for contraction due to preservation. The body is smoothly limaciform with a rounded body and a pointed tail, having seven frontal processes, four on the left and three on the right; this number might be an individual abnormality. The hindermost process is slightly bifid. K. H. BARNARD describes six.

There are ten gills, arranged in a rectangle with a triangular process posterior to the gills. K. H. BARNARD reports nine (or ten) but figures only seven.

K. H. BARNARD describes his specimen briefly as similar to *P. quadrilineata* and separates them on the bifid posterior frontal process, the smooth body and the colouration. He does not mention the small cephalic tentacles, the broad head and very narrow foot, nor does he draw attention to the fact that the processes flanking the gills are triangular rather than digitate.

The radula K. H. BARNARD describes as « very similar to that of the nothern species », but the two hamate labials are shorter than in *quadrilineata* as figured by J. ALDER & A. HANCOCK (1864) and R. BERGH (1879). The radula of the present specimen (Fig. 14) fits BARNARD's description.

FAMILY DORIDIDÆ.

SUBFAMILY ARCHIDORIDIDÆ.

ARCHIDORIS BERGH, 1878.

13. — *Archidoris* sp.

One specimen taken 3°11'S-10°14'E, thirty miles N.W. of Mayumba, on 21.III.49 at a depth of thirty metres. I refer it to this genus but am unwilling to assign it to any described species.

The animal is white, measures 12 × 11 × 35 mm, but these figures are approximate only as it is curved upwards from the tail to the head.

The body is flat, firm but not hard; the margin is edged with processes giving it a digitate effect and the rest of the body is completely covered with papillae of varying sizes developed on irregular warts.

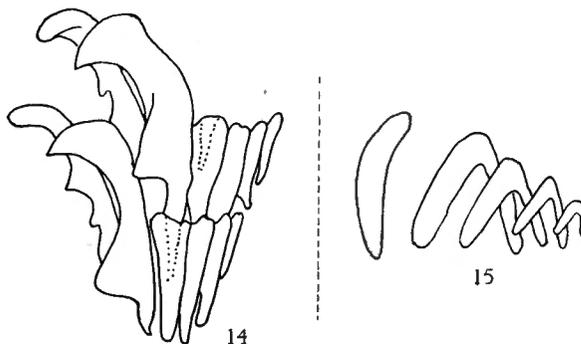


FIG. 14. — *Polycera nigrocrocea*.
Two rows of radular teeth, ×200.

FIG. 15. — *Archidoris* sp.
A tooth from the centre and the last four laterals of the radula, ×200.

The head is small, and the cephalic tentacles are short, as long as the head and longitudinally grooved.

The foot is narrow and much convoluted. The rhinophores appear to be lamellate and are retracted into raised cups with slightly digitate margins.

The gills are completely retracted. There are no jaws or labial armature. The radula (Fig. 15) consists of ten rows with a dental formula of 30.0.30.

This specimen is not referable to any described species from the Mediterranean or South Africa, but I hesitate to make a new species in this genus from a single preserved specimen. I have no notes on the colour and therefore the radula alone could be cited as a clear specific character. I record it as *Archidoris* sp. and hope that additional material at some subsequent date will throw further light upon it.

FAMILY DENDRODORIDÆ.

The general characters of this family are similar to those of the sub-family *Archidorididæ* but the mouth is a small pore, there is no radula, and the penis is armed.

There are two genera :

Dendrodoris EHRENBERG, 1831, and *Doriopsilla* BERGH, 1880.

Dendrodoris has a soft smooth dorsal surface and buccal ganglia in the posterior part of the elongated rudimentary pharyngeal bulb.

Doriopsilla has a harder granular surface and the buccal ganglia are more anterior. A network of spicules is present.

DENDRODORIS EHRENBERG, 1831.

For synonyms see C. H. O'DONOGHUE, 1928, p. 79.

14. — *Dendrodoris limbata* (CUVIER).

= *Doridopsis inornata* ABRAHAM, 1877; *Doris grandiflora* RAPP, 1827; *Doris setigera* RAPP, 1827; *Doris rappii* CANTRAINE, 1841; *Doris virescens* RISSO, 1818.

This species has been described by A. VAYSSIÈRE (1901, p. 33) from the Mediterranean.

Three specimens taken on the ninth voyage of the « MERCATOR », 24°39' N-15° W, south of Garnet Head, Rio de Oro, at a depth of thirteen fathoms on 2.XI.35.

I have notes on the colour of the fresh specimens : « One orange on dorsal and ventral sides; two others with blackish dorsal side and orange ventral side. »

The animals are doridiform, firm and smooth with an undulating mantle edge which in the smallest specimen projects for about 2 mm. all round the dorsal side. The largest is 25 × 11 × 6 mm., and the smallest 21 × 8 × 4 mm.

The head is small and the cephalic tentacles are not visible.

The foot is 8 mm. broad and does not extend beyond the body posteriorly.

There are seventeen lamellae on the rhinophores which project from shallow cups with smooth edges.

There are six tripinnate branchiae forming a complete circle at the posterior end of the mantle. The branchiae are closed but are not retracted into the cup.

The anus is in the centre. There are no jaws or radulae. The buccal ganglia are on the posterior part of the pharyngeal tube.

15. — *Dendrodoris* sp.

Another specimen in a tube with an Aeolid was collected at 14°40'N-16°15'W, Senegal, in front of Rufisque at a depth of twelve fathoms on 14.XI.35.

It is soft, smooth, white, measures 12 × 10 × 6.5 mm., and has retracted rhinophores which are apparently smooth, and seven to eight partly retracted

branchiae. These features indicate that it is a different species, but unless notes on the colour of the living animal are available it is inadvisable to refer preserved specimens of this genus to a species. I report the specimen as *Dendrodoros* sp.

16. — *Doriopsilla areolata* BERGH, 1880.

This species has also been described from the Mediterranean by A. VAYSSIÈRE (1901, p. 50).

There is one specimen taken from the jetty at Dakar on 27.II.40, which is well-preserved, white, and measures $24 \times 13 \times 8$ mm. The body is soft and doridaform with a network of fine opaque white lines formed by the spicules. The mantle edge is thin, undulating, and torn in places. The dorsal surface is covered with papillae. The head is very small and pointed, the foot broad with thin undulating edges. Posteriorly it is very broad and flat. The rhinophores are retracted. There are four to five much branched branchiae, and the anus is flush with the surface in the centre. The reproductive aperture opens far forwards on the right side.

The buccal mass is absent, and the buccal ganglia are at the anterior end of the pharyngeal tube. The small mouth leads to a long thin white oesophagus without glands and of uniform dimensions. The eyes are large, a fact noted particularly by A. VAYSSIÈRE.

There is no radula.

The general form and number of branchiae indicate *D. areolata*.

CLADOHEPATICA.

FAMILY ARMINIDÆ.

There are three or four genera in this family whose members appear to have been modified for a burrowing life.

ARMINA RAFINESQUE, 1814.

With type *A. tigrina* RAFINESQUE by subsequent designation.

This genus is well represented in the present collection by five species from eight localities :

17. — *Armina tigrina* RAFINESQUE, 1814.

= *Pleurophyllidia undulata* MECKEL, 1823 (see A. VAYSSIÈRE, p. 117).

One specimen from Kasamanse taken $12^{\circ}47'N-17^{\circ}7'W$ on a sandy bottom at a depth of ten to eleven fathoms on 9.I.38. The radula had been removed and the specimen identified before arrival, by Dr. W. ADAM. It measures 10×6

× 4.5 mm., and is dark grey in colour with faint indications of the black and white striped coloration of the living animal.

The species is described from the Mediterranean by A. VAYSSIÈRE whose smallest (of three) specimen measured 22 m when alive.

18. — *Armina pustulosa* (SCHULTZ).

= *Armina maculata* RAFINESQUE, 1814; *Doris verrucosa* CHANTRAINE, 1835-1845;
Doris pustulosa SCHULTZ, 1836-1844.

This species has been described by R. BERGH 1866-7, p. 16, and A. PRUVOT-FOL, 1927, p. 46, from Morocco.

Four samples occur in the collection: 1. twelve specimens from 12°12'S-13°27'E, ten miles N.W. of Lobito, taken at a depth of 99 metres on 11.V.49 (Fig. 16).

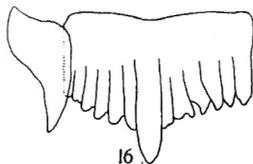


FIG. 16. — *Armina pustulosa*.
Central and first lateral radular teeth, ×100.

The body is limaciform, covered dorsally with small scattered papillae with some larger papillae especially posteriorly. The mantle which overlaps the foot all round has a slight rectangular indentation anteriorly. Fine corrugations or ridges line the ventral part of the mantle.

The animals are cream coloured, varied in size as the dimensions of the largest are 85 × 57 × mm. and of the smallest 25 × 14 mm.; the dissected one, described below, measured 65 × 45 mm. All are somewhat distorted.

The head is flat with a slight indentation in the middle line anteriorly. It tapers slightly and measures 40 × 25 mm. The anterior group of 27 branchial lamellae are larger than the posterior. The anus lies just behind them.

The jaws are yellow, denticulate, and measure 6 × 3.5 mm. The radula is nearly colourless, and measures 3 mm. long and 5 mm. wide when on a slide. There are 16 rows of teeth with 38.I.38 as the maximum number in a row (Fig. 16).

2. Eleven specimens collected from Pulpito Bay, Rio de Oro, at a depth of ten to fifteen fathoms, on 25.XI.36, belong to the same species. They had previously been determined by Dr. W. ADAM as *A. maculata*.

3. Three specimens from 24°29'N-15°W, south of Garnet Head, Rio de Oro, taken at a depth of seventeen fathoms, collected on 1.XI.35, are described as being in the living condition « orange with white patches, the ventral surface a little more yellow-orange ».

These were also first determined by Dr. W. ADAM as *A. maculata*.
There are 47 rows of teeth in the radula with formula 42.1.42.

19. — *Armina pustulosa* var. *denticulata* var. nov.

Five specimens preserved in formalin and in good condition were collected from Rio de Oro, Ancra de Cintra, at a depth of fifteen to twenty fathoms on 30.XII.37. The specimens were named by Dr. W. ADAM *Armina maculata* RAF.

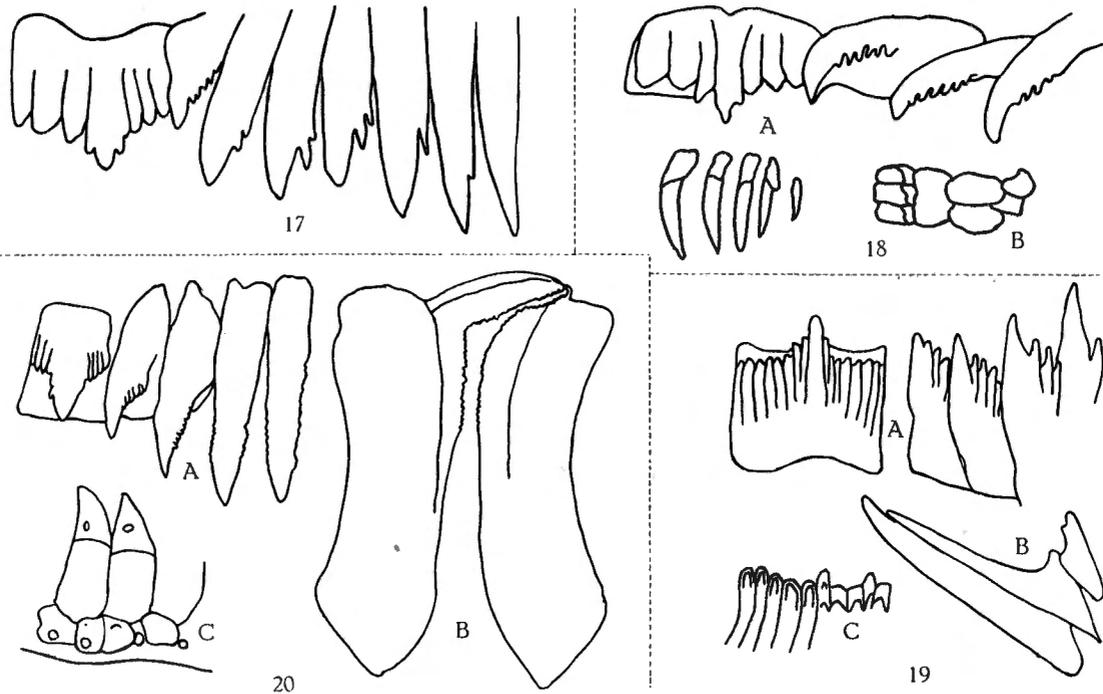


FIG. 17. — *Armina pustulosa* var. *denticulata*.

Central and first lateral teeth, $\times 100$.

FIG. 18. — *Armina gilchristi*.

A. Central and first three lateral teeth from 15th row of radula and the last five;
B. The edge of the jaw, $\times 200$.

FIG. 19. — *Armina microdonta*.

A. Central and first four lateral teeth from 16th row of radula; B. Last three teeth
from same row; C. Edge of jaw, $\times 200$.

FIG. 20. — *Armina adami*.

A. The central and first four lateral teeth of radula, $\times 200$; B. The jaw, $\times 10$;
C. Edge of jaw, $\times 200$.

The largest animal measures $32 \times 16 \times 6$ mm., and the foot 27×10 mm.; the width is taken at the widest part as the foot tapers back to a point. The radula of this animal confirms it as *A. pustulosa*. Dissection and examination of the radula of two of the others show that it is different from that of *Armina pustulosa* (SCHULTZ) (= *A. maculata* RAF.). A. PRUVOT-FOL 1927, p. 47, describes the radula as having a median tooth with 6-7 denticulations on each side of a cusp, the first lateral large, denticulate with cusp turned towards the median. The rest

are not denticulate (Fig. 17). This fits the specific characters as stated by R. BERGH except the first lateral should read serrated. Four of the present specimens have a median tooth with 4-5 denticulations, the first lateral with six denticulations and not the fine serrated edge as figured by R. BERGH; the second, third and fourth laterals have two clearly marked denticulations, the fifth and sixth have one, and, the remaining nineteen have a smooth cusp. The number of rows is 31.

The material, therefore, cannot be referred to *A. pustulosa* sensu stricta.

The animals in preservation are cream-coloured. *A. maculata* in living condition is described as pale yellow and these may have been the colours of the specimens in the living condition which guided Dr. W. ADAM in his identification.

The shape is limaciform, and they are softer and more transparent than are preserved *A. pustulosa*. Careful examination is necessary to ascertain the presence of the scattered, slightly raised papillae.

The largest measures 22×8 mm. and therefore its proportions are different from those of *A. pustulosa*. The branchiae are of the usual form. There are fifteen in the anterior patch which occur with their long axes parallel to the long axis of the animal. The posterior, of which there are twenty-eight, are partly subdivided into varying numbers, usually between three and five.

The radula has been described above and belongs to the type characteristic of *Pl. semperi* BERGH from the Philippines. The present specimen can hardly belong to this species which would indicate a very wide geographical distribution. Moreover the external form differs. *Pl. semperi* is a form with longitudinal lines while the present specimen, although very slightly papillose, is certainly not marked in any other way.

I hesitate to make a new species from preserved animals with, apart from the radula, not clearly marked features, and until more information or material is available simply describe it as *Armina pustulosa* var. *denticulata*.

20. — *Armina gilchristi* (BERGH, 1907).

=*Pleurophyllidia gilchristi* described by R. BERGH, 1907, p. 107,
from four specimens from South Africa.

One specimen collected from $5^{\circ}10'S-12^{\circ}E$, seven miles west of Landana at a depth of thirty metres on 24.III.49, I refer to this species. The animal is cream coloured with a few minute dark spots anteriorly, which are especially crowded below the rhinophores. It measures 18×9 mm. and is, therefore, a little smaller than R. BERGH's. It is oval, limaciform, and studded with small papillae. Lines are not present but there is a tendency for the papillar to be arranged longitudinally. The jaws are pale yellow, measure 2.2×5 mm., and bear four closely packed rows of cones. The radula is colourless, measures 1.8×1 mm. with 35 rows of 22 lateral teeth, of which the first six are denticulate. The median has three to four strong denticles on each side and one smaller on each side of the central cusp. (Fig. 18).

R. BERGH does not make himself quite clear as to the number of denticles on the jaw, he says « with (about ten) series of very small, blunt cones », but he draws four.

There are 36 lateral gill lamellae on the right, and 40 on the left, which agrees with Bergh's « about forty » .

21. — *Armina microdonta* (BERGH, 1907).

This species was reported by R. BERGH from South Africa in 1907, p. 103.

One specimen taken one mile N.E. of L'Isle Dassen, at a depth of 18-20 fathoms, on 15.I.37.

R. BERGH says that his specimen was in a very bad state of preservation. It measured $30 \times 15 \times 10$ mm. The present specimen is well preserved, measures $28 \times 11 \times 6$ mm., with a foot measurement of 23×6 mm. It is soft and plump and tapers to a distinct tail which projects. Its colour is light grey with a few dark blotches on the dorsum and small brown spots of bunches of spicules on the mantle edge especially on the right.

There are sixteen gill lamellae. The light straw coloured jaws measure 2.75×1.25 mm. Five rows of denticles are closely packed on the margin. The pale yellow radula measures 2×2.5 mm., and contains 27 rows of teeth, with 34 laterals on each side of the median; the first 25 have denticles. The median has eight to ten denticles on each side of the central cusp, and the tooth itself is rectangular (Fig. 19).

R. BERGH's radula contained 20 rows with about 50 laterals. The inner laterals had 8-10 denticles, and the outer last 10-15 teeth had no denticles.

The remaining member of this genus does not appear to agree with any of the hitherto described species.

22. — *Armina adami* n. sp.

One specimen from 2 miles from Angra de Cintra collected at a depth of 12-14 fathoms on 28.XI.36, measures $14 \times 8 \times$ about 6.8 mm. Small copepodes were present on the gills.

The animal is a true *Armina* with the mantle as a continuous area not interrupted by the rhinophores. It is limaciform, firm, dark grey with twenty lighter stripes down the dorsum. The rhinophores are completely invisible and are probably retracted and then covered by the triangular flap of skin. the caruncle, which is usual for the genus.

The anterior gill lamellae are fifteen and are grouped together to form a globular mass. The posterior consists of twenty-seven rather larger plates which are irregular and tend to be broken into three or more pieces.

The jaws are 2.8×75 mm., pale yellow, and bear three to four rows of plates.

The radula is pale yellow, measures 2.7×2.5 mm., and consists of 22 rows of 48.1.48. teeth, the appearance of which resembles *Linguella cinerea* FARRAN, described from Ceylon in 1905 (G. P. FARRAN, p. 334). (Fig. 20).

Linguella DE BLAINVILLE differs from *Armina* RAF. in having the rhinophores on the mantle instead of on a neck in front of these, a character not shown by the present species which, therefore, cannot be referred to *Linguella* but to *Armina*. I name it therefore *Armina adami* the specific name of the holotype being that of Dr. W. ADAM

FAMILY ÆOLIDIDÆ.

EOLIDINA QUATREFAGES, 1843.

23. — *Eolidina glauca* (ALDER & HANCOCK, 1855).

The species has been found in the Atlantic and in the Mediterranean (A. VAYS-SIÈRE, 1888, page 108).

The specimen was collected on the 9th voyage of the « MERCATOR » at 24°13' N-15°44' W, at a depth of 12 fathoms on 2.XI.35 at Caballo Bay, Rio de Oro. It is reported as having a white ventral surface, orange dorsal with green gills.

The present specimen is a dirty grey colour and measures 18 × 9 × 5 mm. The back is completely covered with tapering finger-like processes. The head is small, the rhinophores lamellate, 2 mm. long. The foot is flat, rounded anteriorly and produced at the corners into short processes. Anteriorly it is 5 mm. wide and it gradually tapers to 1.5 mm. at the tail.

The jaws are pale greenish yellow without any signs of denticulations.

The radula is uniseriate and consists of eighteen teeth. The tooth is curved and comb-like with 32 denticulations on each side of a small median cusp. (Fig. 21).

FAMILY FIONIDÆ.

GENUS FIONA FORBES et HANLEY, 1851.

24. — *Fiona marina* (FORSKÅL, 1775).

Syn. *F. nobilis* = *Eolidia pinnata* ESCHSCHOLTZ, 1831.

This species occurs in the Atlantic and Mediterranean and two large samples belong to it. Forty-eight specimens were obtained at 7°16' S-12°47' E on 28.IX.48, dredged six miles west of Ambrizette, and thirty-two specimens forty-five miles west of Ambrizette on 1.X.48; no depths were recorded in either case.

The animals are limaciform with rows of cerata and a bare space along the length of the back. There are about six cerata in a row.

The rhinophores are smooth, finely pointed and about 6 mm. long. The cephalic tentacles are about 5 mm. long. The foot is 6 mm. broad, rounded anteriorly and pointed posteriorly.

The measurements of one are 3 × 10 × 7 mm.

The jaws are yellow. The radula is pale horn coloured with, in one specimen, 25 rows of uniseriate teeth, and in another 39 rows. In both cases the

form is identical with that figured by J. ALDER and A. HANCOCK, 1855. The tooth is curved with a strong, pointed central cusp and six small sharply pointed cusps on each side. (Fig. 22).

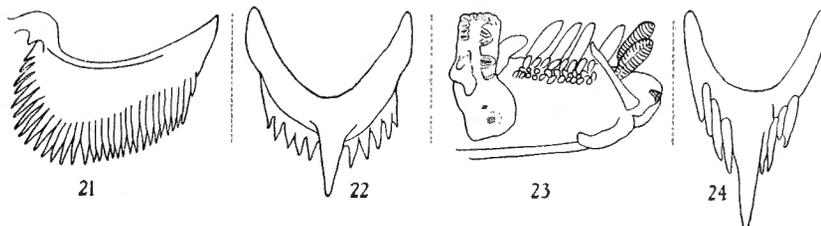


FIG. 21. — *Eolidina glauca*. Part of a single tooth of the radula, $\times 100$.

FIG. 22. — *Fiona marina*. A radular tooth, $\times 100$.

FIG. 23. — *Facelina faurei* var. *quadridenticulata*. Anterior end from the right side, $\times 6$.

FIG. 24. — *Facelina faurei* var. *quadridenticulata*. A single tooth from the radula, $\times 100$.
Catoria sp.

FAMILY FACELINIDÆ.

FACELINA ALDER and HANCOCK, 1855.

25. — *Facelina faurei* BARNARD, 1927, var. nov. *quadridenticulata*.

Two specimens dredged at ten fathoms from Port Etienne on 9.XI.35 on the 9th voyage of the « MERCATOR », are referable to the genus *Facelina*.

The animals are slender and limaciform. The oval and pointed cerata are shed easily. They are very densely packed and irregular on anterior third of both specimens, and in one they are much fewer posteriorly and in the other have been nearly all lost posteriorly.

The colour in the preserved animal is light fawn.

The size is approximately $15 \times 3 \times 4$ mm. The head is small, the foot narrow and produced at anterior corners into stout processes. These are curved and measure about 3 mm. The rhinophores are annulate.

The penis is peculiar and armed with spine-like swellings on the border of a large expansion on the right, 5 mm. from the head. (Fig. 23). Two tentacle-like projections are towards the attached end of the penial projection. The jaw has 15 well developed denticles. The radula is uniseriate and consists of 28 rows of teeth. A prominent long pointed cusp bears four denticles on each side (Fig. 24).

The arrangement of the cerata, the form of the penial lamina, as well as the shape of the radular tooth resemble *F. faurei* BARNARD (K. H. BARNARD, p. 205), but this species has 20-24 teeth on the radula and 8 or 9 denticles on the sides of the central cusp.

The colour of K. H. BARNARD's specimen was not noted but I suggest this to be a variety.

26. — *Caloria* ? sp.

One specimen collected 14.XI.35 at Senegal, was in a tube with *Dendrodoris*. It is soft, elongated, limaciform, white in colour, measures 21×4 mm., and its cerata are represented by stumps only. The head is small, the mouth round, and long cephalic appendages are present. The rhinophores are also long, lamellate, close together, with eyes visible at the base.

The foot has a deep groove anteriorly and is produced into two long tapering projections (Fig. 25).

The animal is somewhat transparent and the pink buccal mass is clearly visible through the skin.

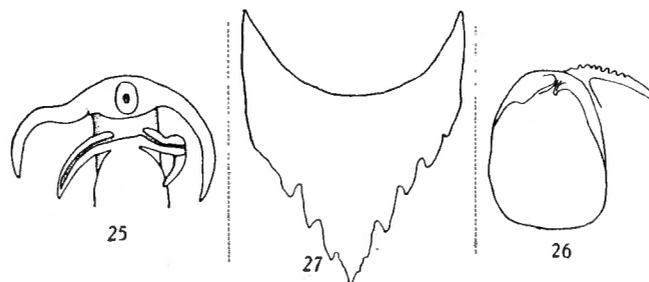


FIG. 25. — Ventral view of anterior end, $\times 2.5$. FIG. 26. — Jaw, $\times 7$.
FIG. 27. — A single tooth of the radula, $\times 100$.

The jaws are pinkish horn coloured and bear 8 distinct and 4 less distinct denticulations (Fig. 26). The radula is uniseriate and consists of 15 teeth. The penis is unarmed.

The tooth has a median cusp with a serrated edge and five somewhat irregular lateral denticulations on each side. (Fig. 27).

This is a new species which I have been unable to assign to a genus. The radula, jaws and general form of the animal resemble *Caloria occidentalis* ENGEL, but the nature of the lamellation on the rhinophores is different. As the rhinophores of the genus *Caloria* are not lamellate it is probable that *C. occidentalis* of H. ENGEL is not a *Caloria* at all.



FIG. 28. — Distribution map; the figures refer to the numbers of the species in the text.

SUBCLASS PROSOBRANCHIATA.

FAMILY LAMELLARIDÆ.

LAMELLARIA MONTAGU, 1815.

27. — *Lamellaria perspicua* (LINNÉ).

This species occurs in the Mediterranean, etc.

One specimen taken in the South Atlantic, 10°05' N-17°0' W, at a depth of 360 metres on 8.VI.49, is oval, soft and firm. The body is completely covered by the mantle which has an open siphon on the left anteriorly.

The mantle is slightly rugose, the colour dirty white, and the measurements are 22 × 14 × 12 mm.

The head is small with a long tentacle at each side. Eyes at the base.

The foot is broad, flat, bilobed anteriorly and produced at the corners. It measures 14 × 11 mm.

There is a single branchial plume anterior to the head. The long radula is pale straw coloured with a formula 1.1.1.

SUBCLASS PULMONATA.

FAMILY ONCIDIIDÆ.

28. — *Onchidella celtica* CUVIER.

Twenty-six specimens collected from the rocks of Kassa Island, French Guinea, on 24.XI.35 have the characters of this species.

The animals are firm, oval and rolled up from head to tail. The dorsal surface is covered with small round warts with along the centre of the back a series of more strongly marked larger ones. The edge of the mantle is crenulate and the ventral side is finely papillose.

The dorsum is grey; the ventral side pale orange. Most of the specimens approximate to one another in size and the largest measures 23 × 19 × 6 mm. The foot is narrow, about 6 mm. wide, square anteriorly with a pointed tail.

The head is small with one pair of short black tentacles which carry the eyes at the tips. The mouth is a very small vertical slit without jaws or labial armature.

The radula is pale grey, measures 4 × 1.5 mm. with 79 rows of teeth with formula 84.1.84.

Numerous specimens, apparently of the same species, were collected on the rocks north of Conakry, French Guinea on 10.XI.35.

Some of the animals from this sample are flatter. The radular formula of a larger one is 78 × 69.1.69.

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