

A synopsis of the Pelagic Polychaeta

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Since “ An annotated list of the pelagic Polychaeta ” was published in 1956 there have been a number of studies which have considerably extended our knowledge and which now make a review worthwhile. All the publications making reference to pelagic polychaetes of which we are aware have been included in the Bibliography. The species are numbered for easy reference, and under each species there is a complete synonymy, taxonomic comments wherever required, general distribution and location of the type when known. Some of the species, notably those belonging to the genera *Vanadis* and *Tomopteris* have never been rediscovered following their original description. Some of these may eventually prove to be synonyms of better known species. It is hoped that this synopsis will prove of use to plankton workers for it was compiled as an aid for further study. The synopsis lists the species belonging to the exclusively pelagic families Lopadorhynchidae, Iospilidae, Pontodoridae, Alciopidae, Tomopteridae and Typhloscolecidae only. There are, of course holopelagic species belonging to other families, and some forms normally benthonic which may sometimes be found in the plankton, especially inshore. Of these, the most frequent belong to the Polynoidae. Many are late larvae of benthonic forms; others such as *Dreishia pelagica* and some *Macellicephala* species may be truly holopelagic, but we know little about these species and much work remains to be done to distinguish those which are truly holopelagic from those that are merely late larvae of benthonic forms. Reference should be made to Fauvel (1914), Støp-Bowitz (1948), Knox (1959) and Tebble (1960) for information on these genera. Pettibone (1966) regards Chamberlin's (1919) *Podarmus ploa* found off Easter Island as a pelagic form. The specimens described by Berkeley & Berkeley (1961) as *Ancistrostylis longicirrata* and by Støp-Bowitz (1948) and Monro (1930) are all apparently the same species, *Podarmus ploa*, described by Chamberlin (Pettibone, 1966). Mileikovskii (1969) has recently described the larvae of *Lagisca hubrechtii* and of *Lepidasthenia grimaldi* commonly found in plankton and possibly holopelagic forms. Many spioniform larvae have been described by Hannerz (1961). The curious *Poebius meseres* Heath is also easily recognized and is certainly holopelagic. It has been studied in some detail by Robbins (1966). Reference to *Poebius*

has also been made fairly recently by Hartman (1955), Berkeley & Berkeley (1960) and its distribution described by McGowan (1960). Hartman placed the Poebiiidae near the Flabelligeridae in which *Flota flabelligera* recently discovered off Chile, belongs (Hartman, 1967). The Otopsiidae are presumably benthonic. Berkeley & Berkeley (1957) found *Otopsis longipes* Ditlevsen in open water, and earlier Berkeley (1956) found *Epidiopatra hupferiana* Augener similarly in open water, but there is little doubt that these are benthonic worms. Ditlevsen (1917) did not describe how his specimen was collected, but Wesenberg-Lund (1950 a) stated that it was dredged. Uschakov (1955) has described a somewhat similar specimen (*Otopsis longipes pacifica*) in the Sea of Okhotsk.

We still know little of the biology of the pelagic polychaetes, although the recent work of Terio (1964, 1967) on luminescence of tomopterids following the summary by Bonhomme (1954) of earlier work, and the embryological studies of Åkesson (1962, 1965, 1967) and Åkesson & Melander (1967) are notable.

Following the early papers by Apstein (1900) and Reibisch (1895, 1905) the most useful taxonomic works are those of Støp-Bowitz (1948) and Tebble (1960, 1962). Day (1967) will be found most useful in accounts of species. Dales (1957 a) gives keys, but these must now be used in the light of more recent studies.

Arrangement of information

References such as those of Friedrich (1950 c) or Muus's (1953 a, b) Plankton Sheets are not included in the lists of synonyms, nor are any books or papers merely listing species and without original figures, taxonomic comments or diagnoses. References are given in chronological order, preceded by the original name, name of author, date of publication, page reference and plate or figure numbers. In Russian literature only the main figure numbers are given to avoid confusion resulting from differences in the Cyrillic alphabet. Spelling of the name follows the recommendations of the International Code of Zoological Nomenclature adopted by the fifteenth International Congress of Zoology (1961). Differences of spelling, such as use of capital for specific name or i/ii in suffix are not distinguished within the synonymies. References to figures or plates of figures are given in Arabic whatever the style of the original. References to charts showing distribution are not included. The number of the first page of the reference only, is noted. The name of the Museum where the Type is located is noted when known. General areas of geographical distribution only are indicated, in addition to Type locality, where stated in the original.

Comments

Comments on the validity of the species, original or useful subsequent descriptions or discussion of opinions are made under this heading where we thought that this would be helpful.

Family **LOPADORHYNCHIDAE** Claparède 1868

Hartman (1959) in her *Catalogue of the Polychaetous Annelids of the World* (p. 173) gives this group of exclusively pelagic genera family status. Clearly derived from phyllodocid stock, this division has some merit. Hartman lists five genera: *Lopadorhynchus*, *Maupasias*, *Pedinosoma*, *Pelagobia* and *Prolopadorhynchus*. The other genera described by Hartman, namely: *Haliplanella* Treadwell, *Halyplanes* Reibisch, *Haliplanes* Reibisch, *Hydrophanes* Claparède, *Mastigethus* Chamberlin, *Nans* Chamberlin and *Reibischia* Bergström are, as Hartman rightly states, all synonyms of species belonging to these five genera.

Hartman follows Bergström (1914) in regarding those species of *Lopadorhynchus* with ventral cirri on the anterior parapodia as belonging to a separate genus *Prolopadorhynchus*. Most authors have followed Bergström in describing *Lopadorhynchus sensu stricto* (anterior parapodia without ventral cirri) and *Prolopadorhynchus* as sub-genera of *Lopadorhynchus*. We agree with Tebble (1960, p. 200) that this distinction is not justified, and suggest that the family is perhaps best regarded as including four genera only: *Lopadorhynchus*, *Maupasias*, *Pedinosoma*, and *Pelagobia*. We have used the variant spelling of *Lopadorhynchus* with one 'r' throughout this synopsis.

Kim's (1967) paper with a key to the species of *Lopadorhynchus* deserves special mention as it constitutes a careful study of this genus, but we cannot agree with some of his conclusions. Kim agrees with Tebble (1960) that *Prolopadorhynchus* (Bergström, 1914) should not be recognised and as already pointed out with this we also agree. Nevertheless, it is possible to distinguish species with, and species without ventral cirri on the anterior parapodia, although we do not regard this character as constituting a generic or even subgeneric difference. Kim's synonymies are therefore radically different from ours. He recognised only five species: *brevis*, *uncinatus*, *krohnii*, *appendiculatus* and *henseni*. Students of *Lopadorhynchus* should refer to Kim's paper. Plankton workers using Muus's (1953) Plankton sheets should note that he maintains *Prolopadorhynchus* as a sub-genus.

Genus **LOPADORHYNCHUS** Grube

Type species: *Lopadorhynchus brevis* Grube, 1855.

1. *Lopadorhynchus uncinatus* Fauvel

Lopadorhynchus uncinatus Fauvel, 1915, p. 3, fig. 2; 1916, p. 57, pl. 1, figs. 2, 3, pl. 4, figs. 4-14-1923, p. 184, figs. 67 a-g; 1932 b, p. 75; Monro, 1936, p. 113; 1937, p. 266; Wesenberg-Lund, 1939, p. 10, figs. 6, 7; Treadwell, 1939, p. 207, fig. 35; Fauvel, 1939, p. 278; Støp, Bowitz, 1948, p. 17, fig. 11; Fauvel, 1953 a, p. 130, fig. 66; Dales, 1955 b, p. 435; Zei, 1956, p. 55, fig. 22; Dales, 1957 a, p. 101, figs. 1-5; 1957 b, p. 662; Berkeley & Berkeley, 1958; p. 400; Tebble, 1958, p. 166; 1960, p. 201; Berkeley & Berkeley, 1960, p. 788; 1964, p. 122; Day, 1967, p. 137, figs. 5, 6 d-h; Tebble, 1968, p. 33; Hartman, 1968, p. 325, figs. 1-4.
L. varius Treadwell, 1943, p. 32, pl. 1, figs. 7-10.

Distribution: N. & S. Atlantic, N. Pacific, Indian Ocean (Type locality: Azores).

Comments: Berkeley & Berkeley (1958) regarded *L. varius* Treadwell (1943) as separate from *L. uncinatus* on account of the simple chaetae in parapodia behind the 4th. Dales (1957 a) examined Treadwell's Type and concluded it was a young *uncinatus*.

2. *Lopadorhynchus brevis* Grube

Lopadorhynchus brevis Grube, 1855, p. 100, pl. 3, fig. 15; Levinsen, 1885, p. 334, fig. 16; Kleinenberg, 1886, p. 21; Reibisch, 1893, p. 35; Lo Bianco, 1904, p. 52, pl. 31, fig. 121; Ehlers, 1913, p. 463; Bergström, 1914, p. 181; Fauvel, 1923, p. 184, fig. 69 k; Monro, 1930, p. 78; 1937, p. 266; 1939 a, p. 347; Wesenberg-Lund, 1939, p. 12, figs. 8–10; Zei, 1956, p. 56; Dales, 1957 a, p. 104, figs. 7, 8; Tebble, 1958, p. 436; Berkeley & Berkeley, 1958, p. 401; Tebble, 1960, p. 200; 1962, p. 416; Dales, 1963, p. 501; Berkeley & Berkeley, 1964, p. 122; Rullier, 1965, p. 867; Day, 1967, p. 162, figs. 5–7 d–e; Tebble, 1968, p. 33.
Lopadorhynchus parvum Chamberlin 1919., p. 114, pl. 17, figs. 1–7.

Distribution: tropical and subtropical waters of N. and S. Atlantic, Mediterranean, Pacific (Type locality: Mediterranean).

Comments: Chamberlin's (1919) specimens of *L. parvum* were all small (4–5 mm) and were probably young *brevis* (Støp-Bowitz). Tebble (1962, p. 417) has examined Chamberlin's Type (USNM 19403) and has confirmed that it agrees with *brevis*. *L. nans* Chamberlin (1919) could also be *brevis* (see comment under *L. nationalis*).

2a. *Lopadorhynchus brevis nuchalis* Monro

Lopadorhynchus brevis nuchalis Monro, 1937, p. 267.

Distribution: (Type locality: Gulf of Aden).

Location of Type: British Museum (Natural History), London.

Comments: Monro (1937) distinguished this 'variety', described from a single specimen, from typical *brevis* by: (1) lack of eyes, (2) 4–5 finger-like processes (nuchal organs) behind the posterior tentacles, and (3) dark pigment patches beneath the nuchal organs. One of us (G. P.) has examined the Type (B.M.(N.H.) 1939, 9.2.85). It is very doubtful if it should be regarded as a distinct variety. Further collections from the locality are desirable.

3. *Lopadorhynchus errans* (Chamberlin)

Mastigethus errans Chamberlin, 1919, p. 120, fig. 8, 9.

Lopadorhynchus errans Støp-Bowitz, 1948, p. 18; Dales, 1957 a, p. 105.

Distribution: (Type locality: Tropical Pacific).

Comments: Chamberlin (1919) described this species from a single specimen, excluding it from other species by: (1) presence of papillae on the sides of the proboscis, and (2) presence of branched outgrowths which he described as nuchal organs. (1) is shared with other *Lopadorhynchus*; (2) could be a parasitic copepod. See comments by Støp-Bowitz (1948) and Dales (1957 a). Further specimens are desirable to check the validity of this species.

4. *Lopadorhynchus krohni* Claparède

Hydrophanes krohni Claparède, 1870, p. 464, pl. 3, fig. 2; Viguier, 1886, p. 385, pl. 22, figs. 1–10. *Lopadorhynchus krohni* Kleinenberg, 1886, p. 21, pl. 1, fig. 15; Reibisch, 1893, p. 253; 1895, p. 37, pl. 4, fig. 4; Ehlers, 1913, p. 463; Bergström, 1914, p. 180, fig. 68; Fauvel, 1923, p. 185, fig. 68 a–d; Wesenberg-Lund, 1939, p. 15, 16, fig. 11; Dales, 1957 a, p. 105, figs. 9, 10; Tebble, 1958, p. 166; 1960, p. 202; Grice & Hart, 1962, p. 302; Dales, 1963, p. 501; Berkeley & Berkeley, 1964, p. 122; Day, 1967, p. 159; figs. 5, 6 i–k; Tebble, 1968, p. 33.

Distribution: warm temperate seas (Type locality: Gulf of Naples).

5. *Lopadorhynchus nationalis* Reibisch

Lopadorhynchus nationalis Reibisch, 1895, p. 38, pl. 3, figs. 10–15; Ehlers, 1913, p. 463; Day, 1967, p. 162, fig. 5.7 a–c.

Prolopadorhynchus nationalis Bergström, 1914, p. 180, fig. 67.

Lopadorhynchus (Prolopadorhynchus) nationalis Fauvel, 1916, p. 53; 1923, p. 186, fig. 68 e–i; 1939, p. 278; Wesenberg-Lund, 1939, p. 16, fig. 12; Støp-Bowitz, 1948, p. 19; Dales, 1957 a, p. 106; (?) Berkeley & Berkeley, 1964, p. 123.

(?) *Lopadorhynchus nans* Chamberlin, 1919, p. 116, pl. 17, fig. 1–5; Treadwell, 1936, p. 60; 1943, p. 33.

Distribution: tropical and subtropical Atlantic and Pacific warm, temperate seas (Type locality: equatorial Atlantic).

Comment: *Lopadorhynchus nans* Chamberlin has been regarded as synonymous with *L. nationalis* by Støp-Bowitz (1948, p. 19, q.v.) and Dales (1957 a); with *L. brevis* by Monro 1930, p. 78, and Wesenberg-Lund (1939). Tebble (1962) has re-examined the Type of *L. nans* (USNM 19402) and found it indeterminate. Berkeley & Berkeley (1964, p. 123) concluded that if *L. nans* was synonymous with *L. nationalis* then *L. brevis* would be synonymous too; but *brevis* has no ventral cirri in the anterior parapodia.

6. *Lopadorhynchus henseni* Reibisch

Lopadorhynchus Henseni Reibisch, 1893, p. 253; 1895, p. 35; pl. 3, figs. 5–9.

Lopadorhynchus (Prolopadorhynchus) henseni Støp-Bowitz, 1948, p. 19, fig. 12 a–e; Grice & Hart, 1962, p. 302; Day, 1967, p. 161, fig. 5.6 o–r.

Reibischia henseni Bergström, 1914, p. 182, fig. 69.

Distribution: tropical and subtropical Atlantic (Type locality: N. of Ascension Is.)

7. *Lopadorhynchus appendiculatus* Southern

Lopadorhynchus appendiculatus Southern, 1909, p. 7, pl. 2, figs. 12, 13; Uschakov, 1957 a, p. 271 fig. 2 a–d.

Prolopadorhynchus appendiculatus Bergström 1914, p. 179, fig. 66.

Lopadorhynchus (Prolopadorhynchus) appendiculatus Fauvel, 1916, p. 55; 1923, p. 187, fig. 69 a–i; Wesenberg-Lund, 1939, p. 17, figs. 13, 14; Støp-Bowitz, 1948, p. 20; Day, 1967, p. 161, fig. 5.6 l–r.

Distribution: N. and S. Atlantic, Mediterranean, Indian Ocean (Type locality: off Ireland).

8. *Lopadorhynchus macrophthalmus* Reibisch

Lopadorhynchus macrophthalmus Reibisch, 1894, p. 36, pl. 4, figs. 1–3.

Distribution: tropical S. Atlantic.

Genus *PELAGOBIA* Greeff

Type species: *Pelagobia longicirrata* Greeff, 1879 a.

9. *Pelagobia longicirrata* Greeff

Pelagobia longicirrata Greeff, 1879 a, p. 247, pl. 14, figs. 23–25; Viguier, 1886, p. 377, pl. 21, figs. 1–13; Reibisch, 1895, p. 21, pl. 2, figs. 1–9; 1905, p. 3, figs. 4–6; Southern, 1909, p. 2, pl. 1, fig. 1; Ehlers, 1912, p. 14; 1913, p. 186, fig. 70; Bergström, 1914, p. 186, fig. 70; Ditlevsen, 1914, p. 690; Fauvel, 1916, p. 61, pl. 1, figs. 6, 7; McIntosh, 1921, p. 294; Benham, 1921, p. 57,

pl. 7, figs. 58–60; 1927, p. 78 (in part); 1923, p. 435, pl. 134, figs. 4, 4 a; Fauvel, 1923, p. 192, fig. 72 a–c; Augener, 1929, p. 291; Hardy & Gunther, 1935, p. 113, fig. 52; Monro, 1936, p. 114; Fauvel, 1936 a, p. 16; Okuda, 1937, p. 75, fig. 1; Nolte, 1938, p. 274, figs. 217–223; Okuda, 1938, p. 88; Fauvel, 1939, p. 276; Støp-Bowitz, 1948, p. 21; Freidrich, 1950 c, pp. 14, 20; Wesenberg-Lund, 1950 b, p. 37; Støp-Bowitz, 1951, p. 6; Fauvel, 1951, p. 292; Fauvel, 1953 a, p. 131, fig. 63 a–d; Uschakov, 1955, p. 105, fig. 11; Dales, 1955, p. 435; 1957 a, p. 107, figs. 11–13; Uschakov, 1957 a, p. 268; Knox, 1959, p. 109; Tebble, 1958, p. 166; Tebble, 1960, p. 202; Dales, 1960, p. 483; Berkeley & Berkeley, 1960, p. 788; Imajima, 1961, p. 6; Tebble, 1962, p. 419, fig. 22; Mileikovsky, 1962, p. 1067; Dales, 1963, p. 501; Imajima & Hartman, 1964, p. 74; Hartman, 1964, p. 64, pl. 19, figs. 5, 6; Berkeley & Berkeley, 1964, p. 123; Guille & Laubier, 1966, p. 263; Bhaud, 1966, p. 436; Day, 1967, p. 163, fig. 5.7 f–i; Hartman, 1968, p. 327, figs. 1–3.

Pelagobia Viguieri Gravier, 1911 a, p. 311; 1911 b, p. 62, pl. 2, figs. 22–25; Chamberlin, 1919, p. 122; Treadwell, 1943, p. 33; Uschakov, 1952, p. 103, fig. 1, 1955, p. 105, fig. 11.

Pelagobia erinensis Nolte, 1938, p. 278, figs. 224, 225.

Distribution: cosmopolitan (Type locality: Arrecife, Canary Islands).

Comments: Hartman (1964, p. 64, Plate 19, Figs. 5–8) retains *P. viguieri* as a species separate from *P. longicirrata*. We agree with Tebble (1960) that *viguieri* and *longicirrata* are synonymous. Both Uschakov (1957 a) and Berkeley & Berkeley (1960) agree with this view. Uschakov (1952, 1955) used the name *viguieri* but corrects this to *longicirrata* in his paper (1957 a). In the original description of *longicirrata* the shafts of the chaetae are described as serrated, but they are smooth; see Tebble (1960, p. 203) for discussion of the confusion caused by some descriptions of *longicirrata* and for the distinction between *longicirrata* and *P. serrata*.

10. *Pelagobia serrata* Southern

Pelagobia serrata Southern, 1909, p. 3, pl. 1, figs. 2, 3; Fauvel, 1916, p. 62; 1923, p. 193, fig. 72 d.

Distribution: N. Atlantic off Ireland.

Comments: the specimen in the British Museum (N.H.) (1909.11.29.2) was identified by Southern and was examined by us. Tebble (1960, p. 204) considers that more material should be examined before admitting specific status.

Genus *MAUPASIA* Viguier

Type species: *Maupasia coeca* Viguier, 1886.

11. *Maupasia gracilis* (Reibisch)

Haliplanes gracilis Reibisch, 1893, p. 252.

Haliplanes gracilis Reibisch, 1895, p. 25, pl. 11, figs. 10–13; Bergström, 1914, p. 90.

Haliplanes magna Southern, 1909, p. 5, pl. 1, fig. 6, plate 2, figs. 7–11.

Maupasia magna Bergström, 1914, p. 90; Fauvel, 1923, p. 191, fig. 71 e–g.

Haliplanella pacifica Treadwell, 1943, p. 32, figs. 4–6.

Maupasia gracilis Dales, 1957 a, p. 108; Day, 1967, p. 166, fig. 5.7 j–l.

Distribution: N. and S. Atlantic, Pacific.

Comments: see the comments on *Haliplanes* and *Haliplanella* by Hartman (1956, p. 276). Treadwell's *H. pacifica* is in The American Museum of Natural History (New York).

12. *Maupasia isochoeta* (Reibisch)

Haliplanes isochoeta 1895, p. 26, pl. 2, fig. 14; Lo Bianco, 1904, p. 52, pl. 31, fig. 123.

Maupasia isochoeta Bergström, 1914, p. 91; Fauvel, 1923, p. 190, fig. 70 a, b.

Distribution: N. Atlantic, Mediterranean (Type locality: Sargasso Sea).

13. *Maupasias coeca* Viguier

Maupasias Coeca Viguier, 1886, p. 382, pl. 21, figs. 14–20; Ehlers, 1912, p. 15; 1913, p. 462; Fauvel, 1916, p. 63; 1923, p. 190, fig. 71 a–d; Hardy & Gunther, 1935, p. 115; Wesenberg-Lund, 1939, p. 19, fig. 15; Fauvel, 1939, p. 276; Dales, 1957 b, p. 662; Uschakov, 1957 b, p. 268, fig. 1; Berkeley & Berkeley, 1958, p. 401; Tebble, 1958, p. 166; 1960, p. 204; 1962, p. 421, figs. 23, 24; Grice & Hart, 1962, p. 302; Dales, 1963, p. 501; Hartman, 1964, p. 63, pl. 19, figs. 3, 4; Berkeley & Berkeley, 1964, p. 123; Day, 1967, p. 164, fig. 5.7 j–l.
Maupasias caeca atlantica Southern, 1909, p. 4, pl. 1, figs. 4, 5.

Distribution: Atlantic, Mediterranean, N. Pacific, Indian Ocean (Type locality: B. of Algiers).

Comments: Viguier (1886) used *œ* in spelling, although *æ* (Lat. 'blind') is perhaps more correct. Subsequent authors (and printers) have used both spellings somewhat inconsistently, so these differences are not distinguished in the Synonymy. Tebble (1962) notes "Since Viguier's original account . . . all authorities agree . . . 3 pairs of tentacular cirri on each side (12 altogether)": see Tebble's remarks pp. 422–423.

14. *Maupasias brodskyi* Uschakov

Maupasias brodskyi Uschakov, 1957 a, p. 270, fig. 1.

Distribution: N. W. Pacific.

Comments: the Type is in the Zoological Institutes Academy of Sciences, Leningrad.

Genus *PEDINOSOMA* Reibisch

Type species: *Pedinosoma curtum* Reibisch, 1895.

15. *Pedinosoma curtum* Reibisch

Pedinosoma curtum Reibisch, 1895, p. 27, pl. 2, fig. 17, pl. 3, figs. 1–4; Lo Bianco, 1904, p. 52, fig. 122; Ehlers, 1913, p. 464; Bergström, 1914, p. 177, fig. 65; Fauvel, 1916, p. 4; 1923, p. 188, fig. 70 c–f; Berkeley & Berkeley, 1960, p. 789; Tebble, 1962, p. 423, fig. 25; Day, 1967, p. 158, fig. 5.6 a–c.

Distribution: subtropical N. Atlantic, S. Atlantic, N. Pacific (Type locality: Azores).

IOSPILIDAE Bergström 1914

Hartman (1959) lists four genera: *Iospilopsis*, *Iospilus*, *Paraiospilus* and *Phalacrophorus*. *Iospilopsis antillensis* Augener is probably *Phalacrophorus uniformis*. *Paraiospilus affinis* Viguier may be synonymous with *Iospilus phalacroides* Viguier. *Iospilus* and *Phalacrophorus* are certainly real and distinct genera.

Genus *IOSPILUS* Viguier

Type species: *Iospilus phalacroides* Viguier, 1886.

16. *Iospilus phalacroides* Viguier

Iospilus phalacroides Viguier, 1886, p. 392, pl. 23, figs. 1–6; Lo Bianco, 1904, p. 53, fig. 125; Fauvel, 1916, p. 53; 1923, p. 194, fig. 72 e; Dales, 1957 a, p. 108; Day, 1967, p. 170, fig. 6.1 e–h. *Iospilus litoralis* Reibisch, 1895, p. 6, pl. 1, figs. 1–3. *Phalacrophorus niger* Treadwell, 1943, p. 33, fig. 15.

Distribution: subtropical N. and S. Atlantic, S.W. Indian Ocean, S. Pacific (Type locality: B. of Algiers).

Comments: Hartman (1956) agrees that Treadwell's *Phalacrophorus niger* is a *Iospilus phalacroides*. Day (1967) concludes that *Paraiospilus affinis* of Viguier (1911) is also synonymous. See comments under that species.

Genus *PARAIOSPILUS* Viguier

Type species: *Paraiospilus affinis* Viguier.

17. *Paraiospilus affinis* Viguier

Paraiospilus affinis Viguier, 1911, p. 250; 1920, p. 259, pl. 3; Fauvel, 1923, p. 194, fig. 73 a-e.

Distribution: B. of Algiers.

Comments: Viguier (1911) was convinced that this species was different from *Iospilus phalacroides* which he had described earlier (Viguier, 1886), but the differences are slight and Day (1967, p. 168) may be correct in regarding them as synonymous. Pending discovery of further material we would prefer to maintain the identity of Viguier's two species. Fauvel's reference is merely a quotation; no one other than Viguier has ever identified *Paraiospilus*.

Genus *PHALACROPHORUS* Greeff

Type species: *Phalacrophorus pictus* Greeff, 1879.

18. *Phalacrophorus pictus* Greeff

Phalacrophorus pictus Greeff, 1879, p. 249, pl. 14, figs. 26-30; Viguier, 1886, p. 395, pl. 23, figs. 7-18; Reibisch, 1895, p. 10, pl. 1, figs. 4-7; Ehlers, 1913, p. 460; Fauvel, 1916, p. 52; 1923, p. 196, fig. 72 f; Augener, 1929, p. 290; Fauvel, 1936, p. 17; 1939, p. 277; Stop-Bowitz, 1951, p. 6; Hartman, 1956, p. 276; Dales, 1957 a, p. 109; Uschakov, 1957 b, p. 274, fig. 3; Berkeley & Berkeley 1957, p. 573; 1960, p. 789; Mileikovskiy, 1961, p. 1101, fig. 4; 1962, p. 1067; Tebble, 1962, p. 426, fig. 27 c; Hartman, 1964, p. 65, pl. 20, fig. 3; Berkeley & Berkeley, 1964, p. 123; Guille & Laubier, 1966, p. 264; Bhaud, 1966, p. 436; Day, 1967, p. 171, fig. 6.1 n-o.

Phalacrophorus borealis Reibisch, 1895, p. 12, pl. 1, figs. 8, 9.

Phalacrophorus maculatus Treadwell, 1943, p. 34, pl. 1, figs. 11-13.

Distribution: cosmopolitan (Type locality: Canary Islands).

Comments: Tebble (1962, p. 426) agrees that the absence of eyes in Reibisch's *P. borealis* is not significant and that this species is synonymous with *P. pictus*. He agrees that *P. maculatus* is synonymous and Hartman (1956) also came to the same conclusion on examination of the Paratypes in the American Museum of Natural History. Tebble (1962) thinks the antarctic populations may be separate.

19. *Phalacrophorus uniformis* Reibisch

Phalacrophorus uniformis Reibisch, 1895, p. 15, pl. 1, figs. 10-16; Ehlers, 1913, p. 460; Fauvel, 1916, p. 53; 1923, p. 196, fig. 72 g, h; 1939, p. 277; Hartman, 1956, p. 276; Dales, 1957 a, p. 109; 1960, p. 483; Tebble, 1962, p. 426, fig. 27 a, b; Dales, 1963, p. 502; Berkeley & Berkeley 1964, p. 123; Day, 1967, p. 171, fig. 6.1 i-m.

Phalacrophorus attenuatus Treadwell, 1943, p. 34, fig. 14.

?*Iospilopsis antillensis* Augener, 1922, p. 41.

Distribution: tropical & subtropical Atlantic, Pacific and Indian Ocean.

Comments: Augener (1922) gives no figure but his short description suggests that his *Iospilopsis antillensis* is synonymous with *Phalacrophorus uniformis*.

Family **PONTODORIDAE** Bergström 1914Genus **PONTODORA** Greeff

Type species: *Pontodora pelagica* Greeff.

20. *Pontodora pelagica* Greeff

Pontodora pelagica Greeff, 1879 a, p. 245, pl. 13, figs. 19–22; Viguier, 1886, p. 388, pl. 22, figs. 11–19; Reibisch, 1895, p. 17; Viguier, 1920, p. 256, pl. 1, figs. 4–6; Fauvel, 1923, p. 197, fig. 73 f–k; Uschakov, 1957 a, p. 273, fig. 3; Berkeley & Berkeley, 1960, p. 788; Day, 1967, p. 167, fig. 6.1 a–d.

?*Epitoka pelagica* Treadwell, 1943, p. 40.

Distribution: warm N. and S. Atlantic (Type locality: Canary Islands).

Comments: we have not seen Treadwell's *Epitoka pelagica*, but Uschakov (1957 a) concludes that it is synonymous with *P. pelagica*, and Berkeley & Berkeley agree with this.

Family **ALCIOPIDAE** Ehlers 1864

(as 'Alciopea')

Hartman (1959) lists the following genera: *Alciopa*, *Alciopina*, *Asterope*, *Callizona*, *Callizonella*, *Cleta*, *Corynocephalus*, *Greefia*, *Halodora*, *Krohnia*, *Liocapa*, *Manita*, *Naiades*, *Nauphanta* (Greeff, non Kinberg), *Plotohelms*, *Rhynchonereella*, *Torea*, *Torrea*, *Vanadis* and *Watelio*. Of these, she rightly regards:

<i>Torea</i> , <i>Asterope</i> and <i>Liocapa</i>	as <i>Torrea</i>
<i>Callizona</i>	as <i>Rhynchonereella</i>
<i>Callizonella</i>	as <i>Krohnia</i>
<i>Manita</i> and <i>Cleta</i>	as <i>Vanadis</i>
<i>Corynocephalus</i>	as <i>Alciopina</i>
<i>Greefia</i> , <i>Halodora</i> and <i>Nauphanta</i>	as <i>Alciopa</i>

and we would agree that the family comprises the following known (nine) genera: *Torrea*, *Naiades*, *Vanadis*, *Alciopa*, *Plotohelms*, *Alciopina*, *Krohnia*, *Rhynchonereella* and *Watelio*. We prefer the variant spelling *Rhynchonereella* (amended by Claparède, 1868 from Costa's (1862) original spelling).

Tebble (1962, p. 387) has criticised use of the angle subtended by the eyes as a character having any taxonomic value in separating the species of *Plotohelms* (Dales 1957 a), and in the light of experience gained since this view was expressed we would agree with him. Also, in the 1956, 'List' several alciopids were mentioned under the heading 'Incertae sedis' (Dales 1956, p. 297). Of these Kinberg's (1866) specimens are mostly indeterminable (*Alciopa pacifica*, *A. splendida*, *A. atlantica* and *Kronia aurorae*), according to Hartman (1948, p. 11) and, in the absence of Types, Hering's *Alciopa bartelsii* (Hering 1860, 1892) which seems like *Krohnia*, *Vanadis tentaculata* (Langerhans, 1880) and *Alciopa heterochelus* Rafinesque (1814) must also remain indeterminable owing to inadequate description. Greeff's *V. macrophthalmus* briefly described from a single fragment and his *V. melanophthalmus* must also remain doubtful in the absence of examination of Type material. Greeff's genus *Nauphanta* = *Alciopa* Audouin & Milne-Edwards. Kinberg's genus *Nauphanta* = *Marphysa* (Hartman, 1948). Hansen (1882) used the name *Nauphanta* in Kinberg's sense. Variant spellings such as *Alciope* (*Alciopa*) have not been distinguished within the synonymies.

Genus *TORREA* Quatrefages

Type species: *Torrea candida* (delle Chiaje).

21. *Torrea candida* (delle Chiaje)

Alciopa candida delle Chiaje, 1828, p. 88; Krohn, 1845, p. 174.

Alciopa vittata Hering, 1860, p. 11; 1892, p. 747, pl. 5.

Liocapa vertebralis Costa, 1864, p. 165, pl. 4, fig. 1; Ehlers, 1864, p. 181; Costa, 1867, p. 55; Claparède, 1868, p. 252.

Liocapa candida Levinsen, 1885, p. 333, pl. 1, figs. 14, 15.

Torea vitrea Quatrefages, 1865, p. 159, pl. 9, figs. 15, 16.

Asterope candida Claparède, 1870, p. 108, pl. 10, fig. 1; Greeff, 1876, p. 62, pl. 2, figs. 7-13, pl. 3, figs. 22-27; Apstein, 1900, p. 7, pl. 5, fig. 52; Lo Bianco, 1904, p. 50, fig. 114; Fauvel, 1907, p. 8, figs. 2, 3; Izuka, 1914, p. 3, pl. 1, fig. 10; Fauvel, 1916, p. 65; 1923, p. 202, fig. 75 a-d; 1932, p. 16; 1939, p. 283; Fyfe, 1952, p. 10; Fauvel, 1953, p. 132, fig. 67 a-d; Zei, 1956, p. 52.

Torrea candida Benham, 1929, p. 186; Monro, 1930, p. 82; 1936, p. 119; Wesenberg-Lund, 1939, p. 22, figs. 17, 18; Stop-Bowitz, 1948, p. 22, fig. 13; Dales, 1955 b, p. 435, 1957 a, p. 111, figs. 14-16; Tebble, 1962, p. 194; Grice & Hart, 1962, p. 302; Imajima & Hartman, 1964, p. 73; Day, 1967, p. 188, fig. 7.3 d-f; Hartman, 1968, p. 315, figs. 1-3.

Distribution: cosmopolitan (Type locality: B. of Naples).

Comments: Quatrefage's *Torea vitrea* is in the British Museum (Natural History) and has been examined by one of us (G. P.). His spelling was followed by some later workers using the name *candida*; we have not distinguished this in the synonymy.

22. *Torrea pelagica* Chamberlin

Torea pelagica Chamberlin, 1919, p. 131, pl. 24, figs. 4-9; Treadwell, 1943, p. 35.

Torrea pelagica Dales, 1957 a, p. 111.

Distribution: Pacific.

Genus *NAIADES* delle Chiaje

Type species: *Naiades cantrainii* delle Chiaje.

23. *Naiades cantrainii* delle Chiaje

Naiades Cantrainii delle Chiaje, 1830, p. 182, figs. 14, 18, 21; Stop-Bowitz, 1948, p. 24, figs. 15, 16; Hartman, 1956, p. 277; Dales, 1957 a, p. 112, figs. 18, 19; Tebble, 1960, p. 184; 1962, p. 388; Grice & Hart 1962, p. 302; Dales, 1963, p. 502; Imajima & Hartman, 1964, p. 71; Hartman, 1966, p. 189; Day, 1967, p. 176, fig. 7.1 a-c; Tebble, 1968, p. 33; Hartman, 1968, p. 311, figs. 1, 2.

Alciopa Reynaudii Krohn, 1845, p. 172, pl. 6, figs. 1-6.

Alciopa Edwardsii Krohn, 1847, p. 39; Grube, 1850, p. 305; Hering 1860, p. 315; 1892, p. 721, pls. 1, 2; Ehlers, 1868, p. 17.

Krohnia Edwardsii Quatrefages, 1865, p. 168.

Liocapa vitrea Costa, 1862, p. 167.

Alciope microcephala Viguier, 1886, p. 404, pl. 26, figs. 1-5.

Alciopa cantrainii Claparède, 1870, p. 469, pl. 10, fig. 2; Greeff, 1876, p. 57; Viguier, 1886, p. 404; Apstein, 1891, p. 128; 1900, p. 7, pl. 5, fig. 53; Lo Bianco, 1904, p. 50, fig. 115; Izuka, 1914, p. 2, pl. 1, fig. 9; Fauvel, 1916, p. 64; Ehlers, 1913, p. 464; Chamberlin, 1919, p. 130; Fauvel, 1923, p. 203, fig. 76; Benham, 1929, p. 186; Monro, 1930, p. 84; 1936, p. 115; Fauvel, 1936 b, p. 56; Wesenberg-Lund, 1939, p. 25, fig. 19; Fyfe, 1952 a, p. 9; Fauvel, 1953, p. 134, fig. 68 a-c; Zei, 1956, p. 51; Rullier, 1965, p. 872.

Alciopa distorta Treadwell, 1943, p. 35, pl. 1, figs. 16, 17, pl. 2, fig. 18.

Distribution: cosmopolitan (Type locality: B. of Naples).

Comments: we have not distinguished in the synonymy the variant spellings of *Alciopa*, *Alciope*, *Cantrainii*, *cantraini* etc. Hartman (1956, p. 277) and Tebble (1962, p. 389) find Treadwell's (1943) *Alciopa distorta* (United States National Museum (Smithsonian)) identical with *N. cantrainii*.

Genus *VANADIS* Claparède

Type species: *Vanadis formosa* Claparède.

24. *Vanadis formosa* Claparède

Vanadis formosa Claparède, 1870, p. 480, pl. 10, fig. 3; Apstein, 1900, p. 8, pl. 1, figs. 1-6; Lo Bianco, 1904, p. 50, pl. 29, fig. 113; Southern, 1911, p. 2; Fauvel, 1916, p. 65; Chamberlin, 1919, p. 134; McIntosh, 1922, p. 13; 1923, p. 440; Fauvel, 1923, p. 205, fig. 77 a-c; Monro, 1930, p. 81; 1932 a, p. 16; Augener, 1934, p. 217; Monro, 1936, p. 116; 1937, p. 268; 1939 a, p. 348; Wesenberg-Lund, 1939, p. 28, figs. 20, 21; Støp-Bowitz, 1948, p. 25, fig. 17; 1951, p. 7; Fauvel, 1953, p. 135, fig. 70 a-c; Fraser, 1955, p. 12; Zei, 1956, p. 52, fig. 18; Dales, 1957 a, p. 117, figs. 21-23; Tebble, 1960, p. 185, fig. 49; 1962, p. 389; Mileikovsky, 1962, p. 1067; Rullier, 1965, p. 870; Day, 1967, p. 181, fig. 7.2 a-e; Tebble, 1968, p. 33.

Vanadis pelagica Greeff, 1876, p. 67, pl. 3, figs. 33, 34.

Alciopa longirhyncha Greeff, 1885, p. 453, pl. 14, fig. 37.

Alciopa Krohnii Hering, 1892, p. 738, pl. 4, figs. 1-13.

Vanadis Greeffiana Grube, 1877, p. 524.

Vanadis longicauda Apstein, 1891, p. 5.

Vanadis latocirrata Apstein, 1891, p. 7.

Vanadis uncinata Treadwell, 1943, p. 36, fig. 24.

Distribution: tropical and subtropical Atlantic, Pacific (Type locality: B. of Naples).

Comments: Tebble (1960, p. 186) notes that some of Monro's specimens ascribed to this species are referable to *V. crystallina* and some to *V. longissima*.

25. *Vanadis crystallina* Greeff

Vanadis crystallina Greeff, 1876, p. 68, pl. 4, figs. 35-39; Apstein, 1900, p. 10, pl. 1, fig. 7; Lo Bianco, 1904, p. 50, fig. 112; Granata, 1911, p. 56; Ehlers, 1913, p. 466; Fauvel, 1916, p. 66; 1923, p. 206, fig. 77 d-e; 1932 a, p. 17; Monro, 1936, p. 116; Wesenberg-Lund, 1939, p. 32, fig. 22; Støp-Bowitz, 1948, p. 27, figs. 19, 20; 1951, p. 7; Fyfe, 1952, p. 10; Dales, 1957 a, p. 118, figs. 25-27; 1957 b, p. 662; Tebble, 1960, p. 186; 1962, p. 300; Rullier, 1965, p. 869; Tebble, 1968, p. 33.

Alciopa candida Hering, 1892, p. 732, pl. 3.

Vanadis augeneri Benham, 1929, p. 187, pl. 1, figs. 1-7; Fauvel, 1935, p. 295; 1951, p. 292; Fyfe, 1952, p. 10.

Vanadis formosa Monro, 1930, p. 81; 1937, p. 268.

Vanadis collata Treadwell, 1928 a, p. 462, figs. 27, 28.

Vanadis crystallina crystallina Day, 1967, p. 182, fig. 7.2 f, g.

Distribution: N. and S. Atlantic, Pacific, Indian Ocean (Type locality: B. of Naples).

Comments: Benham's Type of *Vanadis augeneri* is in the British Museum (Natural History) (1929.9.20.1) and has been examined by one of us (G. P.) and we agree with Tebble (1960) that it is identical with *V. crystallina*. In the same paper, Tebble (1960, p. 187) points out how close *V. crystallina* and *V. formosa* are and he suggests that they may represent the same species. While recognising this as a possibility we feel it better to keep them separate pending further work. Hartman (1956, p. 277) confirms that Treadwell's *V. collata* agrees with *crystallina*. Day (1967, p. 182) differentiates two subspecies, *crystallina* and *inornata*.

25 a. *Vanadis crystallina inornata* Day

Vanadis crystallina inornata Day, 1967, p. 182.

Distribution: Mocambique Channel.

Comments: Day's subspecies differs from *V. c. crystallina* in the relative length of the dorsal and ventral cirri and in the unpigmented segmental organs. The Type is in the British Museum (Natural History).

26. *Vanadis minuta* Treadwell

Vanadis minuta Treadwell, 1906, p. 1158, figs. 25–28; Støp-Bowitz, 1948, p. 30; 1951, p. 7, Dales, 1957 a, p. 119, figs. 28–30; 1960, p. 483; Tebble, 1962, p. 390, fig. 7; Dales, 1963, p. 502; Hartman, 1966, p. 190; Day, 1967, p. 184, fig. 7.2 k–m; Tebble, 1968, p. 33.

Vanadis ornata Greeff, 1876, p. 66, figs. 22–32.

Alciopa candida Hering, 1892, p. 732.

Distribution: Pacific, Atlantic (Type locality: off Hawaii).

Comments: Tebble (1962) criticises the inclusion of Treadwell's (1906) species *fusca punctata* as *minuta* on the grounds that Treadwell's original figure clearly shows a 5th (median) antenna which is absent in *V. minuta*, in spite of the fact that Treadwell (1953) later suggested that the two species were the same as Dales (1957 a) also concluded. Tebble rightly comments, however, that this is a character not likely to vary and that the two species are consequently distinct. Hartman (1966, p. 190) includes *fusca-punctata* as a synonym of *V. minuta* also following Treadwell (1943). The two species have probably often been confused and we would now agree with Tebble that they are distinct.

27. *Vanadis fuscipunctata* Treadwell

Vanadis fuscipunctata Treadwell, 1906, p. 1159, figs. 29–31; 1936, p. 59; 1943, p. 36; Day, 1967, p. 184, fig. 7.2 i–j.

Vanadis minuta Dales, 1957 a, p. 119, figs. 29, 30.

Distribution: Pacific, Atlantic.

Comments: the drawings ascribed to *minuta* (Dales 1957 a, figs. 29, 30) refer to this species: *minuta* was also present, and the two species were confused. See Day, 1967, p. 184 for distinctive features of the two species, and further comments under *V. minuta*, above. The Type is in the U.S. National Museum.

28. *Vanadis longissima* Levinsen

Rhynconerella longissima Levinsen, 1885, p. 330, figs. 7–10.

Vanadis fasciata Apstein, 1890, p. 543, pl. 38, figs. 1–9.

Vanadis longissima Apstein, 1900, p. 11, pl. 1, figs. 8, 9; Fauvel, 1916, p. 66; 1923, p. 207, fig. 77 f, g; Monroe, 1930, p. 79, fig. 24 a–c; Dales, 1955 b, p. 439; 1957 a, p. 121, figs. 31–33; Tebble, 1958, p. 166; Fauvel & Rullier, 1959, p. 157; Tebble, 1960, p. 187, fig. 27; 1962, p. 392, fig. 8; Grice & Hart, 1962, p. 302; Pettibone, 1963, p. 91, fig. 22 a–d; Hartman, 1964, p. 63, pl. 18, figs. 8, 9; Rullier, 1965, p. 869; Day, 1967, p. 186, fig. 7.3 a–c; Tebble, 1968, p. 33; Hartman, 1968, p. 319, figs. 1–3.

Vanadis formosa Monroe, 1930, p. 81.

Vanadis antarctica Monroe, 1936, p. 116 (in part).

Vanadis grandis Izuka, 1914, p. 5, pl. 1, figs. 1–7.

Vanadis pacifica Uschakov, 1957 a, p. 275, fig. 4.

Torea fasciata Treadwell, 1943, p. 35, figs. 19–20.

Distribution: N. and S. Atlantic, Pacific.

Comments: Tebble (1960) has re-examined Monroe's (1930) *Vanadis formosa* and *V. antarctica* (Monroe, 1936) and considers them to be *longissima* (see also Tebble 1962, p. 393). Tebble (1962) is also of the opinion that Uschakov's species *V. pacifica* is synonymous and we concur with his arguments (Tebble, 1962, p. 392). Imajima & Hartman (1964, p. 73) have described *V. grandis* (Izuka, 1914) as having green segmental glands but the arrangement of these organs would appear to be the same as in *V. longissima*. More material is needed to determine whether or not Izuka's species is merely a variety of *longissima*.

29. *Vanadis antarctica* McIntosh

Alciopa antarctica McIntosh, 1885, p. 175, pl. 28, figs. 2-4, pl. 32, fig. 12; Gravier, 1911 b, p. 65; pl. 2, fig. 26, pl. 3, figs. 28, 29, pl. 4, fig. 38.

Vanadis antarctica Apstein, 1900, p. 11; Willey, 1902, p. 27, pl. 44, fig. 8, pl. 46, figs. 1, 2; Ehlers, 1913, p. 466 (in part); Benham, 1921, p. 58, pl. 8, figs. 61, 62; Augener, 1932, p. 27; Monro, 1936, p. 116 (in part); Fauvel, 1936 a, p. 17; Støp-Bowitz, 1948, p. 30; 1949, p. 5; Baker, 1954, p. 208; Tebble, 1960, p. 188.

Distribution: Antarctic Ocean.

Location of Type: British Museum (Natural History).

Comments: McIntosh's Type (British Museum (Natural History) 1885 12.1.131^a) has been examined by Tebble and by one of us (G. P.) and has lost its head. Tebble (1960, p. 224) considered the possibility of *V. antarctica* and *V. longissima* representing races of the same species (see also Tebble 1962, p. 472).

30. *Vanadis violacea* Apstein

Vanadis violacea Apstein, 1893, p. 143, pl. 5, figs. 1-4, 1900, p. 10; Monro, 1936, p. 117; Støp-Bowitz, 1948, p. 30; Tebble, 1960, p. 189; Day, 1967, p. 185, fig. 7.2 n-p.

Distribution: S. Atlantic.

Comments: Tebble (1960) suggests that *V. violacea* may be a geographical race of *V. longissima*.

31. *Vanadis studeri* Apstein

Vanadis studeri Apstein, 1893, p. 145, 1900, p. 10; Støp-Bowitz, 1948, p. 30.

Distribution: W. Australia.

32. *Vanadis macrophthalma* Greeff

Vanadis macrophthalma 1876, p. 69, pl. 3, fig. 28.

Distribution: (Type locality) B. of Naples.

Comments: indeterminable from Greeff's brief description and figure.

33. *Vanadis melanophthalmus* Greeff

Vanadis melanophthalmus Greeff, 1885, p. 448, figs. 22-25; Apstein, 1900, p. 17 (quotation only).

Distribution: West Indies.

Comments: this could be a *Rhynchonerella* sp.

34. *Vanadis nans* (Chamberlin)

Mauita nans Chamberlin, 1919, p. 136.

Mauita, sp. Treadwell, 1943, p. 36.

Vanadis nans Dales, 1957 a, p. 123.

Distribution: tropical Pacific.

35. *Vanadis tagensis* Dales

Vanadis tagensis Dales, 1955 b, p. 436, fig. 1 a-c; Tebble, 1962, p. 394, fig. 9; Hartman, 1968, p. 321, figs. 1-3.

Distribution: deep waters of N. E. Pacific, Antarctic.

Comments: see Tebble (1962) for description. The Type is in the British Museum (Natural History), Paratypes in the Allan Hancock Foundation, (University of Southern California).

Genus *ALCIOPA* Audouin and Milne-Edwards

Type species: *Alciopa reynaudii* Audouin and Milne-Edwards, 1829.

36. *Alciopa reynaudi* Audouin & Milne-Edwards

Alciopa Reynaudii Audouin & Milne-Edwards, 1829, p. 202; 1833, p. 35; Milne-Edwards, 1836, p. 216; Grube, 1850, p. 305; Quatregafes, 1865, p. 157; Støp-Bowitz, 1948, p. 30, fig. 21; Dales, 1957 a, p. 124, figs. 34, 35; Tebble, 1958, p. 166; 1960, p. 193; Berkeley & Berkeley, 1960, p. 124; Pettibone, 1963, p. 93, fig. 23 a, b; Berkeley & Berkeley, 1964, p. 124; Day, 1957, p. 180, fig. 7.1 l-o; Tebble, 1968, p. 33.

Nauphanta celox Greeff, 1876, p. 69, pl. 3, figs. 40-42, pl. 4, figs. 34-55; Levinsen 1882, p. 214, pl. 7, fig. 9, 1885, p. 331, figs. 11, 12.

Nauphanta spectabilis Greeff, 1876, p. 76.

Greeffia oahuensis McIntosh, 1885, p. 182, pl. 28, figs. 5-7; Apstein, 1900, p. 12; Treadwell, 1906, p. 1160; 1928, p. 463; Benham, 1929, p. 188; Monro, 1930, p. 82, fig. 25, 1936, p. 188; Wesenberg-Lund, 1939, p. 35, fig. 23; Fyfe, 1952, p. 10; Berkeley & Berkeley, 1958, p. 400.

Greeffia celox Apstein, 1891, p. 131, figs. 12-15, 1900, p. 12, pl. 2, fig. 10; Reibisch, 1905, p. 5, fig. 9; Southern, 1911, p. 3; Fauvel, 1916, p. 67, 1923, p. 208, fig. 78 a-c, 1953, p. 135, fig. 69 a-c.

?*Alciopa quadrioculata* McIntosh, 1885, p. 183.

Halodora Reynaudii Greeff, 1876, p. 56; McIntosh, 1885, p. 182; Chamberlin, 1919, p. 139.

Distribution: N. and S. Atlantic, Pacific, Indian Ocean.

Comments: Hartman (1966, p. 189) lists *Alciopa pacifica* Kinberg and *A. ?quadrioculata* McIntosh 1885. These are only quotations of the original identifications. *A. quadrioculata* may be synonymous with *A. reynaudi* (Dales, 1957 a): *A. pacifica* is indeterminable because Kinberg gave no description.

Genus *PLOTOHELMIS* Chamberlin

Type species: *Plotohalmis capitata* Greeff, 1876.

37. *Plotohalmis capitata* Greeff

Rhynchonerella Capitata Greeff, 1876, p. 74, pl. 5, figs. 67, 68; Viguier, 1886, p. 408; Granata, 1911 a, p. 59.

Rhynchonerella fulgens Greeff, 1885, p. 450; Apstein, 1900, p. 15, pl. 2, figs. 19-22, pl. 5, fig. 51; Izuka, 1914, p. 8, pl. 1, figs. 11, 12; Chamberlin, 1919, p. 143; Fauvel, 1923, p. 210, fig. 79 a-d; 1939, p. 284; 1951, p. 293; 1953, p. 138, fig. 70 a'-d'; Zei, 1956, p. 55.

Plotohalmis capitata Dales, 1957 a, p. 128; 1960, p. 483; 1963, p. 502; Berkeley & Berkeley, 1964, p. 124; Day, 1967, p. 195, fig. 7.5 j-l.

Distribution: N. and S. Atlantic, Mediterranean, N. W. Pacific.

Comments: see comments under *Plotohalmis tenuis* (below).

38. *Plotohalmis tenuis* Apstein

Corynocephalus tenuis Apstein, 1900, p. 14, pl. 2, figs. 14-16; Chamberlin, 1919, p. 141.

Plotohalmis tenuis Dales, 1955 b, p. 439, 1957 a, p. 125, figs. 36-39, 1957 b, p. 662; Berkeley & Berkeley, 1957, p. 574; Tebble, 1962, p. 403, figs. 15-17; Berkeley & Berkeley, 1964, p. 124; Day, 1967, p. 193, fig. 7.5 a-c.

Alciopina tenuis Hartman, 1968, p. 309, figs 1-3.

Distribution: N. and S. Atlantic, Mediterranean, Pacific.

Comments: Tebble (1962, p. 405) reports that he has not seen any specimens justifying separation of *Plotohalmis tenuis*, *alata* and *capitata*. Berkeley & Berkeley (1964, p. 124) distinguished all three species and agree with us and Støp-Bowitz (1948, p. 32) that these differences are real. See Dales 1957 a for detailed comparison: Day 1967, p. 192 gives most useful descriptions and illustrations (fig. 7.5) of all three species.

39. *Plotohelms alata* Chamberlin

Plotohelms alata Chamberlin, 1919, p. 144, pl. 23, figs. 4-10, pl. 24, figs. 1-3; Treadwell, 1943, p. 37; Dales, 1957 a, p. 128; Berkeley & Berkeley, 1964, p. 125; Day, 1967, p. 193, figs. 7.5 d-l.

Distribution: S. Pacific.

Comments: see comments under *Plotohelms tenuis* (above).

Genus *KROHNIA* Quatrefages

Type species: *Krohnia lepidota* (Krohn), 1845.

40. *Krohnia lepidota* (Krohn)

Alciopa lepidota Krohn, 1845, p. 175; Hering, 1860, p. 12; Langerhans, 1880, p. 312; Hering, 1892, p. 757, pl. 6, figs. 8, 9.

Krohnia lepidota Quatrefages, 1865, p. 158; Granata, 1911 a, p. 56; Støp-Bowitz, 1948, p. 33; Dales, 1957 a, p. 129; Tebble, 1958, p. 166, 1960, p. 193, fig. 50; 1962, p. 406, fig. 18; Berkeley & Berkeley, 1964, p. 125; Day, 1967, p. 179, fig. 7.1 i-k.

Callizonella lepidota Apstein, 1891, p. 133, 1900, p. 12, pl. 2, figs. 11-13; Fauvel, 1916, p. 67, 1923, p. 211, fig. 79 e-h; Wesenberg-Lund, 1939, p. 38, fig. 25; Zei, 1956, p. 54, fig. 21; Uschakov, 1957 a, p. 278, fig. 5; Rullier, 1965, p. 868.

Callizonella pigmata Treadwell, 1943, p. 38, fig. 25.

Callizona cincinnata Greeff, 1876, p. 71, pl. 5, figs. 56-59.

Rhyncherella cincinnata Chamberlin, 1919, p. 146.

Alciopa cirrata Greeff, 1876, p. 60, pl. 1, figs. 5, 6, pl. 2, figs. 19-21.

Alciopa krohnii Greeff, 1879, p. 450, pl. 14, figs. 1-6.

Distribution: tropical and subtropical Atlantic, Mediterranean, Pacific, Indian Ocean.

41. *Krohnia excellata* Uschakov

Callizonella excellata Uschakov, 1955 c, p. 108, fig. 11; 1957 a, p. 278.

Distribution: deep water, N. Pacific.

Genus *RHYNCHONERELLA* Costa

Type species: *Rhyncherella gracilis* Costa, 1862

42. *Rhyncherella gracilis* Costa

Rhyncherella gracilis Costa, 1862, p. 168, pl. 4, figs. 13-15; Støp-Bowitz, 1948, p. 36; Dales, 1957 a, p. 131; 1957 b, p. 662; Tebble, 1962, p. 396, fig. 10 a, b; Berkeley & Berkeley, 1964, p. 126; Imajima & Hartman, 1964, p. 72; Day, 1967, p. 189, fig. 7.4 a-d; Tebble, 1968, p. 33.

Callizona nasuta Greeff, 1876, p. 72, pl. 6, figs. 60-62; Apstein, 1900, p. 19, pl. 3, figs. 31, 32; Fauvel, 1923, p. 215, fig. 81 a-c; Zei, 1956, p. 54; Uschakov, 1957 a, p. 279, fig. 6; Berkeley & Berkeley, 1960, p. 790; Rullier, 1965, p. 871.

Callizona japonica Izuka, 1914, p. 7, pl. 1, fig. 8.

Distribution: tropical and subtropical Atlantic, Mediterranean, Pacific (Type locality: B. of Naples).

43. *Rhyncherella angelini* Kinberg

Krohnia Angelini Kinberg, 1866, p. 242.

Rhyncherella Angelini Greeff, 1876, p. 57; Støp-Bowitz, 1948, p. 34; Fraser, 1955, p. 12; Dales, 1955 b, p. 439; Hartman, 1956, p. 277; Dales, 1957 a, p. 113, figs. 44-46; Imajima, 1961, p. 8, fig. 3 A-C; Tebble, 1960, p. 192, fig. 50, 1962, p. 400, figs. 13, 14 a; Imajima & Hartman, 1964, p. 72; Day, 1967, p. 190, fig. 7.4 e-h; Tebble, 1968, p. 33; Hartman, 1968, p. 313, figs. 1, 2; Clark, 1970, p. 421.

Callizona Grubei Greeff, 1876, p. 72, pl. 5, figs. 63-66, pl. 6, figs. 67, 68; Levinsen, 1885, p. 333, fig. 13; Apstein, 1900, p. 18.

Callizona Angelini Apstein, 1900, p. 18, pl. 4, figs. 33-38; Reibisch, 1905, p. 4, figs. 7, 8; Southern, 1911, p. 4; Fauvel, 1916, p. 68, 1923, p. 215, fig. 81 d-i; Monro, 1930, p. 82; Fauvel, 1932 a, p. 17; Monro, 1936, p. 118; Wesenberg-Lund, 1939, p. 41; Berkeley & Berkeley, 1948, p. 34; 1957, p. 575; 1958, p. 400; 1960, p. 790.

Rhynchonerella pycnocera Chamberlin, 1919, p. 147, pl. 25, figs. 7, 8; Treadwell, 1928, p. 462, 1943, p. 36.

Rhynchonerella parva Chamberlin, 1919, p. 150, pl. 26, figs. 1-6.

?*Callizona Henseni* Apstein, 1900, p. 20, figs. 44-50.

Krohnia angelini Uschakov & Wu, 1963.

Distribution: N. and S. Atlantic, Pacific (Type locality: China Sea).

Comments: the description and figures of Apstein (1900, p. 20, figs. 44-50) referring to *Henseni* come close to *angelini*; we would agree, in the absence of further evidence with the arguments of Støp-Bowitz (1948, p. 35).

44. *Rhynchonerella petersi* (Langerhans)

Alciopa (Halodora) petersii Langerhans, 1880, p. 312, pl. 17, fig. 49; Ehlers, 1913, p. 465.

Callizona setosa Apstein, 1900, p. 18, pl. 4, figs. 39-43; Southern, 1910, p. 5; Fauvel, 1923, p. 214, fig. 80 c, f; Wesenberg-Lund, 1939, p. 43; Uschakov, 1957 a, p. 281, fig. 6.

Rhynchonerella petersii Støp-Bowitz, 1948, p. 34; Dales, 1957 a, p. 133; Tebble, 1962, p. 398, Fig. 12 a-c; Grice & Hart, 1962, p. 302; Dales, 1963, p. 502; Berkeley & Berkeley, 1964, p. 126; Hartman, 1964, p. 61, pl. 18, figs. 4, 5; Bhand, 1966, p. 436; Guille & Laubier, 1966, p. 263; Day, 1967, p. 192, fig. 7.4 i-m; Tebble, 1968, p. 33.

Alciopa Cari Hering 1892, p. 753, pl. 6, figs. 1-3; Ehlers, 1912 b, p. 17.

Vanadis heterochaeta Viguier, 1886, p. 405, pl. 24, figs. 6-13.

Vanadis setosa Greeff, 1885, p. 449, pl. 13, fig. 26.

Corynocephalus magnachaetus Treadwell, 1943, p. 37, figs. 21, 22.

Callizona petersii Monro, 1939 b, p. 107.

Distribution: tropical and subtropical Atlantic, Pacific, Mediterranean, Indian Ocean (Type locality: off Madeira).

Comments: Tebble (1962, p. 400) maintains that the shafts of the acicular chaetae have spines (fig. 12 b, p. 399). He has examined Fauvel's specimen (*Callizona setosa*) in the British Museum (Natural History) and finds it identical in this and in other respects. Berkeley & Berkeley (1946, p. 126) agree with us in regarding Treadwell's *magnachaetus* as synonymous with *R. petersi*.

45. *Rhynchonerella moebii* (Apstein)

Callizona Möbii Apstein, 1893, p. 147; 1900, p. 16, pl. 3, figs. 23-30; Fauvel, 1923, p. 231, fig. 80 a-d; Wesenberg-Lund, 1939, p. 40, fig. 26; Rullier, 1965, p. 871.

Rhynchonerella möbii Støp-Bowitz, 1948, p. 34; Dales, 1957 a, p. 131, figs. 39-43, 1960, p. 484; Grice & Hart, 1962, p. 302; Tebble, 1962, p. 396, fig. 11; Berkeley & Berkeley, 1964, p. 126; Day, 1967, p. 189, fig. 7.3 g-l.

Distribution: tropical and subtropical Atlantic, Pacific, S.W. Indian Ocean.

46. *Rhynchonerella bongraini* (Gravier)

Callizona Bongraini Gravier, 1911 a, p. 312, 1911 b, p. 70, pl. 4, figs. 39-43, 1911 c, p. 694; Benham, 1929, p. 189, pl. 1, figs. 11, 12.

Callizonella Bongraini Augener, 1929, p. 294, fig. 2 a-g; Monro, 1936, p. 119; Fauvel, 1936 a, p. 18, 1936 b, p. 119.

Krohnia Bongraini Støp-Bowitz, 1948, p. 33; 1949 p. 11, figs. 3, 4; 1951, p. 8.

Rhynchonerella fulgens Ehlers, 1913, p. 467; Monro, 1930, p. 83, fig. 26.

Rhynchonerella bongraini Tebble, 1960, p. 191, fig. 12; Hartman, 1964, p. 59, pl. 18, figs. 1-3.

Distribution: Antarctic Ocean.

Comments: *Rhynchonerella bongraini* was wrongly ascribed to *Krohnia* (following Støp-Bowitz) in the 1956 Check-list, but Tebble from his studies of the Antarctic alciopids has established that Gravier's species belongs to *Rhynchonerella* (Tebble, 1960, p. 191). Tebble (*loc. cit.*) has examined Monro's *R. fulgens* and concludes that it is a *R. bongraini*.

Genus *ALCIOPINA* Claparède & Panceri

Type species: *Alciopina parasitica* Claparède & Panceri, 1867

47. *Alciopina parasitica* Claparède & Panceri

Alciopina parasitica Claparède & Panceri, 1867, p. 8; Claparède, 1868, p. 253, pl. 33; Granata, 1911 a, p. 57, pl. 4, figs. 1-3; Støp-Bowitz, 1948, p. 32; Dales, 1957 a, p. 128; 1963, p. 502; Day, 1967, p. 177, fig. 7.1 d-h.

Alciopina Pancerii Buchholtz, 1869, p. 95, pl. 4, figs. 1-4.

Corynocephalus albomaculatus Levinsen, 1885, p. 327, pl. 1, fig. 26; Apstein, 1900, p. 14, pl. 11, figs. 17, 18, pl. 5, figs. 12-14; Fauvel, 1916, p. 68; 1923, p. 208, fig. 78 d-i; Wesenberg-Lund, 1939, p. 36, fig. 24; Fauvel, 1939, p. 284, 1951, p. 293; 1953, p. 137, fig. 69 d-i; Zei, 1956, p. 53; Rullier, 1965, p. 872.

Distribution: N. and S. Atlantic, Mediterranean, S.W. Indian Ocean (Type locality: B. of Naples).

48. *Alciopina paumotanus* (Chamberlin)

Corynocephalus paumotanus Chamberlin, 1919, p. 141, pl. 23, figs. 1-3; Treadwell, 1943, p. 37;

Uschakov, 1957 a, p. 277, fig. 4; Berkeley & Berkeley, 1958, p. 400; 1964, p. 125.

?*Corynocephalus Gazellae* Apstein, 1893, p. 148, figs. 12-14, 1900, p. 15.

Distribution: Pacific.

Comments: in the 1956 Check-list this species was included as a synonym of *A. parasitica* but Berkeley & Berkeley (1964, p. 125) have emphasized their differences and we would now agree with this.

Genus *WATELIO* Støp-Bowitz

Type species: *Watelio gravieri* (Benham, 1929)

49. *Watelio gravieri* (Benham)

Callizona gravieri Benham, 1929, p. 190.

Watelio longifoliata Støp-Bowitz, 1948, p. 37, fig. 23 a-d.

Watelio gravieri Dales, 1957 a, p. 134 figs. 48, 50.

Distribution: Atlantic, Pacific.

Location of Type: British Museum (Natural History).

Family **TOMOPTERIDAE** Grube, 1848

Hartman (1959) list five genera: *Briaraea*, *Enapteris*, *Escholtzia*, *Johnstonella* and *Tomopteris*, but of these *Briaraea*, *Escholtzia* and *Johnstonella* are synonymous with *Tomopteris*. We recognise two genera only: *Enapteris* Rosa and *Tomopteris* Eschscholtz. Tebble (1960, p. 171) draws attention to the artificiality of using Gosse's (1853) genus *Johnstonella* (tailed) as a subspecies of *Tomopteris*, restricting the tail-less species to *T. tomopteris*. While most authors have followed this distribution, including ourselves in the past, we would now agree with Tebble. In the synonymies the sub-generic designations when used by previous authors have been omitted. Day (1967, p. 197) includes *Enapteris* with the genus *Tomopteris*. We follow Rosa (1908 b) in including the species *euchaeta* in a separate genus as most workers have done since Rosa drew attention to it, but the distinctions are ones of degree and it must be admitted reasonable to suggest that the differences between *euchaeta* and other tomopterids are insufficient to separate it as a distinct genus (see also discussion under *Enapteris*).

In the 1956 Check-list (Dales, 1956) the status of a number of species was left in doubt. Some of these can now be re-evaluated:

Tomopteris levipes Greeff, 1870 a (p. 276, pl. 15, figs. 44, 45) cannot really be identified as he saw no chromophile glands (only rosettes) in the pinnules. It was probably an immature worm. Støp-Bowitz (1948) also queried its validity.

The Type of *Tomopteris smithii* Verrill (1880) has been examined by Pettibone (1963) who concluded that it is synonymous with *T. helgolandica*. We could add that *T. Huxleyi* Quatrefages (1865) is probably synonymous with *T. onisciformis* Carpenter (1859) and that these are also in reality *T. helgolandica*. The Type of *Tomopteris tentaculata* Treadwell (1928) has been examined by Hartman (1956, p. 278) who thinks it is probably an immature specimen of a known species but is indeterminable. The same might be said of *T. Danae* (Minor, 1862, p. 429). *Tomopteris opaca* Treadwell (1928) has been resolved as a *T. nissenii* (Hartman, 1956, p. 277). *Tomopteris australensis* and *T. Mortenseni* described by Augener (1927) are difficult to define from published descriptions and Augener's rather inadequate figures. *T. australensis* has not been subsequently described but Fauvel has ascribed specimens to *T. mortensi*.

Dalyell (1853, Vol. 2, p. 260, pl. 36, figs. 11, 16, 17) described a *Tomopteris* as *Nereis phasma*. It is also quite indeterminable but was probably a *T. helgolandica*.

Genus *ENAPTERIS* Rosa

Type species: *Enapteris euchaeta* (Chun, 1887)

50. *Enapteris euchaeta* (Chun)

Tomopteris euchaeta Chun, 1887, p. 19, pl. 3, figs. 1-3; Apstein, 1900, p. 43, pl. 11, figs. 19, 20; Lo Bianco, 1901, p. 453, 1904, p. 51, pl. 30, fig. 117; 1919, 513; Day, 1967, p. 202, fig. 8.2 a, b.

Tomopteris onisciformis Grube, 1848, p. 467.

Tomopteris scolopendra Keferstein, 1861, p. 360.

Enapteris euchaeta Rosa, 1908 b, p. 269; 1912, p. 4; Malaquin; & Carin, 1922, p. 31 Fauvel, 1923, p. 218, fig. 82 a-c; Caroli, 1928 a, p. 7; 1928 b, p. 4, 1928 c, p. 7, 1933, p. 273; Terio, 1947 a, p. 329, fig. 1; Støp-Bowitz, 1948, p. 39, fig. 24; Terio, 1950 a, p. 45; Williams, 1954, p. 59; Zei, 1956, p. 49.

Distribution: N. and S. Atlantic, Mediterranean.

Comments: Day (1967, p. 197) includes this species within the genus *Tomopteris*. While there is some justification for this, we suggest that his view that "*Enapteris* Rosa, 1908 (type species *Tomopteris euchaeta* Chun) is a juvenile stage" requires further examination. Chun's specimens were up to 30 mm in length and Rosa described several specimens 20 mm long. We propose to retain *Enapteris* for the time being.

Genus *TOMOPTERIS* Eschscholtz

Type species: *Tomopteris onisciformis* Eschscholtz, 1825

51. *Tomopteris septentrionalis* Quatrefages

Tomopteris septentrionalis Steenstrup, 1849, p. 4 (*nomen nudum*); Quatrefages, 1865, p. 229; Levinsen, 1883, p. 245; Apstein, 1900, p. 41, pl. 2, figs. 16, 17; Reibisch, 1905, p. 9, fig. 13; Rosa, 1908 b, p. 297, pl. 12, fig. 17; Gravier, 1911 b, p. 72; Southern, 1911, p. 20; Malaquin & Carin, 1911 b, p. 14; Izuka, 1914, p. 13; Ehlers, 1917, p. 229; Saemundson, 1918, p. 191;

- Huntsman, 1921, p. 90; Malaquin & Carin, 1922, p. 38, pl. 6, figs. 3, 4, pl. 9, fig. 4; Fauvel, 1923, p. 224, fig. 84 d; Berkeley, 1924, p. 5; McIntosh, 1925, p. 24, pl. 5, fig. 3, pl. 1, fig. 6; Caroli, 1928 b, p. 8; Bigelow, 1928, p. 340; Wesenberg-Lund, 1928, p. 137; Augener, 1929, p. 301; Benham, 1929, p. 195; Monro, 1930, p. 86; Hardy & Gunther, 1935, p. 115; Wesenberg-Lund, 1935, p. 9, fig. 2, pl. 1, figs. 7-9; 1936, p. 4, fig. 6; Monro, 1936, p. 121; 1939 b, p. 108; Treadwell, 1943, p. 39; Terio, 1947 a, p. 355, fig. 19, 1948, p. 29; Berkeley & Berkeley, 1948, p. 26; Støp-Bowitz, 1948, p. 49, figs. 36, 37; 1949, p. 12; Wesenberg-Lund, 1950, p. 12; Støp-Bowitz, 1951, p. 9; Kielhorn, 1952, p. 236; Fyfe, 1952, p. 10; Baker, 1954, p. 211; Fraser, 1955, p. 12; Uschakov, 1955, p. 110, fig. 13; Dales, 1955 b, p. 440; 1957 a, p. 145, fig. 51 f, 52 g, 54, 1957 b p. 663; Berkeley & Berkeley, 1957, p. 575; Tebble, 1958, p. 166; 1960, p. 176, fig. 8 a, b; Imajima 1961, p. 9, 1962, p. 382, fig. 5; Mileikovsky, 1962, p. 1067; Pettibone, 1963, p. 97, fig. 25 c; Imajima & Hartman, 1964, p. 77; Day, 1967, p. 205, fig. 8.2 l, m.; Hartman, 1968, p. 355, figs. 1, 2.
- ?*Tomopteris Eschscholtzi* Greeff, 1879 a, p. 276, pl. 15, figs. 42, 48, 51; Apstein, 1900, p. 42; Rosa, 1908 b, p. 306; Caroli, 1933, p. 380, fig. 4.

Distribution: cosmopolitan.

52. *Tomopteris carpenteri* Quatrefages

- Tomopteris Carpenteri* Quatrefages, 1865, p. 227, pl. 20, figs. 1, 2; McIntosh, 1885, p. 20; Ehlers, 1917, p. 229, pl. 12, figs. 9-12 (in part); Benham, 1931, p. 63; 1929, p. 191, pl. 2, figs. 18-23; Augener, 1929, p. 304; Monro, 1930, p. 84; Augener, 1932, p. 28; Hardy & Gunther, 1935, p. 115; Monro, 1936, p. 126; Støp-Bowitz, 1948, p. 54; 1949, p. 16, figs. 6, 7; 1951, p. 9; Fauvel, 1953 b, p. 4; Baker, 1954, p. 211; Tebble, 1958, p. 166; 1960, p. 175; Hartman, 1964, p. 67, pl. 21, fig. 1; Day, 1967, p. 204, fig. 8.2 e, f.
- nec. *T. Carpenteri* McIntosh, 1925, p. 39.

Distribution: Antarctic.

Comments: Tebble (1960) has examined Monro's material (Monro, 1930) and agrees with Augener (1929) that *T. planktonis* are not young *Carpenteri* as Monro contended. Tebble (1960, p. 175) suggests that McIntosh's specimen (McIntosh, 1925) described as *Carpenteri* is a *T. nisseni*.

53. *Tomopteris helgolandica* Greeff

- Tomopteris helgolandica* Greeff, 1879, p. 264; Michaelsen, 1897, p. 132; Apstein, 1900, p. 38, pl. 10, figs. 1-6; Moore, 1903, p. 798, pl. 55, fig. 13; Schwartz, 1905, p. 508; Reibisch, 1905, p. 8, figs. 11, 12; Southern, 1910, p. 8; Malaquin & Carin, 1911 b, p. 11, 1922, p. 35, pl. 6, fig. 1, pl. 7, figs. 4, 5; Fauvel, 1923, p. 221, fig. 83 h, i; Støp-Bowitz, 1948, p. 42, fig. 28; Treadwell, 1948, p. 29, fig. 15 b; Fauvel, 1953, p. 143, fig. 71 h, i; Zei, 1956, p. 45; Dales, 1957 b, p. 663; Clark, 1960, p. 17; Grice & Hart, 1962, p. 302; Mileikovsky, 1962, p. 1067; Eliason, 1962, p. 238; Åkesson, 1963, p. 135, figs. 1-31; Pettibone, 1963, p. 95, figs. 24, 25 a, b; Day 1967, p. 199, fig. 8.1 f-h.
- Tomopteris onisciformis* Busch, 1847, p. 180, pl. 7, fig. 5; Leuckart & Pagenstecher, 1858, p. 588; Carpenter, 1859, p. 353, figs. 1-9; Wright, 1861, p. 124; Carpenter & Claparède, 1862, p. 49, pl. 7; Möbius, 1874, p. 170; Vejdovski, 1878, p. 81, pls. 6, 7; Prince, 1888, p. 769; Herdman, 1906, p. 101; Wasserman, 1922, p. 64; Terio, 1952 b, p. 1; Williams, 1954, p. 59.
- Tomopteris Huxleyi* Quatrefages, 1865, p. 227.
- Johnstonella Catharina* Gosse, 1851, p. 356, pl. 25; 1863, p. 153.
- Tomopteris catharina* Rosa, 1908 b, p. 283; Huntsman, 1921, p. 86; Leigh-Sharpe, 1928, p. 214, pl. 11, fig. 3; Bigelow, 1928, p. 334, fig. 94; Terio, 1947 a, p. 337.
- Escholtzia quadricornis* Quatrefages, 1865, p. 225.
- Escholtzia Leuckartii* Quatrefages, 1865, p. 225.
- Tomopteris Pagenstecheri* Quatrefages, 1865, p. 227.
- Tomopteris smithii* Verrill, 1879, p. 182; Hartman, 1944, p. 338, pl. 25, figs. 8, 9.
- ?*Tomopteris vitrina* Vejdovski, 1878, p. 81, pls. 6, 7; Apstein, 1900, p. 37; Rosa, 1908 b, p. 287; Terio, 1947 a, p. 338.
- ?*Tomopteris eura* Chamberlin, 1919, p. 160, pl. 27, figs. 1, 2.

Distribution: Atlantic (Type locality: North Sea).

54. *Tomopteris kefersteini* Greeff, 1879.

Tomopteris kefersteini Greeff, 1879 a, p. 275, pl. 15, figs. 40, 41, 43, 46, 47; Viguier, 1886, p. 412, figs. 3-10, pl. 25; ?Apstein, 1900, p. 41, pl. 2, fig. 15; ?Lo Bianco, 1901, p. 453; 1904, p. 51, pl. 30, fig. 116, 1919, 513; ?Schwartz, 1905, p. 517, pl. 18; Wesenberg-Lund, 1935, p. 12, figs. 10-12; Terio, 1947 a, p. 365, 1947 c, p. 5; Zei, 1956, p. 49 (quotation only).

Distribution: N. Atlantic (Type locality: Canary Is.).

Comments: a redescription of this species is given by Terio (1947 c).

55. *Tomopteris elegans* Chun

Tomopteris elegans Chun, 1887, p. 18, pl. 3, figs. 4-9; Rosa, 1908 b, p. 294, pl. 12, fig. 16; Malaquin & Carin, 1911 b, p. 12; Rosa, 1912, p. 7; Izuka, 1914, p. 12; Ehlers, 1917, p. 227; Malaquin & Carin, 1922, p. 37, pl. 5, figs. 1-6, pl. 8, figs. 3-5, pl. 9, figs. 1-3; Fauvel, 1923, p. 223, fig. 84 b, c; Caroli, 1928 a, p. 17; 1928 b, p. 6; 1928 c, p. 17; Benham, 1929, p. 196, pl. 2, figs. 24-26; Caroli, 1933, p. 378; Terio, 1947 a, p. 353, fig. 18; Støp-Bowitz, 1948, p. 46, fig. 33 a, b; 1951, p. 9; Fyfe, 1952, p. 10; Fauvel, 1953, p. 142, fig. 71 b', c'; Dales, 1955 b, p. 440; Zei, 1956, p. 47; Dales, 1957 a, p. 142, figs. 51 a, 52 a; 1957 b, p. 663; Uschakov, 1957 a, p. 283, fig. 7; Tebble, 1960, p. 179, fig. 11, 1962, p. 381, fig. 4 a, b; Dales, 1963, p. 503; Berkeley & Berkeley, 1964, p. 126; Imajima & Hartman, 1964, p. 77; Rullier, 1965, p. 873; Day, 1967, p. 205, fig. 8.2 i-k; Tebble, 1968, p. 33; Hartman, 1968, p. 349, figs. 1, 2.

?*Tomopteris onisciformis* Eschscholtz, 1825, p. 736; Quatrefages, 1865, p. 226.

?*Tomopteris kefersteini* Apstein, 1900, p. 41, pl. 2, fig. 15; Lo Bianco, 1901, p. 453; 1904, p. 51, pl. 30, fig. 116; Schwartz, 1905, p. 517, pl. 18.

Distribution: N. and S. Atlantic, Mediterranean, Pacific.

Comments: Day (1967) concludes that *Tomopteris kefersteini* Greeff is synonymous with *T. elegans*. If the two species are separate they are certainly close with a result that it is difficult to avoid overlap in the synonymies (*T. onisciformis* Quatrefages or *T. kefersteini* Apstein). We would prefer to maintain *T. elegans* and *T. kefersteini* as separate species pending further evidence. Tebble (1962, p. 380) criticises the statement (Dales, 1957 a, p. 160) that gonads occur in the 3rd-8th parapodia (*T. elegans*) as compared with their occurrence in 3rd-9th in *T. kefersteini*: gonads should be distinguished from free oocytes. In *elegans* oocytes attain 130 μm in diameter only; specimens we would ascribe to *kefersteini* attain 334 μm in diameter.

56. *Tomopteris rolasi* Greeff

Tomopteris rolasi Greeff, 1882, p. 384; 1885, p. 438, pl. 12, figs. 1, 2, 5-11, 17; Apstein, 1900, p. 40; Malaquin & Dehorne, 1907, p. 340, figs. 21-24; Rosa, 1908 b, p. 281; Fauvel, 1935, p. 297; 1939, p. 281; 1953, p. 143, fig. 72 a.

Distribution: Atlantic, Indian Ocean.

57. *Tomopteris mariana* Greeff

Tomopteris mariana Greeff, 1882, p. 384; 1885, p. 440, figs. 3, 4, 12-16; Apstein, 1900, p. 40, pl. 10, figs. 9-14; Rosa, 1908 b, p. 279; Caroli, 1928 c, p. 10; Terio, 1947 a, p. 347; Dales, 1960, p. 485; Hopkins, 1966, p. 44.

Distribution: tropical and subtropical Atlantic, Indian Ocean.

58. *Tomopteris nationalis* Apstein

Tomopteris nationalis Apstein, 1900, p. 41; Rosa, 1908 b, 278; Malaquin & Carin, 1911 b, p. 7; Ehlers, 1917, p. 224, pl. 11, figs. 2-8; Malaquin & Carin, 1922, p. 22, pl. 10, fig. 1; Støp-Bowitz, 1948, p. 39, fig. 26; Terio, 1950 a, p. 95, figs. 1-5; Støp-Bowitz, 1951, p. 8; Dales, 1957 a, p. 139, figs. 51 c, 52 c; Grice & Hart, 1962, p. 302; Day, 1967, p. 198, fig. 8.1 a-c; Salerno, 1965, p. 203.

Distribution: tropical and subtropical Atlantic, Pacific.

Comments: Terio (1950 a) gives a detailed description of this species.

59. *Tomopteris planktonis* Apstein

Tomopteris planktonis Apstein, 1900, p. 42, pl. 11, figs. 21, 22; Reibisch, 1905, p. 9, figs. 14, 15; Rosa, 1908 b, p. 301; Malaquin & Carin, 1911 b, p. 14; Granata, 1911 a, p. 19; Huntsman, 1921, p. 91; Malaquin & Carin, 1922, p. 22, 27, 39, pl. 10, figs. 1, 2; Fauvel, 1923, p. 224, fig. 84 d; Caroli, 1928 a, p. 18; Augener, 1929, p. 303; Fauvel, 1932, p. 18; Caroli, 1933, p. 378; Monro, 1937, p. 270; Terio, 1947 a, p. 356; Treadwell, 1948, p. 29, fig. 15 c; Støp-Bowitz, 1948, p. 52, 1949, p. 13; Wesenberg-Lund, 1950 b, p. 43; Støp-Bowitz, 1951, p. 9; Fauvel, 1953, p. 142, fig. 71, f; Zei, 1956, p. 48; Dales 1957 b, p. 663; Tebble, 1958, p. 166; 1960, p. 171, fig. 6 a-f; 1962, p. 383; Grice & Hart, 1962, p. 302; Dales, 1963, p. 503; Rullier, 1965, p. 873; Day, 1967, p. 206, fig. 8.2 n-o.

Tomopteris ligulata Ehlers, 1917, p. 232.

Tomopteris cavallii Monro, 1939, p. 121; Dales, 1957 a, p. 144, figs. 51 b, 52 b.

Tomopteris Septentrionalis Monro, 1936, p. 121.

Distribution: cosmopolitan.

Comments: we agree with Tebble (1962, p. 383) that the specimens reported as *cavalli* (Dales, 1957 a) should be referred to *planktonis*. Tebble has examined Monro's specimens ascribed to *cavalli* and *septentrionalis* and both may be regarded as *planktonis*. The *cavalli* described by Monro (1930) earlier, Tebble (1962, p. 174) regards as probably being *krampfi*. Ehlers (1917) specimens in Berlin ascribed to *ligulata* have been examined by Tebble (1960, p. 178) who concludes that they are also *planktonis*.

60. *Tomopteris cavallii* Rosa

Tomopteris cavallii Rosa, 1907, p. 176, 1908 b, 304, pl. 12, fig. 20; Southern, 1911, p. 29; Ehlers, 1917, p. 231; Fauvel, 1923, p. 222, fig. 84 a; Caroli, 1928 c, p. 19; Benham, 1929, p. 197, figs. 27, 28; Monro, 1930, p. 87; Caroli, 1933, p. 379; Wesenberg-Lund, 1935, p. 9; 1936, p. 7; Monro, 1936, p. 121; 1937, p. 269; Terio 1947 a p. 361; Wesenberg-Lund, 1951, p. 33; Fauvel, 1953, p. 141, fig. 71 a'; Dales, 1955 b, p. 440; Zei, 1956, p. 49; Dales, 1957 a, p. 144, fig. 51 b, 52 b; Eliason, 1962, p. 237; Grice & Hart, 1962, p. 302; Berkeley & Berkeley, 1964, p. 127; Day, 1967, p. 206; Hartman, 1968, p. 347, figs. 1, 2.

Distribution: Pacific, Indian Ocean.

61. *Tomopteris colosii* Caroli

Tomopteris colosii Caroli, 1928 c, p. 20, pl. 1, figs. 10, 12; Terio, 1947 a, p. 363, fig. 27.

Distribution: Red Sea.

Comments: Caroli (1928 c) believed the single specimen from the Red Sea belonged to a new species close to *T. cavallii* but differing in possession of an anterior cirrus; more material is desirable.

62. *Tomopteris aloysii-sabaudiae* Rosa

Tomopteris Aloysii Sabaudiae Rosa, 1907, p. 176; 1908 b, p. 274, pl. 12, figs. 3-6; Caroli, 1928 c, p. 9; Fauvel, 1932, p. 66; Terio, 1947 a, p. 333, fig. 4; Fauvel, 1953, p. 144; Dales, 1957 a, p. 139, 1960, p. 485.

Distribution: Pacific, Indian Ocean.

63. *Tomopteris ligulata* Rosa

Tomopteris ligulata Rosa, 1908 a, p. 1; 1908 b, p. 302, pl. 12, figs. 18, 19; Malaquin & Carin, 1922, p. 22, 28, 41, pl. 6, fig. 3, pl. 10, figs. 3-5; Fauvel, 1923, p. 224, fig. 84 e; Caroli, 1928 a, p. 4; 1928 b, p. 7, fig. 3; 1933, p. 379; Monro, 1939 a, p. 348; Terio, 1947 a, p. 357, figs. 20, 21; Støp-Bowitz, 1948, p. 52, fig. 38; Terio, 1952 b, p. 52, figs. 1-8; Zei, 1956, p. 49, fig. 14; Dales, 1957 a, p. 142; Tebble, 1958, p. 166; 1960, p. 177, figs. 9, 10; 1962, p. 384; Grice & Hart, 1962, p. 302; Day, 1967, p. 204, fig. 8.2 g-h.

Tomopteris planktonis Monro, 1936, p. 121 (in part).

non *Tomopteris ligulata* Ehlers, 1917, p. 232.

Distribution: tropical and subtropical Atlantic, Pacific.

64. *Tomopteris duccii* Rosa

Tomopteris Ducci Rosa, 1907, p. 166; 1908 b, p. 273, pl. 12, figs. 1, 2; Huntsman, 1912, p. 85; Caroli, 1933, p. 273; Monro, 1937, p. 269; Terio, 1947 a, p. 332, figs. 2, 3; ?Treadwell, 1948, p. 28; Fauvel, 1953, p. 143, fig. 72 d; Dales, 1957 a, p. 139; Day, 1967, p. 201.

Distribution: Atlantic, Pacific, Red Sea, Indian Ocean.

65. *Tomopteris apsteini* Rosa

Tomopteris Apsteini Rosa, 1908 b, p. 288, pl. 12, figs. 10-13; Malaquin & Carin, 1911 a, p. 7; 1911 b, p. 7; Rosa, 1912, p. 9; Izuka, 1914, p. 13; Malaquin & Carin, 1922, p. 31, pl. 2, figs. 1-4 pl. 3, figs. 1-7, pl. 7, figs. 1-3; Fauvel, 1923, p. 220, fig. 83 a-d; Caroli, 1928 c, p. 9; Fauvel, 1936 b, p. 55; Terio, 1947 a, p. 349, figs. 14, 15; Støp-Bowitz, 1948, p. 39, figs. 26, 27; Zei, 1956, p. 47; Dales, 1957 a, p. 139, 1957 b, p. 663; Clark, 1960, p. 17; Berkeley & Berkeley, 1964, p. 127; Imajima & Hartman, 1964, p. 76; Day, 1967, p. 199, figs. 8.1 d, e; Tebble, 1968, p. 33.

Briaraea scolopendra Quoy & Gaimard, 1927, p. 235, pl. 7, figs. 1-6.

Tomopteris scolopendra Keferstein, 1861, p. 360, pl. 9; Greeff, 1879, p. 264; Apstein, 1900, p. 42, fig. 18.

Tomopteris onisciformis Grube, 1848, p. 467.

Distribution: N. and S. Atlantic, Mediterranean, Pacific.

66. *Tomopteris nisseni* Rosa

Tomopteris Nisseni Rosa, 1908 a, p. 1; 1908 b, p. 292; Malaquin & Carin, 1911, p. 11; Southern, 1911, p. 17, pl. 1, figs. 1, 2; Malaquin & Carin, 1922, p. 35, pl. 2, fig. 5, pl. 4, figs. 1-4, pl. 8, figs. 1, 2; Fauvel, 1923, p. 222, fig. 83 e, g; McIntosh, 1925, p. 26; Monro, 1930, p. 87; Fauvel, 1932 a, p. 12; Wesenberg-Lund, 1935, p. 6, figs. 13-15; Terio, 1947 a, p. 351, figs. 16, 17; Støp-Bowitz, 1948, p. 44, figs. 29, 30; Wesenberg-Lund, 1950 b, p. 42; 1951, p. 32; Dales, 1955 b, p. 440; 1957 a, p. 141, fig. 52 d, 1957 b, p. 663; Tebble, 1958, p. 166; Dales, 1960, p. 485; Tebble, 1960, p. 180, 1962, p. 384; Dales, 1963, p. 503; Tebble, 1968, p. 33; Hartman, 1968, p. 351, figs. 1, 2.

?*Tomopteris innatans* Chamberlin, 1919, p. 161, pl. 27, figs. 4-6.

?*Tomopteris idiura* Chamberlin, 1919, p. 159, pl. 27, fig. 3.

Tomopteris longisetis Treadwell, 1936, p. 58, figs. 18-21.

Tomopteris opaca Treadwell, 1928, p. 463, fig. 29.

Distribution: N. and S. Atlantic, Pacific.

Comments: Hartman (1956, p. 277) has examined Treadwell's (1928) Types of *opaca* and *longisetis* (Treadwell, 1936) and concludes that both are synonymous with *T. nisseni*. The identity of Chamberlin's species remain doubtful.

67. *Tomopteris dunckeri* Rosa

Tomopteris dunckeri Rosa, 1908 b, p. 276, pl. 12, figs. 7-9; Caroli, 1928 b, p. 220; 1928 c, p. 8; Fauvel, 1935, p. 297; Monro, 1937, p. 268; Fauvel, 1939, p. 282; Terio, 1947 a, p. 335, fig. 5; Fauvel, 1953, p. 145, fig. 72 b, c; Dales, 1960, p. 485; Day, 1967, p. 201, fig. 8.1 k, l.

Distribution: Indian Ocean.

68. *Tomopteris pacifica* Izuka

Tomopteris pacifica Izuka 1914, p. 11, figs. 1-4; Uschakov, 1955, p. 109, figs. 12, 13; Dales, 1955 b, p. 440; Uschakov, 1957 a, p. 285; Dales, 1957 a, p. 141, fig. 51 e, fig. 52 f; Tebble, 1962, p. 385, fig. 6; Imajima & Hartman, 1964, p. 76; Day, 1967, p. 199, fig. 8.1 i, j; Hartman, 1968, p. 353, figs. 1-3.

Tomopteris elegans Berkeley, 1924, p. 5, pl. 1, figs. 1, 2; Pettibone, 1967, p. 4.

Tomopteris renti Berkeley, 1930, p. 11; Berkeley & Berkeley, 1948, p. 26, figs. 31, 32; Uschakov, 1952, p. 106, figs. 3-5; 1955, p. 110; 1957 a, p. 285; Berkeley & Berkeley, 1957, p. 576; 1960, p. 791.

?*Tomopteris eura* Chamberlin, 1919, p. 160, pl. 27, figs. 1, 2; Treadwell, 1943, p. 39.

?*Tomopteris* sp. Hartman, 1966, p. 190 (following Treadwell, 1906, p. 1160).

Distribution: sub-arctic Pacific (Type locality: Misaki, Japan).

Comments: Tebble (1962, p. 387) agrees with our earlier opinion that *T. renata* (Berkeley & Berkeley, 1957, 1960) is synonymous with *T. pacifica*. We have examined Berkeley's co-types in the British Museum (Natural History) and we cannot differentiate these from *T. pacifica*. Berkeley (1924) described *renata* as *elegans* not knowing of Izuka's (1914) paper and preoccupation of that name. The name *renata* was then ascribed by Dr. E. Berkeley without redescription. In subsequent personal correspondence with the Berkeleys it is clear that they maintain the distinction between *renata* and *pacifica*. We would suggest that the size difference between Izuka's original specimens and those described as *renata* by the Berkeleys could account for these differences. Pettibone (1967, p. 4) in her review of the Berkeleys Types, notes these differences of opinion. Their Type of *T. renata* is in the U.S. National Museum, Washington, D.C. Further specimens referable to *T. pacifica* should be examined in the light of these viewpoints.

69. *Tomopteris mortenseni* Augener

Tomopteris Mortenseni Augener, 1927, p. 123, fig. 5; Fauvel, 1932, p. 65; 1953, p. 141.

Distribution: S.E. Australian waters.

Comments: see comments above in the introduction to the family.

70. *Tomopteris australiensis* Augener

Tomopteris australiensis Augener, 1927, p. 127, fig. 6.

Distribution: S.E. Australian waters.

Comments: See comments above in the introduction to the family.

71. *Tomopteris partenopea* Caroli

Tomopteris partenopea Caroli, 1928 b, p. 2; 1933, p. 373; Terio, 1947 a, p. 341, figs. 8, 9.

Distribution: (Type locality:) B. of Naples.

72. *Tomopteris membranacea* Caroli

Tomopteris membranacea Caroli, 1928 c, p. 14, pl. 1, figs. 7, 8; Terio, 1947 a, p. 336; Dales, 1963, p. 502.

Distribution: Red Sea.

73. *Tomopteris sanzoi* Caroli

Tomopteris Sanzoi Caroli, 1928 c, p. 12, pl. 1, figs. 2, 3; Terio, 1947 a, p. 345, fig. 12.

Distribution: Mediterranean.

74. *Tomopteris novaroi*

Tomopteris novaroi Caroli, 1928 c, p. 16, pl. 1, fig. 9.

Distribution: Red Sea.

75. *Tomopteris ehlersi*

Tomopteris Ehlersi Caroli, 1928 c, p. 13, pl. 1, figs. 4, 6.

Distribution: Red Sea.

76. *Tomopteris colosii*

Tomopteris colosii Caroli, 1928 c, p. 20, pl. 1. figs. 10, 12.

Distribution: Red Sea.

77. *Tomopteris erythrea* Caroli

Tomopteris erythrea Caroli, 1928 c, p. 11, pl. 1, fig. 1.

Tomopteris erythrea Terio, 1947 a, p. 342, fig. 10.

Distribution: (Type locality:) Red Sea.

78. *Tomopteris kempii* Monro

Tomopteris kempii Monro, 1930, p. 88, fig. 27; Tebble, 1960, p. 182; Day, 1967, p. 202.

Distribution: S. Atlantic, (Type locality: Tristan da Cunha).

Comments: This species comes close to *krampi* and *nisseni*: see discussion in Tebble (1960, p. 182). The Type is in the British Museum (Natural History).

79. *Tomopteris marginata* Caroli

Tomopteris marginata Caroli, 1932, p. 159; 1933, p. 376, fig. 2; Terio, 1947 a, p. 340, fig. 7.

Distribution: (Type locality:) B. of Naples.

80. *Tomopteris poliglandulata* Caroli

Tomopteris poliglandulata Caroli, 1932, p. 160; 1933, p. 382, figs. 6-8; Terio, 1947 a, p. 359, fig. 23.

Distribution: Mediterranean.

81. *Tomopteris expansa* Caroli

Tomopteris expansa Caroli, 1932, p. 159; 1933, p. 374, fig. 1; Terio, 1947 a, p. 339, fig. 6.

Distribution: (Type locality:) B. of Naples.

82. *Tomopteris tenuis* Caroli

Tomopteris tenuis Caroli, 1932, p. 160; 1933, p. 380, fig. 5; Terio, 1947 a, p. 358, fig. 22.

Distribution: (Type locality:) Red Sea.

83. *Tomopteris krampi* Wesenberg-Lund

Tomopteris krampi Wesenberg-Lund, 1936, p. 8, figs. 1-3; Støp Bowitz, 1948, p. 48, fig. 34; Dales, 1955 b, p. 440, 1957 a, p. 142, figs. 51 d, 52; 1957 b p. 663; Tebble, 1958 p. 166, 1960, p. 181; Day, 1967, p. 204, fig. 8.2 c, d.

Tomopteris cavallii Monro, 1930, p. 87 (in part, at least).

Distribution: deep waters in N. and S. Atlantic, Pacific (Type locality: Iceland-Greenland).

84. *Tomopteris pediculosa* Terio

Tomopteris pediculosa Terio, 1947 b, p. 6, figs. 2, 3.

Distribution: (Type locality:) Mediterranean.

85. *Tomopteris miriaglandulata* Terio

Tomopteris miriaglandulata Terio, 1947 b, p. 1, fig. 1.

Distribution: (Type locality:) Mediterranean.

86. *Tomopteris biancoi* Terio

Tomopteris Biancoi Terio, 1947 c, p. 16, figs. 12, 13; 1950 b, p. 39, fig. 3.

Distribution: (Type locality:) Mediterranean.

87. *Tomopteris stefanellii* Terio

Tomopteris Stefanellii Terio, 1947 c, p. 14, figs. 10, 11.

?*Tomopteris anadyomene* Meyer, 1929, p. 124.

Distribution: (Type locality:) Mediterranean.

88. *Tomopteris carolii* Terio

Tomopteris Carolii Terio, 1947 c, p. 8, figs. 4-7; 1950 b, p. 45, fig. 1.

Distribution: (Type locality:) Mediterranean.

89. *Tomopteris pierantonii* Terio

Tomopteris Pierantonii Terio, 1947 c, p. 12, figs. 8, 9.

Distribution: (Type locality:) Mediterranean.

90. *Tomopteris spartai* Terio

Tomopteris spartai Terio, 1950 b, p. 1, figs. 1-7.

Distribution: (Type locality:) B. of Naples.

91. *Tomopteris messania* Terio

Tomopteris messania Terio, 1952 a, p. 25, figs. 1-10.

Distribution: Mediterranean (Sts. of Messina).

Family TYPHLOSCOLECIDAE Uljanin, 1878

Hartman (1959) lists six genera: *Acicularia*, *Nuchubranchia*, *Plotobia*, *Sagitella*, *Travisiopsis* and *Typhloscolex*, and indicates that *Acicularia* is synonymous with *Sagitella*, *Nuchubranchia* and *Plotobia* with *Travisiopsis* so that there are, in reality, only three genera within this family. Day (1967, p. 207) says " *Typhloscolex* itself is an enigma." Friedrich (1950 a) was of the opinion that there were five species. He recognised *Typhloscolex muelleri* Uljanin, *T. praecox* Uljanin, *T. leuckarti* Reibisch, and added two species, *T. reibischi* and *T. robusta* distinguished by the proportions of the ciliary band ('Wimperwülste') and lobes ('Wimperhöcker') on the head. *T. phyllodes* and *T. muelleri* cannot be separated on the basis of head : body width. In *T. leuckarti* the head : body width is 2 : 1 as Friedrich (1950 a) noted. Tebble (1960, p. 196) also notes that in *leuckarti* the ciliated epaulettes are wider than the body, in *phyllodes* smaller, and in *muelleri* the same. Tebble suggests that *phyllodes* and *muelleri* are the same, and that all three could be synonymous. We also incline to the view that there is but one species, *T. muelleri*, but we are still not in any position to pronounce with any certainty on the validity of these different 'species' of *Typhloscolex*, and have listed here, *leuckarti*, *phyllodes* and *grandis* Støp-Bowitz separately.

Genus *TYPHLOSCOLEX* Busch

Type species: *Typhloscolex mülleri* Busch, 1851.

92. *Typhloscolex muelleri* Busch

Typhloscolex Mülleri Busch, 1851, p. 115, pl. 2, figs. 1-6; Greeff, 1879 b, p. 661; Reibisch, 1895, p. 52, figs. 7-14; 1905, p. 6, fig. 10; Ehlers, 1913, p. 530; Fauvel, 1923, p. 226, fig. 85 f-h; Augener, 1929, p. 307; Monro, 1930, p. 90; Fauvel, 1932, p. 19; Hardy & Günther, 1935, p. 116; Fauvel, 1936 a, p. 19; 1939, p. 279; Treadwell, 1943, p. 38, pl. 2, fig. 27; Støp-Bowitz, 1948, p. 55; 1949, p. 17, fig. 8; 1951, p. 10; Dales, 1955 b, p. 442; Uschakov, 1955, p. 112, fig. 14, 1957 a, p. 286; Berkeley & Berkeley, 1957, p. 577; Tebble, 1958, p. 166; 1960, p. 145; Dales, 1960, p. 485; Berkeley & Berkeley, 1960, p. 789; Imajima, 1961, p. 7, fig. 2; Tebble, 1962, p. 407; Dales, 1963, p. 503; Hartman, 1964, p. 67, pl. 20, fig. 13; Imajima & Hartman, 1964, p. 75; Day, 1967, p. 208, fig. 9.1 a, b; Hartman, 1968, p. 343, figs. 1-3.

Sagitella Bobretzkii Wagner, 1872, p. 347, figs. 1, 2.

Sagitella barbata Uljanin, 1878, p. 6, pl. 1, fig. 2.

Sagitella praecox Uljanin 1878, p. 8, pl. 1, fig. 3.

Acicularia virchowii Greeff, 1879 a, p. 237, pl. 13, figs. 1-18.

Distribution: cosmopolitan (Type locality: Trieste, Mediterranean).

Comments: Tebble (1960) has examined some of the specimens described by Hardy & Günther (1935) as *Sagitella cornuta* and finds them indistinguishable from *Typhloscolex muelleri*. See the comments on the genus above.

93. *Typhloscolex leuckarti* Reibisch

Typhloscolex Leuckartii Reibisch, 1895, p. 53, pl. 5, fig. 8; Ehlers, 1913, p. 531.

Distribution: (Type locality:) Sargasso Sea.

94. *Typhloscolex phyllodes* Reibisch

Typhloscolex phyllodes Reibisch, 1895, p. 55, pl. 5, figs. 6, 7; Ehlers, 1913, p. 530; Fauvel, 1916; Støp-Bowitz, 1948, p. 55; Knox, 1959, p. 110, pl. 3; Day, 1967, p. 209.

Distribution: tropical Atlantic.

Comments: Day (1967, p. 209) remarks that this is of doubtful validity and could be a larval *Travisiopsis*.

95. *Typhloscolex grandis* Støp-Bowitz

Typhloscolex grandis Støp-Bowitz, 1948, p. 53, figs. 42 a, b.

Distribution: mid N. Atlantic.

Comments: the Type is in the Bergen Museum, Norway.

Genus *SAGITELLA* Wagner

Type species: *Sagitella kowalevskii* Wagner, 1872.

96. *Sagitella kowalevskii* Wagner

Sagitella kowalevskii forme A. Wagner, 1872, p. 342, fig. A-C; Uljanin, 1878, p. 1, pl. 4; Reibisch, 1895, p. 56, pl. 5, fig. 9; Southern, 1910, p. 29; 1911, p. 30; Gravier, 1911, p. 517; Ehlers, 1913, p. 526, pl. 39, fig. 15; Fauvel, 1916, p. 71; Chamberlin, 1919, 1923, p. 228, fig. 85 a-c; Okuda, 1937, p. 76, fig. 2; 1938, p. 89; Støp-Bowitz, 1948, p. 56, fig. 43 a-c; Berkeley & Berkeley, 1948, p. 31, fig. 40; Fyfe, 1952, p. 10; Uschakov, 1952, p. 109; 1955, p. 114, fig. 14; Fraser, 1955, p. 12; Dales, 1955 b, p. 442; Zei, 1956, p. 57; 1957 a, p. 147, figs. 56, 57; 1957 b, p. 663; Uschakov, 1957 a, p. 288; Berkeley & Berkeley, 1960, p. 789; Imajima, 1961, p. 7; Grice & Hart, 1962, p. 302; Mileikovskiy, 1962, p. 1071; Tebble, 1962, p. 410; Dales, 1963, p. 503; Berkeley & Berkeley, 1964, p. 127; Imajima & Hartman, 1964, p. 74; Day, 1967, p. 209, fig. 9.1 c-e; Tebble, 1968, p. 33; Hartman, 1968, p. 333, figs. 1-3.

Acicularia virchowii Langerhans, 1877, p. 727; Greeff, 1878, p. 51; 1879 c, p. 237.

Typhloscolex Mulleri Greeff, 1879 c, p. 661, pl. 39.

Plotobia paucichaeta Treadwell, 1943, p. 38, pl. 2, fig. 26.

Distribution: cosmopolitan.

Comments: Tebble (1962, p. 410) has examined a syntype of *Plotobia paucichaeta* Treadwell (1943) in the U.S. National Museum, Washington D.C., and confirms our earlier contention that it is synonymous with *T. kowalevskii*.

Genus *TRAVISIOPSIS* Levinsen

Type species: *Travisiopsis lobifera* Levinsen, 1885.

97. *Travisiopsis lobifera* Levinsen

Travisiopsis lobifera Levinsen, 1885, p. 336, figs. 17—20; Reibisch, 1895, p. 57; Southern, 1911, p. 31, pl. 1, fig. 4; Fauvel, 1916, p. 73; 1923, p. 229, fig. 86 a-d; 1932 a, p. 19; 1932 b, p. 66; Støp-Bowitz, 1948, p. 57, fig. 44; Friedrich, 1950 a, p. 315; Støp-Bowitz, 1951, p. 10; Fauvel, 1953, p. 139, fig. 71 a-d; Dales, 1955 b, p. 442; 1957 a, p. 148, figs. 58, 59; Berkeley & Berkeley, 1957, p. 577; Uschakov, 1957 a, p. 286, fig. 7; Tebble, 1958, p. 166; Berkeley & Berkeley, 1960, p. 789; Tebble, 1960, p. 196, fig. 13 a; 1962, p. 411, fig. 19; Pettibone, 1963, p. 99, fig. 26 a; Berkeley & Berkeley, 1964, p. 127; Day, 1967, p. 213, fig. 9.1 m-n; Tebble, 1968, p. 33; Hartman, 1968, p. 341, figs. 1-4.

Sagitella kowalevskii Benham, 1929, p. 191.

?*Plotobia simplex* Chamberlin, 1919, p. 155, pl. 46, fig. 1; Treadwell, 1943, p. 38.

Distribution: N. and S. Atlantic, Pacific, Indian Ocean.

Comments: *Plotobia simplex* Chamberlin (1919) was referred to *T. lobifera* by Dales (1957 a) and Berkeley & Berkeley, (1964) have agreed with this; Tebble (1962, p. 411) follows Støp-Bowitz (1948) in suggesting that it is more likely to be synonymous with *T. lanceolata*.

98. *Travisiopsis lumbricoides* Reibisch

Travisiopsis lumbricoides Reibisch, 1895, p. 57, pl. 5, figs. 10-12; Støp-Bowitz, 1948, p. 61.

Distribution: Sargasso Sea.

Comments: Reibisch's figure of the anterior end is very reminiscent of *Sagitta kowalevskii*; the validity of this species is very doubtful.

99. *Travisiopsis lanceolata* Southern

Travisiopsis lanceolata Southern, 1910, p. 429; 1911, p. 30, pl. 1, figs. 3, 5, 6; Fauvel, 1916, p. 75; 1923, p. 229, figs. 86 e-g; ?Augener, 1929, p. 308; Fauvel, 1932 a, p. 20; Wesenberg-Lund, 1935, p. 13; 1939, p. 20; Fauvel, 1939, p. 280; Støp-Bowitz, 1948, p. 58, figs. 45, 46; Friedrich, 1950 a, p. 315; Wesenberg-Lund, 1950 a, p. 13; ?Zei, 1966, p. 56 (doubtful); Hartman, 1956, p. 277; Dales, 1957 b, p. 664; Tebble, 1958, p. 166; 1960, p. 198; 1962, p. 413; Hartman, 1964, p. 65, pl. 20, figs. 4, 5; Day, 1967, p. 212, fig. 9.1 h-i.

Sagitella cornuta Ehlers, 1913, p. 527, pl. 39, figs. 8-14 (nec. Ehlers, 1912); Monro, 1930, p. 90; 1939 a, p. 348.

Travisiopsis atlantica Treadwell, 1936, p. 62, figs. 30-33; 1941, p. 22.

Plotobia simplex Chamberlin, 1919, p. 155, pl. 65, figs. 6-11, pl. 66, fig. 1; Treadwell, 1943, p. 38.

Distribution: N. and S. Atlantic.

Comments: *T. cornuta* Ehlers (1912, p.25) appears to be *levinseni* (in part) but *cornuta* Ehlers (1913, p. 527) is *lanceolata*, according to Tebble (1960, p. 197). Ehlers' cotypes are in the British Museum (Natural History).

100. *Travisiopsis levinseni* Southern

Travisiopsis levinseni Southern, 1910, p. 429; 1911, p. 32, pl. 2, figs. 7-10; Fauvel, 1916, p. 76; 1923, p. 229, fig. 86 h-k; Wesenberg-Lund, 1935, p. 14; Monro, 1939 a, p. 346; Støp-Bowitz, 1948, p. 59, figs. 46, 47 a, b; 1949, p. 19; Wesenberg-Lund, 1950 a, p. 13, 1950 b, p. 44; 1951, p. 33; Friedrich, 1950 a, p. 315; 1950 c, p. 15; Støp-Bowitz, 1951, p. 11; Dales, 1955 b, p. 442; Uschakov, 1955, p. 113, fig. 14, 1957 a, p. 288; Dales, 1957 a, p. 150; 1957 b, p. 664; Tebble, 1958, p. 166; 1960, p. 197, fig. 13 b; 1962, p. 412; Wesenberg-Lund, 1963, p. 100, fig. 26 b; Hartman, 1964, p. 65, pl. 20, figs. 9, 10; Day, 1967, p. 213; Hartman, 1968, p. 339, figs. 1-3.

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Sagitella cornuta Ehlers, 1913, p. 527, pl. 39, figs. 8-14, (nec. Ehlers, 1912, p. 25).
Sagitella kowalevskii Gravier, 1911 b, p. 74, pl. 3, figs. 30-32; Benham, 1927, p. 80, pl. 2, figs. 33-34; Monro, 1930, p. 89.

Sagitella opaca Ehlers, 1913, p. 529, pl. 39, figs. 16, 17.

Travisiopsis benhami Monro, 1936, p. 123, fig. 17 a-c; Friedrich, 1950 a, p. 315; 1950 c, p. 15.

Distribution: N. and S. Atlantic, Antarctic.

Comments: see comments under *T. lanceolata* on the identity of Ehlers' *T. cornuta*, Benham's *Sagitella kowalevskii* (Benham 1927) is synonymous with *T. levinseni*, but (Benham, 1929) is *T. lobifera* (see Tebble, 1960, p. 197). Monro's Type of *T. benhami* in the British Museum (Natural History) has been examined by us and by Tebble (1960) and is synonymous with *T. levinseni*.

101. *Travisiopsis coniceps* Chamberlin

Plotobia coniceps Chamberlin, 1919, p. 156, pl. 66, figs. 2-4.

Travisiopsis coniceps Støp-Bowitz, 1948, p. 61, 1951, p. 11; Dales, 1955, p. 442; Hartman, 1957 a, p. 150; Hartman, 1968, p. 337, figs. 1, 2.; Dales, 1957 a, p. 150; Tebble, 1958, p. 166; 1960, p. 199; Day, 1967, p. 210, fig. 9.1 f, g.

Sagitella lobifera Ehlers, 1912, p. 24, pl. 3, figs. 1-4; Monro, 1930, p. 90; 1936, p. 122, 1939 b, p. 108.

Nuchubranchia palmata Treadwell, 1928, p. 481, figs. 66-68.

Distribution: Pacific, S. Atlantic.

Comments: Ehlers' *S. lobifera* in the British Museum (Natural History) has been examined by one of us (G. P.). Tebble (1960, p. 199) has examined Monro's specimens and also Treadwell's *Nuchubranchia palmata* which is manifestly *coniceps*.

102. *Travisiopsis dubia* Støp-Bowitz

Travisiopsis dubia Støp-Bowitz, 1948, p. 60, fig. 48 a-e; Dales 1960, p. 485; Tebble, 1962, p. 414, fig. 20 a-c; Day, 1967, p. 212, fig. 9.1 j-..

Distribution: N. and S. Atlantic, Indian Ocean.

Comments: although at first sceptical of the validity of this species (Dales, 1956), following the work of Tebble (1962, p. 414) and Day (1967, p. 212) and on finding specimens in the S. China Sea (Dales, 1960, p. 485), it is now evident that this species has been confused in the past with *Sagitella kowalevskii*. The two are very close and the nuchal lobes must be examined carefully to ascertain whether they are distally free (*Travisiopsis*) or not (*Sagitella*), as the caruncle is not present. Tebble (1962) notes that Støp-Bowitz has compared his specimens with the Type material and finds them identical. The Type is in the Bergen Museum, Norway.

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