Rec 2-11-87

Southern California Association of Marine Invertebrate Taxonomists

3720 Stephen White Drive
San Pedro, California 90731

January 1987 Vol. 5, No. 10

NEXT MEETING:	February 9, 1987
SPECIMEN EXCHANGE GROUP:	Tanaidacea, provisional species (This is a new concept for SCAMIT exchanges that is described in detail on the second page.)
TAXONOMIC TOPIC:	Discussion of agenda for 1987 Amphipod workshop

MINUTES FROM MEETING ON JANUARY 12, 1987

Don Cadien (MBC Applied Environmental Sciences) led the discussion of this month's taxonomic topic, the asellote isopods. Don reviewed the distribution and habitats of all the species that have been reported from California and provided a bibliography to the asellotes. A copy of Don's bibliography, as well as a taxonomic listing of the California asellota, is included in this newsletter.

Call for Nominations! Nominations for 1987-1988 SCAMIT officers will be heard at the March meeting. Nominations may also be made to the SCAMIT Secretary by mail. Your participation in these elections, as a nominee or voting member, is essential to the continued success of SCAMIT.

Many Thanks are due the Cabrillo Marine Museum staff and SCAMIT volunteers who made the 1986 SCAMIT Christmas Party such a joyous occasion for all, including the "SCAMITeers" who accompanied their parents. This was the first time SCAMIT has held our Christmas fete at CMM, and we hope that we shall have the opportunity again next year. Again, thanks to all!

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The SCAMIT newsletter is not deemed to be a valid publication for formal taxonomic purposes.

The 1987 Taxonomic Standardization Program will concentrate on the standardization of provisional species. This is a departure from our past practice of dealing with provisionals only as they came up in the exchange. The fact that there are literally several hundred provisional names appearing in data sets from the region makes this latter approach inadequate to meet the pressing need to standardize and disseminate diagnoses of these species. Over the coming year we hope to make significant progress on this front.

The monthly meetings dedicated to provisional species will be run as follows: Taxonomists interested in having their provisional species recognized by SCAMIT are to distribute material to participating members/agencies at the exchange meeting just as has been done in past meetings. If insufficient material is at hand for such an exchange, that material which is available should be prepared for presentation at the topic meeting. In either case, please inform the Vice-President, prior to the exchange, what material will be submitted.

At the topic meeting the taxonomist submitting the material must have a justification for the erection of the provisional species. This is to consist of a written description of the species, emphasizing those characters distinguishing it from its congeners or closely related taxa. This description should be drafted in the SCAMIT voucher sheet format and include pertinent figures (having the information in this form at the meeting will greatly facilitate the production and distribution of final versions of the voucher sheet, the ultimate goal). At the meeting the material will be examined and discussed, and if considered to be valid according to SCAMIT's criteria for provisional designation, shall be adopted by SCAMIT. For those species that are adopted, the taxonomist submitting the material shall be responsible for submitting to the Vice-President a completed final version of the voucher sheet for inclusion in the newsletter. Reference specimens shall be deposited in the SCAMIT collection.

The SCAMIT criteria for use and rules for erection of provisional designations are:

Criterions for use: In cases where a specimen is known or suspected of being new to science, having not appeared in the refereed literature, it is to be given a provisional designation in order to distinguish it from other closely related taxa.

Specimens that may be closely referred to published descriptions in the refereed literature do not justify provisional designations but should be given conditional designations (see SCAMIT recommendations on conditional designations.

Rule 1: The provisional designation is formed by the word "species" (or sp.) followed by a capital letter and is combined with the name of the lowest taxon in which the specimen can be placed with certainty.

Ex 1: When the genus is known the genus name is followed by the construct "sp. A,B,C.."

(e.g. Campylaspis sp. B)

Ex 2: When the generic status is uncertain, or when the specimen is suspected of representing a new genus as well as species, the family name is followed by the construct "sp. A,B,C,..."

(e.g. Dorvilleidae sp. D)

Ex 3: When the specimen cannot be placed with certainty in a family or higher taxon the lowest taxon certain is followed by the construct "sp. A,B,C,..."

(e.g. Cephalaspidea sp. A)

Rule 2: In forming provisional names using taxa above the generic level the full latinized name of the taxon is to be used (see Ex. 2 and 3 above).

Rule 3: Within a provisional name series the letters are to be assigned in alphabetical order.

Rule 4: The removal of species from provisional status does not affect any remaining members of that provisional name series.

Rule 5: The erection of a provisional species is to be supported by a diagnois or description as well as appropriate figures.

Rule 6: One or more reference specimens of a provisional species is to be deposited in the SCAMIT collection.

Rule 7: All previous designations of provisional taxa subsequently recognized and named by SCAMIT will be considered as if junior synonyms.

Proposed 1987-1988 Agenda - SCAMIT Taxonomic Standardization Program:

Feb exchange / March topic	Tanaidacea, prov. spp.
March exchange / April topic	Gammaridean Amphipoda, prov. spp.
April exchange / May topic	Cumacea, Campylaspis - prov. spp.
May exchange / June topic	Polychaeta, prov. spp.*
June exchange / July topic	Porifera, regular meeting
July exchange / Aug topic	Cumacea, prov. spp.

August exchange / Sept topic	Gammaridean Amphipoda, prov. spp.
Sept exchange / October topic	Polychaeta, prov. spp.*
October exchange / Nov topic	Gastropoda, prov. spp.
November exchange / Dec topic	Polychaeta, prov. spp.*
December exchange / Jan topic	Cumacea, prov. spp.
January exchange / Feb topic	Polychaeta, prov. spp.*

* Polychaete topics will be narrowed to ordinal or family levels at a future date.

Position Open - MBC Applied Environmental Sciences is seeking an invertebrate taxonomist with experience in polychaete taxonomy to fill a full-time position (40 hours/week). The position may entail other duties in addition to sample analysis. Versatility is desirable. Interested parties should contact Don Cadien or Mike Mancuso at:

MBC Applied Environmental Sciences
947 Newhall Street
Costa Mesa, CA 92627
(714) 646-1601

Jim Roney (Hyperion Treatment Plant, 12000 Vista del Mar, Playa del Rey, CA 90293) is interested in examining examples of Ampelisca unsocalae and A. careyi from areas outside Santa Monica Bay. Jim will return the material after examination.

LIST OF SPECIMENS EXAMINED ON JANUARY 12, 1987

HYP 70 Munnogonium tillerae (Menzies & Barnard 1959)

HYP 71 Ilyarachna acarina Menzies & Barnard 1959

MBC 59 Prochelator sp. A of SCAMIT 1987

SCAMIT Code: HYP 71

Date Examined: January 12, 1987
Voucher by: Don Cadien

SYNONYMY: Has not appeared under any other name.

LITERATURE: Menzies & Barnard 1959; Thistle 1980; Hessler & Thistle 1975.

DIAGNOSTIC CHARACTERISTICS:

1. Acute spines along anterior dorsal edges of pereonites and on dorsal surface of cephalon.
2. Basal articles (1-3) of antenna 1 spinose.
3. Copulatory organ of male short and thick.
4. Telson triangular (i.e. tapering, with straight lateral margins).
5. Anterior margin straight, with no defined rostrum or sinus for antennal insertion.

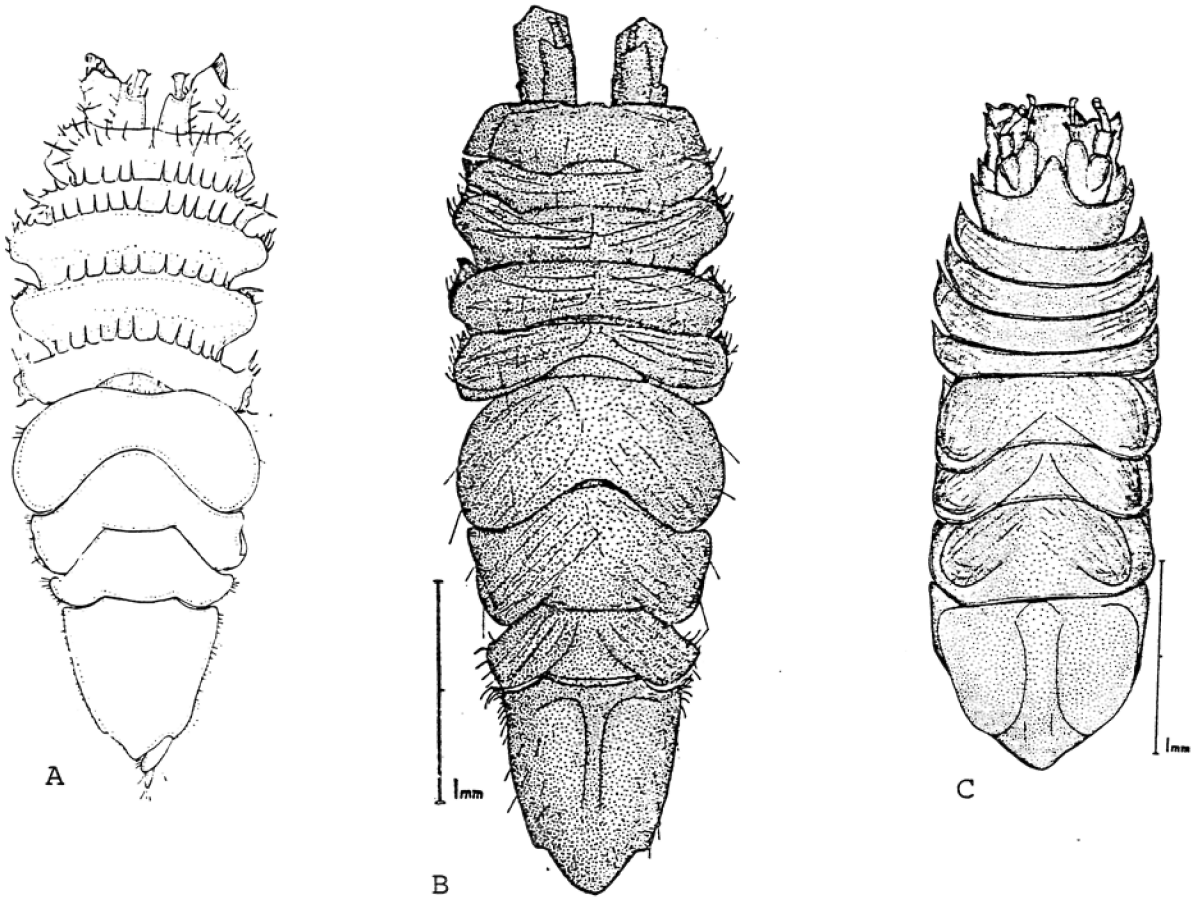
RELATED SPECIES AND CHARACTER DIFRERENCES:

1. Can be distinguished from I. profunda Schultz 1966 by presence of spines (characters 1&2) and shape of male copulatory organ - short in acarina, long and recurved in profunda (character 3). The copulatory organ (or appendix masculina) is located medially on the inner branch of the second pleopod. No other species in the genus have been reported from California waters.
2. Ilyarachnids can be separated from the similar and closely related Eurycopidae (3 genera and 5 species in California - 2 spp undescribed) with the last two characters above. Local species of Eurycope have rostra; either broadly rounded (E. californiensis) or bibbed (E. sp. A). Both local species of Munnopsurus have no defined rostrum, but have deep sinuses in the anterior margin of the cephalon for insertion of the first antennae. None of the eurycopids have the straight sided triangular telson of the ilyarachnids.

Thistle (1980) indicated both I. acarina and I. profunda remain within the genus concept as revised by Hessler & Thistle (1975).

DEPTH RANGE: 80-200 m.

DISTRIBUTION: Pt. Conception - Coronado Submarine Canyon.



A. Ilyarachna acarina (dorsal view from Menzies & Barnard 1959)
B. Ilyarachna profunda (dorsal view from Schultz 1966)
C. Eurycope californiensis (dorsal view from Schultz 1966)

SCAMIT Code: MBC 59

Date Examined: January 12, 1987
Voucher by: Don Cadien

SYNONYMY: Desmosoma sp. A of MBC
Prochelator sp. A of MBC

LITERATURE: Hessler 1970

DIAGNOSTIC CHARACTERISTICS:

1. First pereiopod larger than other legs, carpochelate, with large blade-like spine extending anteriorly (at a slight angle from the appendage axis) off the antero-vertral edge of the carpus of 1st leg. Dactylus forms the "moveaeable finger" of this psendochela.

2. Two accessory spines present on ventral margin of carpus, the second bifid.

3. Peraeonal coxae without produced acute points at anterior corners.

4. Lateral margins of pereonite 1 slightly bilobed.

5. Antennal bases shallowly inserted ($\leq$30%) into cephalor.

RELATED SPECIES AND CHARACTER DIFFERENCES:

1. Can be distinguished from the only described member of the family reported from California Momedossa symmetrica (Schultz 1966) by character 5. Momedossa (formerly Desmosoma) symmetrica has the antennal bases inserted more than 75% of the cephalon length vs. $\leq$ 30% for Prochelator sp. A. The two are in different subfamilies. In the Desmosomatinae (to which Momedossa belongs) pereiopod 1 is not enlarged relative to the remaining legs. In the Eugerdellatinae (including Prochelator) pereiopod 1 is enlarged and carpochelate.

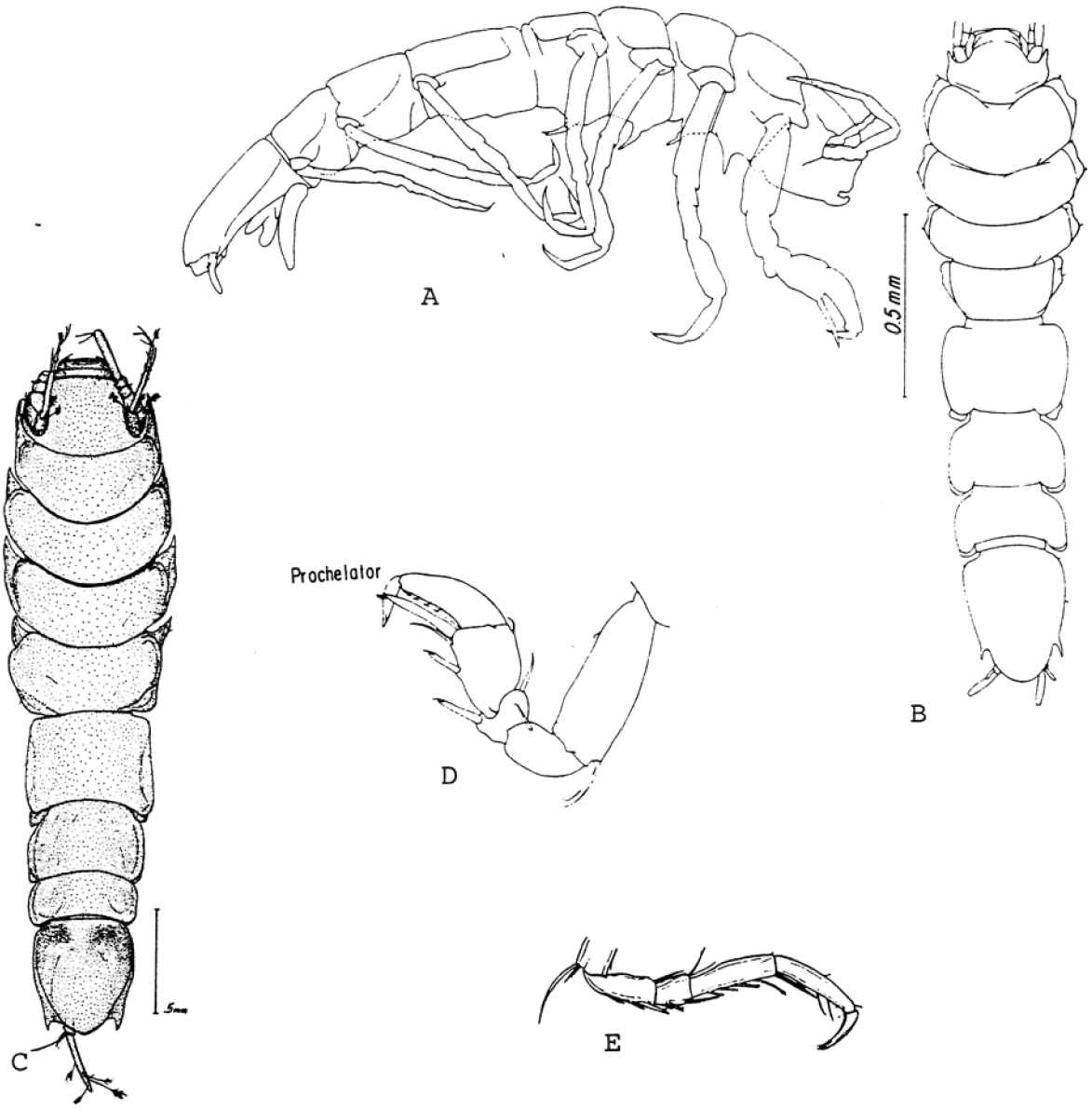
Although no other species are yet recorded from California Hessler (1970) reports undescribed species of Balbidocolon, Whoia, Eugerda, Mirabilicoxa, Eugerdella,

Torwolia and Chelator from collections made on the Cascadia Abyssal Plain by A.G. Carey of Oregon State. Prochelator sp. A can be distinguished from all of the above by one or more of characters 1-3. Characteristic 1 separates Balbicolon, Whoia, Eugerda, and Mirabilicoxa (all in the Desmosomatinae), while character 2 separates Torwollia, Eugerdella, and Chelator from Prochelator. Prochelator was also reported from off Oregon, but whether this was the present species is not known.

Note: This is a small species which is only occasionally retained on a 10mm screen.

DEPTH RANGE: 133m - 308m.

DISTRIBUTION: Off Pt. Estero south to Coronado Submarine Canyon.



A. Dorsal and B Right lateral habitus of Prochelator lateralis (generotype)

C. Dorsal view of Momedossa symmetrica (Schultz 1966) D Pereiopod 1 of same

E. Pereiopod 1 of generalized Prochelator

(A, B and E from Hessler 1970; C and D from Schultz 1966)

SCAMIT Code: HYP 70

SYNONYMY: Austrosignum tillerae Menzies & Barnard 1959
Munnogonium waldronense George & Stromberg 1968

LITERATURE: Menzies & Barnard 1959, George & Stromberg 1968, Bowman & Schultz 1974, Hooker 1985.

DIAGNOSTIC CHARACTERISTICS:

1. Eyed, with eyes borne or peduncles and visible dorsally.
2. Pleotelson with unserrated lateral margins
3. Body rounded dorsally (as opposed to flat dorsally)
4. Mandible lacking palp
5. Antenna 1 and 2 subequal in length, antenna 1 with 4-5 flagellar articles.

RELATED SPECIES AND CHARACTER DIFFERENCES:

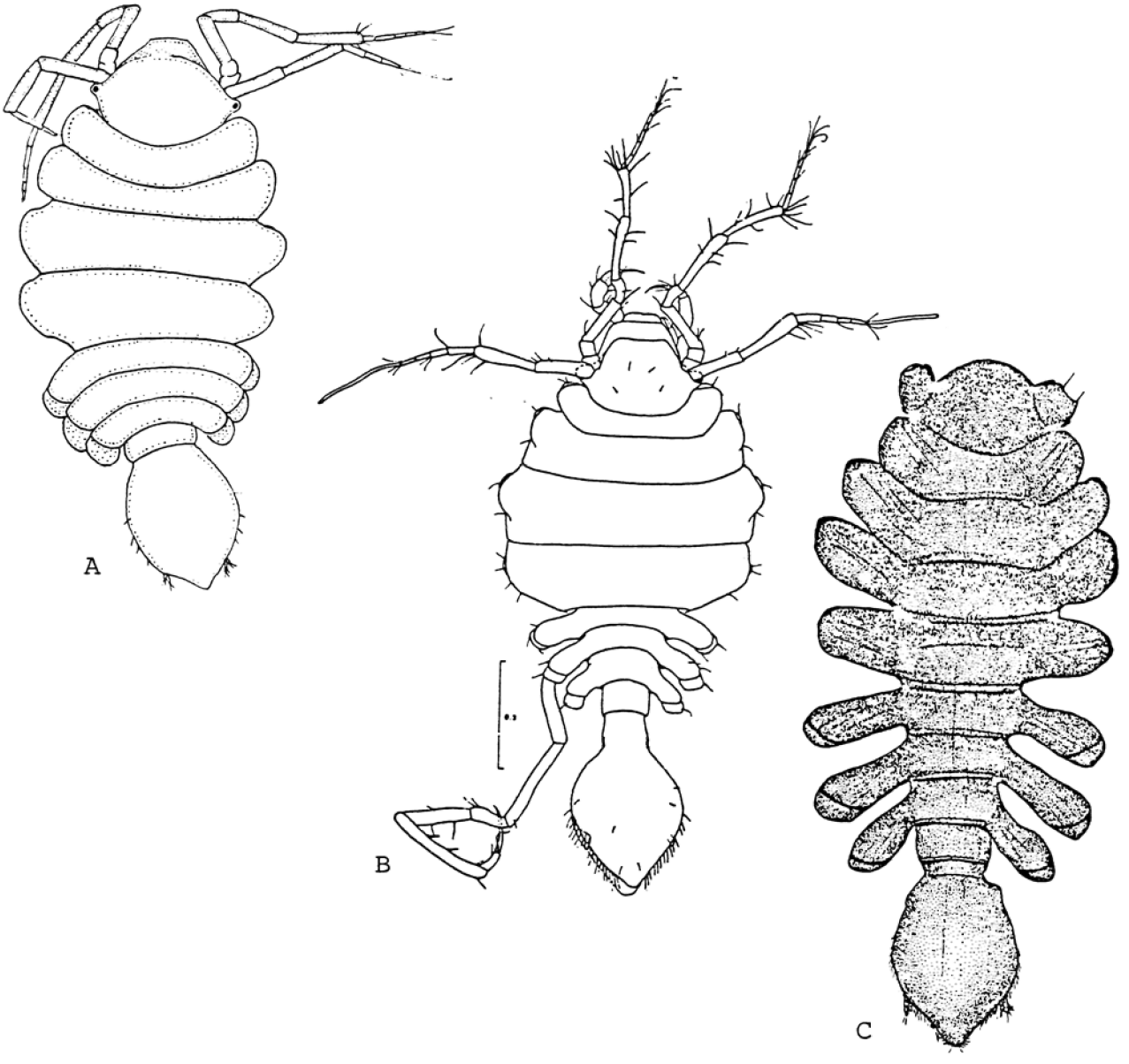
1. Can be distinguished from M. erratum Schultz 1974 (with difficulty) by degree of separation of the lateral extensions of the pereonites (more separated in erratum) and the position of the eyes (directed ventrally and not visible dorsally in erratum).
2. Distinguished from similar appearing Munna spp. by characters 4 and 5. Munna possess a mandibular palp and have antennae very unequal in length, with Anntenna 1 less than or equal to the length of the Anntenna 2 peduncle.
3. Distinguished from species of Pleurogonium in having eyes (character 1), and in having the body arched dorsally rather than flattened (character 3).

Comment: Distributed specimens matched the description of M. waldronense. In the original description of A. tillerae antenna 1 was described as having a tri-articulate flagellum. This is assumed to be an error.

The external features which separate M. tillerae and M. erratum are of dubious value. The type of M. tillerae needs to be reexamined to fill in gaps in the original description and clarify the reported differences in mouth parts between the two species. Note - in Hookers 1985 Key to the species of Munnogonium M. tillerae is keyed as having a serrate pleotelson: a characteristic specifically contradicted in the original descriptions of both M. tillerae and M. waldronense.

DEPTH RANGE: 20m - 200m (intertidal in the northern portion of the range).

DISTRIBUTION: British Columbia to the Coronado Submarine Canyon.



A. M. tillerae (from Menzies & Barnard 1959)
B. M. waldronense (from George & Stromberg 1968)
C. M. erratum (from Schultz 1964)

THE ASELLOTA OF CALIFORNIA

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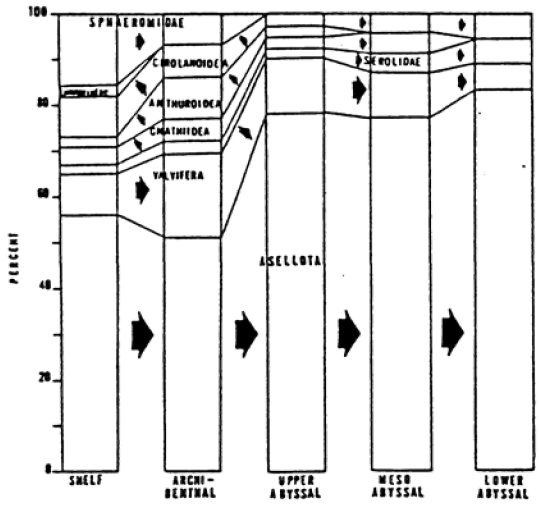
Asellote isopods form one of nine suborders of the peracarid order Isopoda. There are somewhere over 800 described species in the suborder, of which 39 reportedly occur in California waters. The suborder is characterized by

- »bilateral symmetry (unlike most epicarids)
- »well developed antennae (unlike remaining epicarids)
- »1pair of maxillipeds (unlike Gnathiidae which have 2)
- »terminal uropods (unlike Flabellifera, Anthuridea and Valvifera)

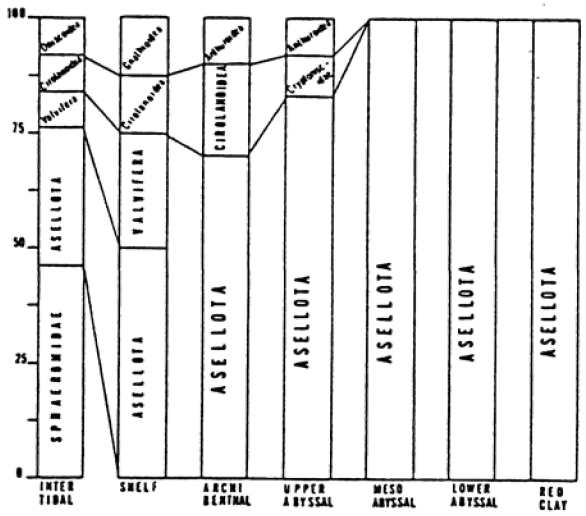
Those of you who counted will notice that the four characters listed exclude only 5 of the 8 other suborders. Of the three remaining the Oniscoidea are terrestrial, the Phreatoicidea are freshwater, and the Microcerberidea are interstitial. Only the microcerberids could be confused with the asellotes. They are, however, all very long and thin (7x body width or more) and very small (max at 1.4mm total length). These characters do not occur together in the asellotes.

The suborder has representatives world-wide in depths from the intertidal to the abyss. Figure 1 gives you an idea of what percentage of the total isopod fauna the asellotes represent in four different areas of the globe. Although the shallow water percentages vary widely from place to place, in deep water the asellotes are clear dominants world-wide. Menzies (1962) attributes this largely to their deposit feeding habits.

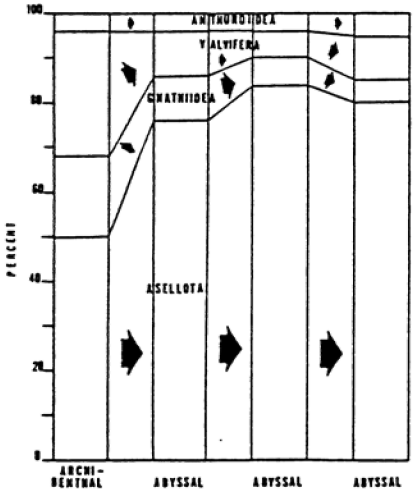
There has been little agreement on the taxonomy at and above the family level within this group. The scheme presented here is that of Wolff (1962) with some small changes to accomodate more recent discoveries. Other useful discussions can be found in Menzies (1962), McLaughlin (1980), Menzies, George & Rowe (1973), Schultz (1969), and Hessler (1969).



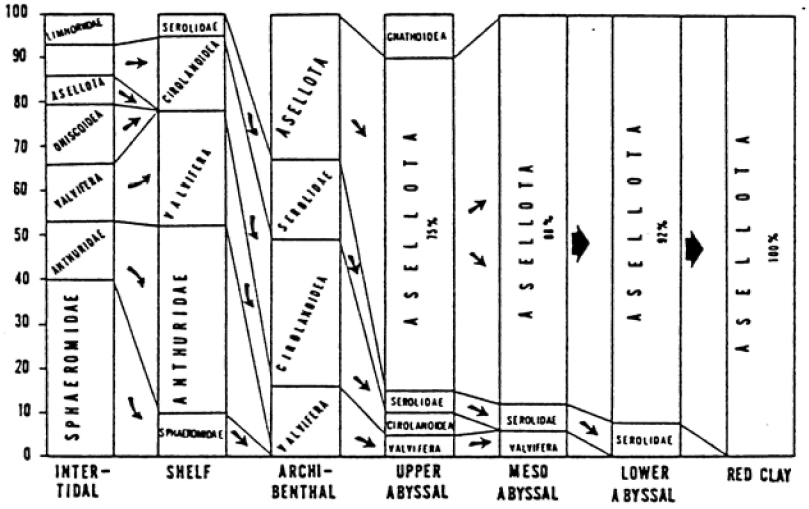
Antarctic



Off Peru(SE Pacific)



Arctic



OffN.Carolina (NW Atlantic)

Figure 1 Distribution of isopod groups by bathymetric zone

(all from Menzies, George, & Rowe 1973)

Suborder Asellota
- Superfamily Stenetroidea
  - Family Stenetriidae
    - Stenetrium sp. A of MBC
- Superfamily Janiroidea (Paraselloidea of Wolff 1962)
  - Family Antiasidae
    - Antias hirsutus Menzies 1951
  - Family Dendrotionidae
    - Acanthomunna tannerensis Schultz 1966
  - Family Desmosomatidae
    - Momedossa symmetrica (Schultz 1966)
      - Desmosoma symmetrica Schultz 1966
    - Prochelator sp. A of MBC
      - Desmosoma sp. A of MBC
  - Family Eurycopidae
    - Eurycope californiensis Schultz 1966
    - Eurycope sp. A of MBC
    - Munneurycope sp.
    - Munnopsurus giganteus ochotensis Gurjanova 1933
    - Munnopsurus sp. A of MBC
  - Family Ilyarachnidae
    - Ilyarachna acarina Menzies & Barnard 1959
    - Ilyarachna profunda Schultz 1966
  - Family Jaeropsidae
    - Jaeropsis concava Schultz 1966
    - Jaeropsis dubia dubia Menzies 1951
    - Jaeropsis dubia paucispina Menzies 1951
    - Jaeropsis cf. lata Kussakin 1961
    - Jaeropsis lobata Richardson 1899
    - Jaeropsis setosa George & Strömberg 1968
    - Jaeropsis sp. B of MBC
  - Family Janiridae
    - Caecianiropsis psammophila Menzies & Pettit 1956
    - Iais californica (Richardson 1904)
    - Janiropsis analoga Menzies 1952
    - Janiropsis epilittoralis Menzies 1952
    - Janiropsis kincaidi kincaidi Richardson 1904
    - Janiropsis kincaidi derjugini Gurjanova 1933
    - Janiropsis magnocula Menzies 1952

Family Janiridae (cont.)
- Janiropsis minuta Menzies 1952
- Janiropsis montereyensis Menzies 1952
- Janiropsis tridens Menzies 1952
- Janiralata davisi Menzies 1951
- Janiralata erostrata Richardson 1899
- Janiralata occidentalis (Walker 1898)
- Janiralata rajata Menzies 1951
- Janiralata solasteri (Hatch 1947)
- Janiralata triangulata (Richardson 1899)

Family Munnidae
- Munna chromatocephala Menzies 1952
- Munna halei Menzies 1952
- Munna magnifica Schultz 1964
- Munna spinifrons Menzies & Barnard 1959
- Munna stephenseni Gurjanova 1933
- Munna ubiquita Menzies 1952
- Munna sp. A of MBC

Family Nannoniscidae
- Nannonisconus latipleonus Schultz 1966

Family Parasellidae
- Caecijaera horvathi Menzies 1951

Family Pleurocopidae
- Pleurocope sp. A of MBC

Family Paramunnidae
- Munnogonium erratum Schultz 1961
- Munnogonium tillerae (Menzies & Barnard 1959)
  - M. waldronensis George & Strömberg 1968
- Paramunna quadratifrons Iverson & Wilson 1981
- Pleurogonium californiense Menzies 1951
- Pleurogonium rubicundum (G.O. Sars 1864)

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Crisia occidentalis (Trask 1857) Vol. 5 No. 10
Crisiidae

SCAMIT Code: SCCWRP 72 Date Examined: 8 September 1986
Voucher by: Carol Paquette

SYNONYMY: *Crisia eburnea* Robertson 1903

LITERATURE: Robertson 1910
Osburn 1953

DIAGNOSTIC CHARACTERS:

1. Erect and jointed, with two alternating series of zooecia, usually 5 or more in each internode.

2. Joints white to yellow.

3. Zooecia are connate for their entire length, with the tips directed forward, usually with a blunt point on the dorsal lip of the tube, giving the edges of the branches a serrated appearance.

4. Ovicell elongate and gradually expanding; ooeciostome straight, without a flap over the aperture. (This character is usually not useful, as most specimens do not contain ovicells.)

RELATED SPECIES AND CHARACTER DIFFERENCES:

1. *Filicrisia* spp. have fewer zooecia per internode (1 to 5 vs. 5 or more) and black joints in older specimens.

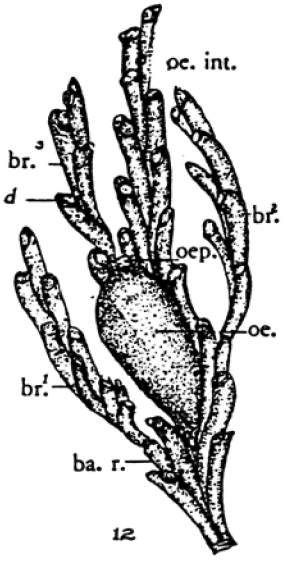
2. *Crisidia* sp. and *Bicrisia* sp. have elongate filiform spines.

3. *Crisia operculata* and *C. maxima* do not have a keel on the frontal surface of the internode.

4. The distance between zooecial apertures is about equal to the width of the branch in *C. occidentolis* compared with greater than the width in *C. operculata* and less than the width in *C. serrulata.* (There are also differences in the ovicells.)

DEPTH RANGE: Low water to 30 fm.

DISTRIBUTION: British Columbia to Galapagos Islands.



12

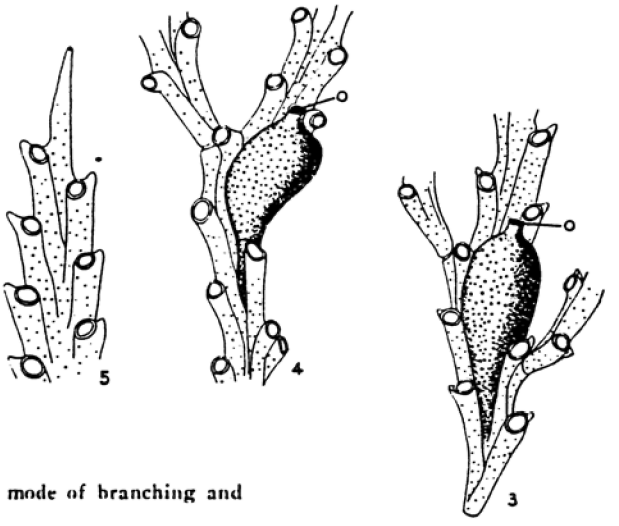
from Robertson 1910

11

Fig. 11. *Crisia occidentalis* Trask. Habit sketch. × 1.

Fig. 12. *C. occidentalis*. A portion of a colony showing branching, especially of the oœcial internode. In this, the oœcium (*oe.*) is the fifth member of the internode; the first branch (*br. 1*) arising in a basis rami (*ba. r.*), not wedged in, but attached to the side of the third zoœcium; the second branch (*br. 2*) arising on the side of the sixth zoœcium, the oœcium which pairs with the oœcium; the third branch (*br. 3*) arising on the ninth zoœcium just above the summit of the ovicell. The distal portion of the oœcial internode carrying the zoarial growth upward. × 36.

from Osburn 1953



5 4 3

Fig. 3. *Crisia occidentalis* Trask, showing mode of branching and normal form of ovicell.

Fig. 4. The same, distorted ovicell due to curved internode.

Fig. 5. The same, pointed tip of terminal internode, often present.

SCAMIT CODE: MBC54

Date Examined: 8 September 1986
Voucher by: Carol Paquette

SYNONYMY: *Flustra membranacea* Linnaeus 1767

LITERATURE: Robertson 1908
Osburn 1950
Pinter 1969

DIAGNOSTIC CHARACTERS:

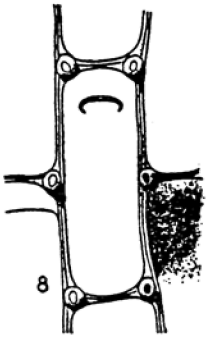
1. Encrusting, usually on algae (*Macrocystis pyrifera* and *Egregia laevigata*).
2. Zooecia simple, with thin walls.
3. The front is membranous, without spinules or cryptocyst.
4. There is a knob or process (sometimes produced into hollow tubes or short pointed spines) at each corner.
5. There are no ovicells or avicularia.

RELATED SPECIES AND CHARACTER DIFFERENCES:

1. *M. tuberculata* and *M. serrilamella* have some development of the cryptocyst (extended side wall).
2. *M. villosa* has frontal spinules and chitinous spines at the corners.
3. *M. perfragilis* rises into convoluted or filled masses.

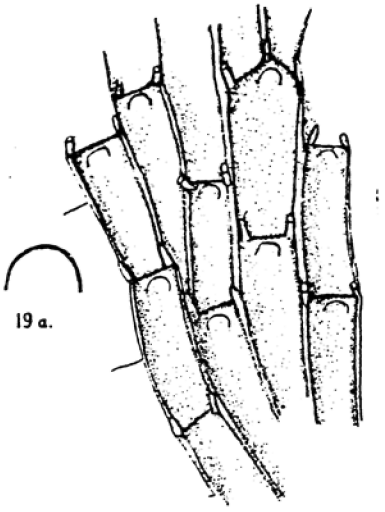
DEPTH RANGE: Intertidal to 20m

DISTRIBUTION: Europe, Atlantic Coast of North America, Caribbean, Alaska to Baja California, Mexico



from Osburn 1950

Fig. 8. *Membranipora mebranacea* (Linnaeus).
Fig. 9. The same, showing a "tower cell."



19.

from Robertson 1908

20

Fig. 19.—*Membranipora membranacea* Linnaeus. A few zoœcia showing membranous aperture and distal spines. × 30.

Fig. 19a.—*M. membranacea*. Outline of the operculum. × 70.

Fig. 20.—*M. membranacea*. Portion of a zoarium.

SCAMIT CODE: MBC55

Date Examined: 8 September 1986
Voucher by: Carol Paquette

SYNONYMY:
Biflustra fragilis MacGillivray 1869
Biflustra perfragilis MacGillivray 1881
Membranipora crassimarginata var. erecta Busk 1884
Amphiblestrum perfragile Ortmann 1890
Acanthodesia perfragilis Hastings 1945

LITERATURE: Osburn 1950

DIAGNOSTIC CHARACTERS:

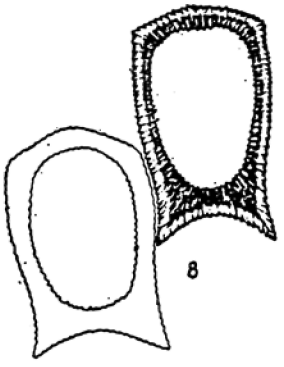
1. Encrusting, then rising into bilaminar convoluted or frilled masses.
2. There is a distinct cryptocyst, sometimes limited to the proximal corners.
3. There are no corner tubercles or spines.

RELATED SPECIES AND CHARACTER DIFFERENCES:

1. *M. tuberculata, M. serrilamella, M. membranacea,* and *M. villosa* are encrusting only, and have corner tubercles or spines.
2. *M. savarti* forms narrow ligulate or bifurcate bilaminate fronds.

DEPTH RANGE: ?

DISTRIBUTION: Japan, Australia, Monterey to San Diego?



from Osburn 1950

Fig. 8. *Membranipora perfragilis* (MacGillivray).

SCAMIT CODE: MBC56
SCCWRP 70

Date Examined: 8 September 1986
Voucher by: Carol Paquette

SYNONYMY:
Flustra tuberculata Bosc 1802
Flustra tehuelcha d'Orbigny 1839-46
Membranipora tehuelcha Robertson 1908
Nichtina tuberculata Harmer 1926

LITERATURE:
Robertson 1908
Osburn 1950
Soule 1959
Pinter 1969

DIAGNOSTIC CHARACTERS:

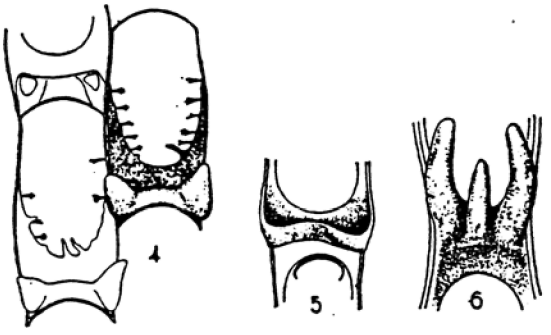
1. Encrusting on algae (*Gelidium* spp. and *Cystoseira osmundacea* most common).
2. Walls heavily calcified; the cryptocyst is usually well developed at the proximal end.
3. There are tubercles at the corners, which may curve toward each other; sometimes a third tubercle occurs between them on the end wall.

RELATED SPECIES AND CHARACTER DIFFERENCES:

1. *M. serrilamella* has cryptocyst little developed; *M. membranacea* has no cryptocyst.
2. *M. villosa* has chitinous spinules and corner spines.

DEPTH RANGE: Shallow water.

DISTRIBUTION: North Carolina to Brazil, California to Peru, Galpagos Islands, Southern Japan, Indian Ocean, East Indies

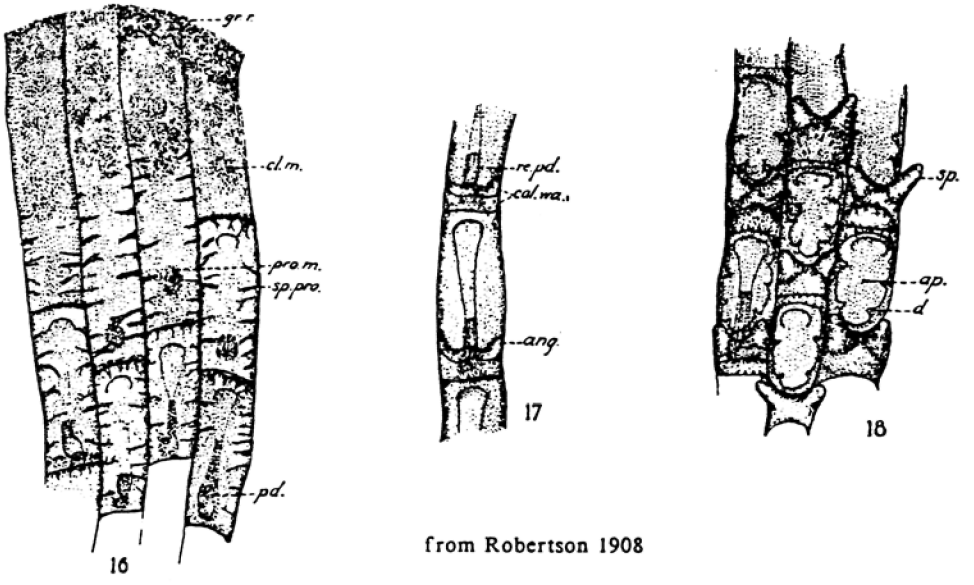


from Osburn 1950

Fig. 4. *Membranipora tuberculata* (Bosc), with tubercles, cryptocyst and internal spinules.

Fig. 5. The same, young with partially developed tubercles.

Fig. 6. The same, with three elongate tubercles.



from Robertson 1908

Fig. 16.—*Membranipora tehuelcha* d'Orbigny. A few immature zoœcia ıd a portion of the growing rim (*gr. r.*). × 30.

Fig. 17.—*M. tehuelcha.* An immature zoœcium showing the beginning of ıe calcified spines at the distal angles (*ang.*). × 30.

ig. 18.—*M. tehuelcha.* A few zoœcia showing the adult condition with ·ed aperture (*ap.*), calcified margins, and calcareous tubercles or spines ·. × 30.

SCAMIT CODE: MBC52

Date Examined: 8 September 1986
Voucher by: Carol Paquette

SYNONYMY:

LITERATURE: Robertson 1908
Osburn 1950
Pinter 1969

DIAGNOSTIC CHARACTERS:

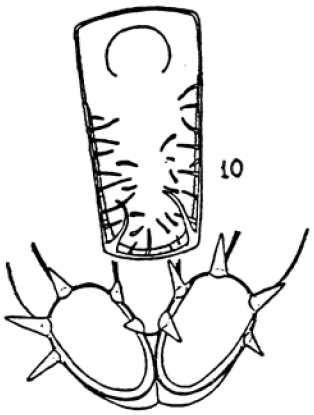
1. Encrusting on algae *(Macrocystis pyrifera* and *Egregia laevigata*).
2. Zooecia walls are thin and parallel.
3. The front is a membrane with minute spinules; larger spinules occur near the margins.
4. Elongate - acuminate, chitinous spines occur at the proximal corners, and frequently there is a still larger median one.
5. There are no ovicells or avicularia.

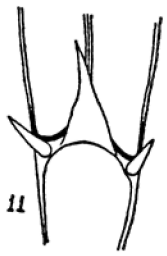
RELATED SPECIES AND CHARACTER DIFFERENCES:

1. *M. tuberculata* and *M. perfragilis* have some development of the cryptocyst (extended side wall).
2. *M. tuberculata*, *M. membranacea*, and *M. serrilamella* have calcareous proximal spines or tubercles.

DEPTH RANGE: Intertidal to 20 m.

DISTRIBUTION: British Columbia to San Diego

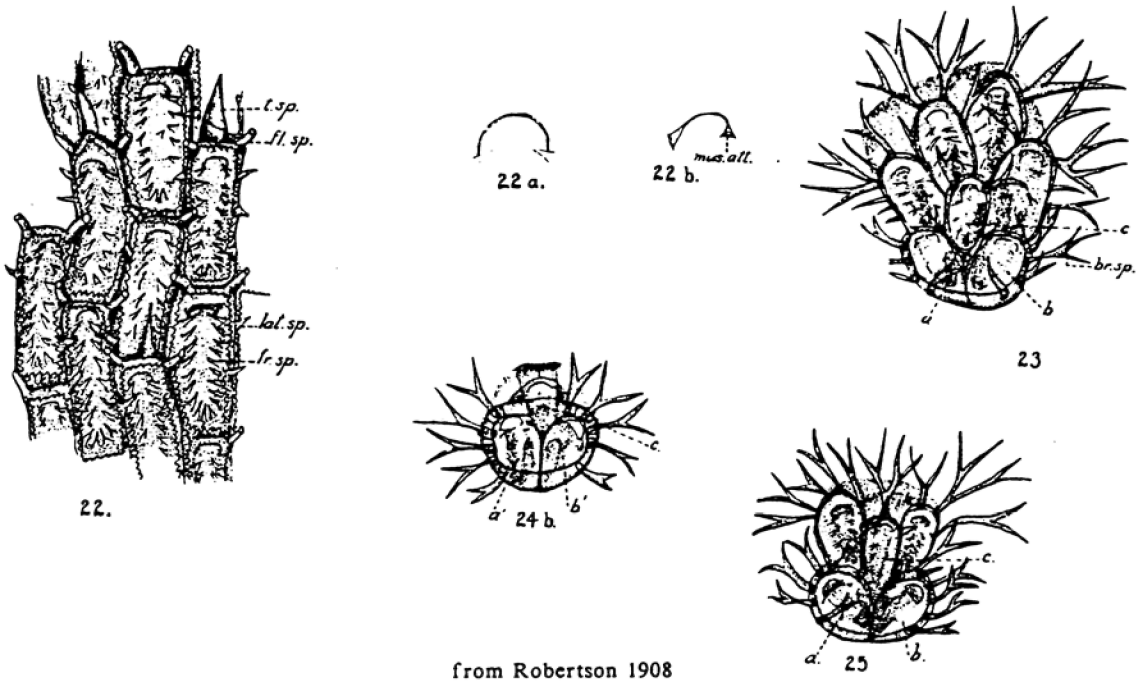




from Osburn 1950

Fig. 10. *Membranipora villosa* (Hincks), normal zooecium above with chitinous frontal spinules, below the twinned ancestrula with bases of five buds.

Fig. 11. The same, showing chitinous corner spines and a larger one at the division of a series of zooecia.



from Robertson 1908

ig. 22.—*Membranipora villosa* Hincks. A few zoœcia showing adult tion, with flaring spines (*fl. sp.*), lateral spines (*lat. sp.*), and minute al spines (*fr. sp.*); also tall spine (*t. sp.*) or process growing in place zoœcium. × 30.

ig. 22a.—*M. villosa.* Outline of operculum when closed, with the most ior pair of frontal spinules. × 70.

ig. 22b.—*M. villosa.* Outline of operculum partly opened showing l base for the attachment of muscles (*mus. att.*). × 70.

ig. 23.—*M. villosa.* A young colony of seven zoœcia showing (*a*) and the first two zoœcia formed, and (*c*) the third zoœcium; also showing ranched spines (*br. sp.*) characteristic of the youthful stage. × 30.

Fig. 24b.—*M. villosa* Hincks. A young colony of three zoœcia still carrying the shell of the larva. × 30.

Fig. 25.—*M. villosa.* A young colony of five zoœcia. × 30.

SCAMIT CODE: MBC50

Date Examined: 8 September 1986
Voucher by: Carol Paquette

SYNONYMY:
Lepralia rostrata Busk 1856
Cellepora verruculata Smitt 1873
Rhynchozoon verruculata Canu & Bassler 1923
Rhynchozoon rostratum Hastings 1930
Rhynchozoon verruculatum Marcus 1939
Rhynchozoon tumulosum (Hincks 1882)
Schizoporella tumulosa Hincks 1882

LITERATURE:
Osburn 1952
Soule and Soule 1964
Robertson 1908 (as *S. tumulosa*)

DIAGNOSTIC CHARACTERS:

1. Differing greatly from marginal (young) zooecia to older zooecia due to secondary calcification.

2. The operculum (and primary aperture) is a little wider than long, oval with a sinuate proximal border. The secondary aperture becomes rounded with a sinus which may be quite narrow. The operculum becomes deeply recessed.

3. There is suboral avicularium on a bulbous chamber on the front, to one side of the median line, directed laterally. This avicularium becomes submerged within the peristome during secondary calcification. There may be frontal avicularia, variously oriented, which develop during secondary calcification.

4. Two to four oral spines may occur on the distal margin of the aperture of marginal zooecia.

5. The ovicell is smooth, a little broader than long, becoming deeply immersed during secondary calcification.

RELATED SPECIES AND CHARACTER DIFFERENCES:

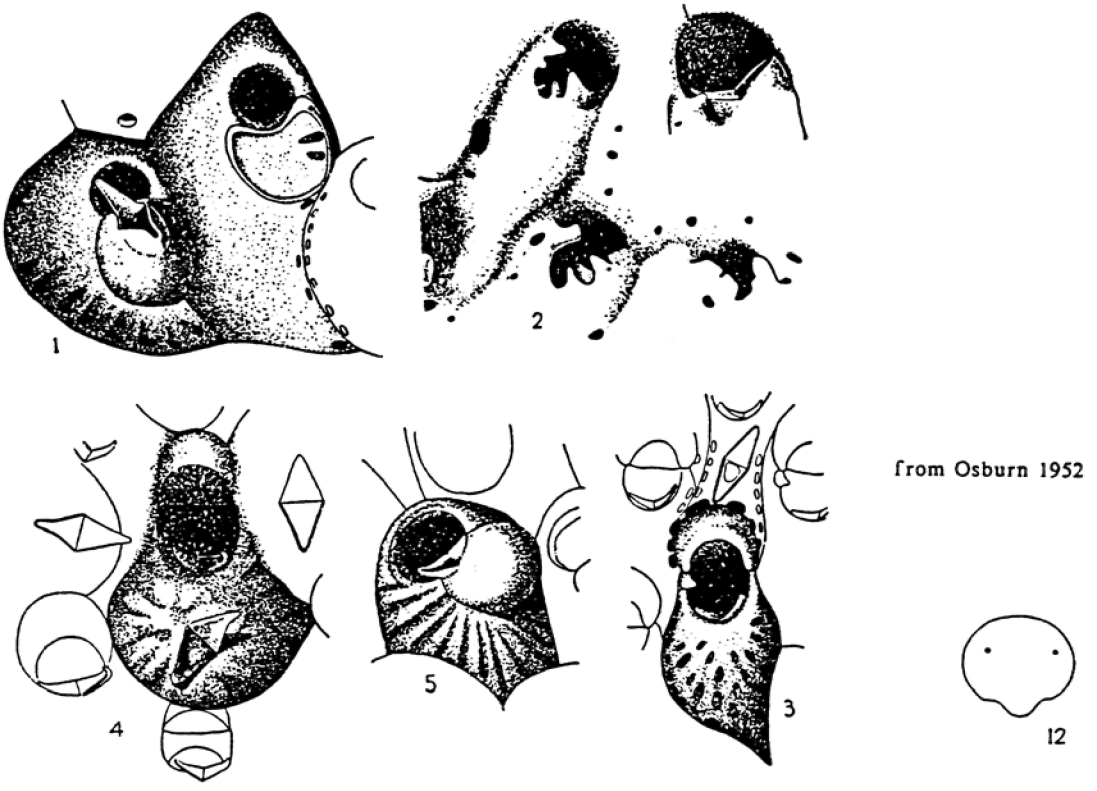
1. *R. grandicella* is a larger species with zooecia about 0.65 to 0.85 mm long by 0.40 to 0.55 mm wide as opposed to 0.45 to 0.55 mm long by 0.30 to 0.40 mm wide.

2. *R. spicatum* has a tall pointed process proximal to the aperture.

3. *R. tuberculatum* has a small lucida on each side of the ovicell, and no frontal avicularia.

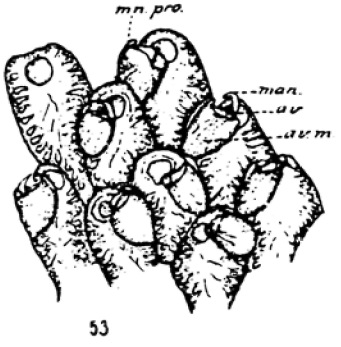
DEPTH RANGE: Intertidal to 100 fm

DISTRIBUTION: British Columbia to Galapagos Islands, Massachusetts to Brazil.



from Osburn 1952

Fig. 1. *Rhynchozoon rostratum* (Busk), young zooecia with details of aperture, suboral avicularium and chamber.
Fig. 2. The same, old and heavily calcified, with tuberosities.
Fig. 3. The same, zooecium with ovicell.
Fig. 4. *Rhynchozoon tumulosum* (Hincks), zooecium with ovicell and suboral and frontal avicularia.
Fig. 5. The same, young zooecium with characteristic bulbous avicularium chamber.
Fig. 12. *Rhynchozoon tumulosum* (Hincks), operculum.



53

Fig. 53.—*Schizoporella tumulosa* Hincks. A few zoœcia near the growing edge showing the elevated avicularium (*av.*) and perforated margins. × 30.

from Robertson 1908

SCAMIT CODE: MBC53
SCCWRP71

Date Examined: 8 September 1986
Voucher by: Carol Paquette

SYNONYMY:

LITERATURE: Robertson 1905
Osburn 1950

DIAGNOSTIC CHARACTERS:

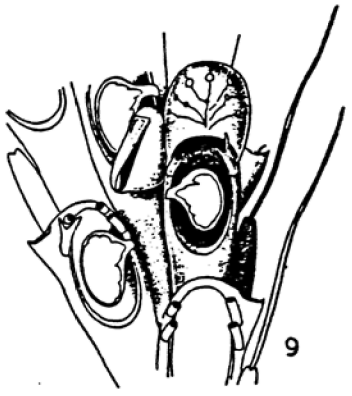
1. Erect, branching, with chitinous joints at the bifurcations; zooecia are biserial.
2. Dorsal avicularia with vibracula (mandible modified into a long lash) present; dorsal avicularia two-thirds as long as zooecium.
3. A large, oval scutum (modified spine) folds over the front of the zooecium.
4. Raised frontal ovicularia occur proximal to the attachment of the scutum. Occasionally these are giant ovicularia with strongly curved, attenuated mandibles.
5. A small lateral avicularium occurs on each zooecium at the outer distal corner.
6. There are 4 or 5 long oral spines, some of which may be bifurcate.

RELATED SPECIES AND CHARACTER DIFFERENCES:

1. *Tricellaria* spp. lack dorsal vibracula or avicularia.
2. *Caberea* spp. and *Amastigia* spp. lack chitinous joints at the bifurcations.
3. *S. varians*, *S. californica*,and *S. bertholetti*have some giant lateral avicularia.
4. *S. bertholetti* and *S. varians* have a forked scutum.
5. *S. californica* and *S. varians* have ovicells without pores.

DEPTH RANGE: Nearshore

DISTRIBUTION: British Columbia to Columbia

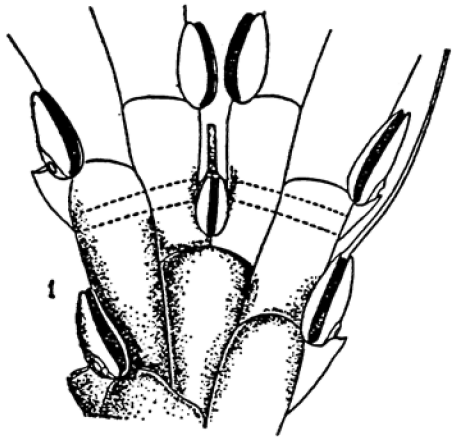


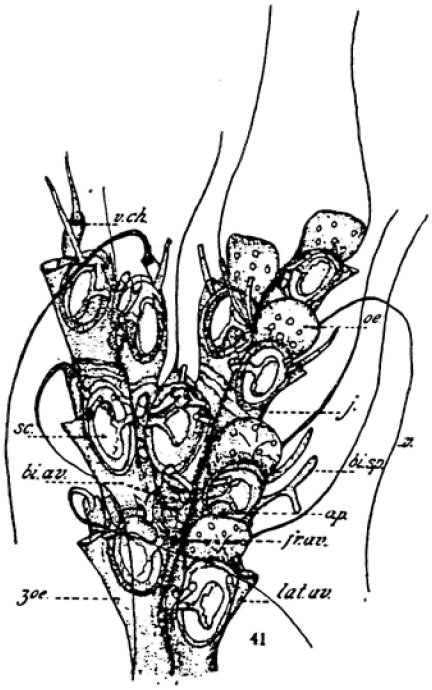
from Osburn 1950

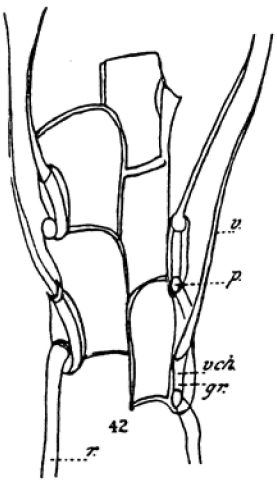
Fig. 9. *Scrupocellaria diegensis* Robertson, ovicell, scutum and avicularium.

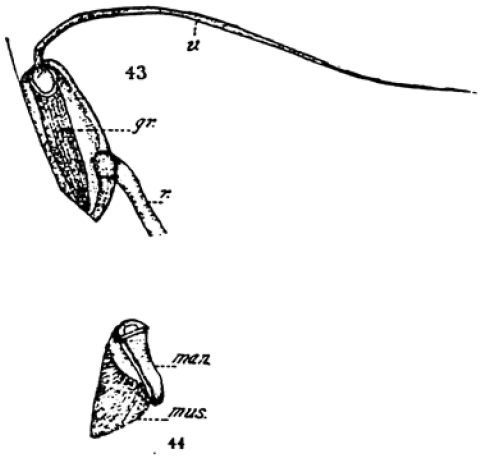
Fig. 1. *Scrupocellaria diegensis* Robertson, lateral and axial vibracula.

from Osburn 1950









from Robertson 1905

Fig. 41.—*S. diegensis* sp. nov. Portion of a branch enlarged showing form of zoœcia (*zœ.*) with large scutum (*sc.*), spines on the upper margin of the aperture (*ap.*) one or more of which are bifid (*bi. sp.*); also lateral avicularium (*lat. av.*) and frontal avicularium on the zoœcium at bifurcation (*bi. av.*). On those zoœcia not possessing oœcia the vibracular chamber (*v. ch.*) plainly visible with its long vibraculum (*v.*). × 50.

Fig. 42.—*S. diegensis.* Dorsal view of a few zoœcia to show vibracular chamber (*v. ch.*) sustaining the long vibraculum (*v.*) at its summit, and showing the groove (*gr.*) extending in the direction of the length of the zoœcia. At the base of the vibracular chamber and to one side of the groove is the pore (*p.*) from which the root fibre extends (*r.*). × 50.

Fig. 43.—*S. diegensis.* A vibracular chamber enlarged to show detail.

Fig. 44.—*S. diegensis.* The avicularium on zoœcium at bifurcation enlarged to show its large muscular portion (*mus.*) and the obliquely directed mandible (*man.*).

SCAMIT CODE: MBC51
SCCWRP69

Date Examined: 8 September 1986
Voucher by: Carol Paquette

SYNONYMY: *Steganoporella rozieri* form *gothica* Hincks 1880
Thalamoporella rozieri Robertson 1908
Thalamoporella rozieri var. *californica* Levinsen 1909

LITERATURE: Robertson 1908
Osburn 1950
Soule 1959
Pinter 1969

DIAGNOSTIC CHARACTERS:

1. At first encrusting, usually on algae (*Egregia laevigata, Gelidium spp., Laurencia spp.*), thin rising into erect, articulated club-shaped branches.

2. Sides of the zooecia nearly straight and parallel, the distal rim arcuate.

3 Front has many small pores.

4. Avicularia are vicarious or interzooecial, and almost as large as the zooecia, with a long, tapering mandible.

5. Ovicells are uncommon but prominent, smooth or faintly striated, bilobate, with a median keeled seam.

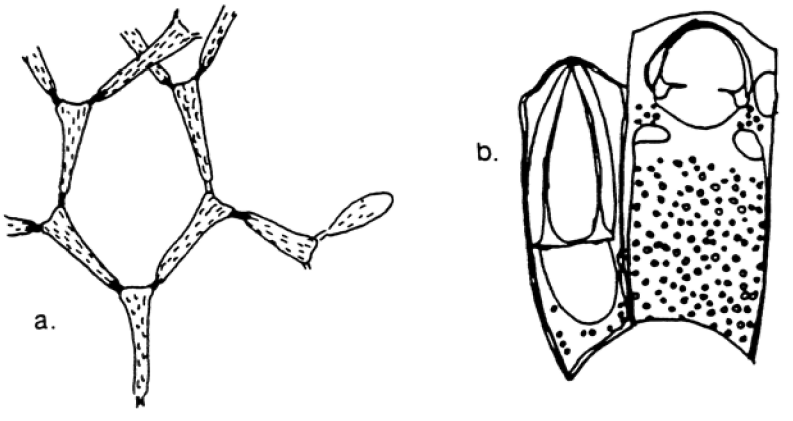
RELATED SPECIES AND CHARACTER DIFFERENCES:

1. *Thalamoporella gothica* is encrusting or rises up in frills or fronds, but does not form erect branching colonies.

2. *Cellaria* spp. do not have pores in the cryptocyst, or prominent bilobate ovicells.

DEPTH RANGE: Shallow to 47 fm

DISTRIBUTION: Point Conception to Galapagos Islands



from Banta, in Brusca 1980

Fig. 24.31 *Thalamoporella californica*.
(a) An erect colony fragment, about life size.
(b) An avicularium and autozoid.
(After Osburn, 1950.)

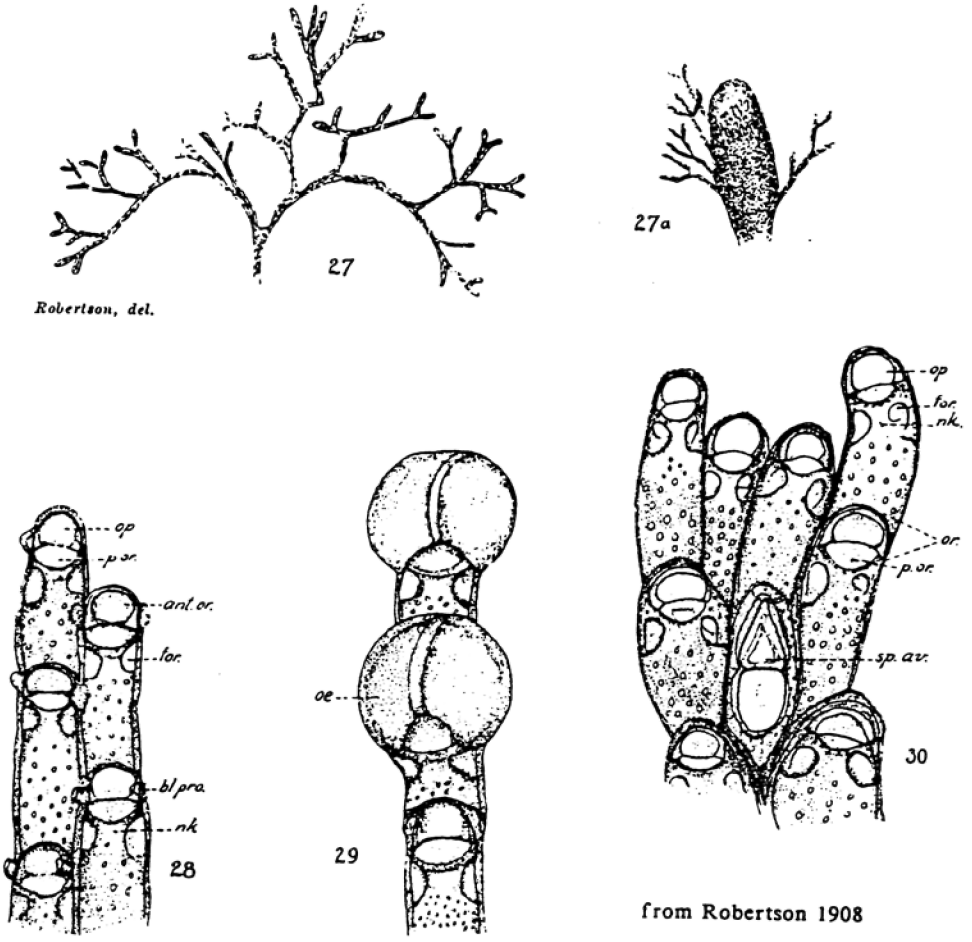


Fig. 27a.—*Thalamoporella rozieri* Audouin. Habit sketch of a portion of an incrusting colony. Natural size.

Fig. 27.—*T. rozieri.* Habit sketch of a portion of a branching colony. Natural size.

Fig. 28.—*T. rozieri.* A few zoœcia in the adult condition showing operculum (*op.*) and posterior portion of orifice (*p. or.*); also foramen (*for.*) and blunt process (*bl. pro.*). × 30.

Fig. 29.—*T. rozieri.* Three zoœcia showing great size of the bilobate œcia (*oe.*) and the diminutive size of the zoœcia bearing them. × 30 .

Fig. 30.—*T. rozieri.* A few zoœcia in the adult condition without blunt processes and showing a large spatulate avicularium (*sp. av.*). × 30.

KEY TO HIGHER TAXA OF BRYOZOANS (From Soule and Soule 1964)

1. a. Soft body parts (the polypide) stalked, unenclosed; anal opening within tentacle ring; tentacles rolling inward, non-retractile ..... Phylum Entoprocta
   b. Soft body parts (the polypide) enclosed in calcareous or chitinous case (zooecium); anal opening outside tentacle ring; tentacles retractile ..... Phylum Ectoprocta 2
2. a. Horseshoe-shaped tentacle ring (lophophore); fresh water only ..... Class Phylactolaemata
   b. Circular tentacle ring (lophophore); marine .... Class Gymnolaemata 3
3. a. Zooecium chitinous; aperture closed by puckering membrane; no ovicells or avicularia ..... Order Ctenostomata (4)
   b. Zooecium calcareous; tubular aperture terminal, circular; not closed by operculum ..... Order Cyclostomata (5)
   c. Zooecia of most species calcareous; aperture closed by movable operculum ..... Order Cheilostomata (8)
4. Ctenostomata
   a. Zooids (individuals) separate, budded from creeping or erect stolons ..... Suborder Stolonifera
   b. Zooids separate or contiguous, budded direct from adjacent zooids ..... Suborder Carnosa
5. Cyclostomata
   a. Colony with joints, branching ..... Suborder Articulata
   b. Colony without joints 6
6. a. Colony discoid ..... Suborder Rectangulata
   b. Colony erect or adnate 7
7. a. Ovicell an inflated zooid ..... Suborder Tubuliporina
   b. Ovicell a rounded expansion on dorsal side of colony ..... Suborder Cancellata
   c. Ovicell a compound chamber through which peristomes protrude ..... Suborder Ceriporina
8. Cheilostomata
   a. Flexible membranous frontal which performs hydrostatic function ..... Suborder Anasca (9)
   b. Solidly bridged frontal with compensation sac (asc) beneath; sac fills through ascophore which lies within peristome or proximal to it; the most advanced bryozoans ..... Suborder Ascophora
9. Anasca
   a. Zooids separate; uncalcified 10
   b. Zooids contiguous; calcified 11
10. a. Zooids tubular; bases adherent simulating stolons ..... Superfamily Inovicellata
    b. Zoarium (colony) plantlike, with uniserial or biserial branches ..... Superfamily Scrupariina
11. a. Large, primitive frontal membrane uncalcified; operculum incompletely differentiated; cryptocyst vestigial 13
    b. Cryptocyst (calcified shelf beneath frontal membrane) well developed .. 12
12. a. Cryptocyst usually extending to aperture, with notches or holes (opesiules) for muscles to frontal from dorsal wall ..... Superfamily Coilostega
    b. Cryptocyst complete, no holes; ovicell separated, pore distal to aperture ..... Superfamily Pseudostega
13. a. Zoarium incrusting ..... Superfamily Malacostega
    b. Zoarium erect or reticulate, branching 14
14. a. Membranous frontal unprotected, or with spines or scutes above frontal ..... Superfamily Cellularina
    b. Spines united above frontal membrane to form costa or frontal shield (pericyst) ..... Superfamily Cribrimorpha[1]

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[1] The superfamily Cribrimorpha represents a transitional group between the Anasca and Ascophora, according to Harmer (1926). Silén (1942) concluded that the ascophoran compensation sac was formed from the primitive uncalcified frontal membrane and the pericyst, which formed above it, by the fusion of spines. This group has been assigned by some authors to the Ascophora as its most primitive representative.

GLOSSARY

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ALVEOLI - pores of various sizes distributed between the zooids in Cyclostomata (Figure 13).

ANTER - portion of the primary aperature distal to the cardelles.

AREOLAR PORES - one or more rows of pores around the margin of the zooecial front (Figure 33).

ASCOPORE - a special median frontal pore opening into the compensation sac proximal to the aperature (Figure 32).

AVICULARIUM - a modified zooid bearing a mandible (Figures 21, 23, 24, 25, 26, 28, 32, 33, 34, 35, 36, 37, 38, 39).

AVICULARIUM CHAMBER - a raised mound proximal to the aperature, with an avicularium at its apex (Figures 33 and 37a).

BASIS RAMI - a small wedge-shaped base of a branch (Figure 12).

CARDELLES - lateral denticles in the aperature for the attachment of the operculum (Figure 30).

CRYPTOCYST - a calcified inward extension from the mural rim, often vestigial (Figure 19).

DEPENDENT AVICULARIUM - an avicularium borne on part of another zooecium (compare with VICARIOUS AVICULARIUM) (Figures 21, 26, 28, 32, 33, 34, 35, 36, 37, 38, 39).

DISTAL - toward the oral end of the zooecium (Figures 2 and 3).

DORSAL - the side of the zooecium opposite that on which the aperature is located (Figure 26c).

ECTOCYST - the chitinous membrane which covers the zooecium (Figure 17a).

ENDOCYST - the thin membrane lining the zooecium and enclosing the body organs.

ENDOZOOECIAL - a type of ovicell formed by the forward extension of the distal zooecial wall (compare with HYPERSTOMIAL) (Figure 18).

FASCICLE - a series or bundle of connate tubules or peristomes (Figures 11 and 13).

FENESTRAE - holes between individual zooecia, sometimes large so that zooecia may be connected by tubes (Figure 20).

FRONT - the side of the zooecium on which the aperature is located (Figures 2 and 3).

FRONTAL - the entire ventral area surrounding the aperature, but more frequently applied to that part of it proximal to the aperature (Figures 2 and 3)

GYMNOCYST - the calcified area of the covering membrane in Anasca, usually limited to the proximal end, and often vestigial or wanting.

HYPERSTOMIAL - a type of external ovicell, which is embedded in the gymnocyst of the succeeding zooecium, but arises above the distal wall of the zooecium to which it belongs (Figures 31, 32, 33, 34, 35, 36, 39).

KENOZOOECIUM - a member of the colony in which there is no polypide and usually no aperature (Figures 8, 9, 27, 47).

LYRULA - a median denticle or shelf on the proximal border of the primary aperature (Figures 33 and 35).

MANDIBLE - the chitinous movable part of an avicularium (Figures 26b, 28, 32a, 36, 37a and b).

MURAL RIM - the frontal edge of the side walls, often bearing spines (Figures 16, 20 and 21).

OLOCYST - the primary calcified covering layer, usually thin but sometimes heavily calcified (Figures 3 and 37a).

OOECIOPORE - the aperature of an ovicell (Figures 10a, 11, 12).

OOECIOSTOME - the tube surrounding an ooeciopore (Figures 10a and 12).

OOECIUM - same as OVICELL.

OPERCULUM - a chitinous membrane which closes the aperature like a trap door (Figures 30b and 37e).

OPESIA - the large oriface beneath the frontal membrane (in Anasca) often occupying nearly all of the frontal area (Figures 2, 16-21, 28).

ORAL AVICULARIUM - an avicularium associated with the aperature, either suboral or lateral-oral (Figures 33, 34, 37b, 38, 39).

ORAL SPINES - spines, usually jointed at the base, which develope on the primary peristome (Figures 22, 31, 32a, 33b, 38).

OVICELL - any structure containing the larva during its development (Figures 10, 11, 12, 18, 19, 20, 22, 28, 31a, 32, 33c, 34, 35d, 36, 39).

PERISTOME - an elevated rim around the aperature (Figures 3, 31, 34, 35, 38, 39).

PLEUROCYST - a secondary calcified covering layer which originates at the border of the zooecium and grows toward the center (Figure 35b).

POSTER - portion of the primary aperature proximal to the cardelles (see SINUS).

PRIMARY APERATURE - the original aperature, closed by the operculum which usually fits it exactly (compare with SECONDARY APERATURE) (Figures 33b, 35a, 37a, 39 lower right).

PRIMARY PERISTOME - the original fold of the olocyst around the aperature (compare with SECONDARY PERISTOME) (Figures 33b, 35a).

PROXIMAL - toward the point of origin of the zooecium (Figures 2 and 3).

SCUTUM - a spine modified into a flat plate or branching "antlers" (or sometimes a narrow strap), attached at the side of and partially covering the opesia (Figure 26 a and b).

SECONDARY APERATURE - the aperature above the level of the operculum, formed by the surrounding frontal wall, variable in height and form, complete or incomplete, and frequently notched on the proximal border to form a secondary sinus (Figures 35b, c, d, 37b, 38, 39 left two zooecia).

SECONDARY PERISTOME - developed from the frontal wall and often covering the primary peristome and partially obscuring the aperature (Figures 35b, c, d, 37b, 38, 39 left two zooecia).

SHIELD - a broad, elevated area surrounding the aperature.

SINUS - a rounded or V-shaped extension of the proximal border of the primary aperature (Figures 29a, 30a, 39).

SPINE - a hollow projection, either open or closed at the tip, marginal or oral (Figures 16a, 19, 20, 21, 22, 26a and b, 27, 31, 32a, 33b, 38).

SPINULE - a small spine without an internal canal (Figure 17a).

STOLON - a creeping stem, consisting of kenozooecia, from which zooecia may arise (Figures 8, 9, 15).

TREMOCYST - a secondary calcified layer of the frontal above the olocyst, usually thickly perforated all over and developed evenly from the frontal pores instead of growing inward from the border (Figures 30a, 32, 34, 38).

TREMOPORES - pores which are scattered more or less evenly over the whole frontal, all of which contribute to the formation of the tremocyst.

TUBULE - the main part of a zooecium which contains the polypide, usually embedded and ending in a peristome (Figures 10, 11, 12, 13, 14).

UMBO - an elevated process or knob-like structure on the frontal usually just proximal to the aperature (Figures 22, 29b, 32b).

VESTIBULAR ARCH - a narrow rim surrounding the aperature inside of the primary peristome (Figure 37a).

VIBRACULUM - a highly modified avicularium, in which the long lash-like mandible con be moved in various directions (Figure 26c).

VICARIOUS AVICULARIUM - an avicularium occupying a place in the zooecial series (interzooecial) (Figures 23, 24, 25).

ZOOARIUM - a colony (Figures 10b, 11, 13, 14).

ZOOECIULE - a diminutive zooecium occurring in series with normal ones, usually closed, sometimes bearing an avicularium.

ZOOECIUM - the exoskeleton of a zooid (Figures 2 and 3).

ZOOID - a functional nutritive individual.

Entoprocta

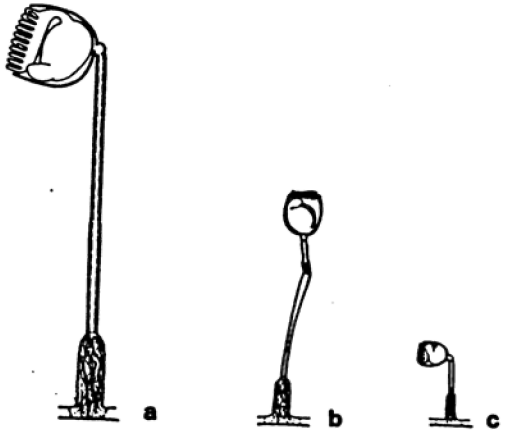


Figure 1. ***Barentsia***

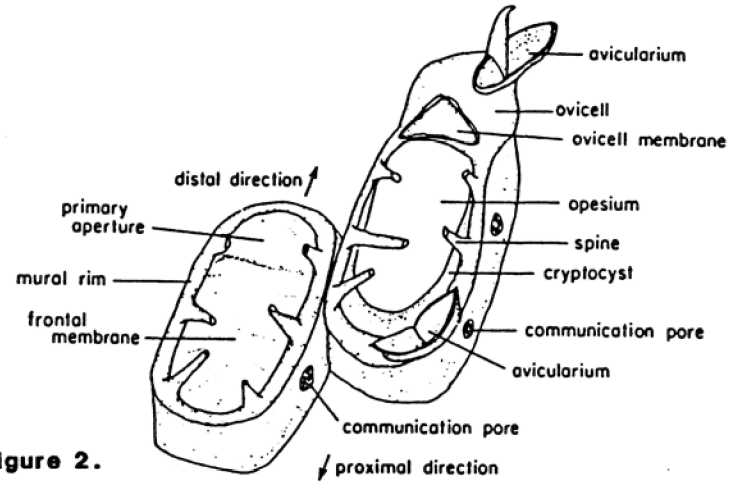


Figure 2.

Generalized anascan

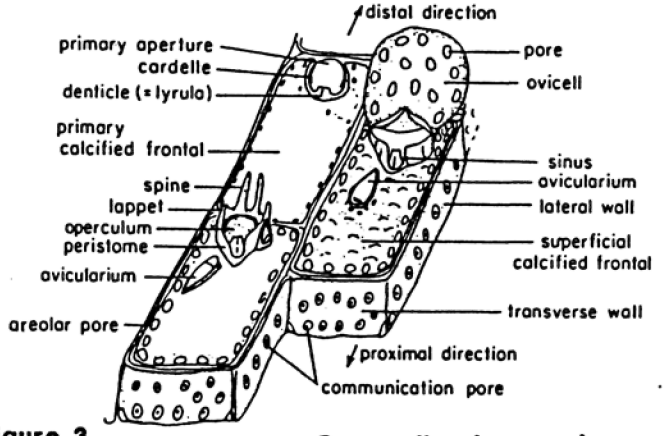


Figure 3.

Generalized ascophoran

Ctenostomata

Figure 4. *Anguinella*

Figure 5. *Clavopora*

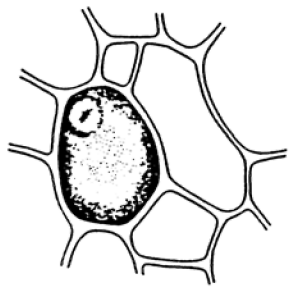


Figure 6. *Alcyonidium*

Figure 7. *Amathia*

Figure 8. *Bowerbankia*

Figure 9. *Victorella*

Cyclostomata

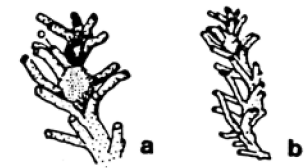


Figure 10. *Proboscina*

Figure 11. *Tubulipora*

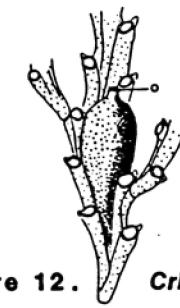


Figure 12. *Crisia*

Figure 13. *Lichenopora*

Figure 14. *Disporella*

Anasca

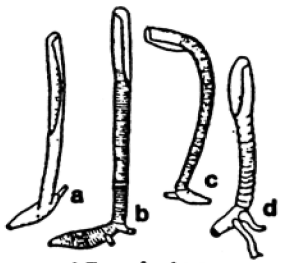


Figure 15. *Aetea*

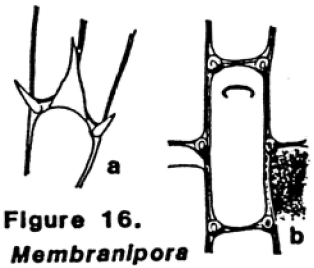


Figure 16. *Membranipora*

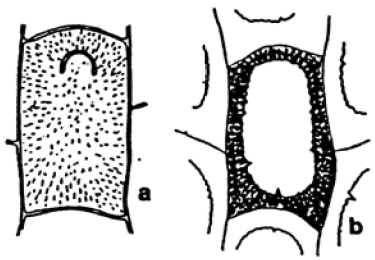


Figure 17. *Conopeum*

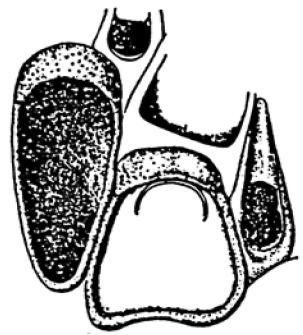


Figure 18. *Hincksina*

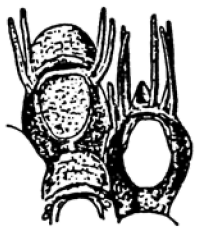


Figure 19. *Chapperia*

Figure 20. *Retevirgula*

Figure 21. *Cauloramphus*

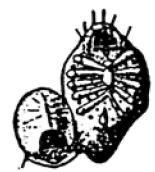


Figure 22. *Puellina*

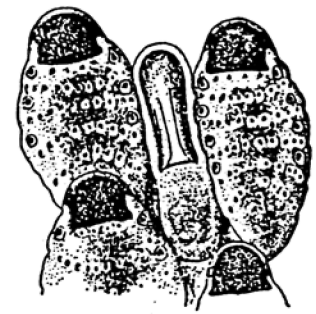


Figure 23. *Lyrula*

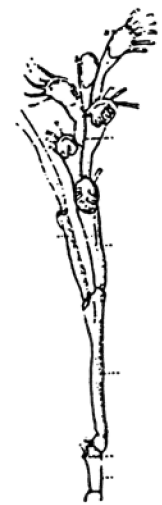


Figure 27. *Caulibugula*

Anasca

Figure 24. *Cellaria*

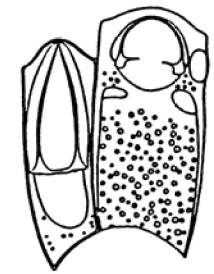


Figure 25. *Thalamoporella*

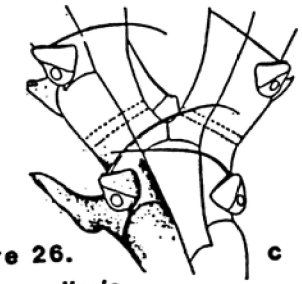
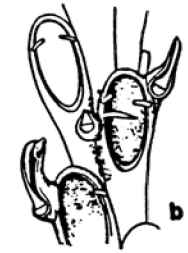


Figure 26. *Scrupocellaria*



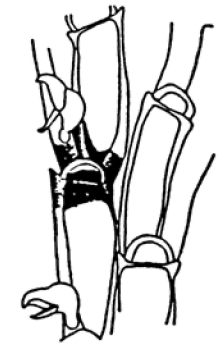


Figure 28. *Bugula*

Ascophora

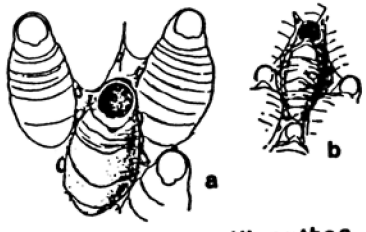


Figure 29. *Hippothoa*

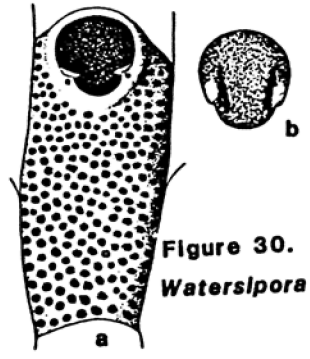


Figure 30. *Watersipora*

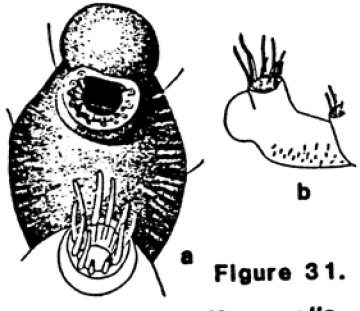


Figure 31. *Mucronella*

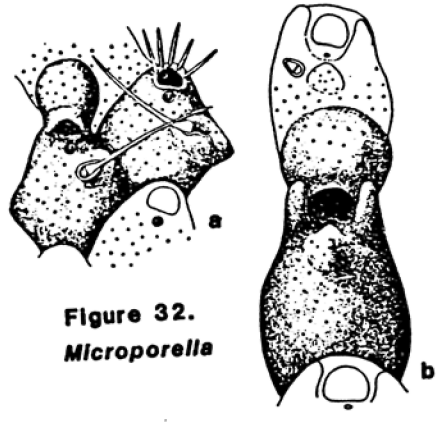


Figure 32. *Microporella*

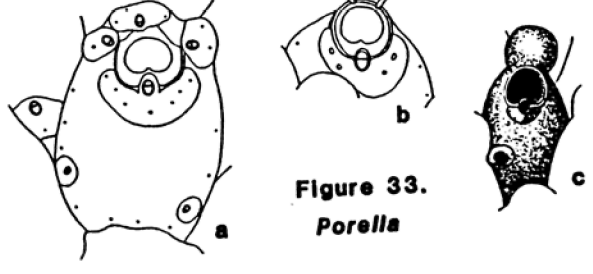


Figure 33. *Porella*

Ascophora

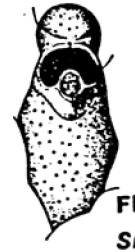


Figure 34. *Smittina*

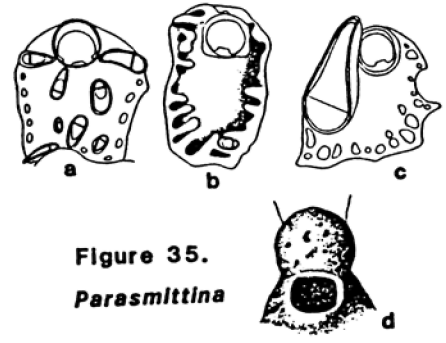


Figure 35. *Parasmittina*

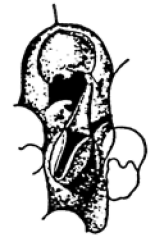


Figure 36. *Phidolopora*

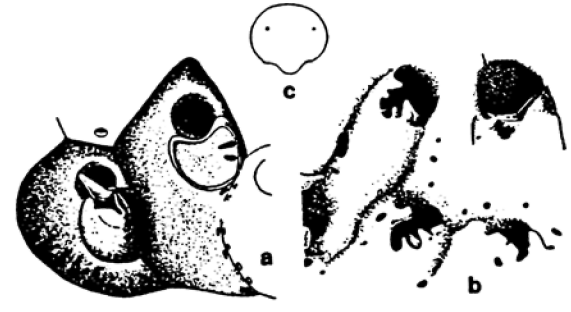


Figure 37. *Rhynchozoon*

Figure 38. *Lagenipora*

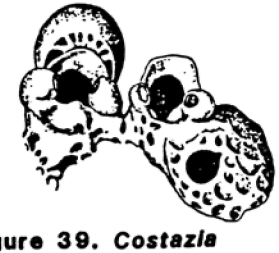


Figure 39. *Costazia*

NAME CHANGES

Osburn, Part 1, 1950.

Puellina setosa (Waters 1899) combined with *Colletosia radiata* (Moll 1803). (Soule 1959)

Osburn, Part 2, 1952.

Hippothoa flagellum Manzoni 1870 changed to *H. distans* MacGilliuray 1869. (Soule 1961)

Petralia japonica (Busk 1884) changed to *Hippopetraliella magna* (d'Orbigny 1852). (Soule 1961)

Schizolavella vulgaris (Moll 1803) changed to *Escharina vulgaris* (Moll 1803). (Soule 1961)

Hippoporina Neuiani 1895 changed to *Cleidochasma* Harmer 1957 (Soule 1961).

Smittia californiensis Robertson 1908 changed to *Alismittia californiensis* (Robertson 1908). (*Alismittia* new genus, Soule & Soule 1964).

Adeona lamouroux 1812 changed to *Reptadeonella* Busk 1884. (Soule 1961)

Phidolopora pacifica (Robertson 1908) combined with *P. labiata* Gabb and Horn 1862. (Soule and Duff 1957)

Rhynchozoon tumulosum (Hincks 1882) combined with *R. rostratum* (Busk 1856). (Soule & Soule 1964)

Costazia costazi (Audouin 1826) changed to *Celleporina costazi* (Audouin 1826). (Soule 1961)

Holoporella brunnea (Hincks 1884) changed to *Celleporaria brunnea* (Hincks 1884). (Soule, Soule & Pinter 1973)

Osburn, Part 3, 1953

Flustrella corniculata (Smith 1871) changed to *Flustrellidra corniculata* (Smith 1871). (Soule, Soule & Pinter 1975)

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Title